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## What Does the Russian Army Think About its War in Ukraine? Criticisms, Recommendations, Adaptations

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# Executive Summary

The Russian army is very critical of its war in Ukraine. Not just of the first phase of the failed special military operation (SVO), which was inspired by the theorization of bypassing, but also of the strategic deterrence phase that preceded it. Russian military theorists have commented on the profound lack of preparation not just for the SVO, but also—in many areas—for the heterotelic war the SVO has become.

The Russian army's weaknesses vis-à-vis the Ukrainian army are generally, and sometimes quite directly, recognized. The Russian military elites have made numerous recommendations for improving Russia's military performance, primarily focusing on the ground and aerospace forces. Meanwhile, the Russian army has mostly adapted (more or less successfully) to the difficulties it has encountered in the last year and a half in Ukraine.

Although the Putin regime is authoritarian and intent on reducing freedom of expression in Russian society, the existence and tolerance of a certain amount of truth-telling at this level of the military apparatus indicate that the Russian army's and state's ability to adapt should not be underestimated.

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# Glossary of acronyms

BTG: battalion tactical group

CIVPZS: Center for Research on the Military Potential of Foreign Countries

CNII: Central Institute for Scientific Research

CVSI: Center for Strategic and Military Studies

GŠ: General Staff

MO: Ministry of Defense

MTO: logistical support

NCUO: National Defense Management Center

OVA: Combined Arms Academy

PLGSN: semi-active laser guidance system

RViA: Missile Troops and Artillery

SVO: "Special military operation"

ŮVO: Southern Military District

VAA: Artillery Academy

VAGŠ: General Staff Academy

VAVKO: Air and Space Defense Academy

VAVPVO: Military Academy of Field Anti-Aircraft Defense

VDV: Airborne Forces

VKS: Aerospace Forces

VM: Voennâ Mysl'

VPK: military-industrial complex

VVA: Air Academy

VVST: weapons and special military equipment

# Introduction

General Smolovyj, the head of the Center for Strategic and Military Studies (CVSI) at the General Staff Academy (VAGŠ), asserted prophetically at the end of 2021 that despite the “non-contact wars” (remote armed struggle) predicted by Russian military theorists in the early 2000s, the land army was now the “epicenter” of armed struggle, albeit in a different way.<sup>1</sup>

The “special military operation” (SVO) quickly became a long, high-intensity, and uncontrolled war: envisaged as similar to Operation Danube, when the Warsaw Pact forces invaded Czechoslovakia in 1968, the SVO actually bears more resemblance to the Red Army’s catastrophic invasion of Finland in 1939, and shows no sign of coming to an end.<sup>2</sup> Since February 24, 2022, Russian military theorists and officers have commented on and drawn lessons from the war in Ukraine, particularly in *Voennaâ Mysl’* (VM), the principal forum for discussing military theory and experience in the Russian Ministry of Defense and General Staff. VM is an open journal where senior and general officers—active, reserve, or retired—, professors, researchers, and directors and/or commanders (including those involved in the war in Ukraine) address their peers and the highest military and political leaders in the country.<sup>3</sup>

As seen in a previous study on the political and strategic lessons to be drawn from the experience (March 2022–January 2023), both the decision to launch the SVO and its implementation, which was inspired by the theorization of bypassing but poorly executed, have been severely criticized.<sup>4</sup> Vertical criticism (directed against the country’s top leaders) is not new in the Russian army, although it is expressed in different, often indirect ways. The field of Russian military theory is also an important arena for more horizontal debates and criticisms.<sup>5</sup> Although the SVO has

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Translated and edited from French by Cadenza Academic Translations. All Russian quotations have been translated into English via French. Unless otherwise stated, all translations of cited foreign language material in this article are our own.

1. A. V. Smolovyj, V. V. Lojko and K. A. Trocenko, “O naučnoj kritike v voennom dele”, *Voennaâ Mysl’*, No. 10, 2021, pp. 153–54.

2. D. Minic, *Pensée et culture stratégiques russes : du contournement de la lutte armée à la guerre en Ukraine*, Paris: Maison des sciences de l’homme, 2023.

3. We read every issue of this journal between March 2022 and June 2023: a total of sixteen issues and around one hundred articles on military science.

4. See D. Minic, “La guerre en Ukraine dans la pensée militaire russe: leçons politico-stratégiques”, *Politique étrangère*, No. 88, Vol. 1, 2023, pp. 161–73, and D. Minic, *Pensée et culture stratégiques russes*, *op. cit.*

5. At the end of 2022, for example, Colonel Orlânskij described the head of the CVSI’s thoughts on network structures (2021) as “insignificant”. See V. I. Orlânskij and D. Ū. Grečîn, “O povyšennii naučnogo urovnâ diskussij v interesah razvitiâ voennogo iskusstva”, *Voennaâ Mysl’*, No. 10, 2022,

been criticized, there is unanimous agreement about one point: the SVO itself was the direct consequence of the West's radical (ontological?) opposition to Russia. This is a central, centuries-old belief that is widespread among the Russian political and military elites.<sup>6</sup>

Russia's military theorists have drawn political and strategic lessons from the SVO, but what about military and operational ones? The preparatory and deterrent threat period that preceded the SVO has been analyzed, as briefly discussed in a previous work.<sup>7</sup> Two areas have been of particular interest to the military theorists: the ground forces and the aerospace forces (VKS), with a special focus on artillery and drones. Moreover, two crosscutting subjects stand out: the psychological and human dimension on one hand, and the military-industrial complex (VPK) and the production of weapons and special military equipment (VVST) on the other.

To what extent has this heterotelic war challenged the Russian army's ideas, theories, doctrines, and even reforms of the last thirty years? What strengths and weaknesses have been identified and what solutions have been proposed to improve Russian military performance? Have appropriate adaptations been made? Does this war confirm the tendencies already noted by military theory? How do Russian theorists see the future of the conflict?

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p. 155. Orlânskij and Grečîn are researchers at the OVA's Center for tactical-operational studies (ground forces).

6. See recently: M. A. Źdanov, M. P. Sidorov, and A. V. Lukašin, "Rol' nacional'nogo samosoznaniâ v dostiženii prevoshodstva nad Zapadom v usloviâh kognitivnoj vojny", *Voennaâ Mysl'*, No. 6, 2023, pp. 38-39; A. M. Il'nickij, "Strategiâ gegemona — strategiâ vojny", *Voennaâ Mysl'*, No. 6, 2023, p. 24. See D. Minic, *Pensée et culture stratégiques russes*, *op. cit.*

7. D. Minic, "La guerre en Ukraine dans la pensée militaire russe", *op. cit.*

# Threat period

## Incomplete deterrence, flawed forecasts

The strategic deterrence that preceded the start of the SVO could, and even should, have gone differently. Russia's military elites, unsatisfied by this deterrence, thus emphasize the fundamentals of bypassing. Non-military means are increasingly used to ensure military security and “in some cases are significantly more important than the power of weapons for achieving political and strategic goals”, emphasize some Russian theorists, who astutely refer to General Valeri Gerasimov, chief of the General Staff, to support their argument.<sup>8</sup> While it is acknowledged by the theorists that North Atlantic Treaty Organization (NATO)'s “hostile” policy “forced” Russia to respond “actively” to the “military threats that have arisen near its borders”, it is also noted that this response has not prevented further deterioration of Russia's position, with Finland and Sweden joining NATO. “Deploying and moving troops in threatening directions towards the borders of the Russian Federation” is not enough, it is also necessary to “apply effective non-military measures”, as stated in the 2014 Military Doctrine. Non-military measures are deemed to be a “high priority”.

This criticism has been voiced by senior military officials. Brigadier General Korževskij, head of the important Military Institute (national defense management) of the VAGŠ, which trains specialists for the equally important National Defense Management Center (NCUO), points out that in peacetime and during the threat period, the “measures taken to deter aggression by demonstrating the capacities of armed force should also be supported by coordinated actions and operations” in the cognitive and economic spheres, with “appropriate political and diplomatic coverage”.<sup>9</sup> In the same vein, Vice Admiral Kalganov, deputy head of the NCUO, stresses that “the key element of strategic deterrence” at the “early stage [. . .], before conflict”, is not “intimidation with threats of destruction”, but first and foremost a “global impact” on “cognitive domain”, on the “behavior of

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8. L. A. Prudnikov and A. V. Kuzmenko, “Primenenie nevoennyh mer v interesah obespečeniâ voennoj bezopasnosti Rossii”, *Voennaâ Mysl'*, No. 1, 2023, p. 7. For the following passages, see pp. 7-8 and 11. Colonel Prudnikov is a professor at the department for state control and national security at the VAGŠ. Major General Kuzmenko is the head of the department for military control at the VAGŠ and the future successor (April 2023) of General Muradov at the head of the “Vostok” group of forces in Ukraine.

9. A. S. Korževskij and I. V. Solov'ëv, “Mental'noe protivoborstvo i problemy formirovaniâ celostnoj sistemy nastupatel'nyh i oboronitel'nyh dejstvij v nem”, *Voennaâ Mysl'*, No. 11, 2022, p. 41.

the potential enemy's leaders by deliberately shaping their expectations as to what crossing any 'red lines' would entail".<sup>10</sup>

Alongside this emphasis on dual (military *and* non-military) strategic deterrence in line with the theorization of bypassing, the importance of producing reliable forecasts and intelligence for adequate deterrence and response to military threats is also highlighted.<sup>11</sup> A "systematic understanding of the correlation of military-political forces in the world" requires constant monitoring of crisis situations as well as an ability to "discover the causes" of situations escalating into military threats "as soon as possible" and to "identify the perpetrators of malicious activities" and their "military potential".<sup>12</sup> Almost a year after the launch of the costly SVO, Russian theorists warned that "any delay is unacceptable" in this area because it leads to a "waste of resources that should be deployed to neutralize emerging threats to military security".<sup>13</sup>

Ensuring Russia's military security requires, claims Colonel Gnilomëdov, Gerasimov's consultant, an "objective assessment of the evolution of the political-military situation" in order to "make timely and well-founded decisions".<sup>14</sup> "Intelligent" strategic forecasting makes it possible to assess situations "soberly" and to form an "accurate" picture of both the "power balance and the actual potential for deterrence" as well as any "hotbeds of tension in the world". The assessment of forecasting specialists, whose "subjective opinion" often prevails, leads to "miscalculations" and "errors of assessment of the situation", and "negatively affects the decisions taken". For that reason, the use of automation is recommended by the theorists when analyzing political and military situations. It should be remembered that the main forecasting (and command) body of the MO and the GŠ, the NCUO, had already been equipped in 2014 with a "supercomputer" that was supposed to forecast the evolution of military threats and conflicts.<sup>15</sup>

This type of recommendation (automation) is revealing, in more ways than one, of the beliefs and way of thought of the Russian political and military elites: first, it reveals the well-known "scientific" and

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10. V. A. Kalganov, G. B. Ryžov, and I. V. Solov'ëv, "Strategičeskoe sderživanie kak faktor obespečeniâ nacional'noj bezopasnosti Rossijskoj Federacii", *Voennaâ Mysl'*, No. 8, 2022, p. 9, 12. This critique is supported by the use of the concept of "red lines", which was introduced by Putin at the beginning of 2021 and reiterated multiple times before the invasion, including in Russian military theory. See V. Putin, "Poslanie Prezidenta Federal'nomu Sobraniû", Kremlin, April 21, 2021, available at: <http://kremlin.ru/>.

11. Besides the references mentioned in this study, see D. Minic, "La guerre en Ukraine dans la pensée militaire russe", *op. cit.*

12. Prudnikov and Kuzmenko, "Primenenie nevoennyh", p. 15 and 17.

13. Prudnikov and Kuzmenko, "Primenenie nevoennyh", p. 15.

14. O. K. Gnilomëdov, "Osobennosti monitoringa i ocenki voennopolitičeskoj obstanovki v ramkah funkcionirovaniâ sistem podderžki prinâtiâ rešenij", *Voennaâ Mysl'*, No. 4, 2023, p. 71. For the following passages, see p. 74-75, 77, and 79-82.

15. "Šojgu: superkomp'ûter centra upravleniâ oboronoj RF možet stat' mošnee", *Ria Novosti*, December 30, 2016, available at: <https://ria.ru/>.

“methodological” shortcomings of actors within the military apparatus (the NCUO is named but not directly accused); second, it reflects an unrealistic view of technology, which is thought to eliminate the chance, contingency, and unpredictability inherent in human interactions. The initial failure of the SVO has intensified this quest—long-standing among some of the elite—for laws, for an infallible explanatory and predictive system or framework. This tendency can also be seen in discussions regarding “troop preparation”.

In parallel with the importance of well-executed deterrence and adequate forecasting, Russian military theorists have also focused on the importance of optimal troop preparation that is consistent with assessments of the military situation, the power balance, and potential future combat actions.

## Inadequate troop preparation

The SVO plan was inspired by the theorization of the bypassing of armed struggle that has been underway in the Russian army for the last thirty years. As the theory went, in the SVO plan, the role of indirect actions was supposed to surpass that of the armed forces, which was to be final and limited; the essential had already been done and would continue to be done outside the armed struggle.<sup>16</sup> This theoretical-strategic paradigm, bolstered by flawed intelligence, played a deleterious role in preparing the troops for what really awaited them in Ukraine. Not just in terms of psychological preparation, as we will see later on, but also at the material and organizational level: when they received the order to penetrate into Ukrainian territory, with twenty-four hours’ notice, Russia’s troops were short of just about everything, including coherence and a clear vision of what they were supposed to do other than avoid Ukrainian army units.<sup>17</sup> The Russian military elites have fully taken this on board.

To achieve “superiority over the enemy” when preparing for and during military actions, it is vital to “provide troops with reliable, real-time intelligence”, claims General Smolovyj, head of the CVSI, who stresses the importance of having a methodology for assessing combat capacities.<sup>18</sup> Smolovyj laments that Russia does not currently have a method or model for “evaluating the combat capacities of troops [. . .] involved in operational tasks”, which he describes as a “serious problem”. This kind of assessment would reveal the “actual capacities of [Russian] and enemy troops” and so

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16. See D. Minic, *Pensée et culture stratégiques russes*.

17. See M. Zabrodskiy, J. Watling, O. Danylyuk, and N. Reynolds, “Preliminary Lessons in Conventional Warfighting from Russia’s Invasion of Ukraine: February-July 2022”, *RUSI*, November 2022, pp. 26-27 and 30-31.

18. A. V. Smolovyj and A. V. Pavlovskij, “Metodika ocenki boevyh vozmožnostej gruppirovok vojsk (sil) na strategičeskikh napravleniâh”, *Voennaâ Mysl’*, No. 12, 2022, p. 31. For the following passages, see pp. 36-38.

enable command units to “determine their ability to carry out operational tasks” and choose the “best way to employ troops” thanks to simulations.

Several tasks are mentioned that should be carried out prior to the deployment of tactical combined arms units so that the commander can “rapidly select the most appropriate method of combat action”:

- conducting an “in-depth study of the composition, condition, and capacities of the potential enemy and the physical and geographic features of specific strategic areas”;
- ensuring the “consistent composition of tactical groups”;
- and finally, “improving unit cohesion in advance”.<sup>19</sup>

To ensure the optimal preparation and use of “tactical combined arms units”, theorists recommend more broadly equipping the Russian army with calculation and simulation systems that can “determine, in a relatively reliable way, the success or futility of upcoming tasks in relation to the ultimate objective”.<sup>20</sup> Studying recent military conflicts is not enough to “predict” the combat actions of “tactical combined arms units”; it is also thought necessary to invest in models.<sup>21</sup> To that end, the 3<sup>rd</sup> Central Scientific Research Institute (CNII) of the Ministry of Defense has reportedly developed a “calculation and modeling system” for the ground forces and the VDV.<sup>22</sup>

If the different elements of the threat period have been the subject of numerous discussions emphasizing the importance of adequate deterrence, forecasting, and preparation, the active combat phase has also been extensively scrutinized and criticized. Two main areas stand out here: the ground forces and the aerospace forces.

19. R. R. Nasybulin, “Izyskanie I osvoenie novyh (nestandartnyh) sposobov boevykh dejstvij v hode podgotovki vojsk”, *Voennaâ Mysl'* No. 5, 2022, pp. 70-71.

20. A. A. Plužnikov and O. B. Usačëv, “Sovremennye trebovaniâ k obševojskovym formirovaniâm taktičeskogo zvena”, *Voennaâ Mysl'*, No. 5, 2022, p. 84. Colonels Plužnikov and Usačëv are respectively department director and researcher at the OVA’s Center for tactical-operational studies (ground forces).

21. P. A. Dul’nev, A. V. Kotov, and N. P. Pedenko, “Prognozirovanie hoda i ishoda obševojskovogo boâ kak metod teorii obšej taktiki”, *Voennaâ Mysl'*, No. 2, 2023, pp. 30-31. The authors are a research team at the OVA’s Center for tactical-operational studies (ground forces).

22. Dul’nev, Kotov, and Pedenko, “Sovremennye trebovaniâ”, p. 31.

# Ground forces and artillery

Russian combat actions in Ukraine have been the subject of much analysis in Russian military theory, which generally focuses on “examining the mistakes made” in order to “mitigate the consequences”.<sup>23</sup>

## The initial phase: Planning, troop movements, and VDV

As often happens, studying Russia’s historical military experiences helps Russian military theorists produce a critical assessment of the current situation. The Winter War between the Soviet Union and Finland is presented as a conflict characterized by scattered battles fought in winter along a discontinuous front that stretched for more than 1,500 km, with the Russian commanders adopting a “nonchalant and disdainful” attitude toward Finnish military capacity.<sup>24</sup> The plan foresaw a “simultaneous invasion of Finnish territory in every direction”, but “reconnaissance of [Finnish] defenses” was “hasty” and “superficial” and the Soviet troops got bogged down. “The planning and execution of a larger-scale operation was necessary”, the theorists add, before concluding that the experience of previous wars “must not be neglected”.

While the Winter War serves as an ill-fated example not to be repeated, Operation Danube against Czechoslovakia in 1968 is held up as a blueprint for military success: units moved quickly (220-270 km per day) in a limited period from the north, south, and east; the first units arrived in the capital six to seven hours after receiving combat orders, while the airborne units succeeded in seizing two airfields near Prague, enabling the delivery of additional forces and equipment. After twenty days, a total of 500,000 soldiers and 6,000 armored vehicles had been transferred to Czechoslovakia.<sup>25</sup>

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23. V. P. Andriječuk and V. A. Popov, “Optimizaciâ processa perepodgotovki voennyh specialistov raketnyh vojsk i artillerii na novye obrazcy vvooruzeniâ s učetom provedeniâ special'noj voennoj operacii”, *Voennaâ Mysl'*, No. 1, 2023, p. 87. Andriječuk is a professor at the Artillery Academy (VAA) and Popov is a lieutenant colonel.

24. V. I. Tolšmâkov and V. V. Zolotarôv, “Vliânie sovetkofinlândskoj vojny (1939—1940 gg.) na razvitie voennogo iskusstva”, *Voennaâ Mysl'*, No. 3, 2023. For the following passages, see p. 136, 137, and pp. 147-48. Tolšmâkov is a brigadier general at the VAGŠ Institute of scientific research (military history). Zolotarôv is a colonel.

25. A. V. Nazarenko, A. U. Čogovadze, and A. V. Šapovalenko, “Razvitie praktiki peredvizeniâ vojsk po opytu vojn i voennyh konfliktov Rossii v XX—XXI vekah”, *Voennaâ Mysl'*, No. 11, 2022, p. 51. For the following passages, see p. 54 and pp. 56-60. Nazarenko and Šapovalenko are colonels. Čogovadze is a lieutenant colonel.

Russian military theorists meticulously pore over Russia's (and the Soviet Union's) track record in performing “highly maneuverable actions” and organizing fast, reliable troop “movements”, not just in the initial phase but throughout an entire strategic operation. Besides the failure of the initial phase of the SVO, the Russian army has demonstrated clear shortcomings when it comes to troop “movement” at small scales, for example on the Irpin River near Kyiv, where dozens of Russian troop transport vehicles were destroyed by the Ukrainians during the crossing (which was eventually abandoned after seven attempts).<sup>26</sup> The same error was repeated two months later in the Donbas region on the Donets River.<sup>27</sup>

To improve “troop movements”, theorists recommend dividing units into smaller columns while marching, bringing to mind the failure of the long Russian reinforcement column heading to Kyiv at the beginning of March; not massing moving troops in low-capacity tactical areas; carrying out extensive, continuous reconnaissance and using drones for reconnaissance when encountering obstacles (natural hills, bridges, difficult stretches or terrains); organizing defenses against tactical reconnaissance or attack drones (air defense and radioelectronic struggle) and adding extra protection to the upper half of armored vehicles.<sup>28</sup> The need to “modernize multipurpose engineering vehicles” is also highlighted,<sup>29</sup> as is the importance of having up-to-date and “reliable cartographic information”, the lack of which was keenly felt by the Russian army at the beginning of the SVO (the experience in Chechnya in 1994 is mentioned).<sup>30</sup>

After suffering numerous losses, the Russian army has gradually adapted (albeit imperfectly) to these challenges, with for example:

- the use of smaller columns from March 2022 (although they were still slowed down by Ukrainian drones);<sup>31</sup>
- the more successful retreat from Kherson;<sup>32</sup>
- and the protection—albeit often rudimentary (and restrictive in terms of visibility and attack angles when welded to the chassis, as has been

26. A. E. Kramer, “Russian forces are attempting another crossing of a river where they suffered a major blow, Ukraine’s military says”, *The New York Times*, May 21, 2022, available at: <https://www.nytimes.com/>.

27. M. Santora, “Ukraine decimated Russian forces trying to cross a river in the east, Britain’s defense ministry says”, *The New York Times*, May 13, 2022, available at: <https://www.nytimes.com/>.

28. Nazarenko, Čogovadze, and Šapovalenko, “Razvitie praktiki”, 60-61.

29. Plužnikov and Usačëv, “Sovremennye trebovaniâ”, 86.

30. A. N. Zaliznûk, A. V. Flegontov, and A. A. Volkov, “Perspektivy razvitiâ nazemnoj navigacii v Vooružennyh Silah Rossijskoj Federacii”, *Voennaâ Mysl'*, No. 9, 2022, p. 66; Nazarenko, Čogovadze, and Šapovalenko, “Razvitie praktiki”, p. 59; B. A. Božedomov and T. G. Levčenko, “Oboronitel'nye boi v gorode : factory uspeha po opytu voooruženogo konflikta na Severnom Kavkaze”, *Voennaâ Mysl'*, No. 7, 2022, p. 59. See also Zabrodskiy, Watling, Danylyuk, and Reynolds, “Preliminary Lessons”, p. 27.

31. J. Borger, “The drone operators who halted Russian convoy headed for Kyiv”, *The Guardian*, March 28, 2022, available at: <https://www.theguardian.com/>.

32. Available at: <https://twitter.com/Mick Ryan>.

observed in some cases) but which was already beginning to be fitted prior to the invasion—of the upper section of armored vehicles (with metallic cages and screens designed to protect the turret from drones, loitering munitions, or Javelin missiles).<sup>33</sup>

The importance of VDV (airborne forces) for conducting operations behind enemy lines and so facilitating the advance of the main forces is another line of reflection: “serious problems” became evident when they were used, “including during the special military operation in Ukraine”.<sup>34</sup> The principles underlying the successful deployment of VDV are reiterated, with reference to the first Russian operations around Kyiv (particularly in Hostomel). First, the use of VDV must be large-scale and sudden, which means keeping their preparation and landing secret (meticulous planning, camouflage, and deception) and ensuring the element of surprise and so success with minimal losses. Second, enemy systems (air defense, radioelectronic struggle, radar reconnaissance) and troops must be destroyed and neutralized in an ordered, reliable way before the VDV land, that is, during the flight phase and just before landing. Once on the ground, the VDV must be supported by missile troops, aircraft, and artillery.

The SVO showed, according to Russian theorists, that VDV are extremely “vulnerable” when facing an enemy with effective reconnaissance resources (combined with strikes), which “can cause significant losses”. This “battlefield transparency” (a recurring phrase in Russian military theory) explains the “particular” importance of deception and operational and tactical camouflage when deploying VDV. In this respect, it is interesting that the deception used by the VDV during Operation Danube, which enabled them to seize Ruzyně airport near Prague and then transport troops there, has been mentioned.<sup>35</sup> Although it is difficult at this stage to confirm that the Russian army employed true *maskirovka* measures at the strategic and operational level before the invasion of Ukraine, and so to discuss their efficacy, it is worth noting that the military command seems to have conducted a relatively effective operational *maskirovka* during the Russian offensive in winter 2023, successfully convincing Kyiv that the Russian army was in a position to invade Ukraine again from Belarus.<sup>36</sup>

To “reduce VDV travel time to the rear of enemy lines” and select the “optimal routes”, theorists also suggest that commanders should “carefully

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33. G. Powis, “Les Russes ajoutent une cage anti-drone sur un char : la tourelle ne peut plus tourner”, *Air et cosmos*, July 3, 2023, available at: <https://air-cosmos.com/>; T. Newdick, “Russian T-80 Tank with Improvised Anti-Drone Armor Reportedly Appears in Crimea”, *The Drive*, November 25, 2021, available at: <https://www.thedrive.com/>.

34. I. A. Adiānov and O. S. Tanenā, “O rešenii problem primeneniā vozdušnyh desantov v sovremennyh operaciāh”, *Voennā Mysl'*, No. 6, 2023, pp. 61-64. For the following passages, see pp. 62-65. Adiānov and Tanenā are colonels.

35. Nazarenko, Čogovadze, and Šapovalenko, “Razvitie praktiki”, pp. 56-57.

36. M. Krutov, “Sluhi o novom nastuplenii na Kiev byli dezinformaciej Genštaba VS RF”, *Radio Svoboda*, April 26, 2023, available at: <https://www.svoboda.org/>.

assess the enemy's capacities, particularly its air-defense and radioelectronic struggle systems".<sup>37</sup> Failure to do so led to heavy losses among the helicopters (Ka-52, Mi-8) leading the VDV assault on Hostomel on February 24: Ukraine's numerous air-defense systems included many infrared homing missiles (like Stinger man-portable air-defense system [MANPADS] missiles), not necessarily radar-guided missiles, making prior Russian strikes on Ukrainian radars irrelevant.<sup>38</sup> "Calculations and exercise experience" show that it is only advisable to land VDV if the abovementioned systems have been at least "90-93 percent neutralized", and that "sufficient resources" must therefore be devoted to achieving this target—the use of the "Vitebsk" radioelectronic struggle system on board helicopters transporting VDV in order to deflect MANPADS missiles and other air-defense systems, is recommended.<sup>39</sup> Other than MANPADS, although the VKS (aerospace forces) managed to neutralize a considerable number of Ukraine's air-defense systems (around 75 percent of sites struck), this success was short-lived because so many of the systems had been moved just before the invasion, and so were not destroyed. They were also less vulnerable to electronic attacks than the Russian army had expected.<sup>40</sup>

More broadly, the experience of the SVO has convinced military theorists, continuing debates begun in 2021, to look beyond "traditional" approaches and create a "new type" of VDV more suited to the urban nature of contemporary military conflicts, in which the enemy's tactical defense zone is saturated with ISR (intelligence, surveillance, reconnaissance) and destruction resources—the need to achieve goals with "minimal losses" is again emphasized.<sup>41</sup>

The failed first phase of the SVO also seems to have reminded Russian military theorists of the poorly prepared invasion of Chechnya by Russian forces in 1994: the Russian army was prepared to fight in a "world war" and its "officers" had learned about fighting in urban areas "principally using maps".<sup>42</sup> This lack of preparation had a "negative" impact during the "initial period of the special operation in the North Caucasus", where the Russian

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37. Adiánov and Tanenâ, "O rešenii problem", p. 67.

38. S. Robin, "Pictures: In Battle For Hostomel, Ukraine Drove Back Russia's Attack Helicopters And Elite Paratroopers", *19FortyFive*, February 25, 2022, available at: <https://www.19fortyfive.com/>.

39. Adiánov and Tanenâ, "O rešenii problem", pp. 67-69.

40. See J. Bronk, "Russian Combat Air Strengths and Limitations: Lessons from Ukraine", *Occasional Paper*, IA, April 2023, pp. 4-5.

41. A. V. Dynnik and A. V. Vdovin, "Primenenie taktičeskikh vozdušnyh desantov v sovremennyh voennyh konflikta15roblemImy i puti ih rešeniâ", *Voennaâ Mysl'*, No. 5, 2023, pp. 75-84.

42. Božedomov and Levčenko, "Oboronitel'nye boi", p. 59. Božedomov is a colonel and researcher at the VAGŠ Institute of scientific research (military history), as well as a veteran of the First Chechen War.

army met “fierce resistance” and was forced to “go on the defensive” despite having been ordered to “capture the capital of the Chechen Republic”.<sup>43</sup>

Following the failure of this first phase, which has been acknowledged and discussed in Russian military theory, the second phase of the war has begun for the Russian army, with the quest for destructive power superseding the (illusory) quest for mobility.

## From mobility to destructive power: The artillery

Moscow’s strategic shift following the failure of the “initial phase” of the SVO and the expansion of its conventional efforts have been fairly well described: “instead of deep raids and large maneuvers of the armed forces [...], the emphasis is now on the use of firepower”.<sup>44</sup> The idea that this “tactic” does not “enable swift victories on the battlefield” but “minimizes the losses of military personnel and civilians” is both an admission of the catastrophic execution of the initial plan and a reversal of reality. The need to “increase the efficacy of target destruction” by “accelerating” the “replacement of obsolete artillery systems” is highlighted, while the “delay” in the “mass distribution of Koalitsiya-SV guns to troops” is regretted. Nevertheless, relying on cutting-edge equipment has turned out to be complicated, as shown by the failed attempt to mass produce T-14 Armata battle tanks (design flaws, corruption, lack of assembly lines), which were also intended as a platform for other devices. This situation has been exacerbated by the sanctions on Russia, which have reduced its capacity to procure the high-performance microelectronic components on which much cutting-edge equipment depends.<sup>45</sup> The—unrealistic—desire to mitigate the Russian army’s shortcomings with high-tech equipment has been ever-present since February 24, 2022.

To make the artillery more efficient, theorists argue that the most important thing is “accuracy” combined with “surprise” and a “sustained willingness to fire on detected targets”, which requires the use of high-precision munitions (VTB).<sup>46</sup> Russia’s vast stores of conventional munitions

43. The glowing praise of Lev Rohlin, who led the defense of the hospital in Grozny at the time, is also ambiguous because he later opposed the political authorities. See Božedomov and Levčenko, “Oboronitel’nye boi”, pp. 58-59 and 66. Rohlin also receives a favorable mention in Nazarenko, Čogovadze, and Šapovalenko, “Razvitie praktiki”, pp. 57-59.

44. V. V. Selivanov and Ū. D. Il’in, “Tendencii razvitiâ sredstv vooružennoj bor’by v sovremennyh voennyh konfliktah, ih vliânie na razvitiâ i smenu pokolenij vooruženia, voInnoj i special’noj tehniki”, *Voennaâ Mysl’*, No. 9, 2022, pp. 35-36. Viktor Selivanov and Colonel Il’in are researchers and professors at Bauman Moscow State Technical University.

45. R. Skomorohov, “‘Armaty’ ne budet. Možno rashodit’sâ”, *Voennoe obozrenie*, December 30, 2022, available at: <https://topwar.ru/>; S. Miller, “Armata – the story is over”, *Wavell Room*, February 10, 2023, available at: <https://wavellroom.com/>.

46. A. Ū. Bežencev, A. E. Polâkov, and V. M. Tumakov, “Vysokotočnye boepripasy stvol’noj artillerii, rezul’taty poligonnyh ispytanij, napravleniâ razvitiâ”, *Voennaâ Mysl’*, Vol. 8, 2022, p. 106. Bežencev, Polâkov, and Tumakov are respectively a colonel, major, and lieutenant colonel.

have slowed down the introduction of VTBs (principally the Krasnopol) into the Russian army: they were reportedly tested in combat situations for the first time in Syria. The shift in Russia's strategy in Ukraine toward the mass use of artillery, which is expensive, less effective, and entails considerable unnecessary damage given Russia's probably quite limited stock of VTBs, seems to have given Russian military theorists pause for thought. The shortage of drones and other ISR resources from the beginning of the SVO made it impossible to improve the artillery's precision and efficacy, with rudimentary methods used instead (human reconnaissance).<sup>47</sup> Although Russia's artillery (mostly guns but also Russian multiple-launch rocket systems [MLRSs]) remains capable of destroying "fixed" targets, it struggles to find and follow mobile targets and transmit targeting information in real time.<sup>48</sup> This problem has been exacerbated by Ukraine's acquisition of high-mobility artillery rocket system (HIMARS) launchers, which have a range of 70 km (before acquiring other types of shell, and perhaps ultimately army tactical missile systems [ATACMSs], which have a 300 km range): although they can theoretically be targeted by Russian MLRSs (Uragan, Smertch, Tornado), the latter are ineffective without adequate ISR resources. The best solution, albeit rudimentary, has been to reposition logistics hubs, reinforce command centers, and use decoys, which measures have managed to make Ukraine's HIMARS less effective.<sup>49</sup>

Russian military theorists recognize that the "main disadvantage" of Russian VTBs for guns (like the 152 mm Krasnopol) is their "semi-active laser guidance system (PLGSN)", which not only requires an unobstructed laser beam trajectory, but also carries a high risk of detection by the enemy because of the prolonged period during which the laser designator is active (fifteen seconds for the Krasnopol).<sup>50</sup> Nevertheless, theorists advise continuing to acquire VTBs with PLGSN, while improving their capabilities, because they offer one "undeniable advantage" over satellite-guided munitions: they are effective with a large margin of error in determining coordinates. To continue to develop and improve VTBs with PLGSN, the theorists suggest:

- synchronizing the start of the laser designator's activity with the moment of launch because of possible interference with radio communications, as indicated by tests;
- designing small-scale laser designators for tactical units in direct contact with the enemy;
- and using drones to illuminate targets as standard.

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47. See D. Axe, "Russia's High-Tech Artillery System Was Supposed To Win The War In Ukraine. But Troops Didn't Know How To Use It", *Forbes*, November 25, 2022, available at: <https://www.forbes.com/>.

48. M. Douro, "MLRS and the Totality of the Battlefield", *RUSI*, February 21, 2023, available at: <https://rusi.org/>.

49. F. S. Gady and M. Kofman, "Ukraine's Strategy of Attrition", *Survival*, Vol. 65, No. 2, p. 15.

50. Bežencev, Polákov, and Tumakov, "Vysokotočnye boepripasy", pp. 109-110. For the following passages, see pp. 108-110.

Tests carried out in 2016 confirmed the effectiveness—including in difficult weather conditions, which normally affect VTBs with PLGSN—of using drones for this purpose, giving the Krasnopol a “new lease on life” (in Shoigu’s words). New models have also been seen as very promising, such as the Krasnopol-M2 (155 mm), which has been used in Syria and Ukraine. Nevertheless, the self-propelled guns (Akatsiya, Msta) that the theorists want to see replaced can only fire the Krasnopol-M2 VTB with a range of 26 km, and the Krasnopol-M2’s lack of global navigation satellite system (GLONASS) trajectory correction module means it cannot go beyond 35 km.<sup>51</sup> These factors led to the design of the Krasnopol-D, which with the Msta-S can reach around 43 km. The widespread adoption of the new Koalitsiya-SV gun would give a range of up to 60 km when used with the Krasnopol-D. Nevertheless, not only is there no guarantee that Western-made and Western-supplied guns (like the CAESAR self-propelled howitzer) would not outclass these systems in terms of the range/accuracy ratio, but production of the Koalitsiya-SV, like that of the T-14 Armata, is mostly on hold at any rate.

The political and military leadership seems to have reached the same conclusion as the military theorists regarding VTBs: it announced that production of the Krasnopol VTB had been significantly increased, partly in expectation of the delivery of modern Western tanks to Ukraine (Leopard, Abrams, etc.).<sup>52</sup> Nevertheless, the proliferation of these sophisticated munitions requires expertise and skill in the soldiers who use them on the battlefield and who are increasingly scarce in the Russian army, which has suffered high attrition.<sup>53</sup> Moreover, there have been reports of problems with the quality of VTB testing (insufficient volumes, lack of experienced personnel).<sup>54</sup>

The question of artillery and its accuracy, which is vital for optimal efficacy, has thus become a crucial one, including in counterbattery “battles”, during which the Russian artillery has been seen as slow and faulty.<sup>55</sup> Theorists emphasize the need to engage the enemy “almost immediately after adopting battle formation” (two to three minutes maximum according to the manuals) and finding a “method for identifying” enemy units in order to fire as quickly and accurately as possible. The Russian artillery reconnaissance system Zoopark (counterbattery radar),

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51. E. Damancev, “Dal’nobojnyj ‘Krasnopol’-D” v artillerijskikh duèláh s zapadnymi SAU. Stoit li ožidat’ triumfa”, *Voennoe obozrenie*, February 4, 2020, available at: <https://topwar.ru/>.

52. “Istočnik zašvil o roste vypuska snarâdov ‘Krasnopol’ protiv tankov NATO”, *RIA Novosti*, February 7, 2023, available at: <https://ria.ru/>.

53. Axe, “Russia’s High-Tech Artillery System”.

54. Bežencev, Polâkov, and Tumakov, “Vysokotočnye boepripasy”, p. 112.

55. V. V. Kozlov and M. Ū. Muhin, “Povyšenie èffektivnosti ognâ artillerii primeneniem metoda passivnoj pelengacii snarâda v hode pristrelki celi”, *Voennaâ Mysl’*, No. 7, 2022, p. 95. For the following passages, see pp. 96-99. Kozlov and Muhin work at the Black Sea Higher Naval School. See also: <https://www.oryxspioenkop.com/>.

some fifteen of which the Russian army has lost in Ukraine, has been judged ineffective (vulnerability, problems with interaction, very expensive). The creation of a “targeted firing system (POK)” has consequently been suggested. This consists of a radio-transmitter target module installed on a projectile (in place of the rocket), as well as a reception antenna and a data-processing and correction-calculation unit. The antenna and the unit detect the module on the projectile’s trajectory, determine the coordinates of its strike point, and calculate the necessary corrections to switch to a kill shot. This method would reduce the time between the test shot and the kill shot to a maximum of 1 min. 50 sec., thus “increasing” the survival rate of artillery units and making targeted firing “effective and fast”.

The use of artillery in urban areas, which seems to be poorly defined in the manuals, has also been the subject of reflection and recommendations.<sup>56</sup> The failure to selectively utilize artillery, along with criticisms linked to the need for precision, is a problem noticed in urban combats, with the experience gained in the Chechnya conflict mentioned<sup>57</sup>: in Grozny, notes the veteran Božedomov at a time when the Russian army is in the process of methodically destroying Ukrainian cities, “the use of indirect artillery fire resulted only in the widespread destruction of the city and the death of civilians, and did little to achieve objectives”.<sup>58</sup> This is also wider criticism of the Russian army’s capacity to engage in urban combats in Chechnya, the lessons of which must, according to the theorists, be taken on board in order to avoid “significant losses”: inadequate psychological and moral preparation; inadequate training and combat preparation; lack of comprehensive, proactive information about the enemy; insufficient consideration of the specifics of the enemy’s situation and tactics; sometimes complete lack of interaction between units from different branches of the armed forces; obsolete topographical maps and means of communication; and the inability of some officers to act independently.

Battles in urban areas in Ukraine have also raised the problem of navigation. Referring to the SVO, Brigadier General Zaliznûk, head of the Military Topographic Department at the GŠ, says that the urban environment is a “space fragmented into small ‘fields’ with numerous structures that reduce visibility by making signals weaker and less

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56. V. Zorin, R. F. Zinatullin, and M. P. Berendejev, “Boakye dejstviâ artillerii obševojkovogo formirovaniâ v urbanizirovannom rajone”, *Voennaâ Mysl’*, No. 6, 2022, pp. 35-36. Zorin is a colonel and professor at the VAA. Zinatullin is a lieutenant colonel and teaches at the same academy. Berendejev is a lieutenant colonel at the Ryazan Guards Higher Airborne Command School.

57. See also S. V. Bug, K. V. Homâkov, and S. E. Zverev, “Suvorovskij kodeks”, *Voennaâ Mysl’*, No. 4, 2023, p. 107.

58. Božedomov and Levčenko, “Oboronitel’nye boi”, p. 65. For the following passages, see pp. 68-70.

precise”.<sup>59</sup> Conscious of the “sanction policy of foreign partners” and the dependence of the Russian state and military on navigation technologies, Zaliznûk suggests creating “alternative (emergency) navigation systems, including autonomous systems, that are more immune to noise”. Long-range radio navigation systems (RSDN), used in the aerospace force (VKS) and the navy (VMF), could be used alongside satellite navigation systems. “According to initial estimates”, these systems could increase the stability of the navigation system used by troops by 10 percent.

Finally, the SVO has made it clear that the “training level” of specialists in the missile troops and artillery (RViA) in the use of new weapons and equipment (Iskander, Tornado-G, Tornado-S, Koalitsiya-SV, MSTA-S) falls below the “standard required for the rapid introduction of equipment in combat, effective interaction with the unmanned aerial component, or the use of GLONASS”.<sup>60</sup> To improve the training received by artillery gunners in the ground forces, and particularly their ability to use new weapons (relearning), the theorists suggest (again) using simulators and modern information and communication technologies, which have the advantage of being more efficient—taking into account the “tight deadlines” for relearning—and “more economical” than training using real equipment.

## **Battle formations: Reduction, mobility, and autonomy**

The deadly, high-intensity war started by Moscow in Ukraine seems to have called into question the organization of the Russian army following its reform and the creation of battalion tactical groups (BTG), although criticism in this area sometimes takes an unexpected angle. Far from reverting to a Soviet system (in other words an army designed around mobilization) when faced with the failure of this rapidly deployable, combined arms force, which is supposedly more professional and better prepared and trained, critics have focused on a central idea: the need to go even further in reducing the size of tactical units and making them more agile. If this idea is based explicitly on observations of tendencies in armed struggle, Russia’s recent military experience, and examination of how Russia’s adversaries fight (irregular groups in Syria, Ukrainian army, etc.), it also implicitly derives from the limits imposed by reality, in this case the

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59. Zaliznûk, Flegontov, and Volkov, “Perspektivy razvitiâ”, p. 66. For the following passages, see pp. 66-68. See also G. Lindström and G. Gasparini, “The Galileo satellite system and its security implications”, *EU ISS*, p. 6, available at: <https://www.iss.europa.eu/>.

60. Andriječuk and Popov, “Optimizaciâ processa”, pp. 87-88. For the following passages, see pp. 88-89 and 95. Moreover, other sources claim that the Koalitsiya has not been used in Ukraine: “Gosispytanâ SAU “Koal”ciâ-SV” zaveršatsâ do konca 2023 goda”, *Tass*, April 25, 2023, available at: <https://tass.ru/>.

shortage of contract soldiers (*kontraktniki*), dating back before the invasion, that came to light after February 24, 2022.<sup>61</sup>

One of the first problems raised is the lack of training and preparation in the BTG, which has been “known for a long time”.<sup>62</sup> Current tactical exercises are still conventional and do not include “real enemy opposition”, as well as involving “significant material and financial costs”. As a result, in March 2022 discussions were reportedly resumed with the Russian technical and military equipment manufacturer Tulatochmash regarding the creation of integrated tactical simulators (KTT) that would enable commanders “to anticipate the development and outcome of a combined arms battle”.

Attempts have been made to improve the concept of the BTG, including before the special military operation. Colonel Nasybulin, chief of the Combat Training Directorate of the Southern Military District (ÛVO)—whose forces are probably the most battle-hardened in Ukraine—thus refers to the creation of “breakthrough BTGs” (within the ÛVO) to better adapt to the “features” of modern combined arms combat: the abandonment of “continuous front lines”, the widespread adoption of “highly mobile actions” based on surprise, and high mobility and maneuverability, and on the skilled use of tactical airborne troops (TakVD) and raid and avoidance units, partly made possible by the “low density” of air defenses.<sup>63</sup> Breakthrough BTGs are “specially trained”, “autonomous” (compared to the main forces), and “highly agile” tactical groups designed to attack “individual strongholds” on the front line (superficial defenses, like those of irregular armed formations) and speed up the advance of the main forces in order to support the “active” use of TakVD. During training, the ÛVO appears to have placed special emphasis on maintaining a high attack rate in motorized and armored rifle units (the main forces), which are supposed to move as quickly as possible toward the TakVD. Each motorized rifle regiment and brigade in the ÛVO would thus have created a “breakthrough BTG” and a “success exploitation BTG” to enable the “successful accomplishment, with minimal losses, of their objectives in modern and future military conflicts”. Was this ÛVO concept implemented (badly) from the beginning of the invasion of Ukraine? Grau and Bartles suggest that, if so, this might explain the failure of the VDV action at Hostomel airport, in

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61. On the lack of recruitment, the “under-staffing” of the BTG, and the evolution of tactical formations in the Russian army since the Soviet era, see M. Kofman and R. Lee, “Not Built For Purpose: The Russian Military’s Ill-Fated Force Design”, *War On The Rocks*, June 2, 2022, available at: <https://warontherocks.com/>; L. W. Grau and C. K. Bartles, “Getting to Know the Russian Battalion Tactical Group”, *RUSI*, April 14, 2022, available at: <https://rusi.org/>.

62. N. N. Leventov, N. D. Alěšečkin, and A. V. Anastasin, “Organizaciâ podgotovki podrazdelenij i organov upravleniâ s ispol'zovaniem kompleksnyh taktičeskikh trenažerov”, *Voennaâ Mysl'*, No. 8, 2022, p. 122. For the following passages see pp. 122-23. The authors are a team at the OVA’s Center for tactical-operational studies (ground forces).

63. Nasybulin, “Izyskanie i osvoenie”, p. 71. For the following passages, see pp. 71-72 and 74-75.

part due to the delayed arrival of the main forces and the total inapplicability of the tactical concept to the Ukrainian context (Ukraine's defenses were far from superficial).<sup>64</sup>

This tendency to improve or even supersede the concept of the BTG has been a constant feature of Russian military theory since February 24, 2022. Although the creation of the BTG in the Russian army was “a step in the right direction”, it required a “radical revision” in diverse areas (management, training and education of military personnel, coordination between units during combat) that was “unfortunately never implemented”.<sup>65</sup> The war in Ukraine has made the BTG look like a “fat cow” facing a pack of wolves (the Ukrainian army), a network of “small, autonomous tactical groups” that were “poorly identified by the intelligence services and poorly evaluated by the General Staffs” and that successfully managed to infiltrate the itineraries of columns and main forces and engage fire before withdrawing “without even giving the BTG commanders time to assess the situation”. The Ukrainian armed forces are thus compared to “irregular armed formations”,<sup>66</sup> whose superiority is explained by their adoption of a network structure (a large number of autonomous, mobile, and light units).<sup>67</sup>

Faced with such a structure, the offensive operation based on “shock” loses its “rhythm” and its forces prove “vulnerable”, resulting in an “unacceptable” consumption of resources.<sup>68</sup> This force model, based on centralized<sup>69</sup> and “monorational (with a single decision center)” management, is no longer considered relevant: these troops are expensive and disinclined to sacrifice; there is a shortage of reserves to mobilize as well as “internal political intolerance of massive losses”; the enemy's small groups are equipped with “effective” and “highly mobile” anti-tank weapons, anti-aircraft defenses, and high-precision munitions; the “capture and retention of geographic zones became of secondary importance”; and finally, the current efficacy of high-precision weapons makes any concentration of forces and resources “impractical” and “extremely dangerous”.

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64. L. W. Grau and C. K. Bartles, “The Russian Breakthrough Tactical Group”, available at: <https://www.benning.army.mil/>.

65. I. L. Makarčuk and K. A. Trocenko, “Harakter operacij sovremennyh armij. Mul'tirazumnye setevye voennye sistemy i taktika ih dejstvij”, *Voennaâ Mysl'*, No. 11, 2022, p. 23. For the following passages, see also p. 24. Makarčuk is a colonel and professor at the VAGŠ. Trocenko is a colonel in the logistical support department (MTO) in the Southern Military District.

66. I. L. Makarčuk and K. A. Trocenko, “Harakter operacij sovremennyh armij. Uroki i vyvody po itogam vojny v Afganistane (2001—2021 gg.)”, *Voennaâ Mysl'*, No. 10, 2022, p. 26.

67. Makarčuk and Trocenko, “Harakter operacij sovremennyh armij. Mul'tirazumnye setevye”, p. 26.

68. I. L. Makarčuk and K. A. Trocenko, “Harakter operacij sovremennyh armij – nazrevšie izmeneniâ”, *Voennaâ Mysl'*, No. 12, 2022, p. 13, 14, 22-23. For the following passages, see pp. 13-16 and 22.

69. On this point see J. Watling and N. Reynolds, “Meatgrinder: Russian Tactics in the Second Year of Its Invasion of Ukraine”, Special Report, *RUSI*, May 19, 2023, p. 24. According to Watling and Reynolds, “[n]or is there much evidence that units have the means to communicate laterally.”

To counter a network structure, theorists advise adopting the same organization and encouraging decentralization and the “effective use of horizontal communication”, principles that will form “the basis of a new generation of combat manuals for the ground forces”.<sup>70</sup> These numerous, well-coordinated units would also offer “asymmetrical advantages”, such as being able to evade modern reconnaissance methods, and would entail a new way of planning and commanding, particularly via the principle of “counter-planning” (high degree of autonomy for lower ranks rather than top-down command), which is considered to be the “next thing in modern combined arms combat”. For the theorists, the SVO has also shown that the presence of these highly mobile and autonomous units means reconnaissance of the enemy must be a priority.<sup>71</sup> Rapid attainment of an “advantageous operational position” is seen as no less important, because it gives troops operational surprise; those who “underestimate this task” are reminded (comparison with the failure of February 24 is tempting) that it can lead, during the “deployment” phase, to “losses [. . .] comparable to those suffered during the operation itself”. Note that although the Russian command tried to exploit operational surprise in Ukraine, the attempt largely failed because the Ukrainian army had access to reliable information and was able to move its air-defense systems shortly before the invasion.<sup>72</sup>

The adoption of a network structure against a similar adversary (the Ukrainians, in the minds of the theorists) would require a large amount of reconnaissance and surveillance equipment (combined with strikes), extra protection for the upper half of tanks, and the massive deployment of drones. Altogether these measures would lead not so much to a physical as a functional defeat of the enemy (a “disruption” of its “coordination” and “mobility”). While the use of TakVD<sup>73</sup> and other “small, autonomous tactical groups” (in large numbers) can deliver “crushing blows” in the tactical defensive zone (TZO),<sup>74</sup> the use of *spetsnaz* (special designation) units, although already partially prepared for this type of combat action (and whose “massive use” on the battlefield has, according to the theorists, been called for), is deemed unsuitable. It is worth remembering that the Russian command made extensive use of *spetsnaz* units alongside the infantry at the beginning of the invasion of Ukraine (in Kharkiv, Mariupol, Vuhledar, and eastern Donbas), leading to considerable losses of valuable

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70. Makarčuk and Trocenko, “Harakter operacij sovremennyh armij. Mul'tirazumnye setevye”, p. 24. For the following passages, see also p. 25.

71. Makarčuk and Trocenko, “Harakter operacij sovremennyh armij – nazrevšie izmeneniâ”, p. 19. For the following passages, see p. 17, 19-20, and 24.

72. Zabrodskiy, Watling, Danylyuk, and Reynolds, “Preliminary Lessons”, p. 11; Bronk, “Russian Combat Air Strengths”, pp. 4-5.

73. Makarčuk and Trocenko, “Harakter operacij sovremennyh armij. Mul'tirazumnye setevye”, pp. 28-29.

74. Makarčuk and Trocenko, “Harakter operacij sovremennyh armij – nazrevšie izmeneniâ”, p. 13. For the following passages, see pp. 23-24.

personnel and equipment (and associated expertise) and ultimately to difficulties conducting operations behind enemy lines.<sup>75</sup>

This emphasis on mobility, autonomy, decentralization, and downsizing of units (as well as adequate means of communication<sup>76</sup>) has been a long-standing theoretical and strategic trend in Russia (resulting notably in the creation of the BTG in the 2010s), which theorists insisted on even a few months before the outbreak of the SVO.<sup>77</sup> It was particularly highlighted after February 24, with theorists championing a “modular”, “flexible”, and “adaptive” approach to the “organizational structure of tactical combined arms formations” rather than the “rigid structure”.<sup>78</sup> The “unpromising” practice of “hastily creating combined arms formations in the form of [...] battalion tactical groups [BTGs]”, which “negatively affects” combat operations, has also been discussed.

Despite the disagreements discussed elsewhere, there seems to be unanimous support for the use of small tactical groups with plentiful ISR resources (combined with strikes).<sup>79</sup> It also seems that the Russian army has partly adapted by creating attack units that are smaller, more agile, and more autonomous than BTGs, as shown by manuals captured by the Ukrainian army at the end of 2022.<sup>80</sup> The exact adaptation mechanisms (and their scope) are at this stage difficult to identify, but the tactics used by Wagner in Bakhmut probably played a role. Moreover, although some officers have commented that private military companies (PMCs) are much more expensive in terms of funds and equipment than the regular army,<sup>81</sup> others, like Lieutenant Colonel Mihlin, Navy Captain Moločnyj, and Frigate Captain Koemets from military unit 45,880 (probably the NCUO<sup>82</sup>), have emphasized “Wagner’s brilliant results” in Ukraine, demonstrating the importance of PMCs.<sup>83</sup> This explicit mention of Wagner is the only one we have found in *VM*; the fact that it is both approving and expressed by members of the NCUO raises questions about the extent of positive

75. A. Horton, “Russia’s commando units gutted by Ukraine war, U.S. leak shows”, *The Washington Post*, April 14, 2023, available at: <https://www.washingtonpost.com/>.

76. See for example I. G. Vorob’ev and V. M. Romanov, “Razvitie form i sposobov postroeniâ sistemy svâzi taktičeskogo zvena upravleniâ”, *Voennaâ Mysl’*, No. 6, 2022, p. 62; V. G. Ivanov, M. A. Gudkov, and V. N. Luk’ânčik, “Edinoe informacionnoe prostranstvo Vooružennyh Sil Rossijskoj Federacii — osnova informacionnogo obespečeniâ vojsk v meždunarodnyh vooružennyh konfliktah”, *Voennaâ Mysl’*, No. 5, 2023, pp. 93-95. The authors of the latter paper draw directly on the experience of the “special military operation”.

77. Trocenko had already discussed the benefits of network structures in an article co-authored with the head of the CVSI at the end of 2021: Smolovyj, Lojko, and Trocenko, “O naučnoj kritike”, pp. 148-157.

78. Plužnikov and Usačëv, “Sovremennye trebovaniâ”, pp. 78-80; also for the following passages. See also Vorob’ev and Romanov, “Razvitie form”, pp. 61-70.

79. See for example Orlânskij and Grečin, “O povyšeniî naučnogo”, p. 148, 149.

80. S. Roblin, “Captured Manual Reveals Russia’s New ‘Assault Detachment’ Doctrine”, *Forbes*, February 28, 2023, available at: <https://www.forbes.com/>. See also: [https://twitter.com/Tatarigami\\_UA/](https://twitter.com/Tatarigami_UA/).

81. Orlânskij and Grečin, “O povyšeniî naučnogo”, p. 152.

82. See <https://vk.com/> and <https://xn--e1afqmbhc3a.xn--plai/>.

83. A. A. Mihlin, V. V. Moločnyj, and T. M. Koemets, “Morskaâ gibridnaâ vojna v straĽegiâh SŠA i NATO: sut’, sodëržanie i vozmožnye mery protivodejstvii”, *Voennaâ Mysl’*, No. 4, 2023, p. 8.

perceptions, at the highest levels of the General Staff, of Wagner and its leader, Yevgeny Prigožin, who had already publicly questioned the competence of Gerasimov and Shoigu when these comments were published.

Defensive operations are also affected by this drive for mobility and decentralization, and by awareness of the importance of ISR resources, as shown by the arguments of Lieutenant General Romančuk, deputy commander of the ŪVO (since 2014) and head of the OVA (since 2019), who was one of the commanders of Russia's defenses in Zaporizhzhia during the Ukrainian counterattack in June 2023.<sup>84</sup> The OVA would thus have developed approaches to improve defensive operations, probably based on the experience of the successful Ukrainian counterattack in Kharkiv in September 2022, during which the Russian army was taken by surprise and almost suffered a major defeat in Izyum.<sup>85</sup> These approaches consist in conducting a “dispersed defensive operation” based on the conservation of the “most important defense zones in operational and tactical terms”, through an “unequal distribution” and a “decentralized use” of forces.<sup>86</sup> A “deeply staggered” defense with a “linear pattern of positions” is not considered “rational” because it “limits maneuvering possibilities”. Moreover, the “significantly increased transparency of the battlefield”,<sup>87</sup> which Romančuk claims to have noticed in Ukraine and which evidently caused the Russian army problems during the Ukrainian counterattack around Kharkiv in September 2022, justifies the “dispersion of troops”. Finally (and above all), dispersed defense is seen as the most appropriate “given a shortage of time, troops, and resources”, although high-tech systems (Nerekhta, Platform-M, Uran-9, BMP B-19 with the “Epoch” module) are paradoxically mentioned as necessary for ensuring liaisons between dispersed forces—systems that the Russian army will not have access to in the short or medium term.

It is too early to say whether the Russian army was inspired by this type of thinking in its relatively well-organized defense against the Ukrainian counterattack. But it was probably helped by the fact that part of that defense was led by commanders like Romančuk, who have authored these sorts of reflections on optimal defensive operations in the war in Ukraine.

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84. “Čem izvesten general Aleksandr Romančuk”, *Kommersant*, June 8, 2023, available at: <https://www.kommersant.ru/>. See also: <https://www.understandingwar.org/>.

85. See M. Goya's and J. Lopez's interview (09/06/2023) on the podcast “Le Collimateur”, hosted by A. Jubelin, available at: <https://soundcloud.com/le-collimateur>.

86. A. V. Romančuk and A. V. Šigin, “Perspektivy povyšeniâ èffektivnosti armejskikh oboronitel'nyh operacij”, *Voennaâ Mysl'*, No. 4, 2023, p. 26, 30-31. For the following passages see p. 26, 28, and 31. Colonel Šigin is a professor at the OVA's department of operational art.

87. In other words, an enemy's “high-tech” capability to precisely identify the positions and activities of armed formations and military installations (thanks to a large number and variety of ISR resources) and to strike them (using high-precision weapons).

# Drones and aerospace forces

As we have seen, one of the major lessons Russian military theorists have drawn from Russia's experience in Ukraine (following on from its assessment of the Second Nagorno-Karabakh War) is the importance of drones, which have given rise to numerous recommendations, both for defending against them and for making better use of them. Although the VKS remain underused in Ukraine, it is also interesting to see what Russian military theorists think about this potentially important asset of the Russian army.

## Drones: Small and numerous

Drones are seen as an essential feature of the battlefield, as the SVO has confirmed. Their "massive" use by Russia created "conditions conducive" to the "success" of offensive actions and the "accomplishment of the operational objective", assert Brigadier Generals Andreev, Krivencov, and Pahmelkin of the Air Academy (VVA).<sup>88</sup> Ukraine's Bayraktar TB2 drones were "defenseless against anti-aircraft defense systems during the SVO",<sup>89</sup> add Selivanov and Il'in, who know how to oscillate between triumphant declarations and scathing criticism.

These assertions are, however, out of touch with reality: on the contrary, we have seen that the TB2 drones were effective initially before the Russian army managed to adapt.<sup>90</sup> Moreover, a major cause of the failure of the large Russian military convoy sent to Kyiv a week after the beginning of the SVO (and the realization of its initial failure) was Ukraine's skilled use of drones to slow down the convoys: first with nighttime attacks on the lead vehicles, and later with attacks on the logistical centers of the smaller Russian columns created in response to the first attacks.<sup>91</sup>

Drones, as we have seen (see Bežencev, Polâkov, and Tumakov), are considered to be an excellent way to improve the accuracy of artillery, and even to illuminate targets for VTBs (Krasnopol, Smelchak, Centimeter,

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88. V. V. Andreev, N. S. Krivencov, D. P. Pahmelkin, and A. I. Antipov, "Osobennosti primeneniâ gruppировок aviatsii v voennykh konfliktakh budușego", *Voennaâ Mysl'*, No. 6, 2022, p. 43.

89. Selivanov and Il'in, "Tendencii razvitiâ", pp. 37-38.

90. A. Shoaib, "Ukraine's drones are becoming increasingly ineffective as Russia ramps up its electronic warfare and air defenses", *Business Insider*, July 3, 2022, available at: <https://www.businessinsider.com/>.

91. F. Greenwood, "The Drone War in Ukraine Is Cheap, Deadly, and Made in China", *Foreign Policy*, February 16, 2023, available at: <https://foreignpolicy.com/>; J. Borger, "The drone operators who halted Russian convoy headed for Kyiv", *The Guardian*, March 28, 2022, available at: <https://www.theguardian.com/>.

etc.).<sup>92</sup> Nevertheless, it is clear that the Russian army is critically short of drones, not just to carry out reconnaissance for the artillery and counterbattery, but also (like the laser-designator-equipped Orlan-30 and some Orlan-10 drones) to designate targets and so enable use of VTBs, which have remained underexploited.<sup>93</sup> The situation seems to have improved at the beginning of 2023, thanks both to the increased number of Orlan-30 used,<sup>94</sup> and the use of less sophisticated reconnaissance drones with no laser designator (for financial reasons and because of limited access to Western technologies), including Chinese quadcopters (DJI), although recently captured Orlan-10 drones show that they are still being fitted with key Western components.<sup>95</sup> The need to possess “inexpensive reconnaissance and attack drones”, to have “our own low-cost [national] drones”, and to use them “on a large scale” has been emphasized by military theorists.<sup>96</sup> “Amateur drones” are “not inferior” to military mini-drones, but are much less expensive and available in large numbers.<sup>97</sup>

But the Russian military-industrial complex has struggled not just—because of the sanctions—to replenish its fleet of military drones (around 2000 before the invasion), which has suffered significant attrition, but also—because of bureaucratic inertia and a lack of coordination—to adapt to the need to develop small tactical drones, quadcopters, and commercial, less expensive first-person view (FPV) drones (like the Chinese DJI models), whose use on the battlefield by Russian troops owes more to the initiative of soldiers and civilian volunteers than to the efforts of those in power.<sup>98</sup> Russia’s most recent attempts to manufacture this type of “inexpensive” small drone using domestic components have failed, as evidenced by its “national” drones such as the Patriot K30T, Sibiryachok, or Dobrynya, which were in fact built using mostly Chinese components.<sup>99</sup> The Russian army’s urgent need for tactical drones is arousing the greed of manufacturers who simply assemble cheap Chinese components and sell the resulting drones to the state at exorbitant prices.

Russian military theorists have noted that “the shortage of drones” (including small military or civilian drones) during the SVO is “one of the

92. Selivanov and Il’in, “Tendencii razvitiâ”, p. 42.

93. Axe, “Russia’s High-Tech Artillery System.”

94. Watling and Reynolds, “Meatgrinder”, p. 12.

95. G. Waldron, “Russia’s workhorse Orlan-10 UAV relies on western technologies”, *Flight Global*, December 23, 2022, available at: <https://www.flightglobal.com/>; C. Livesay and E. Lyall, “Russia is bombarding Ukraine with drones guided by U.S.-made technology, and the chips are still flowing”, *CBS News*, January 4, 2023, available at: <https://www.cbsnews.com/>.

96. Makarčuk and Trocenko, “Harakter operacij sovremennyh armij. Mul’tirazumnye setevye”, p. 29, 31.

97. A. V. Kogtin and G. Â. Šajdurov, “Perspektivy razvitiâ malyh bespilotnyh letatel’nyh apparatov i problema ih obnaruženiâ”, *Voennaâ Mysl’*, No. 1, 2023, pp. 62-65. Colonel Kogtin and Georgi Šajdurov teach at Siberian Federal University.

98. J. A. Edmonds and S. Bendett, “Russia’s Use of Uncrewed Systems in Ukraine”, *CNA*, March 2023, pp. 17-20. See also Greenwood, “The Drone War in Ukraine”.

99. V. Fyodorov, “Istoriâ povtorâetsâ: russkie naklejki na kitajskih kvadropterah”, *Voennoe obozrenie*, June 22, 2023, available at: <https://topwar.ru/>. See also <https://twitter.com/sambendett/>.

biggest problems faced by the armed forces of the Russian Federation”, to which Russia must “rapidly adapt, with no time to lose”.<sup>100</sup> Countries “without powerful armed forces” can “radically” alter the course of a military conflict thanks to the “skillful” use of drones,<sup>101</sup> while an army’s “combat and military-technical capacities” depend increasingly on the presence of various types of drones, on the quantitative and qualitative balance of drone power, and on the effectiveness of drones in combat and support missions.<sup>102</sup> The importance of drones is widely acknowledged and has been a prominent issue since February 24, 2022. The president of the Russian Federation even said (April 2023) that he was in favor of the introduction of courses teaching how to “use, assemble, and design” drones in schools;<sup>103</sup> a wish that is starting to be fulfilled and that would give the next generation of conscripts robust skills in this area.<sup>104</sup>

If, for the theorists, small-scale drones have turned out to be ubiquitous and indispensable (reconnaissance, target designation, strikes<sup>105</sup>) on the battlefield in Ukraine, the Russian army’s ability to counter drones (detection and neutralization) is a “serious problem” that must be addressed.<sup>106</sup> Theorists recommend using available portable ground reconnaissance stations (PSNR-8M, FARA-VR, AISTYONOK, SUROK)—normally used for reconnaissance of enemy artillery positions—to deal with the most critical threats and start creating “specialized radars and means of destruction by firepower”. Because “small-scale” drones are able to detect targets at distances beyond the range of their detection by existing reconnaissance methods (the Pantsir-S1 air-defense system and the Garmon’ and Radeskan radars, as well as the Repellent-1 and R-330J Jitel’ electronic warfare systems), another recommendation is to increase radar detection capabilities.<sup>107</sup> Some theorists highlight the merits (effectiveness and “relatively low cost”) of installing small radars on drones by relocating the detection tool and increasing the antenna height in order to “increase

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100. Selivanov and Il’in, “Tendencii razvitiâ”, p. 37.

101. G. V. Erëmin and S. N. Černyj, “Sistema bor’by s bespilotnymi letatel’nymi apparatami — novyj tehničeskij uroven’ i kompleksnyj podhod”, *Voennaâ Mysl’*, No. 7, 2022, p. 33.

102. Selivanov and Il’in, “Tendencii razvitiâ”, pp. 37-38.

103. V. Râbinina, “Putin podderžal ideû vvesti v školah kursy po upravleniû bespilotnikami”, *Rossiyskaya Gazeta*, April 28, 2023, available at: <https://rg.ru>.

104. S. Savina, “Rossijskie školy načali zakupat’ bespilotniki dlâ obučeniâ detej”, *Vazhnye istorii*, June 1, 2023, available at: <https://histories.media/>. See also [https://twitter.com/ChrisO\\_wiki/](https://twitter.com/ChrisO_wiki/).

105. See for example O. V. Ermolin, N. P. Zubov, and M. V. Fomin, “Primenenie udarnoj aviacii Vozdušno-kosmičeskich sil v voennyh konfliktah buduščego”, *Voennaâ Mysl’*, No. 26, 2023, p. 26. Ermolin is head of the scientific research center of the CNII of the Air Force (VVS) at the MO. Colonel Zubov is a professor at the VVA and a researcher at the VVS CNII. Colonel Fomin is a researcher at the VVS CNII.

106. See for example Kogtin and Šajdurov, “Perspektivy razvitiâ”, 62. For the following passages, see also p. 63-65.

107. M. Mohammad, V. N. Pohvašev, and L. B. Râzancev, “K voprosu povyšeniâ èffektivnosti protivodejstviâ malorazmernym bespilotnym letatel’nym apparatam”, *Voennaâ Mysl’*, No. 6, 2022. For this and the following passages, see pp. 45-48. Mariam Mohammad is a commander at the VVA. Pohvašev is a colonel and deputy department director at the VVA. Râzancev is a lieutenant colonel and teacher at the VVA.

the detection range of small aerial targets twofold or threefold” (and enable the destruction of such targets using ZRK surface-to-air missiles). Others, meanwhile, take the opportunity to promote their own inventions, projects, partnerships, or companies (like Svyaz and Radar MMS), and attempt to arouse the interest of “civilian and military clients”.<sup>108</sup>

To destroy small-scale drones, and to adapt to their use in “swarms”, Major General Gleb Erëmin, head of the Military Academy of Field Anti-Aircraft Defense (VAVPO), suggests developing “relatively inexpensive” surface-to-air missiles and creating “small-scale, mobile, and autonomous radioelectronic destruction systems”.<sup>109</sup> To protect against drones, specialized mixed units (air defense and radioelectronic combat) could carry out an “integrated” and well-organized fight against drones.

It is worth noting that the Russian army has in fact “effectively [. . .] conducted direction finding to direct artillery and electronic attack[s] against Ukrainian aircraft and UAVs” as well as carrying out “successful” strikes on drone ground control stations, which in part explains the short life of Ukraine’s quadcopters (three flights on average).<sup>110</sup> But it is true that “there is minimal interest among Russian crews in synchronizing these effects with other activities”.<sup>111</sup>

The idea of integrated (using diverse methods) anti-drone defense has taken root<sup>112</sup> and is seen as the most effective solution: destruction by firepower (the use of small-caliber guided artillery shells is recommended); detection, monitoring, and disabling using microwaves; functional destruction of optical-electronic systems using low-power lasers.<sup>113</sup> One example mentioned is the Russian mobile system “Rat”, which was first presented at the “Army-2022” forum and would enable electronic suppression by microwave and physical destruction by laser, is mentioned. Another “high-tech” (supposedly successfully tested) system is proposed for countering attacks by swarms of small drones: a “new remotely controlled combat module (DUBM)” equipped with an automatic targeting system and a tactical augmented reality view, which was created by the KEMZ group

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108. See for example Mohammad, Pohvašev, and Râzancev, “K voprosu povyšeniâ”, and Kogtin and Šajdurov, “Perspektivy razvitiâ.”

109. Erëmin and Černyj, “Sistema bor’by”, p. 33. For the following passages, see also p. 34, 37, and 39-40.

110. Zabrodskiy, Watling, Danylyuk, and Reynolds, “Preliminary Lessons”, p. 37.

111. Watling and Reynolds, “Meatgrinder”, p. 18.

112. See also G. A. Lopin, G. I. Smirnov, and I. N. Tkačëv, “Razvitie sredstv bor’by s bespilotnymi letatel’nymi apparatami”, *Voennaâ Mysl’*, No. 1, 2023, pp. 45-50. This team from the VKS CNII at the MO focuses on radioelectronic weapons, lasers, microwaves, and acoustics for combating mass raids by (small) drones. They do not discuss surface-to-air missiles, whose use they deem “not economically justifiable.”

113. M. V. Tulkin, B. V. Mišuk, and Ū. A. Evstifeev, “Obisnovanie oblika i osnovnykh zadač boevogo primeneniâ perspektivnogo kompleksa protivodejstviâ mini-BPLA protivnika”, *Voennaâ Mysl’*, No. 2, 2023, pp. 97-98. For the following passages, see also pp. 100-101. Maxim Tulkin is director of the Tekhmet18 company, which makes electronics and microelectronics for aircraft. Bogdan Mišuk is also a company director (IT, data processing). Ūri Evstifeev is an engineer and researcher at Moscow State University.

(*Koncern Kizlârskij èlektromehaničeskij zavod*) in the Russian VPK and can be installed on “any armored vehicle” (the Typhoon VDV is mentioned, among others). Equipped with a modernized ZU-23 anti-aircraft gun (with remotely detonating 23 mm shells and 5 km range thanks to the installation of the Verba MANPADS), the module functions automatically thanks to a “central computer system” that identifies the features of aerial targets and the “best options” for destroying them and transmits this information to the operator. This type of system is considered not just highly effective, but also capable of minimizing resource wastage (munitions and gun lifespan) thanks to its 85-90 percent accuracy, as well as “accelerating” the training process (thanks to a virtual reality training pod).

Far from these high-tech adaptations, however, the Russian army has in reality opted for intermediate solutions, such as an improvised anti-aircraft and anti-drone vehicle (June 2023), which is equipped with 23 mm guns, an optoelectronic system, and a radar station,<sup>114</sup> or even more rudimentary ones, as exemplified by the metal shields for armored vehicles described above.

Another lesson to be drawn from the “experience gained” by the Russian army during the SVO: an interest in using drones to provide logistical support (*Material'no tekhnicheskoye obespechenye*, MTO) to the troops. That would help to reduce the financial cost and the length of training, increase the effectiveness of MTO, and reduce military losses in combat—which are recurring desires observed in all the other areas analyzed.<sup>115</sup> On the other hand, theorists acknowledge that during the SVO, MTO units have encountered “considerable difficulties due to the destruction and disabling of communication and transportation infrastructure (ground)”. The use of cargo drones, deemed a priority, would make it possible to carry out missions that theorists probably believe have been poorly executed in Ukraine: deliveries of materiel to small units (like special forces) carrying out combat missions in remote and inaccessible areas; transfer of materiel across obstacles in temporary transshipment zones; surveillance of logistical, road, and airport infrastructure; technical reconnaissance (TkhR) when evacuating damaged weapons and materiel—which the theorists emphasize when referring to the SVO; rapid and reliable evacuation of crews of aircraft damaged during combat.

Although Russia still does not have suitable cargo drones, which are “in the development phase”, two drones in particular are mentioned: the versatile “Fregat” drone, currently in development in Russia, which can

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114. See S. Syngaivska, “Russia Put Guns from the ZSU-23-4 Shilka System on the BTR-82 Carrier to Counter UAVs”, *Defense Express*, June 29, 2023, available at: <https://en.defence-ua.com/>.

115. D. E. Kardaš, A. V. Grekova, and E. M. Lužnaâ, “Osobennosti primeneniâ bespilotnyh letal'nyh apparatov pri vypolnenii zadač material'no-tehničeskogo obespečeniâ vojsk v sovremennyh voennyh konfliktah”, *Voennaâ Mysl'*, No. 2. 2023, p. 59, 62-63. For the following passages see also pp. 60-61 and 64. The authors are a team at the MTO Military Academy.

transport up to 1000 kg (vertical takeoff) or 1700 kg (horizontal takeoff) and has a range of 1000 km, as well as the vertical takeoff drone Aladdin AL-1 (made by Platforma NTI), soon to enter the testing phase and designed to transport goods and personnel and to evacuate the wounded (270 kg, 100 km).

Lieutenant General Toporov, head of the MTO Military Academy, has even suggested creating a new MTO special service for logistical support and rescue that would quickly and effectively deliver emergency “supplies in small volumes to a large number of recipients” in “critical situations”.<sup>116</sup> Conclusive studies have apparently been carried out to evaluate the “feasibility” of the new service using cargo drones to supply a BTG with munitions.

## Aerospace forces: Partial and risky deployment

Russia has only partially deployed its VKS in Ukraine. Their importance has been repeatedly emphasized, however, particularly during the first phase of a military conflict. The “period of direct military threat of aggression against Russia” should thus give rise to pre-emptive strikes, without going through a “final diplomatic warning”.<sup>117</sup>

Probably dissatisfied with Moscow’s limited aerospace strategy on February 24, Russian theorists propose their own vision for that strategy: it should “suddenly” hit the enemy’s entire territory, targeting its “decision-making centers” and the “aggressor’s armed groupings concentrated near the state border”. They also deem it “impossible” to accomplish the political and strategic objectives of the war “without achieving air and space superiority”, which the Russian army has never managed to do in Ukraine, either in the initial phase of the war or since then. In a large-scale war between nuclear powers, this first aerospace phase will be “decisive”, “rapid”, and “massive”; “political and strategic” objectives will be accomplished by means of a “non-contact” war (a concept developed by General Vladimir Slipchenko), whereby “the enemy is destroyed or disabled at long range well before” any direct confrontation. “Ideally”, add VAGŠ deputy head Seržantov and CVSI head Smolovj, who also refer to the importance of “non-contact war” in any kind of military conflict—a few months after the failed start of the SVO—, enemy troops should “not even have time to deploy”, although this is only possible on condition of having,

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116. A. V. Toporov, M. S. Bondar and R. V. Ahmetanov, “Material’no-tehničeskââ podderžka v boû i operacii: problemnyj vopros i napravleniâ ego razrešeniâ”, *Voennaâ Mysl’*, No. 5, 2022, pp. 47-48. For the following passages, see also pp. 48-51 and 53.

117. Andreev, Krivencov, Pahmelkin, and Antipov, “Osobennosti primeneniâ”, p. 43. For the following passages, see pp. 40-41.

they specify, “absolute informational awareness in the first place of the enemy, his intentions and plans”.<sup>118</sup>

The importance of the aerospace domain, which should correspond to the “first decisive phase of a large-scale military conflict”, is clearly emphasized by theorists.<sup>119</sup> It is possible to “fully” achieve war aims in the aerospace field alone “without switching to full-fledged naval and land combat actions”, or even targeting the enemy’s armed groupings.<sup>120</sup> It is sufficient for VKS to strike “objects of his infrastructure” and his “strategic rear”. A choice that Moscow did not make at first, believing that the Ukrainian state and army would quickly collapse. In line with post-Soviet Russian strategic thinking, it is asserted that the “ground phase of combat actions” is “only possible in the final stage of the conflict”, that it will be “local in nature”, of low intensity and serve essentially to suppress individual centers of enemy resistance. As Russia fights a costly infantry war in Ukraine, the use of ground forces is even analyzed as a “great disadvantage” in the wars of the future. Other theorists, more perceptive on this point, believe in contrast that “the SVO shows that the mass use of high-precision weapons” cannot lead to “final success without ground operations”.<sup>121</sup>

The skills of Ukrainian pilots have also been noted, as well as the need to “exhaustively analyze the qualifications and combat training level of the enemy’s military personnel”, such as the Ukrainian helicopter pilots who skillfully destroyed a store of petroleum products in the Belgorod region in April 2022, “despite the presence of Russian air defenses in the area”.

While some theorists talk of the “overwhelming advantage swiftly acquired and effectively maintained by Russia’s armed forces in the air at all stages of the SVO”, others are much more realistic. They acknowledge that Russia’s strike aircraft are not conducting missions in Ukraine’s operational depth to destroy communication infrastructure (bridges, rail hubs, trains transporting troops or materiel) even though on “February 28, 2022, the Russian Ministry of Defense stated that Russia’s aircraft had gained air supremacy over Ukrainian territory”.<sup>122</sup> “Air support for troops on the front line” is also deemed to be limited. As Smolovyj predicted in

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118. A. V. Seržantov, A. V. Smolovyj, and I. A. Terenteev, “Transformaciâ soderžaniâ vojny: kontury voennyh konfliktov budušego”, *Voennaâ Mysl'*, No. 6, 2022, p. 29.

119. Ū. V. Krinickij and V. G. Čehovskij, “Sfery looružennoj bor'by i teatry voennyh dejstvij”, *Voennaâ Mysl'*, No. 9, 2022, p. 28. Colonel Krinickij is a professor at the Air and Space Defense Academy (VAVKO). Colonel Čehovskij may also work there.

120. A. S. Ulanov, “Prognostičeskaâ ocenka tendencij razvitiâ sredstv vooružennoj bor'by i sposobov ih primeneniâ v vojnah budušego”, *Voennaâ Mysl'*, No. 8, 2022, p. 41. For the following passages, see also p. 42. Ulanov is a lieutenant colonel and a researcher at Almaz-Antey.

121. Selivanov and Il'in, “Tendencii razvitiâ”, p. 36. For the following passages, see also p. 35 and 42.

122. Ermolin, Zubov, and Fomin, “Primenenie udarnoj”, p. 25. For the following passages, see also p. 26. The authors are colonels at the CNII of the VVS and VVA.

2021, aerospace forces would be completely “ineffective” against “regular ground forces with plentiful air-defense systems in a network structure”.<sup>123</sup>

Several reasons have been put forward by the theorists to explain the limited role played by Russia’s strike aircraft both on the front line and in Ukraine’s operational depth.<sup>124</sup> First, Russia has made insufficient use of air and space reconnaissance means to identify Ukrainian movable objects and troop movements and carry out strikes in real time. To this opinion, which is fully shared by Western experts, should be added the intrinsic technical limitations of aircraft and pilots for close air support.<sup>125</sup> Second, Ukraine’s air defenses are bolstered by “effective support” in the form of air and space reconnaissance and targeting systems from the NATO countries. Although the VKS have effectively failed to provide close support near the front line since the beginning of the war, Ukraine’s counteroffensive has nevertheless shown that the Russian army has partly adapted (in part thanks to the shortage and mobilization of Ukrainian short-range mobile anti-aircraft systems to the rear): Russia has successfully used attack helicopters (like the Ka-52, of which it has lost two-thirds<sup>126</sup> of its operational fleet since February 24) near the front line but out of range of Ukraine’s Stingers and Strelas, alongside long-range anti-tank missiles like the Vikhr (10 km range).<sup>127</sup>

In parallel, the Russian army’s massive attacks on the Ukrainian rear since November 2022 seem to have convinced theorists. The importance of high-precision arms for “destroying critical Ukrainian infrastructure” has been “demonstrated once again”, while their use in conjunction with Geran’-2 (Shahed) long-range loitering munitions has been discussed.<sup>128</sup> It “is becoming clear” that tens or hundreds of these weapons must be fired at once in order to overwhelm the enemy’s defenses and strike critical infrastructure. But this experience has also, according to the military theorists, shown that a “rapid” transition toward hypersonic missiles would be desirable. Under the circumstances, given the reduction of its stock of ballistic and cruise missiles—and despite announcements of a “significant” increase in the production of high-precision weapons<sup>129</sup>—, the Russian army has focused more on the use of kamikaze drones, with Shahed munitions (less expensive, less powerful, more vulnerable) making up

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123. Smolovyy, Lojko, and Trocenko, “O naučnoj kritike”, p. 153.

124. Ermolin, Zubov, and Fomin, “Primenenie udarnoj”, p. 25. For the following passages, see also p. 26.

125. Bronk, “Russian Combat Air Strengths”, p. 11, 14-15.

126. See I. Williams, “Russia Isn’t Going to Run Out of Missiles”, CSIS, June 28, 2023, available at: <https://www.csis.org/>.

127. T. Newdick and T. Rogoway, “Ukraine’s Armor Appears To Have A Russian Attack Helicopter Problem”, *The Drive*, June 15, 2023, available at: <https://www.thedrive.com/>. See also <https://twitter.com/>.

128. Ermolin, Zubov, and Fomin, “Primenenie udarnoj”, p. 26, 18-19.

129. Available at: <https://www.businessinsider.com/>.

around 58 percent of Russian missile salvos against Ukraine between April and June 2023.<sup>130</sup>

Here, too, there is a clear recognition of the shortcomings in ISR resources: the “most important task” for VKS strike aviation is to improve reconnaissance and information support in the TVD (theater of military operations), principally in the form of “reconnaissance and communication satellites” and “automated control points”.<sup>131</sup> However, as with most military theorists, awareness of “economic indicators” and the need to “reduce [...] financial resources”, and for a “rational concentration of financial resources” is clearly asserted.

The underuse of the VKS can also be explained by other structural problems, such as the maintenance and repair system in place in the military aeronautics sector: insufficient reserves of replacement parts; poorly organized repair companies; lack of properly qualified engineers; costs in excess of past contracts; and delays caused by too many intermediaries.<sup>132</sup> The current system leads to a “reduction in the operating level of aeronautical equipment”, while an “absurd” and “widespread” phenomenon is singled out: the cost of repairs necessitated by design and manufacturing flaws is borne by the Ministry of Defense (the operator) and not by the manufacturer (the industry). The system as it stands allows manufacturers to “make money from their products’ flaws” (one example given is the Ka-52 and its faulty landing gear). The current system for maintaining military equipment in the VKS in good condition is deemed “costly, lengthy, and poor quality” because of the Russian military industry, but also because of a lack of funding for maintenance work from the ministry, which only covers maintenance for “some of the equipment”. The problem is systemic: theorists point out that while in the United States the cost of maintaining military equipment is higher than the cost of acquiring it, in Russia the maintenance cost is lower than the acquisition cost. Given the “economic capacities of the state”, theorists thus recommend entrusting maintenance and repair work to the operator as opposed to contracting them out to the manufacturer: doing so would reduce costs by four orders of magnitude and downtime by five.

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130. Williams, “Russia Isn’t Going to Run Out.”

131. Ermolin, Zubov, and Fomin, “Primenenie udarnoj”, p. 21. For the following passages, see also p. 27.

132. Z. G. Omarov, “Problemy èkspluatácii aviacionnoj tehniki na sovremennom ètape”, *Voennaâ Mysl’*, No. 4, 2022, p. 113. Omarov is a researcher at the VVS CNII. For the following passages, see also pp. 115-16.

## Other areas

Two themes crop up in most of these discussions: the psychological, informational, and mental factor, and the production of weapons and military equipment.

### The psychological and mental dimensions: Repairable errors?

The psychological, informational, mental, and human dimensions, both for Russian troops and for the Ukrainian and Russian populations, have been discussed by the military theorists, sometimes in a highly critical and direct way.

Some do not hesitate to draw the conclusion that modern armed conflicts can lead to the “complete destruction of the system of government of one of the parties and the genocide of its population”, as demonstrated, they claim, by the “Ukrainian armed forces [. . .] who commit acts of mass terror outside the combat action area”.<sup>133</sup> The Bucha massacre? A sophisticated deception “inspired” by “manipulators” based in Kyiv and “trained in the West”.<sup>134</sup> After all, the massacre of civilians was supposedly invented in the West: according to a research team at the Center for Research on the Military Potential of Foreign Countries (CIVPZS<sup>135</sup>) led by the eminent Russian military theorist General Kruglov, analysis of modern conflicts and the “viewpoints of the political and military leaders of the NATO countries” shows that the development of NATO’s military art will be characterized by “the extermination of civilians, with counterproductive political consequences inherent to future wars”.<sup>136</sup>

Faced with these untruths, deliberate or not, other officers (and sometimes the same ones) are more clear-headed. The “serious shortage” of non-lethal weapons (and precision weapons or munitions), particularly in urban combats where they are necessary to protect civilian life, is

133. Selivanov and Il'in, “Tendencii razvitiâ”, p. 34. See also Orlânskij and Grečin, “O povyšeniî naučnogo”, p. 147.

134. V. Ū. Brovko and I. A. Čiharev, “Pravdivaâ sila: dokazatel'stvo pravdy v mirovoj politike”, *Voennaâ Mysl'*, No. 10, 2022, pp. 21-22.

135. Probably still under the leadership of the Main Intelligence Directorate (GU; formerly GRU) of the GŠ.

136. V. V. Kruglov, V. G. Voskresensky, V. Â. Mursametov, “Tendencii razvitiâ vooružennoj bor'by v XXI veke i ih vliânîe na voennoe iskusstvo veduših zarubežnyh stran”, *Voennaâ Mysl'*, No. 4, p. 132. Kruglov is a highly prolific theorist and a key proponent of the theorization of bypassing of armed struggle. See Minic, *Pensée et culture stratégiques russes*.

lamented.<sup>137</sup> After Russia's threats regarding the Zaporizhia power plant—but before Russia made it into a full strategy in November 2022—the use of the “fear factor” by the aggressor, that is, threatening to destroy the victim's population and critical infrastructure, was praised, but theorists specified that it must remain “reasonable” and not “harm fixed political objectives”, in other words “not violate the environmental situation or disable infrastructure of interest for further use”.<sup>138</sup> Some theorists, like Colonel Bug, deputy head of the VAA, lament that Russian troops have “often displayed cruelty not just in combat but also toward civilians, prisoners, and sometimes their own comrades”, despite the training given in Russia's military academies on “international humanitarian law”, with cadets making no distinction between pillaging and trophies.<sup>139</sup> Many theorists point out that adopting “the benevolent attitude of liberators” toward the civilian population is crucial because it will determine the real outcome of the war.<sup>140</sup>

Russia's psychological-informational activity in Ukraine has also been criticized. Its “propaganda and agitation” during the capture of Mariupol, designed to reduce the Ukrainian forces, have been deemed highly inadequate, while the information technologies used during the SVO have been described as “obsolete”.<sup>141</sup> On the other hand, Ukraine's informational actions are seen as “important, if clumsy”,<sup>142</sup> with Russian troops subjected to “major psychological-informational influence, deployed in line with NATO's norms by Ukraine's centers of psychological operations”.<sup>143</sup>

Psychological-moral support, the “politico-military treatment” of Russian troops, has been carefully scrutinized. While some theorists refer to “certain Russian military leaders who rely too much on educating soldiers about patriotism or political-military awareness” instead of focusing on military training, which builds real self-confidence,<sup>144</sup> others point out that political-military work (*voenno-političeskaja rabota*) is an essential part of preparing for and carrying out operations.<sup>145</sup>

Theorists have duly identified some serious shortcomings that have “significantly” affected the mental and psychological condition of Russia's forces and compromised the entire operation. First, the decision to launch the SVO was “taken quickly” without implementing the “political-military

137. Selivanov and Il'in, “Tendencii razvitiâ”, pp. 34-35.

138. Ulanov, “Prognostičeskaâ ocenka”, p. 39.

139. Bug, Homâkov, and Zverev, “Suvorovskij kodeks”, pp. 105-106.

140. Bug, Homâkov, and Zverev, “Suvorovskij kodeks”, pp. 105-106; Selivanov and Il'in, “Tendencii razvitiâ”, p. 35.

141. Selivanov and Il'in, “Tendencii razvitiâ”, p. 44.

142. Brovko and Čiharev, “Pravdivaâ sila”, p. 17.

143. O. G. Tukmakov, “Osnovnye napravleniâ soveršenstvovaniâ voenno-političeskoj raboty pri podgotovke operacij”, *Voennaâ Mysl'*, No. 2, p. 47. Tukmakov is a colonel and teacher at the VAGŠ.

144. Bug, Homâkov, and Zverev, “Suvorovskij kodeks”, p. 109.

145. See Tukmakov, “Osnovnye napravleniâ”, p. 42. For the following passages see pp. 44-47.

propaganda and agitation measures” designed to switch soldiers and officers from a “peaceful” to a “warlike” mentality. Moreover, the objectives of the SVO and the soldiers’ places and roles in the execution of their missions were not explained to the troops. Second, the “available assessment of the sociopolitical situation in Ukraine” and of the “mental and psychological condition of the Ukrainian armed forces” turned out to be “incorrect”, while “expectations regarding their lack of preparation for armed resistance and mass surrender were unjustified”. Third, Russia’s troops lacked the technical means to maintain their morale “at a high level”.

The Russian state has tried to adapt to this state of affairs. For example, probably in reaction to the claims made by Russian propaganda in the first months of the war, which have been constantly contradicted by reality, as well as in response to the outspokenness of certain important military (Kartaplov) and paramilitary (Kadyrov, Prigožin) figures regarding the true condition of Russia’s forces in Ukraine, the Kremlin has adopted a more cautious approach. Specifically, this consists of not underestimating a “NATO-supported” Ukraine, as evidenced by a manual drafted by the Presidential Administration and distributed to the outlets of official propaganda.<sup>146</sup> In the run-up to the Ukrainian counteroffensive in summer 2023, this allowed Russia to exaggerate its victories in the event of Ukrainian failures and to minimize its defeats in the event of Ukrainian successes.

Theorists have also examined the psychological condition of Russian society and its implications for military engagement, and so for the SVO. The few anti-war protests in Russia (February-March 2022) were seen as demonstrating a “loss of stable national consciousness among part of the population and a lack of understanding of the state’s actions”.<sup>147</sup> Nevertheless, theorists acknowledge that this is “principally due to the absence of formulated and universally understandable long-term goals in terms of the country’s development, as well as the [absence] of systematic and appropriate work by the state to build and promote state ideology”.

The importance of waging psychological-informational war within Russia itself is constantly highlighted. Il’nickij, one of Shoigu’s advisors, argues that although “West-centrism” and “westernization” did “once help Russia to modernize”, if Russia is to defeat the West, it must now first and foremost “defeat it in its own mind”.<sup>148</sup>

The failure to mobilize Russian society for the war, and the gulf between theoretical and actual conscription figures, have provoked

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146. A. Percev, “Esli Ukraina dostignet uspehov i zajmet territorii, ih poterâ budet ob’âsnima,” *Meduza*, May 2, 2023, available at: <https://meduza.io/>.

147. Ždanov, Sidorov, and Lukašin, “Rol’ nacional’nogo samosoznaniâ”, p. 39. Ždanov is a colonel and expert at the NCUO. Sidorov and Lukašin are respectively colonel and lieutenant colonel.

148. Il’nickij, “Strategiâ gegemona”, p. 33.

discussions about the importance of favorable public perception of the army. The “serious problems” that led to the “discredit” of the Russian army “during the 1990s” (corruption and hazing) have not been totally resolved: “we understand [. . .] that there are currently negative tendencies affecting the perception of the army by society”, that the “political consciousness of citizens [. . .] manifests itself in distrust of the state and [. . .] of the principal state institutions, including the army”.<sup>149</sup> To rectify this situation, it is proposed to boost politico-military efforts in the fields of falsifying history and managing the flow of negative information, in order to avoid “demoralizing the national population, including future soldiers”. The following areas for improvement are identified: provision of legal information to conscripts; work with religious military personnel; military/patriotic youth activities; meetings with veterans (of the Great Patriotic War and others), commanders, politicians, scientists, and athletes; open-house days; exhibitions of weapons and military equipment; and finally, combat training demonstrations.

## The VVST and VPK: Rationalization and innovation

The question of military materiel and the state’s capacity to replenish it, given both the high level of attrition in Ukraine and the sanctions, is raised regularly by military theorists. Nevertheless, they tend to focus less on the need to drastically increase arms production and return to the industrial capacity of the Soviet era, and more on the need to rationalize spending and innovate. On one hand, empirical observations suggest that the Russian VPK is far from exhausting its arms production capacity, as shown by cruise missiles being fired by Russia just a month or two after being manufactured.<sup>150</sup> And, indeed, the Russian authorities seem increasingly “optimistic,” a drastic shift from the “nervous statements” and “threats” voiced last year, suggesting increased confidence in Russia’s arms production capacity and figures.<sup>151</sup> On the other hand, however, the available data show not an increase in production figures, as trumpeted by certain officials (Mishustin, Medvedev), but rather a slowdown. Moreover, despite the ambition of the technological development plan to use 75 percent of national components in all products by 2030, Russia’s manufacturing industry remains highly dependent on imports (as we have

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149. K. N. Lebedev, E. O. Kubâkin, and P. V. Ivanov, “Potencial vliâniâ voenno-političeskoj raboty v Vooružennyh Silah Rossijskoj Federacii na patriotičeskoe vospitanie voennoslužzaših”, *Voennaâ Mysl’*, No. 7, 2022, pp. 124-25. For the following passages, see also p. 126 and 128-29. Lebedev and Kubâkin are respectively colonel and lieutenant colonel (Ministry of Internal Affairs; MVD). Ivanov is a captain at the Shtemenko Higher Military School (which trains Russian soldiers in information security).

150. T. Martin, “Weapons tracing shows Russia firing new cruise missiles at Ukraine just weeks after production”, *Breaking Defense*, May 10, 2023, available at: <https://breakingdefense.com/>.

151. P. Luzin, “The True State of Russian Arms Manufacturing”, *Eurasia Daily Monitor*, Vol. 20, No. 97, available at: <https://jamestown.org/>.

seen), not just from the West but also (and increasingly) from China, whose products Russia prefers despite their lower quality.

The military theorists are not mistaken and their writings in part reflect this pessimism. Some recommend more careful selection of what to produce. Although Russia depends heavily on sanctioned Western technologies, some theorists state that it is possible to “bear the high costs of military action over a long period” by “simplifying, as much as possible, the design of weapons produced in order to ensure they can be repaired on the ground and equipment lost in combat can be replaced in a timely manner during a military conflict”.<sup>152</sup>

Is this even possible? Recently Rostec announced that Uralvagonzavod would halt production of railway equipment in order to concentrate exclusively on combat tanks (of which Russia has lost at least 2,100 in a year and a half).<sup>153</sup> This could indicate both the failure of measures already taken to increase production and a real shortage of qualified personnel. The result is potentially risky decisions, such as asking qualified but non-specialist employees to manufacture tanks, and weakening the rail system, which is a vital part of Russian logistics.<sup>154</sup> There are also concerns about the production of ammunition, for which the army has an “exceptionally high” need in the context of the war in Ukraine.<sup>155</sup> To address these problems, theorists suggest opening a discussion “at the federal level” about including a “separate munitions program (PV BP)” among the missions of the national weapons program “for the upcoming period”. This would enable a “systematic approach” to the issue in order to “cover the entire spectrum [...] of needs in terms of munitions and explosives”. The importance of “using munitions sparingly” has also been indirectly mentioned.<sup>156</sup>

The reduction in the number of personnel qualified to use sophisticated weapons on the battlefield is probably also an implicit motivation behind suggestions to simplify the weapons and equipment being manufactured. Echoing criticisms regarding the lack of expertise required to use cutting-edge military equipment in the RViA, some theorists recommend not “being hasty and giving into wishful thinking” about the idea of “super-weapons” and sophisticated VVST replacing current military

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152. Orlânskij and Grečîn, ““O povyšëнии naučnogo”, p. 151.

153. Unqualified criminals have been mobilized for this purpose: see M. Jankowicz, “Russia’s defense manufacturing sector is using convict labor to meet war-time demands: UK intel”, *Business Insider*, January 13, 2023, available at: <https://www.businessinsider.com/>. See also ““Uralvagonzavod’ robitime liše tanki zamist’ vagoniv, ale švidko rezul’tatu ne bude”, *Defense Express*, 30 June, 2023, available at: <https://defence-ua.com/>.

154. See ““Uralvagonzavod’ robitime liše tanki zamist’ vagoniv, ale švidko rezul’tatu ne bude”, and E. Ferris, “Russia’s Railway Troops: The Backbone Sustaining Russian Military Force Posture”, *Occasional Paper*, CNA, April 2023.

155. Selivanov and Il’in, “Tendëncii razvitiâ”, pp. 41-42.

156. Bug, Homâkov, and Zverëv, “Suvorovskij kodeks”, p. 104, 110.

equipment: “it is people” and their “skilled use” of the weapons that “determine the final result”.<sup>157</sup>

The weakening of Russia’s modern arms manufacturing capacity, and more generally of the Russian economy as a result of the sanctions, is openly discussed. Extremely concerned about Russia’s inability to “consistently reduce inflation”, which is increasing “VVST cost overrun rates”, some theorists suggest rationalizing the state’s “limited financial resources” and the funds allocated to the military by using artificial intelligence to make more accurate cost predictions for VVST development; problems with feasibility and the rational use of resources are mentioned.<sup>158</sup>

The importance of “economic factors” for the production of arms (VVST) and logistics in wartime is emphasized, while the problems Russia must address in this area (sanctions and prohibitions of Western imports) in order to achieve its “political and military objectives” are succinctly summarized.<sup>159</sup> To overcome these unfavorable conditions and implement a policy of “import substitution” and “diversification”, theorists suggest relying on Russia’s “national techno-scientific potential”, pointing out that it has only been possible to provide promising VVST developments with a maximum of “40-50 percent” domestic components. It is deemed pointless to respond to military threats by “expanding the Russian armed forces [. . .] [and] equipping them with mass-produced models”; instead, Russia should develop its VVST with “advanced technological and technical solutions” in order to utilize “asymmetric defense”.

If this reveals (once more) an awareness of Russia’s weaknesses, it also shows that the circumvention of sanctions, thanks to which the Russian army continues to manufacture weapons using Western components, is not seen as a satisfying, permanent solution.

A long-standing concern of the Russian elite can also be detected: the importance of “preventing” a “military-technical and technological gap”. This applies primarily to “critical technologies”, particularly “dual purpose” ones, in Russia’s defense industry. To achieve this goal, theorists propose reversing the current logic and making use of innovative civilian-sector small- and medium-sized enterprises (SMEs) and civilian technologies in the military sphere. The advantages of doing so are deemed numerous: the increase of on average 5 to 10 percent per year in the cost of VVST and the

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157. A. M. Barabanov and A. M. Baran, “Zakony dialektiki i ètapy razvitiâ artillerii Suhoputnyh vojsk Rossii”, *Voennaâ Mysl'*, No. 4, 2023, pp. 150-51. Colonel Barabanov is a professor at the VAA.

158. A. V. Sprengel and V. V. Verin, “Osobennosti prognozirovaniâ rashodov na razvitie vooruženiâ, voennoj i special'noj tehniki v sovremennyh usloviâh”, *Voennaâ Mysl'*, No. 12, 2022, p. 90, 96. Colonel Sprengel is deputy head of the 4th CNII (missile, aeronautical, and space systems). Lieutenant Colonel Verin is at the same institute.

159. O. V. Rodionov and A. E. Nikolaev, “Voенно-экономическаâ bezопасnost' Rossijskoj Federacii v usloviâh mežgosudarstvennogo protivoborstva”, *Voennaâ Mysl'*, No. 6, 2022, p. 7. For the following passages see also p. 8-9, 11-15, and 17. Colonel Rodionov is deputy head of the Military University of Radioelectronics. Colonel Nikolaev is head of department at the same university.

development and production of most of the main weapons systems; the increase in the length and complexity of the development process for special military systems (currently around fifteen years); the higher renewal rate of commercial designs; the fact that technologies from the civilian sector are generally “cheaper” while being similar to military products in terms of quality. The use of “commercial products” would thus enable a reduction in the cost of weapons by “2 to 8 times” and would reduce the time taken to put them into service by “2 to 5 times”.

# Conclusion

The Russian army is very critical of its war in Ukraine. Not just of the first phase of the failed special military operation (SVO), which was inspired by the theorization of bypassing, but also of the phase of strategic deterrence that preceded it (and was perhaps supposed to be decisive), deemed as lacking in support from non-military means. Russian military theorists have commented on the profound lack of preparation not just for the SVO, but also—in many areas—for the heterotelic war the SVO has become. The Russian army's weaknesses in relation to the Ukrainian army are generally, and sometimes quite directly, recognized by the Russian military elites.

The latter also make numerous recommendations for improving Russia's warfare. A threefold concern comes to the fore: the wastage and shortage of material and human resources, as well as difficulties mobilizing them. Recommendations are often explicitly made in these terms, although an unrealistically "technologist" or even "futurist" tropism persists, sometimes co-existing with an awareness of Russia's capacity limits.<sup>160</sup> In fact, the Russian army's adaptations have been no more than interim and sometimes even rudimentary solutions. Another concern has begun to emerge: the loss, due to high rates of attrition, of personnel qualified to use complex, modern equipment. The theorists were struck by two essential parameters of the battlefield in which they believe the Russian army has serious shortcomings, and which determine their criticisms and recommendations. First, ISR resources combined with strikes, with a focus on tactical drones and their "mass" use in "swarms". Second, an extended and "transparent" battlefield, with dispersed units that are smaller, more mobile, and more decentralized than the BTG—an observation that dates back several years and has been confirmed since February 24. Three subjects have been relatively neglected by Russian military reports: battle tanks, the VMF, and nuclear deterrence.

The Russian army has largely adapted—more or less successfully—to the problems it has encountered in Ukraine, which have been clearly highlighted by its military theorists. Although we lack the sources and hindsight to identify the real (and necessarily complex) mechanisms driving

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160. There are several possible ways to explain this paradox: 1) the influence of ideas circulating for decades in Russian military theory regarding "promising VVST" and next-generation armed struggle; 2) the opportunity for certain actors at the intersection of Russia's military and industrial communities to promote and profit from their own solutions and projects; 3) a preoccupation with battlefield effectiveness (including for Russia's future wars) rather than the concrete feasibility of the proposed solutions; 4) a perception of technology as a way to reduce expenses in the long term while disregarding the major short-term costs of its introduction into the Russian army.

these diverse adaptations, Russian military theory has, if not provided a basis for reflection for decision-makers, commanders, and troops, then at least revealed concerns more widely shared among the elites and even the Russian population. The relative freedom of expression at this level of the military apparatus, and the sometimes unbiased and pertinent observations and recommendations that it produces, can only be beneficial to the political-military leadership, from which these observations and recommendations in part come, and throughout which they circulate, are promoted, and considered.

Although the Putin regime is authoritarian and has set about reducing freedom of expression in Russian society, the existence and tolerance of a certain amount of truth-telling, albeit framed by a set of beliefs and a mindset common to the military and political elites (and that to a certain extent distance both groups from objective reality), indicate that the Russian army's and state's ability to adapt should not be underestimated.

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