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Recent Trends in the Development of Ukraine's Military-Industrial Complex in an International Context

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Summary

The large-scale war of extraordinary intensity; successful asymmetric warfare strategies, where cheap and mass-produced weapons capable of exhausting very expensive and powerful armaments are employed in combined combat operations; the determination and creativity of the Ukrainian nation, which has proven capable of generating unique innovative solutions in the field of creating and developing new types of weapons, as well as quickly mastering complex foreign samples; finally, the peculiar situation in European countries, where they have proven unprepared for rapid transformations in the military-industrial complex (MIC), yielding to autocratic Russia, which together has given Ukraine the opportunity for defense and defense-industrial integration into the European, and probably, Euro-Atlantic space – all of the above has incredibly influenced the transformation of Ukraine's MIC. Of course, there are also positions that traditionally play against the development of the defense industry – weak, sometimes abusive, administration of the MIC and manifestations of corruption. But, one way or another, the "great war" has transformed Ukraine into a "mega-customer" of weapons, including domestic production. New dimensions and unprecedented prospects have been created. The material directly addresses recommendations on which mechanisms can be used for the further development of the domestic MIC.

Military-Industrial Retrospective

A brief look at the past of the domestic MIC and its features seems important for understanding the "ceiling of possibilities" in the future. First of all, during the Soviet era, almost no final samples of weapons and military equipment (WME) were produced on Ukrainian territory and, even as of the end of 2010, their share, according to expert estimates, did not exceed 8-12% of the total volume of military and dual-use products. These were military transport aircraft, modern tanks and armored personnel carriers, some radar and reconnaissance systems, anti-tank guided missiles (ATGMs), dual-use wheeled vehicles. At the same time, the domestic school of APCs and ATGMs emerged in the 2000s. On the other hand, Ukraine had a fairly extensive system of production of important components (aircraft engines, gas turbines for military ships, combat modules, aviation missiles, etc.). In addition, a very powerful system of service facilities remained in Ukraine from the USSR – more than three dozen enterprises for practically all weapons of Soviet development. From the beginning of the Russia's war against Ukraine in 2014, the MIC mainly expanded, first of all, repair and modernization capabilities, although it was during this period that new schools for creating unmanned aerial complexes (UACs), ground robotic complexes (GRCs), electronic warfare (EW) systems, and armored fighting vehicles (AFVs) emerged. This primarily refers to initiative work by private enterprises, although some state enterprises were engaged in EW systems and AFVs, but the results were far from convincing. For example, the state sector of the MIC proved unable to establish production of the "Dozor" AFV, and the inability to produce quality APCs led to the failure of several contracts with Iraq. Under conditions of almost absent state orders for the army until mid-2022, the MIC survived through product exports, but gradually lost some schools of high-tech equipment and weapons, having a depressing imbalance between about 40-50 developing enterprises and about two hundred others that were degrading.

As a result of extremely inept state administration of the MIC in Ukraine, entire schools were lost:

- development and production of sonar systems;
- development and production of control systems for combat missiles;
- development and production of ammunition (the school has been restored during the large-scale war);
- shipbuilding was completely lost as an industry.

De facto, as of May 2025, the schools for producing military transport aircraft and modern tanks can also be considered lost – they can be restored through military-technical cooperation (MTC), and an obvious accompanying condition should also be the liquidation of JSC "Ukroboronprom" (after the introduction of SE "Antonov" into the

"Ukroboronprom" concern in April 2015, Ukraine has not manufactured a single aircraft and lost a whole series of international projects; the last "Oplot" tank was manufactured in 2021 for the Independence Day parade and subsequent sale to the USA thanks to the financial efforts of SC "Ukrspetseksport"). The Ukrainian MIC continued to function mainly through the development of Soviet technologies, although some of them were supplemented with modern materials or innovative solutions.

Thus, before the beginning of Russia's large-scale war, the export orientation of the MIC and the use of working financial resources of state special exporters allowed it to survive and not lose development. For example, the undisputed leader of the MIC – State Design Bureau "Luch" – created the "Neptune" anti-ship missile complex (adopted by the Armed Forces of Ukraine in 2020) and proposed developments of an operational-tactical UAC and domestic surface-to-air missile (SAM) system (in 2016, the design bureau defended three preliminary SAM projects – with ranges of up to 10 km, up to 30-40 km, and up to 100 km respectively), and also carried out the transformation of the Soviet 9K58 "Smerch" multiple launch rocket system (MLRS) into essentially new MLRS "Vilkha" and "Vilkha-M". In addition, State Design Bureau "Luch" together with private partner companies developed the "524R" guided weapons complex for Mi-24, Mi-8, Mi-17 combat helicopters with RK-2V missiles.

From 2014, rapid growth of the private segment of the Ukrainian MIC began, which from 2018 had a dominant share of state order fulfillment – 65% and higher. New schools for producing light armored vehicles appeared (wheeled AFVs like "Varta", "Novator", "Kozak" and the multipurpose APC Oncilla – based on the aforementioned "Dozor" AFV that state enterprises could not produce).

Even before the "great war", dozens of new types of UACs and the first GRCs appeared in Ukraine (by 2022, 6 private enterprises were actively producing UACs, 3 private companies were producing GRCs) – for the first time, Ukrainian ground robots were publicly demonstrated during the parade in honor of the 30th anniversary of Ukraine's Independence. New "Anklav" radio jamming complexes, the "Polonez" anti-UAC complex, and the newest "Prometheus-MF5" EW system with reconnaissance and direction-finding range up to 30 km and radio suppression range up to 25 km also appeared. Significant improvement of the "Bukovel-AD" EW complex for fighting UACs occurred – it has been supplied to the Armed Forces of Ukraine since 2016.

The private Kramatorsk Heavy Machine Tool Plant (KHMTP) mastered the production of smoothbore tank guns after Ukraine received an order from Thailand for the delivery of 49 "Oplot" tanks in 2011. And already in 2018, this enterprise presented the wheeled 155-mm self-propelled artillery unit "Bohdana", for which the barrel was already rifled. Thus, another school was born, since self-propelled artillery units (SPAUs) had not been produced in Ukraine before.

Despite the strange inattention of military-political leadership to missile topics (in 2021 they ordered only one division of "Neptune" missile complexes, although the Ukrainian Navy begged for three), missile projects advanced through the efforts of the enterprises themselves. At the "Arms and Security-21" exhibition in autumn 2021, the private

company "Radioniks" presented as many as four guidance heads (GH) – for "air-to-air" missiles, for surface-to-air missiles, and an active radar one for medium-range "air-to-air" missiles. At least two of them were created thanks to export orders. Thus, new defense technologies appeared even on the eve of the large-scale war thanks to export contracts.

Ukraine's MIC During the "Great War"

Russia's war against Ukraine in 2022-2025, with its extraordinary intensity and rapid technological changes, provided many new opportunities. The key element of change was the appearance on the battlefield of a significant number of new, cheap weapons that proved capable of exhausting or destroying more expensive ones through mass application. De facto, military-technical policy (MTP) was being built "from the bottom up". In 2022-2023, a certain part of MIC enterprises was loaded approximately half with state orders and another half with orders from volunteer organizations. At the same time, the MIC gained constant contact with the front – this allowed rapid response to quickly changing needs of the Special Operations Forces (SOF).

In July 2022, the Ministry of Digital Transformation launched the "Army of Drones", and in 2023 – the Brave1 techno-cluster, which became a platform for technology development, with emphasis on private MIC work. Later, the Hackathon competition appeared in Brave1 – the first attempts in the history of Ukraine's MIC to set tasks for scientific-industrial structures from customers, which is why Brave1 is even called "Ukrainian DARPA".

Thanks to the efforts of non-core agencies - the Security Service of Ukraine (SBU) and the Defence Intelligence of the Ministry of Defence of Ukraine (HUR) – serial production of naval surface drones (or MRCs – maritime robotic complexes) began, which allowed squeezing Russian ships out of the western part of the Black Sea. This is a completely new school, as MRCs were never produced in Ukraine. In 2024-2025, several private companies approached the creation of underwater drones.

During the large-scale war, only one private company "Ukrainian Armored Vehicles" reached the level of producing 1,200 mortars (60/82/120 mm) per year and 240 thousand mines per year (60/82/120 mm). The enterprise increased revenue in 2023 by 100 times – from 103 million UAH to 13 billion UAH and continued to grow in 2024-2025.

In 2023, serial production of the "Bohdana" self-propelled artillery unit (SPAU) with an autoloader was launched at KHMTP, and a year later, thanks to an investor, production was brought to 18 units per month.

Overall, on the front, according to military testimony, as of early summer 2024, more than 50% of combat tasks were performed through the use of various types of drones (reconnaissance, strike, kamikaze – with ranges from 0.1 to 50 km). The lion's share of UACs was of Ukrainian production. Ultimately, it was thanks to the MIC that the Unmanned Systems Forces appeared within the Armed Forces of Ukraine (AFU) in February 2024.

The General Staff of the AFU reported that on the night of May 31, 2024, the AFU struck an oil depot in Russia with several "Neptune" missiles. The first use of domestic missiles

for strikes on objects on Russian territory occurred, in the "surface-to-surface" modification as the "long Neptune". This involved significant modernization of the "Neptune" cruise missile (CM), including increased launch range, increased warhead mass, and improved guidance system. In March 2025, according to an official report, "Neptune" increased its range to 1,000 km. Additionally, by the end of 2024, cruise missile production in Ukraine increased eightfold. Production volumes ensured regular use of domestic ballistic missiles and the "long Neptune". Among the new missiles, compact cruise missiles were named – "Palianytsia", "Peklo", "Ruta", as well as the previously unpublicly presented "Bars" missile, which were often mentioned as "drone-missiles".

In 2024-2025, Ukraine significantly increased its own weapons production, mainly various types of unmanned systems, but also missiles, artillery systems, ammunition, various types of AFVs, EW systems, automated control systems, and communication means. Already from autumn 2023, strike UACs appeared with a warhead weight of 30 kg and a strike range of 800 km. In 2025 - up to 1,500 km, and tested up to 3,000 km. The appearance in June 2024 of the Nemesis UAC increased the "gray zone" for the enemy to a distance of over 20 km. In 2024, the Ministry of Defense approved over 330 types of UACs for the front; over 95% of them were of Ukrainian production. By May 2025, approximately 40 types of fiber-optic drones had already been codified and approved for operation. And more than a dozen domestic candidates passed testing as alternative drones to Chinese Mavic UACs.

By May 2025, the Defense Procurement Agency had already contracted 8,000 ground robots. The Ukrainian side continued to amaze the enemy and international partners with creative, sometimes unique solutions. If in 2024, thanks to the use of R-73 "air-to-air" class missiles as surface-to-air missiles on MRCs, a Russian helicopter was shot down, then in May 2025, for the first time in the history of wars, a Russian Su-30 fighter was shot down by an AIM-9 missile launched from the "Magura" naval drone. In 2025, another innovative solution became known: engineers developed a military SAM system based on the HMMWV off-road vehicle – with guided R-73 "air-to-air" class missiles. And during a meeting of one of the leading domestic MIC enterprise associations, it was reported that at the beginning of 2025, a Ukrainian-made SAM system was codified in the country.

In May 2025, leading AFU military officials warned: the battlefield will radically change as early as summer: a continuous kill-zone up to 40 kilometers wide will appear on the front (because combat operations will be conducted almost exclusively by drones).

Ukraine has indeed changed the battlefield of modern warfare, opposing traditional weapons with asymmetric ones. At the same time, there was a very significant increase in MIC capacity. Thanks to these innovations, MIC achievements began to be recognized in the West – in Europe and the USA. The latter becomes the basis for further growth, including joint entry into the global arms market.

Ukraine-Europe Military-Technical Cooperation as Path to Security Guarantees

After a series of steps by the USA towards distancing from NATO allies, the issue of creating continental combat capabilities without the USA has become a very specific task for European countries. For Ukraine, new opportunities have emerged in implementing full integration into the European defense and defense-industrial space. At the same time, appealing to already concluded security agreements with NATO countries, including the USA, looks quite realistic for Ukraine.

At the same time, modern military-technical cooperation can take several forms.

First of all, financing of the Ukrainian MIC under the so-called "Danish model" can be continued and expanded. The national MIC in 2024 received over $1.5 billion for weapons production for the Defense Forces – donors included Denmark, Canada, the Netherlands, Lithuania, Great Britain, Sweden, Norway, Iceland, the USA and the EU. In April 2025, the EU adopted a decision to allocate one billion euros in the form of grants to Ukraine's MIC. At the beginning of May 2025, EU Commissioner for Defense and Space Andrius Kubilius spoke out in favor of doubling military support to Ukraine by purchasing weapons from local manufacturers. The Commissioner emphasized that the cost of weapons produced in Ukraine is approximately twice lower than similar weapons from the EU or USA. He estimated the real cost of EU support at 80 billion euros. In addition, a new instrument has appeared in the EU – guaranteed security loans from the European Union, which allow member states to finance military purchases for Ukraine.

The fact that Ukraine itself has become a powerful market has created another powerful trump card. According to data from SIPRI, Ukraine became the world's largest importer of major types of weapons in the period 2020-2024, increasing imports almost 100 times compared to 2015-2019. Thus, there has been significant growth in the interest of foreign companies and investors in cooperation with domestic manufacturers. Working out a fairly large variety of forms of cooperation seems important – from buying and selling to creating joint developments and even weapons production hubs. Ukraine's key advantage, which has already been recognized and accepted by Western partners, is the high speed of domestic production and quite noticeable cheapness – this has been confirmed by a number of implemented projects.

An unprecedented test of the MIC was Denmark's introduction of a new cooperation model – through financing in 2024 the production for the Ukrainian army of 18 "Bohdana" self-propelled howitzers, which were transferred to the AFU in just two months. A truly unique event occurred: an unknown private enterprise surpassed in production rates the French Nexter (which produces 6-8 Caesar SPAU units per month).

There are statements that the private "Bohdana" SPAU manufacturer has now reached a pace of about 20-36 units per month (although this figure probably includes "Bohdana" towed guns). But the main indicator is that the Ukrainian "Bohdana" costs approximately $2.5 million, while the French Caesar howitzer costs over $4 million. Here it is worth mentioning the calculations of the Bruegel analytical center, which estimates the Caesar SPAU at 6 million euros, and the highest cost indicator for self-propelled artillery was given to German SPAUs PzH 2000 and RCH 155, where the estimated figures are 17 million euros and 11.08 million euros respectively.

A similar story is happening with artillery ammunition. During the large-scale war, howitzer shells became more expensive from $800 to $8,000 at the beginning of 2024. While the Ukrainian MIC is capable of making such ammunition for $1,800. However, the experience of 2024 was not absolutely convincing – the ineptitude and abuse of industrial management in the state sector of the MIC led to failures in the production of Soviet-caliber shells, as well as 120 mm and 82 mm mines by at least one state enterprise.

On the other hand, Design and Manufacturing Company "Ukrainian Armor" agreed on cooperation with the Czech Czechoslovak Group regarding joint production of 155-mm shells – up to 100,000 ammunition in 2025 and up to 300,000 ammunition in 2026. Later it was detailed that Design and Manufacturing Company "Ukrainian Armor" will also manufacture tank and 105-mm artillery ammunition – the company received licenses from the European defense holding Czechoslovak Group for the production of tank and artillery shells. And also with drones: at the end of 2024, American AeroVironment agreed to localize production of Switchblade 600 strike drones already known to the AFU in Ukraine. And Turkish Baykar is scheduled to finish building a factory in Ukraine in August 2025. The factory's capacity will be able to produce about 120 UACs per year, while Ukraine can choose both Bayraktar TB2 UACs and the new Bayraktar TB3 drone, which surpasses its predecessor in all characteristics and can carry a payload of up to 280 kg.

Lithuania in October 2024 announced an investment of 10 million euros in the production of the Ukrainian "Palianytsia" missile. For its part, a Ukrainian company will build a factory in Lithuania for the production of new generation explosives – the start is planned for 2025.

At the same time, some Ukrainian technologies, for example, electronic warfare, surpass the capabilities of both Russian and Western systems – this is recognized in the West. And the Ukrainian "Lima" EW complex is already capable of disabling the guidance system of Russian glide bombs. At this stage, there is a lack of knowledge among European partners about the effectiveness of part of the weapons and military equipment (WME), and especially their resistance to new threats. As an illustration, the "New Energy of Ukraine" Alliance, one of the powerful private developers of drones and EW systems, together with the German company Diehl Defence provides IRIS-T SAM systems and new RCH 155 SPAUs produced by KNDS with modern EW means. And this is an element of a new type of MTC that has never existed before.

More and more innovative solutions in the MIC are appearing in Ukraine, which can systematically interest partners in Europe, and perhaps MTC will become part of new cooperation with the USA. After all, two Ukrainian companies have already been selected by an American customer (Defense Innovation Unit) to create drone prototypes for the USA within the ARTEMIS project, and this may be just the first swallow. Western specialists already recognize that Ukrainian weapons manufacturers manage to create and scale quite effective modern weapons, which are at the same time noticeably cheaper than Western analogues.

Europe also recognizes Ukrainian technological advantages in UACs: in April 2025, it became known about discourse on how Ukraine surpasses the West in producing quality and cheaper drones. This concerned the supply to the AFU of German drones from Helsing company. Bloomberg quoted a Ukrainian military from the AFU Unmanned Systems Forces: "We are talking about a product that is made from cheap components and sold as advanced technology". According to his words, the German UAC 120 HF-1 costs no more than 100 thousand hryvnias (2,200 euros), and was sold for 1,700 euros per drone.

Ukraine's MIC itself needs not only money for quality army support, but also some high-tech components – optics, gyroscopes, sensors, motion controllers. Through this, technological advantage over the enemy can be achieved. The mentioned "New Energy of Ukraine" Alliance gives an example that existing approaches to organizing technological assistance do not allow obtaining a key element of the modern underwater drone being created by the association's enterprises, since a Western-made inertial system is needed, which, moreover, costs almost as much as the entire underwater vehicle.

Another powerful MTC mechanism is joint production and increasing participation in it by mastering licensed production. In the most developed format, this is already a transition to joint weapons development and Ukraine's entry into international clubs for development and production of new types of weapons.

After a series of negotiations in 2024-2025, the contours of joint production with Italy of modern SAM systems and surface-to-air missiles for them with small and medium ranges – up to 45 km – appeared. These are modular surface-to-air missiles CAMM (Common Anti-Air Modular Missile) and CAMM-ER – they are compatible with both MAADS launchers and can be integrated into the modernized SAMP/T NG SAM system. From the NATO country, the Italian division of MBDA and Leonardo company participate, from Ukraine - five enterprises, three of which are private.

Another significant project for Ukraine should be joint production of missiles for effective drone countermeasures with Thales Belgium company. These missiles will be equipped with a new warhead specially developed taking into account the war in Ukraine in 2022-2025. Thus, the 70-mm FZ275 LGR missile will have inside an explosive charge and several thousand steel balls, which will ensure effective countermeasures against strike drones like Shahed.

In 2025, Norwegian surface-to-air system manufacturer Kongsberg announced its intention to integrate interceptor missiles of already Ukrainian production into NASAMS systems.

And in the British Parliament in mid-April this year, they started talking about producing Ukrainian weapons in the country – within a joint MIC hub. And this is no longer a story about strengthening the AFU, this is also about technology exchange, because part of the weapons will be produced for the British army. The compact "Peklo" cruise missile is already being considered as one of the armament options that could be produced in Great Britain.

French defense company Thales jointly with JSC "Ukroboronprom" are creating a joint venture on Ukrainian territory. Estonian defense company Frankenburg Technologies announced that it will start producing missile systems in Ukraine. Finnish company Insta Group Oy jointly with Ukrainian specialists developed and presented a new Steel Eagle ER strike drone for the AFU. Lithuania together with partners from Ukraine are building a factory for new generation explosives. JSC "Ukroboronprom" and Danish Weibel Scientific will develop and produce radars.

Joint scaling of weapons can also be of Ukrainian production. For example, the successful use of domestic cruise missiles, in particular the modified version based on the R-360 MC missile, called the "long Neptune", quite claims joint production. And in 2024, Romania was already mentioned several times in the media as a potential partner for joint production. Also, Spanish special equipment manufacturer Tecnove will produce armored vehicles of Ukrainian Scientific Production Association "Praktyka" for the European market – within the created Human & Safe Systems association, which will carry out licensed production of Ukrainian armored vehicles at Spanish manufacturer facilities and promote them in markets (referring to "Dzhura" tactical vehicles, as well as "Kozak" armored vehicles of unnamed modification).

Regarding promising missile developments for the future, the Ukrainian MIC could present itself as a partner for several projects. For example, with MBDA company, where they are developing new generation FC/ASW missiles, which are called successors to Taurus, and Storm Shadow/SCALP. Or with Germany, which is creating a new RCM² missile with a strike range of 500 km – without US components. Unlike the Taurus cruise missile, the RCM² missile will be launched from various platforms, including MLRS and military transport aircraft. In addition, there is a promising European ELSA (European Long-Strike Approach) project to create long-range missiles with a range of 2,000 km. Not to mention France, which since November 2024 announced its intention to create its own ballistic missile with a range of 1,000 km – Ukraine with already existing developments in this area can quite offer participation and cooperation in production.

It should be emphasized that the issue of synergy between Ukraine's MIC and Western defense companies lies in combining efforts precisely in the field of joint development (R&D) and joint weapons improvement, where the unique contribution of the Ukrainian side can lie in rapid testing and determining directions for improvement, and the contribution of Western specialists in providing this process with available high-tech

solutions and resources. At the same time, thanks to operational feedback from the front, there is an opportunity for joint rapid receipt of information about testing new weapons in war and refinement of modern weapons samples to ensure advantage. In connection with such problems, MIC specialists and Ukraine's Defense Forces are promoting the idea that within the framework of creating corps in the Defense Forces, experimental combat units should be introduced and the possibility for the command of these corps (and, probably, the most significant tactical formations) to purchase some types of weapons – drones of all types, EW systems, communications and part of ammunition. The idea deserves special attention because the exceptional trump card of Ukrainian newest defense-industrial structures is their direct proximity to the line of contact, and sometimes presence on the battlefield, which provides instant feedback on the effectiveness level of new types of weapons. Moreover, often MIC structures are created from army veterans, former experienced military personnel who are simultaneously engineers and inventive (and sometimes continue to participate in combat operations). At the same time, representatives and, moreover, leaders of high-tech Western companies do not have the opportunity to obtain data on practical testing of weapons in war, or receive information after months, which significantly slows down the implementation of modern innovative solutions. The opportunity to test modern Western weapons and take direct part in their improvement creates unique opportunities for developing MTC with foreign states.

The first results in MTC development in the direction of joint development and, in particular, with the involvement of Ukraine's MIC private sector have already appeared at the end of 2024 – beginning of 2025. For example, at the beginning of May 2025, the Ukrainian "Bulava" drone was demonstrated, developed by the Ukrainian-Czech UAC company – it is equipped with a modern powerful cumulative-thermobaric warhead weighing 3.6 kg and can hit targets within a radius of up to 60 km. And Swedish Saab chose the Ukrainian private company Radionix as a partner for joint development. Obviously, these are first attempts that should be scaled up.

"Homework" for Ukraine's MIC

The state needs to actively develop guarantee mechanisms for investors and branches of foreign companies in Ukraine, envisage maximum possible deregulation of all processes and simplified state policy that would promote investment flows into the MIC.

There is another matter of extremely high importance – organizing and stimulating weapons component manufacturers. Ukraine has already announced investment at the level of one billion hryvnias in this matter – the Ministry of Economy launched a grant program where enterprises will be able to receive grants for equipment procurement on co-financing terms – 50% covered by the state and 50% by manufacturers.

There are attempts to overcome this problem "from below" – in March this year, the Defense Forces received the first batch of localized FPV drones that were assembled entirely from Ukrainian components, including camera and other electronics. But the question now is in scaling these areas and moving to systematic work on developing such productions. This should allow getting rid of dependence on China. To become influential international players in this segment, complete liberalization and the possibility of production and localization of components in Ukraine are needed. Without this, entering the international drone market with Chinese components could be a false start. And the development of the component base is impossible without further deregulation of the entire system.

According to the most experienced industrialists, the advantage in future warfare will be gained by the side that will be able to master the printing of weapons components, primarily for engines for missiles and drones. Ukraine has already taken the first steps, but a long road lies ahead, to which it would be worth involving foreign partners. At the beginning of April 2025, the UK Ministry of Defence already concluded a contract with Babcock company to develop a concept that will allow Ukrainian military personnel to use 3D printing to manufacture spare parts directly in field conditions. In November 2024, Babcock delivered the first batch of spare parts manufactured using 3D printing to the British army – parts created within the TAMPA program entered the troops for repairing a wide range of military equipment.

Since there is a plan to take the first steps in arms export with partners, one should take care of eliminating artificial organizational obstacles. It is worth mentioning that Rheinmetall head Armin Papperger spoke about the "too slow process of creating companies" in Ukraine. "For example, we decided to create an enterprise with a 51% share in Rheinmetall – previously this was impossible in Ukraine", he said, "because the controlling stake had to be owned by state enterprises". However, having a controlling stake in the concern itself is the concept by which Rheinmetall operates worldwide. The coordination process lasted several months. There is only one conclusion here – if Ukraine wants to work with Western defense companies, especially to enter the world market together with them, it needs to quickly learn to work according to international

rules and standards – both in production culture and in the sphere of process organization. This is a vital necessity for MIC development, including its success in the global market, since Ukraine is already part of Europe and has one of the advanced MICs on the continent.

Finally, MIC development is being slowed down and will continue to be slowed down without completing the reform of the state sector of the MIC. The incompetence and irresponsibility of industrial management of the state MIC is based on impunity, accordingly, under conditions of preserving such a situation, the risks of production of key types of Ukrainian weapons will grow.

At a time when the Russia-Ukraine war of 2014-2025 is essentially a competition of technologies, the absence of MIC reform in Ukraine has become a threat to national security. Although the transformation concept of "Ukroboronprom" was worked out as early as 2021 using the example of the "Radar Systems" holding, which was to include about two dozen specialized enterprises, there are still no plans for liquidating the "artificial management center". JSC "Ukroboronprom" has become an artificial instrument of shameful interference by the Ministry of Strategic Industries of Ukraine in the economic activity of industrial enterprises. Moreover, the incompetence and abuse of the existing industrial management regarding the organization and implementation of the mine and ammunition production program in 2023-2025 created preconditions for partial failure of this program. Unfortunately, the responsible persons have not been held accountable, and so far the situation looks like a prospect of punishing only the executors. It should be emphasized that such a state of affairs may negatively affect the attitude of Ukraine's Western partners towards MIC integration into the Euro-Atlantic space.

Conclusions and Recommendations

Before the beginning of Russia's large-scale war in 2022, the export orientation of the MIC ensured its survival and development. Currently, Ukraine's return to the global arms market appears necessary, but the process must be extremely careful – with emphasis on trade on behalf of partners or with partners.

The liquidation of JSC "Ukroboronprom" is an extremely necessary factor for ensuring MIC development. The Ministry of Strategic Industries must complete the formation of sectoral holdings in 2025, after which it should liquidate the management link in the form of JSC "Ukroboronprom". Legal successors under international agreements should become sectoral holdings or their key enterprises. Unfortunately, there are already signs of disappointment from some partners who took the path of creating joint ventures or projects directly with JSC "Ukroboronprom" rather than with specialized enterprises. Ukraine should urgently reach the level of adequate "rules of the game" with foreign partners. Special exporters from JSC "Ukroboronprom", as well as special exporters of the Ministry of Defence of Ukraine, should be transformed into investment and production companies.

Military-technical cooperation is becoming a key factor in MIC growth. But it is precisely the Ministry of Defence of Ukraine as the main customer of weapons that should determine priorities, form directions for weapons improvement and unification, and exercise leadership of MTC, including in terms of determining Ukrainian manufacturers for joint projects. The highest, most desirable form of MTC should be joint projects and joint weapons development – precisely the synergy of Ukraine and partners can ensure technological advantages.

The Ministry of Defence of Ukraine, within the framework of long-term needs planning, should take steps (jointly with other related ministries, particularly the Ministry of Strategic Industries and the Ministry of Economy) regarding weapons development. At the same time, the military department acts as organizer and coordinator (as customer) of integration work and creation of consortiums for weapons development; the executor should be the industrial ministry. A technology development center is formed within the structure of the Ministry of Defence – as the main decision-making center in the form of orders and coordination of efforts on behalf of the state, while executive areas can develop in other ministries and departments, as well as in research structures, higher educational institutions, non-governmental enterprise associations or in individual enterprises. It will also be quite logical to leave the already existing area – the government techno-cluster Brave1 – as an "entry point" for new developments. The example of having 330 types of UACs in the Defense Forces that cannot penetrate Moscow's air defense is evidence of imperfection of military-technical policy in this area. The obvious center here should be the Unmanned Systems Forces (or a single inter-agency center for the development of all types of UACs needs to be created).