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Introduction

Since the beginning of the full-scale Russian invasion of Ukraine, Kyiv has suffered from a crucial disadvantage in long-range strike capabilities against Moscow. The debates and policies around supplying Ukraine with this type of munitions as well as the extent of their use on the battlefield have been some of the most controversial of the war and have only partially helped the war-torn country to offset its disadvantage. Today, Ukraine has taken important decisions regarding the domestic production of long-range munitions, which is strategically crucial to pursue both the strategic interdiction campaign against Russia's energy infrastructure and the build-up of Ukraine's deterrence potential through a greater long-range munition arsenal. The aim of this article is to delineate Kyiv's innovative drone and missile programme while analysing the possible implications these projects could have on future European long-range capabilities. In the first section, the article will describe how Ukraine's long-range capabilities have changed over the past three years, whereas the second section will touch upon newly developed domestic munitions. The final section will analyse the implication for European countries with the main arguments of the article then summarized in the conclusion.

1. Background

Ukrainian and Russian capabilities at the start of the hostilities

The 2022 Russian invasion of Ukraine has once again highlighted the importance of striking the opponent at strategic depths. Hoping to disrupt Russia's military capabilities before they are deployed, long-range conventional munitions allow Ukraine to carry out a strategic interdiction campaign that targets critical military and dual-use infrastructure in enemy territory (Hoffmann, 2025). The targeted infrastructure include oil refineries, ammunition storages, fuel depots, troops barracks, command centres as well as transport and supply routes (Umland, 2024). Both Russia and Ukraine have carried out long range strike campaigns against each other, although their arsenals and capabilities in this sector differ in degree. Before the invasion, Russia could count on hundreds of cruise and ballistic missiles of different types, such as Iskanders, Kalibr or Khinzals. The range of these missiles varies from a few hundred metres to more than 2000km and they have proven to be extremely destructive and challenging for Ukraine's air defence systems (CSIS, 2021). Pre-war Ukraine, on the other hand, could only rely on a very limited number of less advanced Tochka-U missiles and launchers, whose range spans between 70 and 120km (CSIS, 2021). For this reason, Ukraine asked several EU and NATO countries to provide their long-range missiles soon after the beginning of hostilities, in particular the French-British Storm Shadow, the US-made ATACAMS and the German Taurus (Schmitt et al., 2022; Yahoo News, 2023).

Western policy over missile supplies to Ukraine

NATO and EU policy towards supplying long-range munitions to Ukraine has been characterized by a high degree of reluctance and scepticism. The United States in particular has opposed the delivery of its ATACAMS ballistic missiles citing escalations concerns, with US officials fearing that the delivery of this type of weapon would cross a red line for Russia, inciting a nuclear strike against Ukraine and drawing the Atlantic Alliance into the conflict (Tucker, 2022; Wheeldon, 2022). The United Kingdom was the first country to decide to distance itself from such a policy, providing Storm Shadow cruise missiles to the war-torn country almost two years after the beginning of the hostilities, followed by France and Italy, who also operate Storm Shadow cruise missiles (called SCALP-EG in their French configuration)(West, 2025). Although the number of missiles provided is classified, it is realistic to believe that Ukraine has been provided with several hundred (Defense Express, 2024).

After several months and intense rounds of negotiations, the United States decided to provide Ukraine with the long sought ATACAMS ballistic missiles, placing severe restrictions on their use: the missiles could only be used inside Ukraine's occupied territory (Hodunova & The Kyiv Independent news desk, 2024). It was unclear whether these restrictions applied only to US supplied munitions or also to the long-range capabilities supplied by other partners, but the absence of strikes inside Russia using Storm-Shadow/SCALP-EG led some analysts to believe that this ban applied to those as well (Badwahr, 2024). After extensive lobbying from the Ukrainian side and renewed negotiations, the ban appeared to be lifted in November 2024, although it seemed that Ukraine could only use Western-supplied munitions in border regions with Russia, such as the Kursk region (Entous et al., 2024). Today, all limitations on strikes deep inside Russia have reportedly been lifted (Syngaivska, 2025). The Western partners' decision to supply long-range munitions to Ukraine was a significant upgrade to the country's arsenal, although the scarce number of missiles provided as well as the restrictions imposed on their use greatly reduced their effectiveness on the battlefield.

2. Ukraine's long-range capabilities development

Ukraine's domestic long-range drone capabilities

Ukraine's limited missile arsenal and Western reticence to supply Ukraine with long-range munitions has forced Kyiv to come up with innovative solutions to pursue its strategic interdiction campaign. The backbone of this strategy is a reliance on low-cost, long-range drones that can be produced en masse, causing limited but repeated damage to Russia's

infrastructure. In 2024, international observers recognized 23 different types of long-range drone employed by Ukraine (Hambling, 2024b). The notorious “drainpipe drone”, for instance, is composed of a plastic drainpipe, while its fuel tank is nothing more than a few 5 litre plastic bottles joined together (Hambling, 2024a). While the drone carries just 3 kilos of explosive, the ignition of unexpended fuel might do more damage, especially when the drone targets highly flammable infrastructure such as oil or gas facilities (Hambling, 2024a). Ukraine’s main target for long-range drone strikes appear to be Russian oil refineries together with several missile and air defense facilities whose production rates have decreased considerably as a result of the attacks (Axe, 2024; Dickinson, 2024). Since oil is one of the main sources of revenues for Russia, damaging oil related infrastructure would represent a significant setback in Russia’s ability to finance the war.

Between 2023 and 2024, Ukraine targeted more than a dozen oil refineries and depots in Russia and reduced its refinery capacity by 12% (Axe, 2024). The strikes have been successful and painful, with Ukraine set to produce 30.000 long range-attack drones in 2025 to consolidate this progress (Hambling, 2024b). However, these munitions still have a very limited impact on Russia’s total oil refinery capacity and are far from crippling Russia’s war machine (Axe, 2024). While small, low-cost and long-range drones still play a central role in Ukraine’s strategic interdiction campaign, Kyiv needs other long-range platforms to inflict maximum damage to Russia’s military and energy infrastructure and build a credible deterrent to discourage future attacks.

Ukraine’s new drone and missile development programmes

Mykhailo Fedorov, Ukraine’s deputy prime minister recently stated that “2025 will be the year of the Ukrainian cruise missile.”(The Economist, 2024). This statement reflects Ukraine’s willingness to scale up development and production of more powerful long-range projectiles, capable of inflicting more damage to Russia’s infrastructures than the current long-range drones. The statement also underscores Kyiv’s aim to acquire more powerful domestic capabilities to discourage further aggression in the future. To be sure, Ukraine has been working on some traditional, heavy cruise and ballistic missile projects since before the war. The famous anti-ship cruise Neptune missile and its land configuration as well as the Hrim-II ballistic missiles are two notorious examples, however their slow developments and high costs have convinced the Ukrainian government to focus their efforts on innovative start-up projects (The Economist, 2024). These projects would focus on cheaper, faster missiles or missile drones with a lighter payload, which can be produced in high numbers and would be more difficult to intercept (Dickinson, 2024). Sources disagree on the nature of these new platforms, as they can be described at times as long-range drones, drone missiles or cruise missiles. According to Hoffman, a missile is “a single-use, airborne, self-propelled, unmanned

weapon system designed to travel a specified distance and neutralize a target” (Hoffmann, 2024). According to this definition, long range Unmanned Aerial Vehicles (UAVs) and the new Ukrainian projects are all included within the category of missile (Hoffmann, 2024). Some of these new projects are described below:

- Palianytsia: One of the first “rocket-drones” of Ukrainian production, it is a cheap platform with a range of around 700km and a speed of 500 km/h (Hoffmann, 2024). The projectile has a payload of 9-20 kg, which is much lighter than normal cruise and ballistic missile payloads (Hoffmann, 2024).
- Ruta: A new cruise missile with a range of 300 km and a speed of 800 km/h which can support various payloads varying between 30 and 100 kg (Hoffmann, 2024; Kramarenko & Vialko, 2024). The main advantage of this missile would be its increased speed, which would make it more difficult to intercept for mobile air defense systems (Hoffmann, 2024; Kramarenko & Vialko, 2024).
- Pekklo: This cruise missile has a range of 700 km and a speed of up to 700 km/h, with a payload of around 50 kg (Kramarenko & Vialko, 2024). According to Ukrainian officials, the light payload will be more than enough to inflict serious damage to certain types of Russian infrastructure, such as oil refineries, the primary target for this missile (Kramarenko & Vialko, 2024). It appears that the missile has been already deployed by the Ukrainian Armed Forces, and it is realistic to believe that mass production is already underway (Hoffmann, 2024).
- Trembita: The Trembita missile is the result of another Ukrainian missile program, which produced a platform with a range of 200km at 400 km/h speed and a payload of 20kg (The Economist, 2024). The peculiarity of this missile is its affordability: the decoy version costs only \$3000 USD, whereas the armed variant equipped with a basic navigation system reaches around \$15,000 USD (Petriv, 2024). The missile has a visible heat trace, which makes it a priority target for the enemy's air defence. Given its low cost and visibility, the missile will likely be produced in great numbers and used to overwhelm Russian air defense systems (Petriv, 2024).

These projects represent a promising prospect for Ukraine's defence industry and its ability to inflict damage to targets deep inside Russia. However, Ukraine will likely remain dependent on Western partners for the supply of heavier, stealthier missiles capable of successfully destroying hard, buried or sensitive targets like bunkers and military decision-making centres.

3. Implications for Europe

Despite being the first to supply long range conventional munitions to Ukraine, European countries are no match for American or Russian arsenals. While the US and Russia can both count on a wide range of conventional cruise and ballistic missiles, there are currently only two European-grown platforms in service with some European armies, both in short supply: the Franco-British SCALP-EG/Storm Shadow and the German Taurus (Hoffmann, 2023). While several EU Member States have adopted US-made platforms to offset this imbalance, some projects to improve Europe's long range indigenous capabilities have gained traction in recent years: France, Italy and the UK intend to replace the SCALP-EG/Storm Shadow cruise missile with a more advanced platform dubbed Future Cruise/Anti-Ship Weapon (FC/ASW), while the European Long-Range Strike Approach (ELSA) undersigned by Germany, France, Poland, the United Kingdom, Italy, Spain and Sweden aims at developing a cruise missile with a 1000km range (Defence Industry Europe, 2024; Salerno-Garthwaite, 2024). Although these projects signal a paradigm shift, they are insufficient to equip Europe with capabilities comparable to those of Russia or the United States. Cooperating with Ukraine in this field could further improve Europe's readiness, capabilities and conventional deterrence. There are two ways in which this cooperation can take place:

- Direct Procurement: European countries could opt for direct procurement of Ukrainian missiles. The low cost of Ukrainian munition offers multiple advantages, as they can be purchased in large numbers by those EU countries with smaller defence budgets while still adding complexity to their strategic interdiction tactics.
- Research and Development Partnership: EU countries, in particular larger members who already possess indigenous long-range munitions, could start cooperative partnership in the field of long-range munitions development with Ukraine to produce new, advanced platforms. By uniting EU countries' larger financial capabilities and advanced technology with Ukraine's battlefield-driven innovation, it is possible to produce high-performance munitions that maintain a lower cost than comparable US and European made missiles.

As the new US administration under Donald Trump is signalling a growing disengagement towards European allies, defence cooperation on the European continent will become key to ensure its countries' security. Developing new and modern systems as a result of partnerships and joint ventures would likely be the most effective way to address future security challenges and potentially transform the EU and its partners into reliable security providers.

Conclusion

The Russian invasion of Ukraine demonstrated that long-range drones and missiles represent a crucial component of today's battlefield. At the beginning of the invasion, Russia had an overwhelming advantage over Ukraine in particular field, which was only partially offset by the supply of long-range cruise and ballistic missiles from Western partners to Ukraine. However, the limited arsenal of Western countries and their imposed limitations on provided munitions pushed Ukraine to explore homegrown solutions to target and damage Russian critical dual-use infrastructure. In 2025, Ukraine is set to scale up the production of various types of domestic long-range missile and missile drones, which will allow for a more aggressive strategic interdiction campaign and contribute to the country's future deterrence strategy. At the same time, Ukraine's proficiency in this sector could represent an advantage for Europe. As Europe lacks long-range capabilities, cooperation with Ukraine in this field could upgrade European countries' arsenals while providing a viable option to enhance EU strategic autonomy, a necessity only made more urgent by the new US administration's disengagement policy towards both Ukraine and NATO.

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