Russia-Ukraine War's Strategic Implications

edited by **Alessandro Marrone**

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Cover photos

- Parade military marine sea fleet of Russia on 9 May 2014 in Sevastopol (Nemeziya/Shutterstock)

- Mobile military base, soldier engineer transmits aerial pictures and data from drone to artillery (Parilov/Shutterstock)

- Flags' of members of NATO at the NATO headquarters in Brussels, 26 June 2019 (Alexandros Michailidis/Shutterstock)

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Foreword

by the Italian Chief of Defence Staff, Giuseppe Cavo Dragone

It was with great pleasure that I accepted the proposal to formulate some of my considerations as a preface to the IAI's in-depth work entitled "The Strategic Implications of the War in Ukraine for Italy". I say this not only because of the great topicality of this subject, but also because the challenge it poses is certainly daring: the analysis of a complex event of extraordinary geopolitical impact when it is still in full swing and will be a harbinger of new developments.

The study brilliantly exceeds expectations through a narrative choice that I fully endorse. Beginning with an accurate and careful reconstruction of the origins and unfolding of the War in Ukraine, it carefully analyses the conflict in all five domains (land, sea, air, cyber and space) and progressively focuses attention on the 'lessons' we have to draw from this geopolitical earthquake in Italy through a whole-of-country approach, as a key member of the Euro-Atlantic community.

From my perspective as Chief of Defence Staff, I was struck by the analytical and operational perspective of the authors' work, who, with mastery and competence, offer us a range of possible strategic and operational choices in a vast array of sectors, from geopolitics to the not simple meanderings of the Italian defence budget.

In this context, I appreciated their ability to focus on the focal points of the debate on Atlantic cohesion and the constitution of a European Defence; the sharp analysis of the challenges in the land, air and maritime domains; the really effective emphasis on the new domains of space and cyber; the central role attributed to the crucial issue – which is very close to my heart – of the industrial dimension at Italian and European level.

For an insider, the IAI study offers original and unprecedented food for thought, as well as real work strands that I believe it is in everyone's interest – the military

in the first place – to explore and deepen.

I have rarely come across analyses of the soundness and quality of this study, which fully enriches the national and international debate on the war in Ukraine, an event of historic significance with many complex facets on the political, strategic, military and economic levels, on which we have only just begun to reflect.

Introduction

by Alessandro Marrone

In February 2022 Russia invaded Ukraine from North, East and South in order to control the whole country through direct military occupation and/or a proxy government. Moscow assumed a rapid collapse or surrender of the Ukrainian state and planned a relatively fast war of manoeuvre coupled with air assaults to take over major cities such as Kyiv, Kharkiv and Odesa. Ukraine prepared to some extent since 2014 for a Russian invasion, resisted and rolled back invading forces from its major cities in 2022, including from Kherson despite its illegal annexation to the Russian Federation. Over 2023, Kyiv launched a counter-offensive aimed at liberating territories south of Zaporizhzhia and east of Bakhmut, but unfortunately, Russian forces hold most of the ground previously gained. A high level of attrition has been experienced by both sides for several months, with more than half a million troops deployed by belligerents.

The war has turned into a stalemate over the last months. It witnesses continuous and indiscriminate air campaigns by Russia – including bombs, missiles and drones – tailored raids by Ukraine on the occupied territories and across the Black Sea, and above all fierce, bloody land battles over a highly fortified frontline with a systematic, mutual shelling and massive use of drones. Two years after the beginning of the invasion, Russian armed forces control the land corridor that connects the Crimea peninsula to Donbas – two areas already directly or indirectly under Moscow since the 2014 war – and the whole Azov Sea: a region accounting for slightly less than 20 per cent of Ukrainian territory. Ukraine continues to access the Black Sea and export its goods. Such an occupation did cost so far dozens of thousands of military casualties in both warring countries, the lives of thousands of Ukrainian civilians, as well as huge numbers of injured people and millions of displaced citizens – plus the material destruction brought by the conflict.

After two years of the Russia-Ukraine war, a number of observations can be made at the strategic level. First, the Russian leadership is so risk-prone, solid

and obsessed with Ukraine to continue a large-scale, high-intensity, attrition war despite its enormous costs in terms of blood and treasure, the limited territorial gains obtained so far and the likely scenario of a military stalemate. For the Kremlin and part of Russian society, the war entails a sort of existential character: the restoration of Russia's great power status, the rollback of Western influence from the former Soviet Republics, and possibly the wreckage of European and transatlantic unity by leveraging certain governments and/or constituencies within EU and NATO.

Second, Russia miscalculated several key factors, including the resilience of Ukraine as a country, the strengths of its own armed forces, and the military and economic support to be provided by the US, Europe and like-minded countries worldwide to Kyiv. Moscow made also a number of mistakes in terms of war planning and execution, at both strategic and tactical levels, ranging from scarce unity of command – epitomised by the Wagner drama – to poor logistics, training and doctrines.[1] Nevertheless, Russia adapted to the initial failures and compensated for miscalculations and mistakes with the mobilisation and sacrifice of its human and material resources to a level well beyond the Cold War – including the Soviet invasion of Afghanistan. Such a dynamic contributed to a military stalemate on the ground since 2023. Notably, Russia is spending less than 6 per cent of its GDP on its military, a level far below the usual average for countries at war, and both sides have not resorted to full wartime mobilisation.

A third observation concerns the fact that the powerful and large Russian military, employed in a long-prepared war without constraints of international law such as proportionality or discrimination, failed to occupy a smaller and in theory weaker country. Ukraine's geography, spirit, leadership, organisation and training, command control and communication (C3), all compensated for the material unbalance in favour of Russia – particularly over the first semester of the invasion, halted by Ukrainians with limited international support. These structural elements have strongly concurred with the military stalemate on the ground. Moreover, the extensive integration of a large number of pretty expendable drones – a variety including micro and mini ones, loitering

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[1]   Some of these miscalculations and mistakes will be addressed in the first section of this study.

munitions, etc – within Ukrainian and then Russian operations made the battlefield far more transparent by reducing the surprise effect and further enhancing the respective defensive lines.

A fourth point can be made regarding the international level. Ukraine stood vis-à-vis the Russian invasion for the first half of 2022 with little military support from abroad. Then gradually it received a large quantity and variety of equipment, encompassing artillery, armoured vehicles, air defence, main battle tanks and missile systems, Soviet-era helicopters and aircraft, and the related ammunition, spare parts, logistic support and training – plus massive and growing satellite communication and intelligence, surveillance and reconnaissance. The numbers and timing of supplies have been questionable and far inferior to Kyiv's requests, while the heterogeneity of hardware drawn from allied arsenals is high and problematic. Still, as a whole, it represents an unprecedented war support effort worth over 90 billion euros from 31 donor countries[2] – plus 5,6 billion euros earmarked by EU institutions – in less than two years. Further and wider economic aid has been provided, including humanitarian assistance, financial support, connection of Ukraine's energy infrastructures with the EU electric grid, customs-free import of Ukrainian goods in the Union, etc. Without such military and economic support, Ukraine would have not held so far more than 80 per cent of its territory against Russian invasion. As a result, while not belligerent, donor countries – particularly but not only the US – play a major role in shaping Kiev's military options. In particular, Washington and its major allies placed limitations on significant Ukrainian operations into Russian territory, despite their potential operational value to weaken Russia's war effort, and avoided or postponed certain supplies, in order to avoid an escalation between Moscow and NATO. On the opposite side, the Kremlin obtained military aid from North Korea and Iran without significant constraints towards its strategy against Ukraine, while the role played by China seems limited so far to a political, energy and economic partnership with Russia, falling short of the provision of defence equipment.

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2 For a good accounting of such effort see Kiel Institute for the World Economy, *Ukraine Support Tracker*, updated on 16 February 2024, https://www.ifw-kiel.de/topics/war-against-ukraine/ukraine-support-tracker.

Fifthly, the military donation to Ukraine drastically drained North American and European arsenals not fit for a large-scale, prolonged, attrition war mainly fought on the land domain. Therefore, stockpiles of ammunitions, armoured vehicles, anti-tank missiles, and air and missile defence system – including man portable air defence systems – rapidly dwindled by constraining de facto the amount and timing of Western support to Ukraine. European defence industry and, to a lesser extent, American one found it difficult to ramp up production for a variety of reasons, and this has further limited the international support to Kyiv. Two years after the beginning of the Russian invasion, Europe and the US find themselves deprived of much of their pre-2022 stockpiles and unable to simultaneously replenish them and increase the pace or quantity of deliveries to Ukraine. In other words, a peacetime defence and the related industrial complex had not yet ordered and paid equipment to adapt to the war going on. Over the last two years, Germany, France, Italy, Poland and other NATO members have begun to adjust their military budget and procurement to cope with the war implications, but such adaptation will be long, costly and hard to implement.

Last but not least, this is a conventional conflict between two countries involving one nuclear power. So far Russia has used its nuclear rhetoric mainly against international allies of Ukraine in order to dissuade or at least limit their provision of military aid to Kyiv, with mixed results. Albeit the remote risk of a nuclear escalation remains on the table, US and NATO deterrence has effectively worked to constrain Moscow's options to the conventional realm- and it is set to continue. This in turn has enabled Ukraine to defend itself against a larger but still comparable military. As such, the nuclear dimension keeps playing an indirect but relevant role in the conflict, with significant implications in terms of Europe's strategic stability, arms control and non-proliferation.

The outbreak of the war surprised many experts and practitioners in Western Europe. The conflict's evolution over 2022-2023 was hard to predict and its future remains uncertain. A large-scale, high-intensity, prolonged, conventional war between Russia and the second-largest country in Europe is an extremely complex phenomenon not seen in the Old Continent since World War II. It presents significant even if in many cases peculiar implications across the five operational domains – land, air, naval, space and cyber – as well as multiple implications at the strategic level, involving also NATO and EU defence.

Against this backdrop, this study discusses the Russia-Ukraine war's strategic implications for European countries. As such, it does not consider either the reasons for Moscow's war of aggression nor its possible outcomes beyond 2024. The first part of the publication looks at the operational level of the conflict, with a dedicated chapter for each of the aforementioned domains plus a focus on the defence industry. The second part of the study addresses a number of implications for European countries and the US, NATO and EU, with a focus on defence policy – also with regards to nuclear deterrence, arms control and non-proliferation. The publication does not deal with issues related for instance to energy supplies, international trade or the EU enlargement process, nor consider the UN or the so-called global South, in order to perimeter its focus and deepen the analysis. The conclusions and recommendations relate mainly to Italian defence policy.

The study was drafted in the second half of 2023 by an ad hoc research team and finalised in February 2024, by benefitting from a series of informal exchanges of views with practitioners and experts in Italy and abroad.

Part one

The strategic implications of a large-scale and high-intensity war in Europe

1. The land domain

by Michelangelo Freyrie and Salvatore Farina

1.1 Russian operational mistakes and adaptation

1.1.1 Russia's initial failures

Russia's invasion of Ukraine was supposed to be limited in scope and time and see little ground combat, coherently with Russia's self-perceived weakness in prolonged conventional peer-to-peer conflicts.[1]

The misguided expectations of the political and military leadership have had a significant impact on the order of battle of the ground forces, especially because Russian forces did not prepare for protracted sophisticated, large-scale land operations.[2] Up until 2022, Russian military thinking had embraced a concept of "complex defeat" involving a more commensurate use of manpower and more precise use of fires compared to Soviet doctrine, which relied on mass and overwhelming fires to enable manoeuvre.[3] In the land domain, this new approach should have involved a strengthening of Russian Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) and sophisticated integration of mechanised forces in a network of sensors and reconnaissance systems, with the aim to fully exploit old and new capabilities such as long-range fires, precision-strike systems, EW and UAVs.[4]

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1 Scott Boston and Dara Massicot, *The Russian Way of Warfare. A Primer*, Santa Monica, RAND, 2017, https://www.rand.org/pubs/perspectives/PE231.html.
2 Liz Sly, "Nine Ways Russia Botched Its Invasion of Ukraine", in *The Washington Post*, 8 April 2022, https://www.washingtonpost.com/world/2022/04/08/how-russia-botched-ukraine-invasion.
3 Michael Kofman et al., "Russian Military Strategy: Core Tenets and Operational Concepts", in *CNA Reports*, October 2021, https://www.cna.org/reports/2021/10/russian-military-strategy-core-tenets-and-concepts.
4 Ibid., p. 78.

1.1.2 Issues in force composition and organisation

A belief that the Ukrainian government would swiftly collapse meant that Russian forces did not prepare for significant combat. Blindness to actual political conditions in Ukraine, as well as the failure to account for active and passive resistance from Ukrainian civilians, had significant operational repercussions.[5] In the first phases of the war, Russian C2 was lacklustre at best and different service branches were unable to carry out sequential and mutually reinforcing actions in diverse domains in order to support land operations. Field commanders were provided with insufficient and outdated intelligence in the run-up to the invasion.[6] In the first hours of the war, Russia's modest employment of its missile stockpile[7] was aimed at Ukrainian ground-based air defences (GBAD) and obsolete military assets.[8] As such, the first volleys did little to disorganise the Ukrainian defenders, which maintained the capacity to react and mount an effective defence. More generally, Russian units proved initially unable to coordinate different branches, with armoured forces advancing without infantry or artillery support, and logistical networks were almost immediately overwhelmed once it became clear that fuel and ammunition were insufficient for longer operations.[9]

There were also issues pertaining to the Russian force model, built around the battalion tactical group (BTG), the workhorse of Russia's new operational approach. The top-heavy officer's corps is unaccustomed to autonomously exploiting local victories and seizing the initiative without explicit orders from the regimental level. The relatively high echelons at which missions are planned

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5   Interview, 17 September 2023.
6   Claire Press and Svitlana Libet, "How Russia's 35-mile Armoured Convoy Ended in Failure", in *BBC News*, 22 February 2023, https://www.bbc.com/news/world-europe-64664944.
7   On 24 February 2023 Russia launched 75 missiles – a relatively low number compared to the scale of the operation. Interview, 23 May 2023.
8   This is consistent with the expectation that Russian land units would "just" need to occupy Ukrainian territory, whose infrastructure had to be preserved for the new regime. See: Mykhaylo Zabrodsky et al., "Preliminary Lessons in Conventional Warfighting from Russia's Invasion of Ukraine: February–July 2022", in *RUSI Special Reports*, 30 November 2023, p. 24, https://www.rusi.org/explore-our-research/publications/special-resources/preliminary-lessons-conventional-warfighting-russias-invasion-ukraine-february-july-2022.
9   Bonnie Berkowic and Artur Galocha, "Why the Russian Military Is Bogged Down by Logistics in Ukraine", in *The Washington Post*, 30 March 2022, https://www.washingtonpost.com/world/2022/03/30/russia-military-logistics-supply-chain.

and executed have thus defied the purpose of the BTG as an autonomous, agile unit.[10] Russian forces have maintained a very centralised approach to C2, which has proven especially perilous in a setting characterised by intense fires and thus requiring a broad dispersion of forces.[11]

While not limited to the land domain, the absence of unity of command also proved to be far-reaching and consequential. From the very beginning until October 2022,[12] Russian ground forces lacked a unified chain of command and were scattered among different military districts, foregoing the advantages of a singular authority to deal with the military (but also political) dilemmas emerging from such a large-scale operation in heavily urban settings.

Deployed units respond to a plethora of command authorities (both formally, such as PMC Wagner, militias from the self-proclaimed People's Republics or Rosgvardiya[13] units, and informally, such as Chechen troops within Rosgvardiya or VDV troops) whose political clout has complicated efforts to coordinate and execute complex operations.[14] Further down the chain of command, the absence of a strong NCO corps and intermediate commanders has also exacerbated the breakdown of morale and command structures under duress, which has been associated with the rampant abuse and brutality of Russian troops during land operations.[15]

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[10] David Saw, "The Rise and Fall of the Russian Battalion Tactical Group Concept", in *European Security & Defence*, 8 November 2022, https://euro-sd.com/?p=26319.

[11] Interview, 14 September 2023.

[12] Andrew Roth, "Russia Appoints Notorious General to Lead Ukraine Offensive", in *The Guardian*, 8 October 2022, https://www.theguardian.com/p/mdhg6.

[13] Russia's official internal military force.

[14] Regular army units and mercenaries from Wagner have reportedly fought each other even before the June 2023 mutiny, while the political feuds involving the leadership of Defence Chief of General Staff Valeri Gerasimov has resulted in severe dysfunctions within the command and improbable force employment, such as utilising elite paratroopers in human wave attacks. See Mark Galeotti, Pavel Baev and Graeme P. Herd, "Militaries, Mercenaries, Militias, Morale, and the Ukraine War", in *The Clock Tower Security Series. SCSS*, No. 2 (15 November 2022), https://www.marshallcenter.org/en/node/2622; Matthew Loh, "Russian Troops and Wagner Mercenaries Killed Each Other in a Shootout after Blaming Each Other for Their War Failures, Ukrainian Government Says", in *Business Insider*, 25 April 2023; Riley Bailey et al., "Russian Offensive Campaign Assessment, July 13 2023", in *ISW Backgrounder*, 13 July 2023, https://www.understandingwar.org/node/5381.

[15] While this has certainly undercut any chance of winning "hearts and minds" of the occupied areas, such horrifying violations of international humanitarian law are compatible with the apparent Russian policy of resettlements. Beyond the (illegal and reprehensible) political aim of ethnic cleansing, mass deportations and brutality against civilians are compatible with a strategy of territorial control based on the substitution of civilians with friendly non-combatants. See Julia Friedrich and Niklas Masuhr,

1.1.3 Forces disposition and mobility issues

At least until 2023, Russia has suffered from a deep asymmetry in force composition. Up until the partial mobilisation started to be implemented and conscripts deployed to the front, Russian commanders faced a more numerous adversary which, also thanks to shorter, internal logistical lines, was able to quickly shift forces between different segments to the front and alternate attrition and combined arms manoeuvre when local superiority was achieved, especially in zones within Russian defences.[16] The Ukrainian breakthroughs in Kharkiv and Kherson over the fall of 2023 are largely attributable to this. Moscow was later able to partially correct this imbalance, thanks to the partial mobilisation[17] and by employing low-quality troops, or "blocking detachments",[18] essentially meant to be disposable and impose material and equipment attrition on the Ukrainian units. Still, quantity is not quality: *mobiks*[19] have sported poor operational security[20] and the deployment of instructors to the frontline will curtail Russia's capacity to properly train new units.[21]

Finally, Russian armoured formations also suffered major losses, which were only partially a consequence of insufficient coordination with other service branches. A large availability for Ukraine of smaller reconnaissance drones, loitering munition and other long-range anti-tank weapons can strike deeper and thus endanger tanks beyond direct-fire zones.[22] While this does not necessarily mean "the end of armoured warfare as we know it", it does make

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"Why Is Russia Being So Brutal in Ukraine?", in *Political Violence at a Glance*, 23 May 2022, https://politicalviolenceataglance.org/?p=17802.

16   Vikram Mittal, "Basic Attrition Models Provide Insight into Russian Woes in Russia-Ukraine War", in *Forbes*, 20 September 2022, https://www.forbes.com/sites/vikrammittal/2022/09/20/basic-attrition-models-provide-insight-into-russian-woes-in-russia-ukraine-war.

17   It is estimated that Russia was able to double the number of troops in Ukraine. Joan Faus, "EU's Borrell: Russia Won't Enter Negotiations While Trying to Win War", in *Reuters*, 29 May 2023, https://www.reuters.com/world/europe/eus-borrell-russia-wont-enter-negotiations-while-trying-win-war-2023-05-29.

18   Stephen Biddle, "Ukraine and the Future of Offensive Maneuver", in *War on Rocks*, 22 November 2022, https://warontherocks.com/?p=27891.

19   Mobilised personnel.

20   See, for instance: Will Vernon and Elsa Maishman, "Makiivka: Russia Blames Missile Attack on Soldiers' Mobile Phone Use", in *BBC News*, 4 January 2023, https://www.bbc.com/news/world-europe-64159045.

21   Interview, 14 September 2023.

22   Michael P. Losacco, "An Unerring Sense of Locality: Ukraine and the Future of Armored Warfare", in *Modern War Institute Analyses*, 2 May 2023, https://mwi.westpoint.edu/?p=20255.

infantry support and combined arms manoeuvre even more crucial in an ever-shrinking battlefield in which safe havens have become rarer.[23] Balancing and combining the use of different weapon systems in a mutually reinforcing manner, including loitering munitions, has proven a challenge for Russian forces.[24] The fact Russia operated without air superiority and with limited close air support,[25] largely in line with Russian doctrine, made land operations more difficult.

1.1.4 Shift to massive fires and defence-in-depth

Russian land forces proved capable of adapting to their own failures, especially once they shifted to static defensive operations. Russian units reverted to a firepower-centric approach, likely concluding that Ukraine's limited manpower pool and limited Western aid would condition Kyiv's capacity to withstand prolonged attrition and started to carry out indiscriminate preparatory fire missions, fully exploiting its advantage in conventional artillery, but still not synchronising with infantry and supporting actions.[26] To avoid risking its limited stock of tactical ballistic missiles and strategic bomber fleet, attacks on military targets (including troops and logistical hubs) were mainly carried out using Kh-101 cruise missiles and Iranian-made Shahed-136/Geran-2loitering munition launched from significant distances, with the bombers operating in "safe havens".[27] Together with the rationing of artillery shells,[28] this has curtailed Russia's ability to saturate Ukrainian defences, both on the homefront and on the battlefield.[29]

The invading forces adopted new informal unit structures ("assault detachments"), notably devolving support weapons such as artillery to lower-

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23   David Johnson, "The Tank Is Dead: Long Live the Javelin, the Switchblade, the…?", in *War on Rocks*, 18 April 2022, https://warontherocks.com/?p=26829.

24   Interview, 14 September 2023.

25   See in this regards chapter 2 of this study.

26   Sergio Miller, "Anatomy of a Russian Army Village Assault", in *Wavell Room*, 1 February 2023, https://wavellroom.com/?p=30007.

27   The majority of Shaded loitering munition was used against military targets. Interview, 23 May 2023.

28   Tuqa Khalid, "Russia Rationing Artillery Shells to Keep Fire Capability, 'Fragile' in Bakhmut: UK", in *Al Arabiya English*, 18 July 2023, https://ara.tv/p9msm.

29   Peter Mitchell, "Contested Skies: Air Defense after Ukraine", in *Modern War Institute Analyses*, 3 November 2022, https://mwi.westpoint.edu/?p=18886.

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level commanders[30] and making heavier use of UAVs for ISR purposes and then progressively for attack. "Disposable" units are inhumanly employed as bait to reveal enemy positions and waste Ukrainian ammunition. They are used in combination with regular and élite forces and heavy losses are taken for granted.[31] Since autumn 2022, the organisation of command posts and ammunition dumps also seem to have been scattered and reinforced,[32] making them less vulnerable to Ukrainian long-range precision fires while contrasting the targeting systems of US-provided M142 High Mobility Artillery Rocket System (HIMARS) with electronic warfare (EW) measures.[33] Counter-battery fires have reportedly also become more sophisticated, employing Lancet loitering munition, together with an overall boost to reconnaissance segment in the Russian artillery kill chain.[34] Still, Russia's massive use of artillery barrages and bombardment, while at times effective, has only allowed the invaders to achieve modest gains after the stabilisation of the front, at the expense of high volumes of ammunition and tying down the majority of its manpower in costly sieges.[35] While it is true that "firepower has a mass of its own", *mobik* units have proven incapable of exploiting this feature due to their relatively static nature, preventing the implementation of flexible defence tactics.[36]

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30   Sebastien Roblin, "Captured Manual Reveals Russia's New 'Assault Detachment' Doctrine", in *Forbes*, 28 February 2023, https://www.forbes.com/sites/sebastienroblin/2023/02/28/captured-manual-reveals-russias-new-assault-detachment-doctrine.
31   Jack Watling and Nick Reynolds, "Meatgrinder: Russian Tactics in the Second Year of Its Invasion of Ukraine", in *RUSI Special Reports*, 19 May 2023, p. 3-4, https://www.rusi.org/explore-our-research/publications/special-resources/meatgrinder-russian-tactics-second-year-its-invasion-ukraine.
32   AP, "Russia's Improved Weaponry and Tactics Pose Challenges to Ukraine's Counteroffensive", in *AP News*, 12 June 2023, https://apnews.com/article/8fbdd80504e9d2d1f722b471081504c0.
33   Alex Marquardt, Natasha Bertrand and Zachary Cohen, "Russia's Jamming of US-provided Rocket Systems Complicates Ukraine's War Effort", in *CNN Politics*, 6 May 2023, https://edition.cnn.com/2023/05/05/politics/russia-jamming-himars-rockets-ukraine.
34   Jack Watling and Nick Reynolds, "Meatgrinder", cit., p. 13-14.
35   John Spencer and Liam Collins, "Twelve Months of War in Ukraine Have Revealed Four Fundamental Lessons on Urban Warfare", in *Modern War Institute Analyses*, 23 February 2023, https://mwi.westpoint.edu/?p=19778.
36   Interview, 14 September 2023.

1.2 Ukraine between defence and counter-offensive

1.2.1 Ukrainian preparations and the experience of Kherson and Kharkiv

Ukraine adopted a flexible response to the Russian invasion, which was initially dictated by the limited aid the country had received in the run-up to the large-scale war. Military aid to Kyiv between 2014 and 24 February 2022, mainly from the US, had been limited to training and small ticket items or enabling capabilities,[37] rather suited for an asymmetric campaign and insurgency-like operations. This was predicated on the expectation that Ukrainian forces would execute an orderly retreat from Kyiv and later eventually retake much of the lost ground.[38] Once it became clear that Ukrainian lines would hold, the focus moved to providing anti-armour systems and ammunition for Soviet legacy systems, and even later armoured and mechanised vehicles.

Early on, Ukraine carried out sabotage actions against its own waterways and infrastructures, causing extensive flooding along the Dnieper River north of Kyiv, worsening the logistical quagmires of the Russian rear and forcing advancing columns in dangerous chokepoints.[39] The defenders used barriers to force enemy mechanised troops into dense urban environments and forests, nullifying the invaders' advantage in terms of hardware. In most cities of the heavily urbanised northern Ukrainian border, and subsequently in the clashes for Kherson and Severodonetsk, river crossings became the most important

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[37] Aid included "sniper rifles, rocket-propelled grenade launchers, counter-artillery radars, […] secure communications, satellite imagery and analysis capability, counter-unmanned aerial systems (UAS), air surveillance systems, night vision devices, and equipment to support military medical treatment and combat evacuation procedures". See Christina L. Arabia, Andrew S. Bowen and Cory Welt, "U.S. Security Assistance to Ukraine", in *CRS In Focus*, 15 February 2024, https://crsreports.congress.gov/product/details?prodcode=IF12040.

[38] Victoria Nuland, US Undersecretary for Political Affairs at the Department of State, put it this way: "We were preparing for many scenarios in which the Ukrainians essentially had to get Kyiv back, get their country back — potentially a government-in-exile. We didn't know which scenario we were going to be looking at". See Erin Banco et al., "'Something Was Badly Wrong': When Washington Realized Russia Was Actually Invading Ukraine", in *Politico*, 24 February 2023, https://www.politico.com/news/magazine/2023/02/24/russia-ukraine-war-oral-history-00083757.

[39] Sean Watts and Winston Williams, "Ukraine Symposium – Destructive Counter-Mobility Operations and the Law of War", in *Articles of War*, 5 May 2022, https://lieber.westpoint.edu/?p=15168.

strategic objective to cut off the adversary's resupply avenue.[40]

In the first year of the war, Ukraine could count on a significant, local numerical advantage over Russia. While Moscow had decided to politically limit the number of conscripts deployed in the "special military operation", the defenders immediately carried out a policy of general mobilisation.[41] In autumn 2022, this allowed Ukraine to fully exploit its numerical advantage imposing attrition on Russian troops and weakening their lines in different sectors of the front. This allowed Ukrainian troops to feint an offensive in the southern Zaporizhzhia oblast, forcing a Russian redeployment and critically weakening the defences in the Kharkiv oblast, where Ukrainian mechanised troops were able to quickly bypass and overwhelm Russian irregular troops. Combat proved more arduous in the simultaneous assault on Kherson, where a dense concentration of Russian troops required extensive artillery barrages. Here, Russian units were able to perform a competent retreat.[42]

1.2.2 C4ISR as a decisive factor

The complex urban terrain of Ukraine, with its high-rise structures and resistant concrete buildings, enhanced the strong points of the Ukrainian defences while worsening Russia's lack of coordination. Especially in the initial phase of the war, the decentralised C4ISR of Ukrainian forces, was streamlined with innovative solutions such as "Uber-like" apps to call in artillery strikes.[43] Innovative C4ISR solutions also allowed to cut the Ukrainian reconnaissance-fire cycle by automatising and embedding in user-friendly interface trajectory calculations.[44] The use of First-Person-UAVs to prepare strikes[45] also lent the defenders enough flexibility to effectively decimate advancing Russian units.[46]

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40 John Spencer and Liam Collins, "Twelve Months of War in Ukraine Have Revealed Four Fundamental Lessons on Urban Warfare", cit.
41 As of July 2022, Ukraine is assessed as fielding up to 700,000 troops against the 300,000 deployed by Russia. CIA, "Ukraine", in *The World Factbook*, updated on 6 February 2024, https://www.cia.gov/the-world-factbook/countries/ukraine/#military-and-security.
42 Franz-Stefan Gady and Michael Kofman, "Ukraine's Strategy of Attrition", in *Survival*, Vol. 65, No. 2 (April-May 2023), p. 7-22, https://doi.org/10.1080/00396338.2023.2193092.
43 Olena Mukhina, "NATO Calls New Software Developed by Ukrainian Army an 'Artillery Uber'", in *Euromaidan Press*, 26 July 2022, https://euromaidanpress.com/?p=171396.
44 Interview, 4 October 2023.
45 Olena Mukhina, "NATO Calls New Software Developed by Ukrainian Army an 'Artillery Uber'", cit.
46 Sam Plapinger, "Urban Combat Is Changing. The Ukraine War Shows How", in *Defense One*, 3

Ukrainian forces were capable of fully exploiting the growing transparency of the battlefield, which translates into increased lethality and precision of long fires.[47] The availability of Starlink technology, but also more low-key secure tactical communication systems provided by NATO and intel and ISR info shared by Western partners and supporters were a decisive advantage for Ukrainian land forces in tactical settings.[48]

However, superior tactical C4ISR failed to translate into an operational advantage. Despite a recent shift to mission command, older Ukrainian military leaders still cling to a rigid command structure in which junior officers and deputies cannot gain the initiative and exploit local advantages.[49] Mission planning is still mostly performed in silos, without cross-branches coordination, and the ability to conduct combined arms operations (the synchronisation e.g. of artillery fires, close air support and mechanised assaults) still eludes Ukrainian forces.[50] This may partly be due to the fact that training with Western-made material is provided at lower command echelons and not on a brigade level.[51]

1.2.3 Force projection and force protection

The lack of aircraft and combat and support helicopters and the few available being far from advanced (see in this regard chapter 3 of this study) means that Ukraine has to heavily rely on barrelled and rocket artillery to soften and suppress enemy positions, especially in the country's south, where Russian engineers have built extensive fortifications.[52] However, Ukrainian forces

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February 2023, https://www.defenseone.com/ideas/2023/02/ukraine-war-shows-how-urban-combat-changing/382561.

47 Interview, 14 September 2023.

48 Hanna Shelest, "Defend. Resist. Repeat: Ukraine's Lessons for European Defence", in *ECFR Policy Briefs*, November 2022, https://ecfr.eu/?p=98415.

49 Erik Kramer and Paul Schneider, "What the Ukrainian Armed Forces Need to Do to Win", in *War on the Rocks*, 2 June 2023, https://warontherocks.com/?p=28862.

50 Charles McEnany and Daniel S. Roper, "The Russia-Ukraine War One Year In: Implications for the U.S. Army", in *AUSA Spotlights*, No. 23-1 (March 2023), https://www.ausa.org/publications/russia-ukraine-war-one-year-implications-us-army.

51 "Scaling up training from the level of squads to platoons, companies, and eventually battalions will give Ukrainian forces the agility and speed they need to overcome Russia's preferred war of attrition and to recapture Russian-occupied territory." Alexandra Chinchilla and Jahara Matisek, "Ukraine's Hidden Advantage", in *Foreign Affairs*, 11 May 2023, https://www.foreignaffairs.com/node/1130322.

52 Christopher Miller, "Military Briefing: Ukraine Switches to Artillery Power for Eastern Push", in *Financial Times*, 27 July 2023, https://www.ft.com/content/e26ea4c9-90ed-48e5-a599-b2f306682e18.

lament that they lack the means to engage Russian units and logistical nodes in depth. Initial successes with HIMARS, which has a 70 km range when equipped with Guided Multiple Launch Rocket System (GMLRS) munitions, have spurred adaptation from the Russian side.[53] Ukraine also got both the Excalibur and a small number of the Italian Vulcano 155 mm long-range/precision ammunition, but again these are costly "silver bullets" to be sparingly used on important targets. The provision of British Storm Shadow cruise missiles has provided to engage critical objects (e.g., bridges, ships) at a maximum range of over 250 km, but the contested airspace above Ukraine and the high costs of the system have stymied extensive use.[54] MGM-140 Army Tactical Missile System (ATACMS) munition for the HIMARS thus remains a critical request by the Ukrainian MoD. ATACMS supplies, including cluster warheads, have started but these systems are available in very limited quantities. Long-range fires also matter for an effective distribution of troops, considering the relatively low force-to-space ratio of Ukraine's extensive frontline.[55]

When effectively employed, electronic warfare has also proven critical in support of artillery operations. The identification of Russian electromagnetic signatures, for instance, has allowed to carry out debilitating strikes against troop concentrations in Makiivka.[56]

The proliferation of UAVs (with Ukraine reportedly using up to 10,000 drones per month) and the widespread use of artillery fires also means that Ukrainian forces opted for spreading units and making a parsimonious use of armoured units, especially during the summer 2023 counteroffensive after some disappointing initial attempts.[57] Conducting Western-style manoeuvre mobile warfare with the newly equipped units without air superiority and support proved difficult and costly also for Ukrainian forces.

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[53] "Russians Have Adapted to HIMARS. What Are Ukraine's Alternatives?", in *Euromaidan Press*, 9 January 2023, https://euromaidanpress.com/?p=191667.
[54] Michael Peck, "Storm Shadow Missiles Give Ukraine 'a Much Longer Stick,' but Russia is Already Learning to Adapt, Expert Says", in *Business Insider*, 31 July 2023.
[55] Seth G. Jones, Alexander Palmer and Joseph S. Bermudez Jr, "Ukraine's Offensive Operations", in *CSIS Briefs*, June 2023, https://www.csis.org/node/105851.
[56] "Makiivka: Russia Blames Its Own Soldiers' Mobile Phone Use for Deadly Ukraine Missile Strike", in *Euronews*, 4 January 2023, https://www.euronews.com/2023/01/04/makiivka-russia-blames-its-own-soldiers-mobile-phone-use-for-deadly-ukraine-missile-strike.
[57] Interview, 4 October 2023.

Finally, the early, massive provision of man-portable air-defence systems (MANPADS) and then during the war of a variety of air defence systems forced Russia to forego the use of rotary-wing assets in offensive operations and close air support.[58] Since spring 2023, Russian helicopters have been employed in a stand-off manner to blunt Ukrainian forays into the multi-layered defensive lines on the southern front.[59]

1.3 Implications

The war against Ukraine has been dominated by land-based combat. As explored in the first section of this chapter and chapter 3 of this study on the air domain, this was due to the failure to establish air dominance and a sequence of catastrophic mistakes committed by the Russian forces – as well as the Western choice of only progressively transferring ever-more sophisticated weapon systems to Ukraine rather than immediately providing the necessary assets for a peer-to-peer confrontation.[60] Obviously, these are contingencies that would (or should) not manifest in the ill-fated case of a major military confrontation involving NATO. NATO countries, like most armed forces in history, plan for short wars[61] – and land combat is expected to be limited thanks to crushing air, space and cyber dominance. Still, identifying implications is possible and necessary: a Western failure to establish air dominance is in the realm of possibilities, and the different phases of the first 19 months of the war (a lighting offensive, trench warfare, manoeuvre counteroffensives) present distinct features and operational shortcomings from which NATO land forces are not necessarily immune.

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58   See Ottavia Credi, "The threat in Light of the Russian-Ukrainian War", in Ottavia Credi et al., "Short Range Air Defence: Operational and Technological Developments", in *Documenti IAI*, No. 22|07en (September 2022), p. 3-10, https://www.iai.it/en/node/15971.
59   See Karolina Muti, "Helicopters and War: Lessons Learned from Ukraine", in Alessandro Marrone and Giancarlo La Rocca (eds), "Future Military Helicopters: Technological Innovation and Lessons Learned from Ukraine", in *Documenti IAI*, No. 23|19 (September 2023), p. 3-11, https://www.iai.it/en/node/17434.
60   The question whether immediate, massive aid would have been politically viable, diplomatically sound and militarily sustainable is outside of the scope of this study.
61   Cfr. Lawrence Freedman, *The Future of War. A History*, New York, Public Affairs, 2017.

1.3.1 Mission command and C4ISR

The war against Ukraine has demonstrated the degree to which multi-domain, manoeuvre warfare can be impactful when correctly carried out.[62] In the land domain, this translates into flexibility and mobility of forces, the timely exploitation of local advantages, a combined arms approach and rapid Observe Orient Decide Act (OODA) loops thanks to effective C4ISR.[63] Tactical engagements in Ukraine have shown how innovative technology, in particular UAVs, can have an outsized enabling effect at every command echelon. The strengthening of ISR capabilities with tactical drones and the exploitation of the electromagnetic spectrum can increase the lethality of squads and smaller infantry units of manoeuvre when they act in concert with armour, artillery, and fire support. This broadly confirms the embrace of mission command by Western military thought,[64] and more recently Russia,[65] although the latter's experience also reminds the importance of unity of command.

1.3.2 Manoeuvre in a transparent battlefield

The conduct of operations by Ukraine has also consisted of a continuous alternation between attrition and manoeuvre, especially on fronts where Russian forces were competently led and organised.[66] Increased transparency of the battlefield thanks to new ISR techniques has meant that ground units have become more lethal and precise, increasing frontline attrition. Long fires, loitering munitions and UAVs have also become far more precise, greatly reducing "safe havens" in the rear. Increased precision of artillery means that ground forces are likely to operate in a more scattered manner, again requiring

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62   Christopher Tuck, "The Future of Manoeuvre Warfare", in Mikael Weissmann and Niklas Nilsson (eds), *Advanced Land Warfare. Tactics and Operations*, Oxford, Oxford University Press, 2023, p. 25-42, https://doi.org/10.1093/oso/9780192857422.003.0002.

63   Benjamin Jensen and Matthew Strohmeyer, "The Changing Character of Combined Arms", in *War on the Rocks*, 23 May 2022, https://warontherocks.com/?p=27015; Lester W. Grau and Charles K. Bartles, "The Russian Army and Maneuver Defense", in *Armor*, Vol. 136, No. 2 (Spring 2021), p. 47-54, https://www.moore.army.mil/armor/earmor/content/issues/2021/Spring.

64   Jeroen Verhaeghe, "Is NATO Land Operations Doctrine Aiming Too High?", in *War on the Rocks*, 6 June 2021, https://warontherocks.com/?p=25392.

65   Clint Reach and Anthony Atler, "Russian 'Principles of Victory in Combat' and MCDP-1 Warfighting", in *NDC Russian Studies Series*, No. 2/2022 (15 February 2022), https://www.ndc.nato.int/research/research.php?icode=747.

66   Franz-Stefan Gady and Michael Kofman "Ukraine's Strategy of Attrition", cit.

flawless C2. This new setting is causing armed forces to re-balance between combat mass, firepower and technological sophistication.[67] This will also force a reappraisal of manoeuvre warfare, which may become more and more based on indirect fires and the conditional on phases of attrition (although such considerations were already present even during the 20th century World Wars).[68]

1.3.3 High-low mix in a combined arms framework

Even still, the central role played by attrition has some profound implications for how a NATO country such as Italy, with innovative but limited material and human resources, looks at land operations. Ukraine's experience has confirmed how important it is for land units to be meshed in a combined arms framework. Short-range air defence (SHORAD), long-range artillery or close air support will not be effective if they are not integrated in such a way that they mutually reinforce the respective effects and even out possible system-specific shortcomings and vulnerabilities. This will require NATO armies to adopt a balanced procurement policy, combining expendable systems (such as loitering munitions, one-way attack and/or first-person view UAS) with sophisticated, high-value hardware (such as Main Battle Tanks). When using a combined arms approach, Ukrainian forces were able to put to good use even obsolete weapon systems such as the MILAN anti-tank system. Effective C4ISR and the ability to impose fire control over larger areas unlocks new levels of lethality in smaller, scattered units.

In a peer-to-peer confrontation one should expect safe havens to effectively stop existing, requiring additional investments in force protection, starting with air (with a focus on counter-UAS) and missile defence, both fixed and mobile. The difficulties met by Ukrainian forces in the 2023 summer counteroffensive have highlighted the importance of being able to engage the enemy in depth, which the UAF was only partially able to do due to the lack of longer-range systems.

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67   Interview, 14 September 2023.
68   Franz-Stefan Gady and Michael Kofman, "Ukraine's Strategy of Attrition", cit.

1.3.4 The political dimension of territorial control

A ubiquity of indirect engagements does not mean that units will forego the need to effectively control the conquered terrain. The organisation of the battlefield by building military infrastructures (such as trenches and casemates) and exploiting environmental factors (such as rivers) remains crucial, especially around key positions. One should also not underestimate the political ramifications of these operational decisions. Increased lethality, better C4ISR, an improvement of indirect fires and a scattering of forces are expected to push armed forces towards a doctrine of point defence and to focus on the seizure of neuralgic points in the enemy network of forces and logistics in order to avoid attrition.[69] However, in Ukraine, this military logic, especially touted by Western commentators, has clashed with the understandable political imperative of reclaiming territory, citizens and resources from an invader which is perceived as operating with genocidal intent, and defending from air attacks against fielded forces, strategic and industrial targets, cities and population. Likely, similar concerns would also pertain to other nations engaged in a defensive peer-to-peer conflict. This divergence may still have implications for the international community, with the perspective of an enduring conflict potentially weakening the resolve of open-ended support for the Ukrainian cause.

One should not be too quick to discount these considerations are contingent on the Ukrainian context. Of course, the conditions illustrated above are specific to the peculiarities of ground combat in Ukraine, where neither side could for instance benefit from air superiority. Nevertheless, the war has shown that in a combat scenario in which losses are expected to be high, a swift, "clean" breakthrough with little ground engagements is unlikely and lethal, indirect combat is expected to be ubiquitous and may be extremely tangible and far-reaching.

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[69]   Interview, 14 September 2023.

2. The air domain

by Alessandro Marrone and Vincenzo Camporini

The war in Ukraine presents four key implications pertaining to the air domain, with regards to: 1) the bloody consequences of air parity; 2) the key role of air and missile defence; 3) the drones' massive added value; 4) the challenges to modern helicopters.

The fact the war unfolded mainly in the land domain should not lead to the underestimation of the airpower, which has been indeed one of the main factors shaping the military battles and the ongoing stalemate on the ground.[1]

2.1 The bloody consequences of air parity

In this conflict, neither Russia nor Ukraine achieved air superiority not to mention air dominance over the whole operational theatre and on a permanent basis. From the outset, the Russian air force had a greater than 10 to 1 advantage over Ukraine's in total combat aircraft and deployed some 350 for this war.[2] Still, it is unclear why Russia did not seriously try to obtain air superiority in the early weeks of the invasion – perhaps because of another miscalculation about the resistance of the opponent. Moscow relied heavily on Iskander ballistic missiles and Kalibr cruise missiles, firing more than 900 of various types and sizes in just the first three weeks of the war,[3] but did not run a prolonged, massive air campaign *before* its troops crossed the Ukrainian borders. Thus, it accepted the risk to field a land offensive without the control of the skies and the subsequent ability to ensure close air support to manoeuvring troops.

1   Satcha de Henning Michaëlis and Laurent Borzillo, "What Lessons Can Be Drawn from the 'Second Russo-Ukrainian War'?", in *Network for Strategic Analysis Policy Reports*, No. 23 (July 2023), https://ras-nsa.ca/what-lessons-can-be-drawn-from-the-second-russo-ukrainian-war.

2   Herbert Bowsher, "Air Denial Lessons from Ukraine", in *USNI Proceedings*, Vol. 149/9/1,447 (September 2023), https://www.usni.org/node/61874.

3   David Vergun, "Russians Pounding Ukraine Cities with Long-Range Fires, Says Official", in *DOD News*, 14 March 2022, https://www.defense.gov/News/News-Stories/Article/Article/2965939.

International observers were also surprised by the lack of any air interdiction campaign and offensive counter-air against the Ukrainian air force at the beginning of operations. An explanation may be the total confidence of the Russian leadership that Ukraine would surrender in a few days and that infrastructures could be spared. Later, when the value of this infrastructure for the flow of Western military supplies became evident, the Russian inability to maintain air superiority prevented an effective campaign. The absolute need for a credible interdiction capability became even more evident throughout subsequent operations, with the Ukrainians strongly engaged, for example, in making it difficult for the Russians to maintain the required level of resupply for Crimea.

At the same time, the Ukrainian forces lacked the capabilities to overcome Russian robust, large-scale air defences. Kyiv repeatedly requested F-16s and other fighters from its allies, which have not provided Western-manufactured aircraft during the conflict – which in any case would have taken a lot of time (i.e. for pilots' training, support weapons, etc). As a matter of fact, Ukraine had to run its counter-offensives in 2022 – around Kharkiv and Kherson – and 2023 without local air superiority nor proper close air support via fixed- or rotary-wings assets. The US Head of NATO Air Command estimated that in the first year of the conflict Ukraine lost about 60 aircraft and Russia more than 70,[4] further confirming a situation of air parity – which further disadvantages Kyiv as it holds a smaller fleet. He also argued that a more powerful air force on the Ukrainian side could have blunted Russia's invasion in its initial phases.[5]

Over the first weeks of the war, Russian air forces run between 150 and 300 air sorties per day. At the end of 2023 further estimates of Russian losses pointed to at least 100 aircraft and 120 helicopters – including both incidents and those shot down). Reportedly, Russia is able to produce between 20 and 36 aircraft per year but struggles to train combat-ready pilots. On the Ukrainian side, as it got the available MIGs from Eastern European allies and no other aircraft will reasonably be supplied over 2024, it has to limit air operations to save

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4   Chris Gordon, "Ukraine Has Lost 60 Aircraft, Taken Down 70 in Russian Invasion, Hecker Says", in *Air & Space Forces Magazine*, 6 March 2023, https://www.airandspaceforces.com/?p=184204.
5   Chris Gordon, "Lack of Airpower in Ukraine Proves Value of Air Superiority, NATO Air Boss Says", in *Air & Space Forces Magazine*, 22 March 2023, https://www.airandspaceforces.com/?p=186107.

the modest capabilities at its disposal while ensuring challenging repair and maintenance. A positive note concerns the successful integration by Ukraine of Western weaponry on Soviet-era aircraft: HARM and Storm Shadoe missiles have been successfully integrated into MIGs.

The stalemate in the air domain strongly concurred to shape the land operations in a way profoundly different from contemporary state-to-state conflicts like the first Gulf War. Artillery, main battle tanks and armoured vehicles have become the key capabilities for land manoeuvres. As a result, an attrition war has taken place from Spring 2022 onwards. Russian advances in Mariupol or Bakhmut have been extremely slow and implied huge losses in terms of both military personnel and equipment. Ukrainian 2022 campaigns around Kharkiv and Kherson have been relatively rapid and took a lower death toll, but this is not the case for the 2023 counter-offensive which was meant to be the decisive effort to free occupied territories.

Broadly speaking, the modalities of land warfare in this conflict un-directly demonstrate the relevance of airpower and at least air superiority: without it, victory becomes far more difficult to achieve, and exceedingly costly in terms of blood and treasure. The casualties suffered by Ukraine over the last year would be extremely difficult to sustain in Western Europe and the US for a much shorter period of time without weakening the domestic public opinion support for a continuation of the conflict. Therefore, achieving air superiority, at least temporarily and/or over certain areas, remains a crucial task for NATO members. It is not by chance since 2022 Alliance's commands and air forces are increasingly focusing on the tactics and assets to reach this goal in the framework of the collective defence of the European continent.[6]

2.2 The key role of air and missile defence

The second key implication regards Integrated Air and Missile Defence (IAMD) as a strategic enabler of Ukraine's resistance. After the blitzkrieg envisaged by

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6   Rachel S. Cohen, "Ukraine War Prompts New US Air Tactics in Europe", in *AirForce Times*, 18 August 2023, https://www.airforcetimes.com/news/your-air-force/2023/08/18/ukraine-war-prompts-new-us-air-tactics-in-europe.

the Kremlin failed and Russian troops had to withdraw from Kyiv and the whole of northern Ukraine, Moscow consistently tried to destroy the opponent's critical infrastructures by targeting energy plants and electricity grids. Russia used most of its stockpiles of missiles – including old, modern and hypersonic ones[7] – bombs and drones, ramped up domestic production as possible given Western sanctions and bought UAS from Iran as well as missiles and ammunition from North Korea.[8] Moscow has managed for many months to run night bombings on a regular basis, and from time to time to conduct massive air bombings. The goal was to disrupt society's functioning over the long, cold winter season in order to let the population pressure political leadership to negotiate a peace deal favourable to Moscow. Winter 2023-2024 witnessed a shift of priority: from electricity grids to the industrial military complex. At the same time, such air campaigns are meant to consume Western-donated, costly military equipment, in order to make it more difficult for the US and Europe to share the burden of long-term support to Kyiv. In other words, the systematic air campaigns towards civilian infrastructures and/or defence industry over almost two years aim to obtain the strategic effect that land warfare has not granted to Russia.

So far, Moscow failed to achieve this goal thanks to the air and missile defence capabilities deployed in Ukraine. Since 2022 Kiev consistently asked for more of these assets, including the related effectors, sensors and ammunitions, and as much advanced, effective and long-range as possible. Allies gradually donated such capabilities over time, with an increasing pace and magnitude of supplies, and Ukraine made extraordinary progress in terms of integration and effective use of a variety of assets in a country-wide air and missile defence architecture. Even if this is a very difficult goal, as the variety of systems donated is not (yet) integrated into a full IADS. Over the months, the air defence systems donated by international allies to Kyiv made it almost impossible for Moscow to achieve air superiority. The combination of a variety of assets, from MANPADS to Patriot anti-air/anti-missile systems and MIG aircraft, has enabled Kyiv to shoot down

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7 On the Russian hypersonic weapons used in Ukraine see Karolina Muti (ed.), "Le capacità missilistiche ipersoniche: stato dell'arte e implicazioni per l'Italia ", in *Documenti IAI*, No. 23|22 (November 2023), https://www.iai.it/en/node/17807.

8 Brad Lendon, "Russia Is Using North Korean Missiles in Ukraine, US Says. That's Bad News for Asia", in *CNN*, 5 January 2024, https://edition.cnn.com/2024/01/05/europe/russia-north-korean-missiles-ukraine-asia-intl-hnk-ml.

the vast majority of Russian air attacks and to run air operations on its side of the frontline. The Ukrainian military largely neutralised Russia's air force also thanks to dispersed and mobile ground-based air-defence systems and took full advantage of US intelligence to disperse its forces confusing the Russian military.[9] It also fully exploited what is a weakness: the lack of standardisation. Indeed, Russian forces pilots are by default uncertain about which systems they will have to face and how to counteract them. In a nutshell, Ukraine's air-denial approach involved: mobility to increase survivability; dispersion to complicate adversary targeting; selective use of ground-based air defence to reduce visibility and vulnerability; and efficient choice of ordnance to conserve missiles.[10] Still, Ukraine lacks the air defences needed to protect deployed forces at the frontline and at the same time defend the cities as well as military infrastructures. Therefore, for obvious political reasons, it has been forced to fire precious and scarce assets to intercept cheap targets such as the Iranian-made drones carrying a mere 20 kg warhead but aimed against city centres. As a result, as mentioned before, Kyiv managed to shoot down the vast majority of Russian attacks before they hit the target. At the same time, Ukrainian institutions and the private sector invested in the resilience of energy-critical infrastructures, again with important international support, and in the ability to rapidly repair what was hit by the Russian missiles, drones and bombs which penetrated the Ukraine IAMD. This overall response succeeded in keeping a sufficient level of infrastructures functioning, which in turn enabled the country's economy and society to resist despite the casualties, displacements, suffering, damages and limitations imposed by the war.

The key implication is that IAMD was vital for the country's war effort in many ways, and would be vital for any Western country in a scenario of peer-to-peer conflict. First, to deny air superiority. Second, to protect critical infrastructures as the probable centre of gravity of the opponent's air campaign. NATO IAMD and Italian contribution to it is worth the price of investments in adequate, advanced, multi-layered capabilities.[11] This includes also electromagnetic spectrum operations, since electronic warfare is assessed as a key element

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9   Herbert Bowsher, "Air Denial Lessons from Ukraine", cit.
10   Ibid.
11   For a pre-war comprehensive analysis of the IAMD in Europe see Alessandro Marrone and Karolina Muti (eds), "Europe's Missile Defence and Italy: Capabilities and Cooperation", in *Documenti IAI*, No. 21|05 (April 2021), https://www.iai.it/en/node/13072.

of the Russia-Ukrainian war and a source of concern for Western militaries – including US ones – which risk loose superiority and therefore suffer high attrition and casualties.[12] At the same time Italy, together with other NATO allies should invest in air power to overcome adversary IAMDS – the so-called anti-access/area denial bubbles – and achieve air superiority. This is rightly a top priority for US and NATO military commanders because the specific constraints that Ukraine had in not attacking Russian territory would not apply in a NATO-Russia conflict, and the best way to protect allied infrastructure and population is not to destroy the "arrows" of Russian air power – missiles, bombs and drones – but the "bows" in terms of aircraft, missile systems, airfields, command and control centres, logistics and factories, and this requires allies to overcome Russia own IAMD.

2.3 The drones' massive added value

The third key implication concerns unmanned aerial systems (UAS). The use of UAS in Ukraine has been unprecedented in terms of both quantity and quality. By counting the whole variety of assets of both sides, the total number of drones used over the last two years is in the range of dozens if not hundreds of thousands. As neither Russia nor Ukraine achieved air superiority, the two parties have been deploying tactical UAS to reduce risks when carrying out ISR and strike missions.[13] Ukraine is reported to use as many as 10,000 drones per month, with 40 per cent of them lost due to operator errors.

Most of them have been used as suicide drones and loitering munitions to hit targets – albeit with limited precision – and/or to saturate Ukrainian air defences in order to pave the way for more effective missiles or bombs. As mentioned before, Russia developed over time more sophisticated ways to combine drones with missiles and bombs within massive air strikes. Ukrainian armed forces effectively integrated them into land warfare to systematically

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12 Colin Demarest, "Electronic Warfare in Ukraine Informing US Playbook", in *Defense News*, 13 September 2023, https://www.defensenews.com/electronic-warfare/2023/09/13/electronic-warfare-in-ukraine-informing-us-playbook.
13 Giulia Tilenni, "UAV Programmes: a Focus on the EU", in *European Security and Defence*, 3 August 2023, https://euro-sd.com/?p=32890.

attack Russian tanks, armoured vehicles, and trenches,[14] as well as military assets, logistic infrastructures and symbolic targets well behind the frontline across territories occupied by Moscow. Quadcopters carrying anti-tank bombs have plagued main battle tanks in Ukraine.[15] The same applies to naval warfare, with air drones integrated into sophisticated attacks against Russian vessels and ports, particularly but not only in the Crimea peninsula, sometimes integrated with naval drones.[16] Doctrinal developments occurred both top-down and bottom-up, hand in hand with dynamic changes in tactics, techniques and procedures, in a timely, effective and unprecedented way. The integration of drones and command-control networks has ushered in a new era of information supremacy.[17] Supplies of UAS has evolved too, with a greater emphasis on mass, lethality and, in some cases, survivability. Drones' production ramped up, particularly in Turkey and Iran to supply respectively Kiev and Moscow. Reportedly, Teheran has supported also the build-up of a drone factory in Russia.[18] Several European countries have now embraced drone diversity with respect to the previous focus only on ISR and/or on medium altitude long endurance assets, including investments in loitering munitions.[19] Finally, it should be noted that drones have been reportedly used by Ukraine to conduct psychological operations through a few long-range attacks on Kremlin buildings in July 2023.[20]

The key implication is that the combination of crewed and uncrewed assets, as well as a variety of effectors, significantly multiplies the impact of air campaigns at tactical and operational levels. In particular, due to the war's dramatic urgency, drones' integration made a leap forward and proved surprisingly crucial in delivering tactical victories, by acting in the lower airspace in the

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14 See in this regards chapter 2 of this study.
15 Can Kasapoğlu, "Lessons from Ukraine for the Future of War", in *Hudson Institute Commentaries*, 16 August 2023, https://www.hudson.org/node/46869.
16 See in this regards chapter 3 of this study.
17 Can Kasapoğlu, "Lessons from Ukraine for the Future of War", cit.
18 Natasha Bertrand, "Iran Helping Russia Build Drone Stockpile that Is Expected to be 'Orders of Magnitude Larger' than Previous Arsenal, US Says", in *CNN Politics*, 25 July 2023, https://edition.cnn.com/2023/07/25/politics/us-russia-iran-drones.
19 Dominika Kunertova, "Drones Have Boots: Learning from Russia's War in Ukraine", in *Contemporary Security Policy*, Vol. 44, No. 4 (October 2023), p. 576-591, https://www.doi.org/10.1080/13523260.2023.2262792.
20 Grace Jones, Janet Egan and Eric Rosenbach, "Advancing in Adversity: Ukraine's Battlefield Technologies and Lessons for the U.S.", in *Belfer Center Policy Briefs*, 31 July 2023, https://www.belfercenter.org/node/138030.

absence of air superiority.[21] In light of the Russia-Ukraine war, there is a strong push worldwide to produce armed drones of different sizes,[22] costs and performances to be fully integrated in air campaigns as well as in land and naval warfare. At the same time, their attrition vis-à-vis robust air defences calls also for the development of faster, stealthier and more lethal combat air systems, acting alone or as an adjunct to fighter aircraft.[23] In Italy, much work has to be done to acquire and effectively integrate armed drones across the three services, as well as to invest in future uncrewed combat systems.[24] In particular, those armed drones more advanced than loitering munitions will need adequate rules of engagement, command and control mechanisms and decision-making processes similar to a Joint Force Air Component Command. At the same time, much effort is required in developing effective electronic countermeasures against lower spectrum drones, given on the one hand their lethality and on the other hand the unsustainable effort to neutralise these weapons with kinetic kill systems due to their limited availability and high cost.

2.4 The challenges to modern helicopters

The war in Ukraine tested the vulnerability of modern helicopters in near-peer conflicts, by raising a dilemma on the future of military rotary wing assets. During the first 16 months of the conflict, it has been estimated that Moscow lost 90 helicopters,[25] although real numbers are probably higher, thus demonstrating a low aircraft survivability. Such significant helicopter losses resulted in a gradual change of the tactics by the Russian Armed Forces: until March 2022, helicopters were more widely used to conduct hunter-killer missions, penetrating up to 50 km in depth of enemy-controlled territories,[26]

21 Dominika Kunertova, "Drones Have Boots", cit.
22 Elisabeth Gosselin-Malo, "Ukraine War Drives Push for Arming Smaller Drones", in *Defense News*, 12 September 2023, https://www.defensenews.com/unmanned/2023/09/12/ukraine-war-drives-push-for-arming-smaller-drones.
23 See in this regards Elio Calcagno and Alessandro Marrone (eds), "Above and Beyond: State of the Art of Uncrewed Combat Aerial Systems and Future Perspectives", in *Documenti IAI*, No. 23|24 (December 2023), https://www.iai.it/en/node/17889.
24 Ibid.
25 Jakub Janovsky et al., "Attack on Europe: Documenting Russian Equipment Losses during the 2022 Russian Invasion of Ukraine", in *Oryx*, 24 February 2022 (updated on 14 February 2024), https://www.oryxspioenkop.com/2022/02/attack-on-europe-documenting-equipment.html.
26 Justin Bronk, Nick Reynolds and Jack Watling, "The Russian Air War and Ukrainian Requirements for Air Defence", in *RUSI Special Reports*, 7 November 2022, p. 21, https://rusi.org/explore-our-research/

while afterwards, their use for penetration missions decreased significantly. A number of elements in terms of doctrine, organisation, training, tactics, techniques and procedures, maintenance and logistics, hampered Russian use of helicopters.[27] Surely, they include an effective use by Kyiv of equipment provided by allies, such as the FGM148 Javelin, the FIM-92 Stingers, longer-range US National Advanced Surface-to-Air Missile System (NASAMS) and Aspide missile defence systems.[28]

On the Ukrainian side, the use of helicopters during the conflict has been necessarily more restrained than the Russian one, because Kiev's rotary wings fleet is limited. Ukraine seems to have avoided Russia's tactical mistakes with regard to flight altitude and day flights, and its military was actually able to fly at very low altitudes with appropriate flight discipline, especially at night, to disable or destroy high-value targets and to resupply encircled troops, such as in the battle of Azovstal. Still, the number of Ukrainian helicopters that were shot down – a few dozen – was deemed unacceptably high and, similarly to Russia, Kyiv reduced the use of helicopters for deep penetration throughout the war. Overall, penetrating the frontlines with helicopters appears to be considered by both sides a high-risk tactic, viable only in very specific circumstances.[29] Both Russian and Ukrainian forces have often opted to launch effectors by helicopters quite distant from the target, in order to protect the platform at the expense of the strike's precision and effectiveness. Finally, over time Ukraine had to face a shortage of helicopters, while Russia improved its use together with artillery and air defence to protect a rather static frontline.

The interpretation of the challenges to modern rotorcraft in the Ukraine war can lead to two different implications. The predominant view, particularly in the US, is that next-generation helicopters must be capable of overcoming current vulnerabilities. Accordingly, the Pentagon's Future Vertical Lift programme will consider the following elements based on the implications of the war in Ukraine: higher speed, beyond air domain and extended to cyber and AI, contributing to providing air and decision-dominance; longer range and weapons with

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publications/special-resources/russian-air-war-and-ukrainian-requirements-air-defence.

27 For an in-depth analysis see Karolina Muti, "Helicopters and War", cit.

28 Ibid., p. 5.

29 Ibid., p. 8.

longer reach to stay outside the reach of surface-to-surface fires and increase survivability; improved safety in low altitude flight, and taking better advantage of clutter; standoff over 30 km for better manoeuvrability, as anticipated by the Nagorno-Karabakh conflict;[30] last but not least, full integration with Army long-range precision fires capability and US air force tactical fighters. Another vision suggests that rotary wing capabilities will remain too vulnerable on the future battlefield among near-peer forces, and that the conflict in Ukraine is providing ample demonstration in this sense. Accordingly, it would be better to invest in more expendable systems such as UASs and loitering munition at the tactical level, and on fighter aircraft at a higher level.[31] Italy and major European members of NATO have undertaken joint initiatives within both the EU and Alliance's frameworks to reflect upon requirements and technologies for future military helicopters, and the priority should be to clarify for what scenarios and operations these capabilities should be planned and developed.

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[30]   Center for Strategic and International Studies (CSIS), "The Future of Army Vertical Lift", in *CSIS Events*, 24 August 2022, https://www.csis.org/node/66525.
[31]   David Barno and Nora Bensahel, "The Other Big Lessons that the U.S. Army Should Learn from Ukraine", in *War on the Rocks*, 27 June 2022, https://warontherocks.com/?p=27193.

3. The naval domain

by Elio Calcagno

3.1 Implications

While Russia's unprovoked invasion of Ukraine in February has led to a war that is overwhelmingly fought in the land and air domains, the naval one has witnessed some pivotal moments in the war, including the sinking of the Russian Black Sea Fleet Flagship, the cruiser *Moskva*. Indeed, the Black Sea undoubtedly represents a remarkably important theatre of operations with clear strategic implications for the war – especially on land. Firstly, a sizeable part of the frontline is in the proximity of the sea, from which Russian naval forces are in the position – at least in principle – of carrying out missile strikes against land targets. Secondly, in the early stages of the invasion, one of Russia's prime objectives was to establish a land bridge between the mainland in the southeast of Ukraine, where its forces have made advances, to the illegally annexed Crimean Peninsula.[1] Crucially, Crimea is home to the Russian Black Sea Fleet's home base at Sevastopol, which has proven to be vulnerable to attacks from multiple domains.

One of the most interesting aspects of the naval war from 2022 onwards is the speed at which Ukrainians have conceived and fielded innovative solutions extremely asymmetric with respect to available conventional naval forces.[2] Indeed, in early 2022 the differences in numbers, mass and capabilities of the Ukrainian and Russian Black Sea fleets were stark; when Russia took control of Crimea in 2014, it also gained possession of most of the Ukrainian navy, meaning that only a small fleet of patrol vessels was available to Kyiv at the outset of the invasion,[3] with the only, rather outdated, frigate having been

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[1] Benjamin F. Armstrong, "The Russo-Ukrainian War at Sea: Retrospect and Prospect", in *War on the Rocks*, 21 April 2022, https://warontherocks.com/?p=26854.
[2] Interviews, 21 and 22 September 2023.
[3] Benjamin F. Armstrong, "The Russo-Ukrainian War at Sea", cit.

scuttled in the early stages of the war to prevent a Russian takeover. Following the takeover of the peninsula, Moscow also bolstered the Novorossiysk port, further strengthening its strategic position in the Black Sea, now an important fault line between the West and Russia.[4] On the other hand, at the outset of the invasion, Russian assets in the Black Sea were diverse and included missile corvettes, conventional submarines, frigates and the Moskva Slava-class cruiser.[5] These high-end capabilities, apt for high-intensity naval warfare, were part of Russia's A2/AD strategy versus NATO forces in the Black Sea.[6] In addition, anticipating Ukraine's unavoidable reliance on asymmetric warfare in the maritime domain, Russia has for nearly a decade employed smaller vessels, as well as aircraft and coastal artillery, in order to contrast possible threats from Ukraine.[7] Despite the odds, Ukraine has managed to inflict significant damage to Russia's naval forces employing unconventional, integrated tactics and leveraging innovative technological solutions.

Firstly, the sinking of the Moskva, although still shrouded in uncertainty given the lack of official records by the warring parties, was allegedly the result of a strike by two Neptune anti-ship missiles.[8] While some reports claimed a Turkish-made TB2 Bayraktar uncrewed aerial vehicle (UAV) was used by Ukrainian forces in order to distract the Moskva's main radar, which is only able to cover a 180-degree angle at any given point, they remain mere speculation. According to this theory, the TB2 would have been loitering on one side of the Russian ship, while the missiles would have been coming from the opposite direction.[9] Should this theory be accurate, it would demonstrate an integrated (and successful) use of missile systems and UAVs as part of a single kill chain against a naval vessel in open waters. While some hinted at the presumed obsolescence of large surface combatants such as the Slava class in the face of anti-ship missiles, any conclusions to that effect are in all likelihood rushed and fail to consider contextual variables which contributed to the ship's vulnerability or indeed some radar system shortcomings.[10]

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4   Lisa Aronsson and Jeffrey Mankoff, "The Inhospitable Sea. Toward a New U.S. Strategy for the Black Sea Region", in *CSIS Reports*, February 2023, https://www.csis.org/node/103711.
5   Benjamin F. Armstrong, "The Russo-Ukrainian War at Sea", cit.
6   Lisa Aronsson and Jeffrey Mankoff, "The Inhospitable Sea", cit.
7   Ibid.
8   Ibid.
9   Lisa Aronsson and Jeffrey Mankoff, "The Inhospitable Sea", cit.
10   Sam LaGrone, "Warship Moskva was Blind to Ukrainian Missile Attack, Analysis Shows", in *USNI*

Another key aspect of Ukraine's adaptability in the naval domain is the role that uncrewed surface vessels (USV) have played in several operations in the Black Sea and the Sea of Azov. Starting with a raid in late 2022, Ukraine has employed 'kamikaze' USVs to threaten the Russian navy while in or near its ports.[11] The 29 October 2022 attack involved a reported nine drones, which penetrated the port and attempted to hit Russian naval vessels there. Only minor damage was reported to one frigate and a minesweeper, though the attack forced Russian authorities to significantly bolster defences at the port's entrance and keep ships inside the harbour to avoid exposure to further attacks.[12]

The fact that USVs that small (5.5m in length) and allegedly relatively cheap at 250,000 US dollars per unit were used successfully to limit the Black Sea Fleet's freedom of movement is a testament to the efficacy of swarms of small, manoeuvrable and hard-to-detect surface vehicles against much larger warships' sensors and defence systems.[13] The effectiveness of this type of action has led the Ukrainian Navy to create a new, specialised unit: the 385th Separate Brigade, which focuses on the use of naval uncrewed systems.[14] On the other side, Russia has employed, with some success and for the first time in naval warfare, loitering ammunition against Ukrainian vessels.[15]

In the early stages of the war, Russia had dispatched a large amphibious naval force, consisting of two groups of combatants and five landing ships to the coastal waters adjacent to Odessa, where they lingered for weeks without ever attempting a landing operation.[16] The Moskva was hit in waters not far from Odessa and its sinking was immediately seen as a major blow to any ambition by Moscow to attempt any major amphibious operation,[17] with no

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News, 5 May 2022, https://news.usni.org/?p=94114.

11   Mariano Zafra and Jon McClure, "Sea Drones and the Counteroffensive in Crimea", in *Reuters*, updated on 18 August 2023, https://www.reuters.com/graphics/UKRAINE-CRISIS/CRIMEA/gdvzwrmrlpw.

12   Ibid.

13   H.I. Sutton, "Ukraine's Maritime Drones (USV) What You Need to Know", in *Covert Shore*, 11 November 2022, http://www.hisutton.com/Ukraine-Maritime-Drones.html.

14   H.I. Sutton, "World's First Specialized Explosive Naval Drone Unit Formed in Ukraine", in *Naval News*, 31 August 2023, https://www.navalnews.com/?p=48358.

15   Tayfun Ozberk, "Loitering Munition Strikes Ukrainian Gunboat, a First in Naval Warfare", in *Naval News*, 6 November 2022, https://www.navalnews.com/?p=39432.

16   H.I. Sutton, "World's First Specialized Explosive Naval Drone Unit Formed in Ukraine", cit.

17   Julian E. Barnes and James Glanz, "Prized Russian Ship Was Hit by Missiles, US Official Says", in *The New York Times*, 15 April 2022, https://www.nytimes.com/2022/04/15/us/politics/russia-moskva-ship-sunk-ukraine.html.

further indication that such an attempt may be seen as viable by Russia in the foreseeable future.

As the Russian Navy does not have an enemy fleet to chase around the open seas, and in the absence of any prospects for an amphibious invasion, in recent months it has been confined to ship-launched land strikes with its Kalibr missiles. Indeed, these missiles still have sufficient range to hit targets throughout Ukraine, with Russian warships somewhat safer from sea-based (but not air- land-based) Ukrainian attacks as long as they stay in port after the aforementioned bolstering of defences.[18]

While the Russian fleet still conserves offensive potential thanks to its Kalibr missile capabilities, the fact that they remain stationary makes them vulnerable to Ukrainian missile strikes launched from land or the air, provided they obtain accurate targeting solutions. For instance, on 13 September 2023, a Ukrainian missile attack (reportedly involving Storm Shadow/SCALP missiles, launched by Su-24M strike aircraft) hit Sevastopol's shipyards, reportedly damaging a Ropucha-class amphibious operations ship and destroying a Kilo-class submarine.[19] This situation has allowed Ukraine to keep the exports of grain and other goods flowing out of its ports even after Russia left the Black Sea Grain Initiative. Indeed, as of November 2023 over 150 ships had left Ukrainian ports and crossed the Black Sea humanitarian corridor safely, with more making the crossing since.[20]

What transpires from the current situation is that thanks to innovative solutions and Western support, Ukraine is able to carry out a rather successful sea denial campaign against the Russian Navy. From Moscow's perspective, the role of the sea as a form of buffer zone around Crimea – which still acts as a crucial logistics and naval hub in the Russian war effort – has essentially been negated by Ukrainian forces' ability to hit enemy targets in a multitude of ways.

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18   John Paul Rathbone and Roman Olearchyk, "Military Briefing: the Advance of Ukraine's 'Mosquito Navy'", in *Financial Times*, 9 October 2023, https://www.ft.com/content/86dd7061-e54d-48a4-a06a-347b1732bcb9.
19   "I missili Storm Shadow sulla base di Sebastopoli innalzano la tensione tra Mosca e Londra", in *Analisi Difesa*, 19 September 2023, https://www.analisidifesa.it/?p=168488.
20   "Ukraine Says 151 Ships Have Used Black Sea Corridor", in *Reuters*, 17 November 2023, https://www.reuters.com/world/europe/ukraine-says-151-ships-have-used-black-sea-corridor-2023-11-17.

The Black Sea represents a very peculiar theatre given the treaty-based rules regulating the entry of military vessels, especially since Turkey closed off the Dardanelles and Bosporus Straits to warships on 28 February 2022.[21] Because of Ankara's move, Russia is currently unable to redirect naval assets from other theatres into the Black Sea, meaning that any reinforcements will have to be built in local shipyards. However, importantly from an Italian perspective, Moscow has for years sought to strengthen its naval presence in the Mediterranean, including by the expansion of its naval base in Tartus. An analysis of open-source intelligence-based data offers an interesting insight into how many resources Russia has dedicated to its Mediterranean naval presence as the conflict rages in Ukraine. The data (see Figure 1) show that, while a spike of 11 warships was present concurrently in the Mediterranean just weeks before the war, total numbers (including warships, submarines and non-combat/support ships) have steadily declined to just a handful in the first weeks of October 2023. This is perhaps explained by a number of factors, but perhaps the most likely was the need to dispatch more forces to theatres deemed to be more crucial to Russian interests (such as the Baltic and North Seas).

Figure 1 | Russian naval forces in the Mediterranean from the start of the war to October 2023

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21   Heather Mongilio, "Turkey Closes Bosphorus, Dardanelles Straits to Warships", in *USNI News*, 28 February 2022, https://news.usni.org/?p=92472.

3.2 Implications for Italy

By far the most evident implication for many NATO navies is the need for a shift back to high-intensity naval warfare after decades of focusing more on maritime security, anti-piracy operations and crisis management tasks. While the Italian navy (*Marina Militare Italiana*, MMI) has always strived to maintain a very balanced naval force in order to carry out operations across the spectrum, from peer-to-peer combat to constabulary tasks,[22] limited resources resulting from a stagnating defence budget might mean that some compromises will have to be made. While maritime security remains a core task for the Italian navy, tensions with Russia and unprovoked aggression in Europe make accidental escalation more likely. High-intensity warfare thus needs to remain high up on the agenda, with procurement and force structure planning pointing to an increase in both firepower and mass.[23]

A rough way to gauge a fleet's warfighting efficacy is sometimes measured in size (both in terms of numbers and combined mass), but also the number of vertical launching systems (VLS) for deploying missiles.[24] A look at the number of available VLS cells for sea-launched cruise missiles (SLCM) in European navies as of 2021 reveals that they suffer an enormous gap compared to their US ally. Only five European NATO navies had more than 200 VLS cells, whereas the US had over 8,000 at the time.[25] More recent official or rumoured requirements – some pre-dating the Russian invasion – clearly suggest that the future surface fleet will be centred around more numerous and more lethal surface combatants. For instance, the MMI's concepts for its future destroyers (the DDX programme) are particularly telling in this regard as, according to the latest renders, they may end up representing the largest and most armed surface combatants built in Europe since the Cold War, fitted with as many as 80 VLS

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22   Interview, 25 November 2022.
23   Alessandro Marrone and Elio Calcagno (eds), "Naval Combat Systems: Developments and Challenges", in *Documenti IAI*, No. 23|01 (January 2023), https://www.iai.it/en/node/16476.
24   The greater the number of VLS installed on a warship, the greater the number of missiles that can be simultaneously ready for launch.
25   Jeremy Stöhs, *How High? The Future of European Naval Power and the High-End Challenge*, Copenhagen, Djøf Publishing, 2021, https://cms.polsci.ku.dk/english/publications/how-high-the-future-of-european-naval-power-and-the-high-end-challenge.

cells: significantly more than any other European warship currently in service[26] and nearly twice the amount fitted on the Andrea Doria-class destroyers.[27]

However, the limited number of missile stockpiles at the disposal of European navies could negatively affect their true potential in a protracted exchange of fire at sea with a peer-level adversary. In this context, Italy has ordered along with France 700 Aster surface-to-air missiles, some of which will be handed to the Navy.[28] As the posture vis-à-vis Russia necessarily changes following its aggression, so too the European approach to advanced weaponry stocks must evolve to safeguard the navies' deterrence potential. This last point, in particular, is even more pressing considering the rates of consumption for missiles currently experienced by some Western navies in the Red Sea to tackle the UAVs and missiles launched by Houthi forces against military and civilian vessels. The fact that even non-state and non-peer actors such as the Houthis are able to field anti-ship capabilities at a scale requiring such costly and advanced countermeasures by two of the world's leading navies demonstrates how modern navies must by all accounts achieve a degree of combat readiness unprecedented since the end of the Cold War. This does not only translate into the need for more and more capable platforms, but also the ability to deploy them in active combat scenarios for long periods of time.

Therefore, it is clear that navies (and the Italian Navy among these) have to completely review their procurement policies and priorities as they need to establish ammunition stocks that were generally already well below agreed, pre-war levels. This extends to all categories of ammunition: anti-air and anti-ship missiles, land attack missiles, heavy and light torpedoes, and artillery shells (with a special focus on long-range and guided versions). Even the US Navy is facing similar issues with regard to weapon stocks[29] and flag officers responsible for making the navy forces ready to sail and combat have made clear that the targets have not been met and vessels do risk having to sail with

26   Pietro Batacchi, "DDX, un super-cacciatorpediniere per la MM", in *Portale Difesa*, 22 February 2023, https://www.rid.it/shownews/5519/ddx-un-super-cacciatorpediniere-per-la-mm.
27   Jeremy Stöhs, How High?, cit.
28   Chiara Rossi, "Mbda, tutto sui missili Aster comprati da Italia e Francia", in *Start Magazine*, 1 February 2023, https://www.startmag.it/?p=220569.
29   Wilson Beaver and Jim Fein, "The US Needs More Munitions to Deter China", in *Defense News*, 19 December 2023, https://www.defensenews.com/opinion/2023/12/19/the-us-needs-more-munitions-to-deter-china.

some empty magazines. The US Navy is therefore discussing with industry accelerated delivery of weapon systems while placing additional orders.[30]

There is also a clear need to develop and field both hypersonic weapon systems and systems to counter them, all the more since the Russian navy is (or will be soon) able to field ship-, submarine- and air-launched hypersonic anti-ship missiles and other navies will follow. There is also a marked need to equip navies properly in order to defend against anti-ship ballistic missiles (ASBM). Defensive and offensive systems are required to counter and deter such threats, though weapons alone will not suffice if sensors combat management systems and combat systems are not "upgraded" to reflect the new threats.

Among the implications that can indeed be identified from the conflict in Ukraine there is certainly the integration of USV and UAV in naval warfare. The advent of more numerous, diverse and capable uncrewed vehicles able to operate under the surface and near the seabed, but also on the surface and in the air, requires that the Navy continue to evolve toward a force able to integrate these new tools seamlessly into an already complex fighting force. The concepts already presented in the Future Naval Combat System 2035,[31] published in 2021, are certainly a step in the right direction if the MMI is to sustainably and effectively face this challenge. At the same time, the Navy will have to confront the rise of UAVs, USVs and uncrewed underwater vehicles (UUV) both as a potential threat as well as part of its force structure, including embarked fixed-wing and rotary UAVs. Indeed, it is already clear that new instruments are needed to tackle the growing UXV threat: massive and swarm-like UAV and UAV attacks, combined with missile attacks in some scenarios, could overwhelm current systems and defences. In the long term, the use of expensive anti-air missiles to intercept and neutralise cheap drones is not a sustainable strategy. The novel, more cost-efficient countermeasures must be fitted to warships accordingly.

While the perpetrators of the September 2022 Nord Stream pipelines sabotage are yet to be identified with certainty, this disruptive event has served to

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30 Justin Katz, "After Last Year's Warning Shot, Navy Admiral Credits Industry for Stepping Up", in *Breaking Defense*, 9 January 2024, https://breakingdefense.com/?p=330441.

31 Italian Navy, *Il Future Combat Naval System 2035 nelle operazioni multi-dominio, Edizione 2021*, https://www.marina.difesa.it/media-cultura/Notiziario-online/Documents/Il%20Future%20 Combat%20Naval%20System%202035.pdf.

show that underwater critical infrastructure is more vulnerable than ever and that attribution of attacks targeting it remains elusive.[32] Despite a general lack of investments in Europe, Russia's (and increasingly China's) seabed warfare capabilities have continued to develop through the decades and represent a serious threat to European telecommunications and hydrocarbon infrastructure.[33] Technological progress in this field, including in UUV robotics and autonomy presents the Italian Navy with the necessity to develop a degree of underwater situational awareness in order to detect and quickly react to possible threats. At the same time, however, the same instruments open up concrete opportunities for the Navy to invest in UUV and autonomous UUV capabilities to increase its potential under the surface and beyond traditional submarines.

The effectiveness of USVs (such as the kamikaze USVs used by Ukrainian forces to threaten the Russian Black Sea Fleet) against surface combatants is still to be properly assessed, though a reflection on potential vulnerabilities should still be undertaken. Whether and under what circumstances UUVs, USVs and UAVs represent an existential danger to warships, navies should make sure ships are equipped with the necessary sensors and countermeasures in order to contrast the use of these systems for sea denial purposes by less capable or peer-level navies.

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32 Elio Calcagno and Alessandro Marrone (eds), "The Underwater Environment and Europe's Defence and Security", in *Documenti IAI*, No. 23|13 (June 2023), https://www.iai.it/en/node/17225.
33 Ibid.

4. Space domain

by Karolina Muti and Maria Vittoria Massarin

4.1 War in Ukraine and space: Implications of the conflict

The Russian invasion of Ukraine began in the space domain which resulted in the commercial satellites which Kyiv relied on for military and government purposes to be identified as targets.[1] As a matter of fact, one of Moscow's first offensive activities was the cyber-attack on ViaSat's user terminals, the prime satellite communications system used by the Ukrainian government. Kyiv did not and still does not have autonomous Satcom capabilities, although it recognises its strategic value. The attack had large-scale consequences in Central and Eastern Europe, destroying more than 3,000 wind farm terminals in Germany[2] and creating problems for Galileo's systems.

Despite Russian and Chinese advances in the development of anti-satellite weapons (ASAT),[3] there was no use of ASATs during the war, not least because Ukraine does not possess satellites to be attacked.[4] Both electronic warfare and cyber-attacks were silent yet powerful weapons during the conflict, as proven by the satellites, their terminals and their data transmissions being interfered with through jamming or spoofing attacks. Non-kinetic attacks[5] on commercial

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[1]   Kari A. Bingen, Kaitlyn Johnson and Zhanna Malekos Smith, "Russia Threatens to Target Commercial Satellites", in *CSIS Critical Questions*, 10 November 2022, https://www.csis.org/node/67711; Giancarlo La Rocca, "Il fronte spaziale della guerra in Ucraina", in *AffarInternazionali*, 27 May 2022, https://www.affarinternazionali.it/?p=4060.

[2]   "France's Space Commander Shares Lessons Learned from Ukraine and Future Plans", in *SatelliteObservation.net*, 6 February 2023, https://wp.me/p6fD6F-250.

[3]   Rafael Loss and Silvia Samorè, "Multilateral Space: A European Space Oddity", in *ECFR Commentaries*, 28 April 2023, https://ecfr.eu/?p=104742.

[4]   Even if Ukraine has no satellites, such attacks could have potentially targeted Ukraine's allies' satellites providing relevant data to Kyiv, as it happened with cyber-attacks, but as of January 2024, it did not happen.

[5]   Non-kinetic threats can be divided into cyber, electronic and electromagnetic. Electronic attacks focus mainly on interfering with transmitted signals, while cyber-attacks compromise the transmitted data. They are characterised by an inherent ease of execution favoured by the difficulty in their attribution and the absence of collateral damage for those carrying out the attack.

satellites were predominant due to the increasingly pivotal role commercial space actors played in making sure Ukraine had the necessary communication and navigation tools.[6]

Although possessing no capabilities of its own, Kyiv has been able to use space systems to its advantage during the conflict thanks to a network of partners and allies, both civilian and military, state and non-state. Starlink systems possess a high level of resilience and redundancy thanks to the widespread distribution of its space assets. The system itself is hard to take down, despite Russia trying to hack and jam it multiple times.[7]

Earth Observation (EO) capabilities have also been massively and widely exploited in order to obtain, through satellite imagery, information on the positioning and movements of Russian forces and their assets, as well as the numbers of units deployed, not only by the Ukrainian military but also by civilians. This was possible thanks to agreements signed by Kyiv to exchange data with various countries and agencies, including the EU Satellite Centre (EUSATCEN), which has been providing data to Ukraine.[8]

In the Russian-Ukrainian conflict, space systems services are thus being requested by Ukraine and exploited extensively by both civilian and military, private and public, combatant and noncombatant actors in all traditional categories of activity: 1) EO; 2) telecommunications/secure satellite communications; 3) positioning, navigation and timing (PNT), including georeferenced in order to support missile and drone attacks; 4) space-based intelligence, surveillance and reconnaissance (ISR); 5) early warning through space-based sensors and radars.

Ukrainian armed forces often received relevant intelligence thanks to their partners.[9] Such intelligence sharing occurred through Ukraine's allies

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6   Interview, 19 October 2023.
7   Elon Musk, "Starlink has resisted Russian cyberwar …", in *X*, 11 May 2022, https://twitter.com/elonmusk/status/1524191785760788480; Interview, 19 September 2023.
8   Interview, 19 September 2023.
9   Eric Marc, "Ukraine Asks Commercial Satellite Operators for Help Tracking Russian Troops", in *CNET*, 2 March 2022, https://www.cnet.com/science/space/ukraine-asks-commercial-satellite-operators-for-help-tracking-russian-troops.

transferring relevant information obtained from satellite data, rather than through giving the Ukrainians direct access to allied satellites (and data). This is especially true for early warning capabilities. It must be also noted that Ukraine managed to increasingly use non-classified information to gain an edge during the conflict.

Space-based systems have been used in an unprecedented manner and intensity for the purposes of the conflict. Satellite data have, for instance, enabled a real strategy of demystification against Moscow. For instance, Washington has repeatedly anticipated and publicly disseminated Russian numbers, positions and moves to undermine their effectiveness. Cyber and electronic warfare attacks multiplied to interfere with communication between satellites (Satcom jamming) as well as to disrupt services.[10] Both parties involved in the conflict carried out these actions,[11] accelerating a pre-existing trend to rely on non-kinetic attacks. Against this backdrop, several implications are relevant for NATO and notably for Italy's armed forces to effectively navigate the space domain.

4.1.1 The unprecedented role of commercial actors

The role of commercial actors in providing space services was and is key to both Ukraine's armed forces and civilian institutions during the conflict and is a trend that could become even more relevant in the future. Beyond the well-known Starlink, other commercial actors such as ICEYE, Planet or Black Sky played a very important role in providing Satcom and EO data to Ukraine.[12] Commercial space capabilities contributed to command and control (C2) on the ground, intelligence, and informed decision-making.[13] Russian forces' movements were to some extent tracked and anticipated thanks to commercial remote sensing imagery acquired by Ukraine.[14] Satellite imagery allowed for contrasting propaganda claims related to the situation on the ground, including the

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10   Caleigh Kelly, "Russia-Ukraine War Holds Key Lessons for US Space Command: Top Official", in *The Hill*, 10 July 2023, https://thehill.com/?p=4089559.
11   Ibid.
12   Interview, 6 September 2023.
13   Theresa Hitchens, "Space Force Should Heed Ukraine Lessons as It Revamps Structure: CSO Nominee Saltzman", in *Breaking Defense*, 13 September 2022, https://breakingdefense.com/?p=243550.
14   "The First Commercial Space War" (podcast), in *This Means War*, 19 January 2023, https://sites.libsyn.com/420071/the-first-commercial-space-war.

number of victims,[15] bombings, and troops as well as employed and destroyed equipment, leading some experts to define the conflict in Ukraine as the "first commercial space war".[16]

At least four elements stemming from the growing role of commercial space actors and assets are worth mentioning:

- At the operational and tactical level, the resilience and protection (especially cyber) of governmental and commercial space assets –in both space and ground segments – is of uttermost importance, along with an increase in the cyber-resilience of military space assets and operations.

- At the strategic level, there is a need for better, systematic, and well-rounded public-private partnerships (PPP)[17] to ensure a higher level of societal resilience when faced with the risk of disruption of space services and thus limit the possibility for adversaries to exploit such vulnerability. Better partnerships are also necessary to leverage rapidly evolving innovation coming from the private sector and guarantee the Ministries of Defence (MoDs) access to cutting-edge technology, based on an assessment that identifies those capabilities and services that should be sovereign and those that can be obtained through partnerships. Promoting long-term space sustainability and creating strong risk management frameworks requires PPP too.

- At the international level, partners with advanced space capabilities concerning SATCOM, EO and PNT, as well as military ISR, Signal Intelligence (SIGINT) and space-based early warning assets are crucial. Ukraine does not own or operate satellites, but it has leveraged help from allies with space capabilities, including from the commercial sector,[18] and this proved crucial. This should be instructive for those countries, within and beyond NATO and the EU, who do not possess or operate advanced space capabilities, to establish cooperation frameworks for the provision of space services. Ukraine's collaboration with both ESA and Starlink before the outbreak of the war proved useful in quickly activating support.[19] This is

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15   This was the case, for example, of the dramatic killings of more than 1,400 people by Russian forces in Bucha.
16   Ibid.
17   Debra Werner, "Ukraine's Lessons for Military Space", in *SpaceNews*, 19 April 2023, https://spacenews.com/?p=151259.
18   Theresa Hitchens, "Space Force Should Heed Ukraine Lessons as It Revamps Structure", cit.
19   Interview, 26 September 2023. Starlink services were swiftly provided to Ukraine after Mykhailo

even more true considering that also countries with advanced space assets seek cooperation with governmental and commercial partners.

- At the national level, despite the increasing relevance of commercial actors, the role of the governments of those countries where the companies reside should be considered. In fact, governments can play a role in allowing or supporting cooperation with third countries, thus having an oversight/control power over it. Such government approval may not be taken for granted, especially in case of major crises or conflicts, with particular reference to specific legal frameworks or political sensitivities, as well as for national security purposes.

4.1.2 Access to space and supply chain

The European reliance on Russia's Soyuz launch systems resulted in the cancellation of already booked launches – including but not only two Galileo satellites[20] – due to the suspension of space cooperation with Moscow by ESA and the departure of Russian technical staff from the Kourou spaceport, heavily damaging Europe's autonomous access to space.

From an industrial and supply chain point of view, the Russian invasion also jeopardised and delayed the Vega C launch timeline. The launcher's development entailed cooperation with the Ukrainian space company YB Yuzmash, responsible for the second-stage engine's components, and some of its engines were stocked in Italy.[21] The issue exposed the dire state of autonomous access to space in Europe, acknowledging the level of dependency on extra-European launch systems and providers, namely Soyuz and the US' Space X Falcon family. Notably, the US managed to replace Russian engines for their launchers and stopped using Soyuz launchers once they got the SpaceX alternative.

Fedorov, Deputy Prime Minister for Innovation, Education, Science and Technology and Minister for Digital Transformation, asked Elon Musk to restore the country's internet connectivity and communications. Tariq Malik, "Elon Musk Says SpaceX's Starlink Satellite Internet Service Is Active in Ukraine with More Terminals on the Way", in *Space.com*, 27 February 2022, https://www.space.com/elon-musk-says-spacex-starlink-active-ukraine.

20   Giancarlo La Rocca, "Il fronte spaziale della guerra in Ucraina", cit.

21   Jeff Foust, "ESA Studies Options for Vega C Upper Stage Engine Ahead of First Launch", in *SpaceNews*, 7 July 2022, https://spacenews.com/?p=129368.

4.1.3 Relevance of space domain awareness and space support

Despite the lack of sensors and systems to ensure space domain awareness (SDA)[22] and the necessary protocols to securely process and transmit data, Ukrainian forces were able to indirectly leverage selected capabilities from allies such as the US including from its intelligence community.[23] As part of SDA, space-based intelligence is crucial for understanding Russian troops' movements, identifying targets, coordinating logistics and communication, and ultimately enabling Ukraine to plan and conduct military operations more effectively. Such elements demonstrated the importance of having proper SDA capabilities, including not only sensors, and ad hoc satellite design,[24] but also ground-based software to process and fuse data transforming it into "decision quality information".[25]

Russia too made heavy use of space assets for intelligence and operation support, in line with Moscow's doctrine strongly relying on situational awareness based on space control.[26] Having no active satellite constellation for positioning, communication or reconnaissance, Russia had to rely on its 15 satellites[27] dedicated to intelligence collection.[28] As of May 2022, 73 out of the 172 Russian satellites present in the Union of Concerned Scientists' database were military, with 35 being dual-use.[29] More specifically, Russia owns 46 military communications satellites, and more than half are past their warranted lifetime.[30] During the war, the Russian private military company Wagner Group was forced to buy satellites from China due to the lack of intelligence provided

22   For a reflection on the term and definition of space domain awareness (SDA), and the distinction from SSA and STM or SST, please see Daniel Fiott, "In Orbit: The European Union, Defence and Space Domain Awareness" in *CSDS Policy Briefs*, 7 July 2023, https://csds.vub.be/?p=689.

23   Theresa Hitchens, "Space Force Should Heed Ukraine Lessons as It Revamps Structure", cit.

24   Interview, 14 November 2023.

25   Theresa Hitchens, "Space Force Should Heed Ukraine Lessons as It Revamps Structure", cit.

26   Michael Connell, "The Role of Space in Russia's Operations in Ukraine", in *CAN Reports*, November 2023, https://www.cna.org/reports/2023/11/role-of-space-in-russia-operations-in-ukraine.

27   Based on data from December 2022, Russian troops can count on a total of 174 satellites.

28   Harold Degeert, "Space Lessons Learned from the War in Ukraine", in *Finabel Info Flash*, December 2023, https://wp.me/paDUqP-3u0.

29   Union of Concerned Scientists, *UCS Satellite Database*, updated on 1 May 2023, https://www.ucsusa.org/resources/satellite-database.

30   Pavel Luzin, "Russia's Military Space Program: 2022 Results", in *Eurasia Daily Monitor*, Vol. 19, No. 187 (15 December 2022), https://jamestown.org/?p=94703.

by those controlled by Russia's institutions.[31] This lack of precision in satellite imagery hindered Russian abilities to monitor Ukrainian movements, effectively plan strikes and gain air superiority. Furthermore, the sanctions imposed on Russia's Global Navigation Satellite System (GLONASS) slowed down the system's modernisation process,[32] making it more vulnerable to attacks from its adversaries. Russia's space agency Roscosmos also suffered the impact of the Kremlin-led invasion of Ukraine, amid budget cuts and isolation from the international space community. This was evident in the loss of demand for Russian launch services and in the cuts to the Russian space programme. Western countries interrupted space cooperation agreements and partnerships with Moscow that in some cases have lasted decades, and are in the process of re-orienting such agreements towards new partners to substitute Russian systems and technologies. The director general of Roscosmos, Yuri Borisov, admitted that Russia has fallen behind other leading nations in its space programme,[33] whereas the country's space capabilities appear to not be up to par with its military ambitions.

4.2 Implications of the conflict for Italian Armed Forces

The *Documento programmatico pluriennale* (DPP) 2023-2025 refers to a classified Space Strategy for Defence of the Defence General Staff (*Stato Maggiore Difesa* – SMD),[34] which represents the basis for the future Space Plan for Defence (*Piano spaziale della Difesa*).[35] The document is not public, but the DPP provides a few interesting insights to understand the direction undertaken by Italy's armed forces in the space domain. It affirms that the guarantee of operational capabilities of national space assets entails "fully operational,

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31   AFP, "Chinese Firm Sold Satellites for Intelligence to Russia's Wagner: Contract", in *France 24*, 5 October 2023, https://www.france24.com/en/live-news/20231005-chinese-firm-sold-satellites-for-intelligence-to-russia-s-wagner-contract.

32   "Russian Media: US Sanctions Hinder GLONASS Modernization", in *OE Watch*, Vol. 10, No. 12 (December 2020), https://community.apan.org/wg/tradoc-g2/fmso/m/oe-watch-articles-2-singular-format/379983.

33   Bruce Einhorn, "Russia's Space Trajectory Is Going the Wrong Way", in *Bloomberg*, 25 July 2023, https://www.bloomberg.com/news/newsletters/2023-07-25/how-ukraine-war-has-damaged-russia-s-space-program.

34   The strategy was elaborated by the General Office for Space of the Chief of Defence Staff (*Ufficio Generale Spazio - Stato Maggiore Difesa* – UGS SMD).

35   Interview, 24 October 2023.

industrial, technologic control of space".[36] The strategy states that armed forces should operate in the space domain through a joint component capable of ensuring the protection and defence of national military satellite systems and contributing to the protection and defence of national, European, and allied civil space systems.

The strategy sets three key objectives:

1. consolidate and increase military capabilities to sustain operations and forces projection and ensure availability of space services in terms of SATCOM, EO, PNT, meteorology;
2. achieve a level of space domain awareness (SDA) as autonomously as possible;
3. conduct active and passive defence space operations, and potentially develop a responsive launch capability to restore compromised satellite capabilities aimed at dissuading hostile actions.

Current capability priorities include space-based SSA, LEO SatCom, signal intelligence (SIGINT), in-orbit servicing and space operations, and responsive space capabilities.

The identification of these three objectives shows that the Italian military is taking stock of the implications of the war in Ukraine for the space domain, as described in the previous section of this chapter, by accelerating a reflection begun well before February 2022.[37] Italian armed forces already possess and operate some very advanced capabilities, such as the Cosmo-SkyMed constellation of EO satellites with dual-use applications as well as dedicated military satcoms.[38] EO capabilities, similarly to sensor technology, represent an area of excellence for Rome that should be preserved.[39] Italy is also one of

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36 Italian Ministry of Defence, *Documento programmatico pluriennale della Difesa per il triennio 2023-2025*, October 2023, p. 28, https://www.difesa.it/content/notaaggiuntiva/30714.html.

37 Alessandro Marrone and Michele Nones (eds), "The Expanding Nexus between Space and Defence", in *Documenti IAI*, No. 22|01 (February 2022), https://www.iai.it/en/node/14669.

38 Cosmo-SkyMed was a pioneering endeavour, as Italy was the first to plan, develop, and launch a fully dual-use EO space system. It was co-developed by the Ministry of Defence and ASI, now in the process of developing four second generation satellites and based on the synthetic aperture radar (SAR) technology.

39 Karolina Muti, Ottavia Credi and Giancarlo La Rocca, "Italy and the Challenges of Space: Between Space Economy, International Cooperation and Cybersecurity", in *Documenti IAI*, No. 23|15en (July 2023), https://www.iai.it/en/node/17272.

the six NATO nations operating advanced SSA capabilities and contributing to NATO's SDA from the Aerospace Operations Command (*Comando Operazioni Aerospaziali* – COA) in Poggio Renatico, being one of the allies providing the most of these capabilities to the Alliance.[40] Furthermore, based on a memorandum of understanding (MoU) in the framework of the NATO Satcom Services 6th Generationprogramme,[41] Italy provides capabilities to the NATO Communication and Information Agency (NCIA), thanks to the geostationary satcom satellites SICRAL (*Sistema Italiano per Comunicazioni Riservate ed Allarmi*) operated from the Joint Control Center SICRAL (*Centro Interforze Gestione Controllo SICRAL*) in Vigna di Valle. SICRAL is one of the most advanced, fully military-operated secure satcom systems now in the process of reaching its third generation phase, with the planned launch of Sicral 3A and Sicral 3B[42] geostationary satellites by 2027.[43]

Further implications for Italian Armed Forces stemming from the war in Ukraine include the following four elements.

1) *Achieving resilience of space systems through redundancy, responsive space, and disaggregation/decentralisation of assets*. – The concept of redundancy of space systems is gradually evolving also in light of the value attributed to them in the war in Ukraine. To achieve an acceptable level of resilience and avoid interruptions in SSA capabilities and services, Italian militaries would have to operate also a higher number of cheaper satellites, so that if a national satellite is attacked, others with the same function can take over its task and guarantee the continuation of service. As opposed to an exquisite capability, the redundancy is given by high numbers and lower costs. The downside of this option is that it presents challenges for space sustainability and that small and relatively cheap satellites in LEO do not offer the same services of dedicated systems and constellations operating at different orbits.

40   Interview, 26 January 2024.

41   Italian Ministry of Defence, *Difesa: incontro a Torino dei vertici del programma NATO SATCOM Services 6th Generation*, 15 June 2023, https://www.difesa.it/smd/news-italia/difesa-incontro-a-torino-dei-vertici-del-programma-nato-satcom-services-6th-generation/27780.html.

42   Telespazio, *Telespazio and Thales Alenia Space Sign Follow-on Contract with Italian Ministry of Defense to Develop the SICRAL 3 Satcom System*, 17 June 2022, https://www.telespazio.com/en/news-and-stories-detail/-/detail/space-alliance-follow-on-contract-sicral3.

43   Interview, 26 January 2024.

At an operational level, the resilience of Italian military space systems should be pursued also by developing responsive space capabilities, in order to rapidly launch at least a small satellite into orbit to substitute a damaged or malfunctioning one. The ambition is to reduce to the minimum the time to orbit. Currently, Italy is participating in the EDF Responsive European Architecture for Space (REACTS) project which will produce a feasibility study on an interoperable and scalable network aimed at putting into orbit a satellite in less than 72 hours.[44] Another concept that is maturing among Italian armed forces as a measure to secure critical infrastructures, including space systems, is the disaggregation or distribution of systems to augment resilience through lower dependence on one centralised and localised infrastructure.[45] In light of the implications of the war in Ukraine, this emerges as a sensible solution to pursue.

2) *Resilience of space systems through protection from non-kinetic attacks (cyber and electromagnetic spectrum)*. – The need for higher protection from non-kinetic threats, such as attacks through cyberspace, electromagnetic spectrum, and radiofrequency, to both civil and military space systems, emerged as a key implication for the Italian military.[46] This is particularly true for the ground segment, which is the most vulnerable to cyber-attacks.[47] The Italian Space Operations Command (*Comando Operazioni Spaziali* – COS) is in direct and systematic contact with the Cyber Operations Command (*Comando Operazioni in Rete* – COR) to address this threat, as well as with COA for SSA. The conflict has highlighted the need to have resilient space systems able to withstand jamming and spoofing attacks[48] and to develop more advanced cyber defence and attribution capabilities.

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[44] European Commission, *European Defence Fund: REACTS* (Factsheet), 26 June 2023, https://defence-industry-space.ec.europa.eu/system/files/2023-06/REACTS-Factsheet_EDF22.pdf. The Italian participation in recent EDF projects such as REACT is in line with its traditionally important role played in EU projects, including Copernicus and Galileo, as well as within ESA and at the bilateral level. See in this regard Ottavia Credi and Maria Vittoria Massarin, "Italy in Space: Collaborations and Future Prospects", in *Documenti IAI*, No. 23|21en (November 2023), https://www.iai.it/en/node/17753.
[45] Interview, 18 December 2023.
[46] Interview, 19 October 2023.
[47] Ottavia Credi, Giancarlo La Rocca and Alessandro Marrone, "Il dominio spaziale e la minaccia cyber", in *Documenti IAI*, No. 23|06 (March 2023), https://www.iai.it/en/node/16806.
[48] Interview, 2 October 2023.

3) *Better collaboration and information-sharing with Allies in space.* – The war in Ukraine has underlined the need for operational cooperation in space among allies and partners. On 7 December 2023, Italy joined the Combined Space Operations Initiative,[49] an exclusive club of like-minded states led by the US aimed to deepen interoperability in areas such as SDA, mission support from space, and space launches.[50] Among NATO Allies, only a few have advanced SSA assets that can be pulled to provide the Alliance with the necessary SDA level, crucial for intelligence and information-sharing. Italy is one of them and can leverage its advanced capabilities in NATO. Rome will have a liaison officer at the US Space Command in Vandenberg by spring 2024 and already has an exchange officer at the Pentagon in the Space Force. Such growing links between Italian and US militaries contribute to the development of knowledge and doctrinal innovations, by creating synergies and best practices that can benefit Italian armed forces.

4) *Civil-military partnership, qualified personnel.* – In line with what emerges from Ukraine, Italian MoD needs to better coordinate with civilian stakeholders.[51] Moreover, as stated in the 2023 DPP by Defence Minister Guido Crosetto, armed forces should involve specialised civilian personnel[52] to adapt better to new space scenarios and to elaborate changes in doctrinal aspects. Involvement of civilian know-how and expertise would also contribute to filling the gap of qualified personnel with space skills and expertise, which is a systemic challenge for all actors in Italy – and to some extent in Europe. This could also complement and enhance those capabilities that the Italian Armed Forces already possess, for instance to operate space assets and in space operations in general. This is already the case in some countries, like the US, where the integration of commercial actors in the conduct of space operations is being tested.

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[49] The initiative currently includes the United States, the United Kingdom, Canada, Australia, New Zealand, France, Germany and, from 2023, also Italy, Japan and Norway.

[50] Marco Battaglia, "Tutto sull'iniziativa spaziale a guida Usa a cui si è unita l'Italia", in *Formiche*, 8 December 2023, https://formiche.net/?p=1596604.

[51] Debra Werner, "Ukraine's Lessons for Military Space", in *SpaceNews*, 19 April 2023, https://spacenews.com/ukraines-lessons-for-military-space.

[52] Introduction of Minister Crosetto to *Documento programmatico pluriennale per la Difesa per il triennio 2023-2025*, cit.

5. The cyber domain

by Ottavia Credi*

5.1 Key elements in the cyber domain

The Russian-Ukrainian conflict has a significant cyber dimension, in terms of both the nature and scope of the offensive and defensive operations. Russia is conducting a wider, global cyber-influence campaign to bolster its military efforts.[1] Over 800 Russian cyber-attacks against Ukraine were registered between January 2022 and February 2023.[2] Yet, Moscow's cyber offensive operations have not been confined to Ukraine: in retaliation for the West's imposition of economic sanctions and its ongoing provision of military equipment to Ukraine, Russia also targeted Kyiv's allies – including Italy – with cyber operations.

5.1.1 Russia's cyber operations

The resort to cyber operations is envisioned in Russia's military doctrine – though the Russian strategic and military lexicon generally refers to the "information" domain, which also includes offensive cyber operations.[3] The integration of military and non-military means in conflicts traces back to Russia's 2010 Military Doctrine and is further emphasised in the 2014 Doctrine, up to the point of including the information space in the range of military dangers.[4]

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1   Microsoft, *Defending Ukraine: Early Lessons from the Cyber War*, 22 June 2022, p. 3, https://aka.ms/June22SpecialReport.
2   CERT-EU, *Russia's War on Ukraine: One Year of Cyber Operations*, 24 February 2023, p. 3, https://cert.europa.eu/blog/1yua-cyberops.
3   Ibid.
4   Russian Presidency, *The Military Doctrine of the Russian Federation*, 5 February 2010, https://carnegieendowment.org/files/2010russia_military_doctrine.pdf.

CERT-EU identified three pivotal phases of the Russian cyber war against Ukraine: a preparation phase lasting until the beginning of the conflict; a five-week "fast and furious" phase following the start of the war; and a sustained phase that has been ongoing since April 2022.[5] As a matter of fact, Moscow has been resorting to malevolent cyber operations against its adversaries for years. Yet, since the beginning of the conflict cyber offensives targeting the critical infrastructures increased sensibly: experts were able to estimate that between 25 and 29 March 2022, in the space of five days only, there were 65 attempted attacks on Ukrainian critical national infrastructure.[6] In the first four months of the conflict alone, Russia destroyed 15 per cent of Ukrainian internet infrastructure.[7] Governmental organisations were the most targeted entities and Russian attacks frequently targeted multiple ministries at once.[8] With specific regard to defence institutions, up to this point Russia mainly targeted entities that were playing an active role in the conflict, including the Ukrainian Armed Forces.

Amongst the most used tactics, techniques and procedures (TTPs) used by Russia during the conflict are Distributed Denial of Service (DDoS), destructive malware, phishing, disinformation campaigns, and wiper attacks.[9] DDoS operations and destructive malware are mainly aimed at disrupting Ukrainian websites and information technology (IT) infrastructure, causing severe service disruptions and economic damage. Russia's online disinformation campaign intends to spread propaganda and misinformation about the invasion of Ukraine. This campaign uses a variety of channels, including social media, websites and news channels. Russia's cyber campaign against Ukraine already marked a record in terms of malicious attacks targeting social media in order to conduct misinformation operations.[10] Russia also conducted numerous wiper attacks (a type of cyberattack in which the attacker uses malware to delete or

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[5]   CERT-EU is an EU inter-institutional service provider working within the European Commission; CERT-EU, *Russia's War on Ukraine*, cit., p. 3.
[6]   Marcus Willett, "The Cyber Dimension of the Russia–Ukraine War", in *Survival*, Vol. 64, No. 5 (October-November 2022), p. 7-26, https://doi.org/10.1080/00396338.2022.2126193.
[7]   Digital Europe, *The Digital Front Line. 15 Actions to Boost Europe's Digital Resilience*, 6 March 2023, p. 8, https://www.digitaleurope.org/?p=21365.
[8]   CERT-EU, *Russia's War on Ukraine*, cit., p. 18.
[9]   Ibid., p. 27.
[10]   Ibid., p. 19.

destroy data on a computer system or network)[11] in the weeks immediately prior to the invasion, then continued at a slower rate. Hermetic Wiper was one of the most disruptive malware attacks registered so far, as it deleted data from the computers of several Ukrainian organisations.

In addition to its offensive cyber operations, Russia has carried out a series of electronic attacks against Ukraine. These include, for instance, jamming actions on GPS, radar and communication systems intended to disrupt Ukrainian military communications, besides haltering their ability to use guided weapons and navigation, as well as spoofing operations meant to send false or misleading messages to Ukrainian military systems.

5.1.2 An underwhelming campaign, an overwhelming defence

Russia's combat operation against the Viasat network, which resulted in the disruption of internet services of thousands of Ukrainian and other European customers, took place just minutes before the military invasion. Such an attack has been recognised by some as the "most significant and successful Russian offensive cyber operation of the war".[12] In a way, the Viasat case has been the first and only truly significant cyber attack against Ukraine carried out by Russia – since then, and despite the amount of efforts in this operational domain, Moscow's cyber offensive campaign is considered rather underwhelming.[13] Though Russia demonstrated to be particularly active in the cyber domain since the start of the war, it mostly conducted poorly planned and badly organised operations.[14] That is why Russia's cyber activities throughout the war have been defined as "more disruptive than degrading".[15]

Theories behind Russia's restraint in the use of malevolent cyber operations are varied.[16] Amongst them, there is the argument that Moscow does not want to invest in cyber activities given the much more flagrant and explicit

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11 Ibid., p. 10.

12 Marcus Willett, "The Cyber Dimension of the Russia–Ukraine War", cit.

13 Interview, 3 October 2023 A.

14 Marcus Willett, "The Cyber Dimension of the Russia–Ukraine War", cit.

15 Grace B. Mueller et al., Cyber Operations during the Russian-Ukrainian War, in *CSIS Analyses*, July 2023, p. 8, https://www.csis.org/node/106318.

16 Interview, 3 October 2023 A.

effects that can come from kinetic attacks. Russia may also face difficulties concerning its workforce, which may be too limited to conduct operations in the kinetic world and cyberspace at the same time. According to others, Putin values psychological effects in the information domain much more than more "technical" consequences a cyber attack may be able to provoke.[17]

Russia's seeming cyber failure should also be understood in terms of Ukraine's seeming cyber success. Up until now, Kyiv displayed a strong and layered cyber defence.[18] This is all the more impressive given that in cyberspace defence is much more difficult to implement than offence.[19] Throughout the ongoing conflict, Ukraine demonstrated its ability to respond to cyber and electronic attacks, by enforcing a variety of countermeasures aimed at opposing, mitigating and/or circumventing Russian offensives. For instance, Kyiv was able to resort to some extent to alternative navigation systems to replace GPS signals and adopt security measures to protect its IT infrastructure.

It is also thanks to a tight public-private partnership that Ukraine has been able to build its cyber resilience: the collaboration between governmental entities and private firms allowed Kyiv to gain access to crucial cybersecurity and intelligence tools.[20] Differently from traditional physical operational domains such as land, naval and air ones, in the cyber domain potentially any actor – be it state, non-state, public or commercial – can claim a role and participate in common reflection and joint actions.[21] In this instance, well-known private companies such as Google, Microsoft and Tesla have so far come together in an effort to counter a common enemy.

Ukraine's cybersecurity is also supported and enhanced by its partners' governmental agencies – first and foremost, companies based in the US and

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17 Gavin Wilde, "Cyber Operations in Ukraine: Russia's Unmet Expectations", in *Carnegie Papers*, December 2022, p. 8, https://carnegieendowment.org/publications/88607.
18 Dan Black, "Russia's War in Ukraine: Examining the Success of Ukrainian Cyber Defences", in *IISS Research Papers*, March 2023, https://www.iiss.org/research-paper/2023/03/russias-war-in-ukraine-examining-the-success-of-ukrainian-cyber-defences.
19 Alessandro Marrone, Ottavia Credi, Ester Sabatino, "Italy and Cyber Defence", in *Documenti IAI*, No. 21|12en (2021), https://www.iai.it/en/node/14125; Interview, 3 October 2023.
20 Anushka Kaushik et al., "Ukraine's Cyber Defence: Insights on Private Sector Contributions since the Russian Invasion", in *GLOBSEC Publications*, 12 June 2023, p. 1, https://www.globsec.org/node/2343.
21 Interview, 3 October 2023.

the UK.[22] Kyiv can also count on the so-called "IT Army of Ukraine", namely a global IT community which united in its efforts to counter the Russian invasion of Ukraine.[23] Through time, it transformed into a well-structured organisation encompassing governmental entities and private actors, such as IT professionals and amateur volunteers.[24]

Though the conflict is still ongoing, it already appears clear Kyiv won the "adaptation battle" of the cyber domain: by learning Russia's approach to cyber warfare, Ukraine has demonstrated a remarkable ability to prevent and respond to Russia's offensives throughout the conflict.[25] Yet, cyber attacks can be latent: a malicious operation can be triggered through a cyber-mine that had previously been placed within an enemy's cyberspace.[26] In these terms, it is impossible to pinpoint the beginning and the conclusion of a cyber war.[27] Even once the current conflict has somehow ended, it will not mean Ukrainian systems will be safe. Hence, it is critical to continue to support Kyiv's cyber security and defence in parallel with any eventual diplomatic negotiation.[28]

5.2 Implications for Italian cybersecurity and defence policy

The number of cyber attacks against Italian critical infrastructures rose dramatically in the last few years, with an increase of 138 per cent in 2022 alone compared to 2021 (5,434 and 12,947 respectively).[29] Between 2021 and 2022, Rome especially witnessed a sensible increase in malevolent operations against private entities.[30] As of September 2023, Italy is the third country in

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22 Marcus Willett, "The Cyber Dimension of the Russia–Ukraine War", cit.
23 For more information on the IT Army of Ukraine, see the official website: https://itarmy.com.ua/?lang=en.
24 Aiden Render-Katolik, "The IT Army of Ukraine", in *CSIS Blog*, 15 August 2023, https://www.csis.org/node/106783.
25 Dan Black, "Russia's War in Ukraine", cit.
26 Interviews, 13 September 2023 and 3 October 2023 A.
27 Interview, 13 September 2023.
28 Interview, 3 October 2023 A.
29 Italian Postal and Communications Police, *Resoconto attività 2022 della Polizia Postale e delle Comunicazioni e dei Centri Operativi Sicurezza Cibernetica*, 3 January 2023, https://www.commissariatodips.it/notizie/articolo/resoconto-attivita-2022-della-polizia-postale-e-delle-comunicazioni-e-dei-centri-operativi-sicurezz/index.html.
30 Intelligence System for the Security of the Republic, *Relazione annuale 2022 sulla politica dell'informazione per la sicurezza*, 28 February 2023, p. 77, https://www.sicurezzanazionale.gov.it/sisr.nsf/relazione-annuale/relazione-al-parlamento-2022.html.

the world in terms of intensity of cyber attacks, following the United States and Japan.[31] According to the Italian Postal Police's 2022 annual report, such an increment in the number of offensive cyber operations is attributable to the conflict in Ukraine.[32]

5.2.1 Italy's response to increased cyber attacks

The Italian intelligence institutions reported that amongst the main targets of offensive cyber operations are electric, transport and finance national infrastructures, which are mainly hit by ransomware attacks conducted by non-state actors.[33] They largely aimed at inhibiting the provision of a given service, by eliminating data and halting the functioning of the system. In September 2023, the Italian defence registered numerous DDoS attacks conducted by pro-Russia hacktivists such as Killnet and NoName057(16) aimed at damaging governmental websites and internet providers.[34] Still, none of these offensives were able to cause serious consequences to the targeted entities or halt their regular functioning.

Italy observed a correlation between declarations of intent to support Ukraine to an increment in Russian cyber attacks.[35] In order to counter such threats, the Postal Police implemented wide-ranging information and monitoring activities, also encompassing the dark web, in collaboration with the European Union Agency for Law Enforcement Cooperation (Europol), the International Criminal Police Organisation (Interpol) and the US Federal Bureau of Investigation (FBI).[36] The activities carried out by the Postal Police in collaboration with the National Cybercrime Centre for Critical Infrastructure Protection of the Italian Police (*Centro Nazionale Anticrimine Informatico per la Protezione delle Infrastrutture Critiche* – CNAIPIC) resulted in technical analyses of the cyber threats affecting

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[31]   Mariavittoria Savini, "Attacchi informatici in aumento, colpite soprattutto le piccole e medie imprese", in *RaiNews*, 14 September 2023, https://www.rainews.it/articoli/2023/09/attacchi-informatici-in-forte-aumento-aumento-urso-cybersicurezza-e-una-necessita-e-opportunita-ef08f83a-2f6d-406d-bc4d-bb55771a2f12.html.

[32]   Gabriele Carrer, "Infrastrutture critiche, cyber-attacchi più che raddoppiati nel 2022", in *Formiche*, 3 Janualy 2023, https://formiche.net/?p=1523533.

[33]   Intelligence System for the Security of the Republic, *Relazione annuale 2022*, cit., p. 76.

[34]   Interview, 3 October 2023 B.

[35]   Ibid.

[36]   Gabriele Carrer, "Infrastrutture critiche, cyber-attacchi più che raddoppiati nel 2022", cit.

Italy, which allowed the elaboration of preventive security measures as well as the provision of operational support to national infrastructures which underwent cyber offensives.[37]

5.2.2 Implications and recommendations

The war in Ukraine shed new light on the relevance of the cyber domain in a conflict. As a consequence, more attention has been placed on the concept of digital resilience.[38] Italy should invest in cyber security, defence and deterrence. This includes information and communication, quantum, and artificial intelligence (AI) technology. A positive step in this direction came in September 2023, when the Delegated Authority for the Security of the Republic announced that increasing Italian cybersecurity is amongst the main priorities of the government, as demonstrated by the intention to invest 220 million euros in this sector in 2024.[39] Such a commitment at the government level should be met with an increased so-called "cyber hygiene" amongst civil society, which needs to be more aware, cautious and prepared about the risks of cyber attacks in its everyday activities.[40]

A key implication of the war in Ukraine is the importance of public-private cooperation in the cyber domain. Private companies represent a key element in attacking and defending cyberspace.[41] They can act at a much faster pace than public institutions, can count on a wide pool of highly trained personnel, and – differently from state actors – their operations are not automatically perceived as escalatory measures.[42] There is a need for increased coordination amongst governmental and private organisations responsible for Italy's defence and security in the cyber domain. To this end, it will be important to explore sensible ways in which private companies can serve the public interest

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37   Ibid.

38   Digital Europe, *The Digital Front Line*, cit., p. 12.

39   Piermario Boccellato, "Servizi Segreti, Mantovano spinge: 'Serve un restyling' e aggiunge: 'La cyber è una priorità per il Governo, nel 2024 altri 220 milioni di euro'", in *CyberSecurity Italia*, 5 September 2023, https://www.cybersecitalia.it/?p=26345.

40   Interview, 3 October 2023 B.

41   Linda Monsees, "The Cybersecurity Implications of Russia's War on Ukraine", in Ondřej Ditrych, Jakub Eberle A. Asya Metodieva (eds), *Svět v proměnách 2023*, Praha, Ústav mezinárodních vztahů, March 2023, p. 85-89, https://www.iir.cz/en/the-cybersecurity-implications-of-russia-s-war-on-ukraine-1.

42   Interviews, 3 October 2023 A and 3 October 2023 B.

whilst guaranteeing the reliability of their services.[43]

At the same time, Italy should explore strategies to increase its pool of human resources working in cyber security and defence within public entities. The institution of the Network Operations Command (*Comando per le Operazioni in Rete* – COR) within the Ministry of Defence in 2020, followed by the establishment of the National Cybersecurity Agency (*Agenzia per la Cybersicurezza Nazionale* – ACN) in 2021, represents positive steps in this direction, signalling the intention to enhance Italy's capability in cyber security and defence, whilst allocating appropriate human resources amongst the dedicated public institutions.[44]

Italy's cyber defence has traditionally differed from that of other NATO countries in terms of the extent to which offensive operations are envisioned in its cyber doctrine. The ACN 2022-2026 Strategy marked a significant development in this field, as it suggested Rome embraced "active defence" techniques to protect its cyberspace.[45] Further progress was registered with the release of Law-decree No. 115 of 9 August 2022, which introduced a series of provisions aimed at conducting intelligence operations in cyberspace meant to counter cyber attacks.[46] Yet, such operations could only be carried out under well-defined circumstances: an official recognition of a serious threat to national security; a formal approval of the Interministerial Committee for the Security of the Republic;[47] and a common agreement that no other preventive or defensive solutions are adequate to counter the threat.

Whilst Italian cyber defence continues to be amongst the most conservative if compared to other NATO allies, gradual changes in its doctrine suggest a shift of paradigm. For instance, the Italian Ministry of Defence's Multiannual Programming Document (*Documento programmatico pluriennale* – DPP) for

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[43] Interview, 3 October 2023 B.

[44] For further information on Italy's cyber defence architecture, see: Alessandro Marrone, Ester Sabatino and Ottavia Credi, "Italy and Cyber Defence", in *Documenti IAI*, No. 21|1en (September 2021), https://www.iai.it/en/node/14125.

[45] National Cybersecurity Agency, *National Cybersecurity Strategy 2022-2026*, May 2022, https://www.acn.gov.it/ACN_EN_Strategia.pdf.

[46] Law-decree No. 115 of 9 August 2022: *Misure urgenti in materia di energia, emergenza idrica, politiche sociali e industriali*, https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:2022;115.

[47] The Interministerial Committee for the Security of the Republic is the entity in charge of ensuring intelligence activities abide by the Italian Constitution and the national law.

the years 2023-2025 hints at the possibility of operating within the entire cyber spectrum, hence conducting both offensive and defensive operations.[48] The current Chief of Defence Strategic Concept confirms this choice and provides further guidance.[49] These developments, combined with the institution of new governmental entities, indicate an evolving field which may be subject to additional changes in the near future, especially after witnessing a cyber conflict fought so close to the borders of the Alliance.

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[48] Italian Ministry of Defence, *Documento programmatico pluriennale della Difesa per il triennio 2023-2025*, cit., p. 26.
[49] Ibid.

6. The industrial dimension

by Michelangelo Freyrie

Scalable and resilient industrial production is the key to a credible, long-term warfighting capability. In times of peace, a sustainable defence technological industrial base (DTIB) creates strategic options: it enables countries to commit to extended military support, as well as to bolster conventional deterrence against peer adversaries possibly willing to engage in high-intensity combat. In times of war, production capacity is crucial to underpin the military effort and sustain combat operations for as long as necessary. The war against Ukraine pits two countries that, to a different degree, have long played a major role in the global defence markets. Russia is among the world's top arms exporters, while Ukrainian business prominently figured in niches such as aircraft engines and combat land vehicles.[1] Most major Western defence companies have been involved in programmes and activities aimed at bolstering Ukrainian defenders and at the same time increasing national and allied capabilities. Nevertheless, all of the involved parties were ill-prepared for such a complete redefinition of the respective industrial policies, demonstrating the difficulties involved in managing a productive surge during a peer-to-peer conflict.

6.1 Russian and Ukrainian defence industries

6.1.1 Russian industry

The Russian defence industry has struggled to be financially sustainable while bearing prolonged military operations, which were not contemplated at the outbreak of the war. The population's partial mobilisation and the intense use of military hardware have multiplied the demand for spare parts, upgrades and repairs of assets already in service and new assets. This has essentially been

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1   See SIPRI Arms Transfers Database, https://www.sipri.org/databases/armstransfers.

an extreme stress test on the defence industrial policy adopted by Moscow since 2011 (the start of Russian rearmament), also in light of Western sanctions against Russia enacted since 2014.

The unprovoked invasion has exposed some known limitations of Russia's DTIB. The Russian industrial complex, mostly organised under the state-controlled conglomerate Rostec, is characterised by high levels of consolidation and scarce competition, which limits both R&D investments and has adverse effects on the quality of the delivered products and inefficiency.[2] Paradoxically, the prevalence of non-market conditions has not allowed Russian defence primes to profit from their monopolistic positions. The Russian DTIB is beset by massive debts and the government has to regularly intervene with cash injections, which however rarely translate into sustainable revenues.[3] Russian companies are forced to keep prices unreasonably low when dealing with the MoD, and for years they relied on export (now partially blocked due to the sanctions regime) to break even.[4] All in all, Rostec subsidiaries do not achieve enough revenues to invest in large-scale R&D, and the state budget rarely finances research and prototyping.

Since the invasion, Russia has invested massive public resources in the defence budget, increasing military expenditures by 9.2 per cent in 2022. Nevertheless, these additional funds are not enough to compensate for objective limitations that constrain Russia's DTIB. Years of underinvestment and sanctions have prevented most companies from acquiring modern machinery and tools.[5] For instance, while Moscow still has access to many critical raw materials, its steel industry is far from efficient and cutting-edge.[6] The greatest limitation pertains to workforce availability: it is estimated that Russia's DTIB is 400,000 workers short of reaching its full productive capacity,[7] and the Russian penitentiary

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2 Andrew S. Bowen, "Russian Arms Sales and Defense Industry", in *CRS Reports*, No. R46937 (14 October 2021), https://crsreports.congress.gov/product/details?prodcode=R46937.

3 Pavel Luzin, "Russia's Arms Manufacturers Are a Financial Black Hole", in *Riddle*, 30 January 2020, https://ridl.io/?p=7273.

4 Georgy Aleksandrov, "The Barren Barrels", in *Novaya Gazeta Europe*, 2 November 2022, https://novayagazeta.eu/articles/2022/11/02/the-barren-barrels-en.

5 Cfr. Max Bergmann et al., "Out of Stock? Assessing the Impact of Sanctions on Russia's Defense Industry", in *CSIS Reports*, April 2023, https://www.csis.org/node/104981.

6 Georgy Aleksandrov, "The Barren Barrels", cit.

7 Pavel Luzin, "Russia's Defense Industry Growing Increasingly Turbulent", in *Eurasia Daily Monitor*, Vol. 19, No. 173 (17 November 2022), https://jamestown.org/?p=94418.

administration has even offered to supply the industry with (low-quality) indentured labourers.[8] Overall, the political priority of the Kremlin seems to increase welfare spending on current workers, who are often employed in triple shifts and likely considered a crucial political constituency to be kept at bay,[9] while at the same time trying to streamline the defence industry[10] and support it drawing from other state budget lines.[11]

The success of import substitution measures since 2014 has also been limited: for instance, engine production is still inadequate to fulfil Russian ambitions,[12] while the domestic production of high-end semiconductors lags generations behind Western equivalents.[13] However, sanctions elusion through purchases in third countries has been effective in guaranteeing the continuous inflow of microchips, especially for missile guiding systems.[14]

Overall, the production of military goods and defence-related hardware has somewhat increased, but it is not enough to compensate for inflation and the enormous increase in demand.[15] Russia's DTIB can currently keep up with the conflict, but it is no condition to surge production levels so high as to plug the capability gaps opened by the disastrous first weeks of the war[16] and act upon the outsized ambitions of the government.[17] Compared to the West, Russia has fully mobilised its economic system and is willing to sacrifice and depress other sectors to privilege defence industrial production. Moreover, Moscow benefits

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8 "Rostec Is Convoying Human Resources" (in Russian), in *Kommersant*, 29 March 2023, https://www.kommersant.ru/doc/5901489.
9 "Obukhov on the Head" (in Russian), in *Kommersant*, 18 February 2023, https://www.kommersant.ru/doc/5774171.
10 Jaroslaw Adamowski, "Belarus to Make Su-25 Attack Aircraft as Russia Eyes Industry Takeover", in *Defense News*, 21 February 2023, https://www.defensenews.com/global/europe/2023/02/21/belarus-to-make-su-25-attack-aircraft-as-russia-eyes-industry-takeover.
11 Ibid.
12 "Obukhov on the Head", cit.
13 "Prospects for Microelectronics in Russia" (in Russian), in *Defense Media*, 28 March 2022, https://dfnc.ru/c106-technika/perspektivy-mikroelektroniki-v-rossii-2.
14 Daniel Salisbury, "Ukraine: the Problem with Russia's Sanctions-Busting Arms Industry", in *The Conversation*, 4 May 2022, https://theconversation.com/ukraine-the-problem-with-russias-sanctions-busting-arms-industry-182358.
15 Pavel Luzin, "The True State of Russian Arms Manufacturing, June 2023", in *Eurasia Daily Monitor*, Vol. 20, No. 97 (15 June 2023), https://jamestown.org/?p=96164.
16 Pavel Luzin, "Doomed to Failure – Russia's Efforts to Restore its Military Muscle", in *Fletcher Russia and Eurasia Program website*, 15 November 2023, https://sites.tufts.edu/fletcherrussia/?p=10967.
17 Sergio Miller, "1,500 New and Modernised Tanks – Really?", in *Wavell Room*, 1 May 2023, https://wavellroom.com/?p=30907.

from still vast soviet arsenals, including old MBT, that can be modernised. After two years they have also adopted a more tailored approach to consumption for missiles: the last waves of attacks against Ukraine used fewer Kalibr missiles, as they are likely stockpiling. Russian industrial capacities have probably already peaked, while Western and Ukrainian ones are far from it since no full mobilisation has been undertaken. Finally, North Korea and Iran's military aid helps as it gives Russia breathing room on low-quality material.

Table 1 | Examples of Russian hardware losses (up to 25 September 2023) and production rates

	Type	Active inventory (2022)[18]	Deliveries 2020-22	Losses in Ukraine[19]
T-90M	Main battle tank	100	56[20]	40
T-90°	Main battle tank	200	None (unknown number currently stockpiled)[21]	34
T-72B3M	Main battle tank	250	>30[22]	247
Su-34 (basic and M version)	Multirole fighter	112	11[23]	22
Ka-52	Combat helicopter	105	>30[24]	44

6.1.2 Ukrainian industry

The Ukrainian defence industry, for its part, has suffered greatly from the air and land campaign carried out by Russia from February 2022 onwards. For

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18 International Institute for Strategic Studies (IISS), *The Military Balance 2023*, February 2023.

19 Jakub Janovsky et al., "Attack on Europe", cit.

20 Sergio Miller, "T-90Ms Are Appearing on the Eastern Front – What Is the Threat?", in *Wavell Room*, 10 March 2023, https://wavellroom.com/?p=30213.

21 IISS, The Military Balance 2023, cit.

22 "T-72B3M Main Battle Tank", in *Army Technology*, 13 April 2022, https://www.army-technology.com/?p=16308.

23 MilitaryToday website: Sukhoi Su-34, https://www.militarytoday.com/aircraft/su34_fullback.htm; "Unexpected Delivery of Two Su-34s to the Russian Federation - Aerospace Forces", in *Scramble*, 7 December 2020, https://www.scramble.nl/military-news/unexpected-delivery-of-two-su-34s-to-the-russian-federation-aerospace-forces; "Russian Aerospace Forces Received Three More Su-34M Front-Line Bombers", in *Scramble*, 4 January 2023, https://www.scramble.nl/military-news/russian-aerospace-forces-received-three-more-su-34m-front-line-bombers.

24 "Russia's Aerospace Force to Get 30 More Ka-52 Attack Helicopters by 2022", in *TASS*, 28 May 2019, https://tass.com/defense/1060360.

instance, Russia's ability to strike sites such as the Malyshev tank factory in Kharkiv has forced Ukraine to rely on a network of makeshift shops around the country.[25] While the homegrown industry seems to be still able to provide basic infantry equipment and small arms, few specialised companies (such as UAS manufacturers) have reportedly relocated abroad.[26] Due to the sensitivity and complexity of the issue, it is not possible to estimate how much Ukrainian-used equipment is currently produced domestically and abroad, be it by evacuated companies or by foreign suppliers.

The overall picture is even more complex. Ukrainian industry had already suffered from the sudden decoupling from Moscow it experienced from 2014 onwards, as Kyiv lost access to many of its key clients and subcontractors in the Russian Federation (although proportionally more Russian entities have been affected by the divorce).[27] The unwieldy state-owned conglomerate Ukroboronprom has not been able to revive the ailing Ukrainian defence sector and to capitalise on pockets of excellence, such as aircraft maker Antonov, resulting in Kyiv steadily losing its global market share since 2016.[28]

The war has provided an opportunity to finally modernise Ukraine's DTIB and to enact various measures to reform Ukroboronprom's management structure, which is considered the main culprit of the conglomerate's poor performance.[29] Endemic corruption, political influence and red tape are all issues which Kyiv hopes to contrast by resetting current structures and transforming the state holding into a government-owned stock company, subject to OECD management practices and up to NATO standards.[30] This progress should enable the tightening of existing partnerships between Ukrainian companies

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25   Jack Detsch, "Russia Is Supplying Ukraine with Lightly Used Tanks", in *Foreign Policy*, 13 September 2022, https://bit.ly/3L97fC5.

26   Thomas Laffitte, "Ukraine's Defense Industry and the Prospect of a Long War", in *FPRI Articles*, 21 September 2022, https://www.fpri.org/?p=37439.

27   Alexandra McLees and Eugene Rumer, "Saving Ukraine's Defense Industry", in *Carnegie Articles*, 30 July 2014, https://carnegieendowment.org/publications/56282.

28   Cfr. "Top 100 Defense Companies", in *Defense News*, https://people.defensenews.com/top-100.

29   Illia Ponomarenko, "Ukraine's State Defense Conglomerate UkrOboronProm Transformed into Stock Company", in *The Kyiv Independent*, 29 March 2023, https://kyivindependent.com/ukraines-state-defense-conglomerate-ukroboronprom-transformed-into-stock-company.

30   Okroboronprom, *The Cabinet of Ministers of Ukraine Approves the Transformation of Ukroboronprom into a Modern Defense Company*, 21 March 2023, https://ukroboronprom.com.ua/news/kabinet-ministriv-ukrayini-zatverdiv-peretvorennya-ukroboronpromu-na-sucasnu-oboronnu-kompaniyu.

and their NATO counterparts, enhancing joint ventures with European and US prime contractors and providing some much-needed capital investments.[31] Since 2023, Ukraine has entered into co-production agreements with the US and has launched the so-called Defence Industries Alliance.[32] Rheinmetall is planning to open production sites in the country,[33] while BAE System has established a local legal entity to work directly with Ukrainian armed forces[34] and French companies started a dialogue with Kyiv supported by France's defence ministry.[35] Such efforts respond to a clear political rationale and are part of a broader strategy to make Ukraine's defence industry more self-sufficient, to guarantee technological transfers and joint production schemes, and to bolster Kyiv's conventional deterrence in the long term.[36]

Finally, it is noteworthy that Ukrainian defence companies have attracted much interest from foreign actors looking to purchase those weapon systems that have proven to be more than capable of facing Russian hardware. It is thus likely that Ukrainian "combat-proven" equipment will be in high demand in the next few years,[37] as long as enough manufacturing capacities are made available for export.

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31 See, for instance: "Rheinmetall and Ukraine's Ukroboronprom Form JV to Build, Repair Tanks", in *Reuters*, 13 May 2023, https://www.reuters.com/world/europe/rheinmetall-ukraines-ukroboronprom-form-jv-build-repair-tanks-2023-05-13.

32 Kateryna Tyshchenko, "38 Companies from 19 Countries Join Defence Industries Alliance", in *Ukrainska Pravda*, 30 September 2023, https://www.pravda.com.ua/eng/news/2023/09/30/7422061.

33 Frederik Pletigen and Anna Cooban, "Rheinmetall Will Build and Repair Tanks in Ukraine, Says CEO", in *CNN Business*, 10 July 2023, https://edition.cnn.com/2023/07/10/business/rheinmetall-german-tank-factory-ukraine/index.html.

34 BAE Systems, *BAE Systems Establishes Local Presence and Signs Agreements to Support Ukraine*, 31 August 2023, https://www.baesystems.com/en/article/bae-systems-establishes-local-presence-and-signs-agreements-to-support-ukraine.

35 Laura Kayali and Caleb Larson, "France, Germany Pave the Way to Making Weapons in Ukraine", in *Politico*, 29 September 2023, https://www.politico.eu/?p=3642468.

36 Jaroslaw Adamowski, "Ukrainian Defence Firms Seek Ties to Europe's Industry", in Defense News, 15 June 2023, https://www.defensenews.com/industry/2023/06/15/ukrainian-defense-firms-seek-ties-to-europes-industry.

37 Jaroslaw Adamowski, "Ukraine Arms Maker Finds Export Interest in 'Combat-Proven' Missiles", in *Defense News*, 6 September 2022, https://www.defensenews.com/global/europe/2022/09/06/ukraine-arms-maker-finds-export-interest-in-combat-proven-missiles.

6.2 The struggle of the Ramstein countries

Kyiv benefits from the support from the global coalition crystallised around the Ukraine Defence Contact Group – the so-called Ramstein group – made up of 54 participating countries. They encompass all NATO members and host most of the world's high-technology prime defence and aerospace contractors, and are involved in providing Ukraine with military aid, either by mobilising existing stocks or by producing new hardware.

The US is by far the most important military donor to Ukraine, but Europe as a whole has provided a comparable amount of equipment. EU institutions have also supported Ukraine militarily, by allocating 5.6 billion euros through the European Peace Facility. Among European states, Germany stands as the primary military contributor to Kyiv, followed by the UK and Poland.

Figure 2 | Breakdown of military aid to Ukraine, in billions of dollars
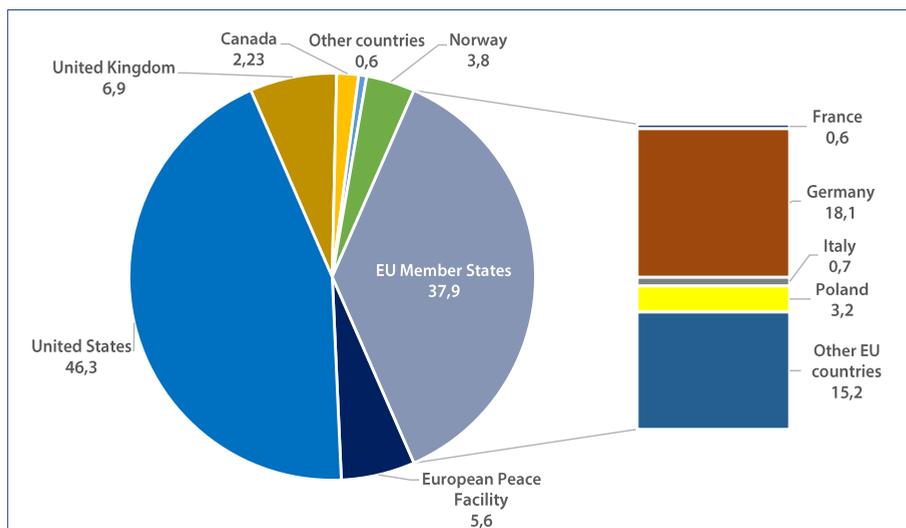
Source: Kiel Institute Ukraine Support Tracker.
Note: Italian donations are based on the declarations of Foreign Minister Antonio Tajani in early 2023.

Conversely, Italy has provided a more modest yet still significant contribution compared to other European nations, through eight military aid packages. In December 2023, the Italian government approved the eighth decree law

allowing arms shipment to Ukraine, extending the previous authorisation until the end of 2024. Despite information regarding the shipment of Italian military equipment to Ukraine being classified, it is now known that Italy has provided, among other items: infantry equipment, mortars, rocket launchers, machine guns, armoured vehicles for troop transport such as the Lince, towed artillery and self-propelled howitzers, anti-tank, anti-aircraft, and missile defence systems, along with their respective ammunition. Additionally, civil protection devices such as generators and equipment for countering nuclear, biological, chemical, and radiological threats (NBCR) have been provided.

The massive volumes of military aid have nevertheless proven to be a challenge for businesses that over the previous 30 years have mainly strived for efficiency over the maintenance of auxiliary manufacture capacities. This has also meant that defence stockpiles have gained a strategic valence for Western armed forces: accumulated materiel could be used to replenish potential losses and unused hardware could be cannibalised for spare parts.[38] However, Western military aid has mostly relied on such existing stockpiles, putting Europe and the US in a defence-economic predicament. Considering the relatively low production rates of the transatlantic DTIB, especially for expendable assets such as artillery shells or artillery rockets, most NATO allies now face a scenario in which supply chains are inadequate to achieve the Alliance's triple goal of reconstituting dwindling stocks, supporting the Ukrainian cause and contribute to increased military preparedness across the board. Given that the expansion of productive capacities will be gradual and relatively slow, keeping up with attrition rates in Ukraine while reacquiring lost and exhausted capabilities will be a challenge for most Ramstein countries.[39] While NATO[40] and the EU[41] have both recognised the necessity of a general reappraisal of current logistics and industrial policies, ammunition and artillery have seemingly taken centre stage

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38 Léo Péria-Peigné, "Military Stockpiles: A Life-Insurance Policy in a High-Intensity Conflict?", in *Focus stratégique*, No. 113 (December 2022), https://www.ifri.org/en/node/26801.

39 For an in-depth analysis of the transatlantic defence industrial production, see: Michelangelo Freyrie, "Industrial Production in Support of European and Transatlantic Defence", in *Documenti IAI*, No. 23|14 (July 2023), https://www.iai.it/en/node/17266.

40 See, for instance: Murielle Delaporte, "NATO Military Stockpiles Policy: Reversing the Just In Time Logic", in *Wide Angle Defense & Security*, 25 April 2023, https://www.eurosatory.com/en/nato-military-stockpiles-policy-reversing-the-just-in-time-logic.

41 See Section 2.4 in this study.

of current efforts.[42]

Table 2 | Examples of Western donations to Ukraine up to summer 2023

System	Country	Type	Original stocks	Transferred to Ukraine	% of total stock transferred
CAESAR	France	Self-propelled artillery	74[43]	30[44]	41
AHS Krab	Poland	Self-propelled artillery	80	>18[45]	>23
T-72A / T-72M1	Poland	Main battle tank	384[46]	260[47]	67
Challenger 2	UK	Main battle tank	157[48]	14	9
Leopard 2	Germany	Main battle tank	298	18[49]	6
Stinger	USA	MANPADS	5,600[50]	1,866	33

Insufficient productive capacity is tied to a long-winded policy of defence industrial consolidation in Europe and the US and, above all, to decreasing demand by European governments since the 1990s. Such an approach has decreased industrial resilience, increased the reliance of companies on fragile

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42 See, for instance: NATO, *Four More Allies Join NATO's Multinational Ammunition Warehousing Initiative*, 15 June 2023, https://www.nato.int/cps/en/natohq/news_215692.htm; and Sabine Siebold, "NATO Pushes for Common Standards to Tackle Shortfalls in Artillery Munitions", in *Reuters*, 14 June 2023, https://www.reuters.com/business/aerospace-defense/nato-pushes-common-standards-tackle-shortfalls-artillery-munitions-2023-06-13.

43 Patricia Mirallès and Jean-Louis Thiériot, "La préparation à la haute intensité", in *Rapports d'information de l'Assemblée Nationale*, No. 5054 (17 February 2022), p. 76, https://www.assemblee-nationale.fr/dyn/old/15/rap-info/i5054.asp.

44 French Ministry of Defence, *Soutien à l'Ukraine : les 4 points à retenir de l'audition de Sébastien Lecornu*, 16 March 2023, https://www.defense.gouv.fr/actualites/soutien-lukraine-4-points-retenir-laudition-sebastien-lecornu.

45 Josh Smith and Joyce Lee, "Exclusive: Seoul Approved Poland's Export of Howitzers with S.Korean Parts to Ukraine", in *Reuters*, 8 March 2023, https://www.reuters.com/world/seoul-approved-polands-export-howitzers-with-skorean-parts-ukraine-official-says-2023-03-08.

46 "Poland Provides Ukraine with More than 200 T-72 Main Battle Tanks", in *Army Recognition*, 29 April 2022, https://www.armyrecognition.com/x94y6.

47 "Poland Has Already Transferred More than 260 T-72 Tanks to Ukraine", in *Militarnyi*, 17 January 2023, https://mil.in.ua/?p=186549.

48 House of Commons Defence Committee, *Oral Evidence: Responsibilities of the Minister for the Armed Forces*, HC 717, 8 March 2023, https://committees.parliament.uk/oralevidence/12834/html.

49 German Federal Government, *The Arms and Military Equipment Germany Is Sending to Ukraine*, 30 January 2024, https://www.bundesregierung.de/breg-en/news/military-support-ukraine-2054992.

50 Mark F. Cancian, "Is the United States Running out of Weapons to Send to Ukraine?", in *CSIS Commentaries*, 16 September 2022, https://www.csis.org/node/66931.

"just-in-time" supply chains and lessened the overall ability to surge production in times of need.

The issues affecting the transatlantic defence industrial basis can be summarised with the following points:

- Increasingly intricate and hard-to-coordinate value chains due to ever-more complex components, digitalisation of weapons systems and outsourcing;
- Scarcity of qualified human resources due to a lack of attractiveness in the labour market and broader macroeconomic trends;
- Structural imbalances in the global commodity markets, which translate to a scarcity of critical raw materials (e.g. rare metals);
- Physical limitations in the energy-intensive production processes;
- Constraints to large, proper testing areas in Europe;
- Absence of ad-hoc financial tools to facilitate private investments in productive capacities, considered high-risk by defence companies if they are not enshrined within procurement contracts;
- In many cases, lack of reliable multi-annual perspectives in national procurement strategies and budgetary laws.

Above all, in Europe industrial capacity is tightened primarily to government contracts for military supplies, therefore any ramp-up will heavily depend on the increase of actual procurement.

6.3 Implications for Italy

The war has shown that industrial production capacity remains a crucial element to be considered in defence planning and procurement. Most EU and NATO countries have committed to a structural increase in defence expenditures. Pursuing only national solutions would prevent the development of a mature (and scalable) European industrial and technological base within the next decade. An improvement of EU industrial defence integration, further analysed in Section 2.4, will be crucial in this regard.

For large and medium defence companies across Europe, a multiannual financial framework with adequate production volumes for procurement programmes is needed to carry out capital investments, such as the purchase

of new machinery or hiring and training qualified personnel – a challenge that will persist given the demographic decline affecting most of European countries. In particular, Italy's multiannual defence planning (*Documento programmatico pluriennale* – DPP) lacks both financial dimension and certainty in its administrative implementation. These lacking elements are however necessary to give industrial stakeholders assurances, enabling them to carry out capital investments such as the purchase of new machinery or hiring qualified personnel.

Managerial, organisational, and administrative rationalisation are also key ingredients to limit waste and prioritise investments where they are actually needed, while at the same time, a logic of efficiency and optimisation should be complemented by criteria such as resilience, efficacy and redundancy. These principles especially apply to second-tier suppliers, need to be pursued aiming for the establishment of a true European defence single market rather than maintaining rather fragmented national markets.

Finally, the experience of the Ukrainian armed forces and the actual use of weapons systems on the battlefield will likely play a major role in future procurement and R&D policies in the years to come, particularly with regard to the whole land sector, UAS and counter-UAS, helicopters and air defence. Italian companies can and should play a role in tightening industrial relations between Ukraine and the EDTIB. In particular, the fields of electronics and enabling capabilities seem to be particularly promising.[51]

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51   Interview, 4 October 2023.

Part two

The strategic implications of a Russian war in Europe

7. NATO and a reinforced collective defence

by Elio Calcagno and Alessandro Marrone

7.1 Ukraine war's implications for NATO

Because of the war in Ukraine, the 2022 NATO summit in Madrid and the resulting Strategic Concept signalled a substantial departure for the alliance in terms of focus and posture. Firstly, the new Concept represents an unequivocal return to a stance vis-à-vis Russia based first and foremost on deterrence and defence,[1] rather than calls for cooperation that had been typical between the end of the Cold War and Russia's illegal annexation of Crimea in 2014.[2] This approach was enshrined in the previous Strategic Concept, which was written in 2010 at a time when relations between Russia on the one hand and the US and its NATO allies on the other on the surface were still benefitting from a phase of détente and tentative partnership following the breakup of the Soviet Union and the establishment of the NATO-Russia Council in 2002.[3]

Russia's unprovoked aggression against Ukraine, starting in 2014 with the occupation of Crimea and the involvement in the Donbas conflict and climaxing with the February 2022 invasion, has compelled the Allies to formally reinforce their stance. The latest Strategic Concept explicitly points to Russia as "the most significant and direct threat to Allies' security and peace and stability in the Euro-Atlantic area".[4] The NATO emerging from the Russian invasion of Ukraine has a clear focus on deterrence and defence and is enhancing its posture by ensuring "a substantial and persistent presence on land, at sea, and in the air".[5] The other two core tasks featured in the 2022 Strategic Concept – namely Crisis

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[1] NATO, *2022 Strategic Concept*, July 2022, https://www.nato.int/strategic-concept.

[2] Elio Calcagno, "Dove punta la bussola Nato", in *AffarInternazionali*, 1 July 2022, https://www.affarinternazionali.it/?p=4236.

[3] Enrico Casini and Andrea Manciulli (eds), *La guerra tiepida. Il conflitto ucraino e il futuro dei rapporti tra Russia e Occidente*, Rome, Luiss University Press, 2023.

[4] NATO, *2022 Strategic Concept*, cit.

[5] Ibid.

Prevention and Management as well as Cooperative Security – are clearly de-prioritised in comparison with the 2010 document. First, it is clearly stated that they serve the overarching goal of collective defence. Second, their wording is rather cautious, vague and modest in comparison with the ambitious, concrete and robust part related to Article 5. To make just one example, two long-standing NATO partnerships such as the Mediterranean Dialogue and the Istanbul Cooperation Initiative are not even explicitly mentioned in the Strategic Concept. The focus on Russia's threat from the eastern flank entails also a de-prioritisation of the southern one.[6] Although terrorism is formally indicated as a major asymmetric threat to the Alliance, as a matter of fact, the ruinous NATO withdrawal from Afghanistan and above all the war in Ukraine have radically turned NATO military posture towards the conventional scenario of a peer-to-peer conflict waged by a state actor on the Alliance's eastern long border from Scandinavia to the Black Sea. This will probably relegate the Crisis Prevention and Management core task to a background role.[7]

Such a new reality is unlikely to change in the short and medium term, and its effects will probably be felt by some European allies on the Mediterranean shores as they seek to keep NATO engaged in North Africa and the Middle East.

When it comes to NATO enlargement, the issue of Ukraine's membership has been controversial since the 2008 Bucharest Summit.[8] At the 2023 Vilnius summit, allies reiterated that Ukraine might not enter NATO while the conflict with Russia is ongoing, closing the door to such an outcome for the mid-to-long term.[9] In a telling shift from Bucharest, France has been very forthcoming regarding giving Kyiv a clear path for membership, though the final communiqué stopped short of a promise.[10] On the same occasion, G7 countries gathered in Vilnius pledged long-term military support to Ukraine

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6 Alessandro Marrone, "NATO's New Strategic Concept: Novelties and Priorities", in *IAI Commentaries*, No. 22|30 (July 2022), https://www.iai.it/en/node/15667.

7 Enrico Casini and Andrea Manciulli (eds), La guerra tiepida, cit.

8 Andrew Gray, "Bucharest Declaration: NATO's Ukraine Debate Still Haunted by 2008 Summit", in *Reuters*, 10 July 2023, https://www.reuters.com/world/europe/natos-ukraine-debate-still-haunted-by-bucharest-pledge-2023-07-10.

9 Sean Monaghan et al., "What Happened at NATO's Vilnius Summit?", in *CSIS Critical Questions*, 14 July 2023, https://www.csis.org/node/106347.

10 NATO, *Vilnius Summit Communiqué*, 11 July 2023, https://www.nato.int/cps/en/natohq/official_texts_217320.htm.

as a group and via bilateral agreements, *in primis* between Washington and Kyiv.[11] As a result, for the foreseeable future, Article 5 will obviously apply to the current NATO *limes* and will not include Ukraine as a third country: allies will continue to provide military assistance to Ukraine while refraining from a direct conflict with Russia on Ukrainian territory.

The Alliance took several steps in order to meet the collective deterrence and defence goals set up by the Strategic Concept, drawing up a new NATO Force Model. Among the initiatives under this model, perhaps the most advertised was the increase of the Rapid Reaction Force to 300,000 troops from the current 40,000 to be deployed within one month.[12] Indeed, NATO is aiming at a force model in which allied troops are divided into three tiers based on their respective readiness level: tier 1 forces (over 100,000) are to be deployable in up to ten days; tier 2 (200,000) in around 10-to-30 days; tier 3 (500,000) in between 30 and 180 days.[13] This move will, in all likelihood, prove to be as difficult to implement in the short and medium term as it is ambitious. The task is particularly arduous considering the magnitude of the leap required in sheer numbers and, above all, the fact that most NATO countries outside of the US are already under pressure to maintain high readiness across domains as they concurrently make huge investments in the modernisation of their forces and re-stocking of ammunition.[14] Notably, these numbers entail a level of enablers and logistics not seen as necessary during the post-Cold War in an era marked by crisis management and stability operations. Even at the peak of its military engagement in Afghanistan in 2011, NATO deployed a maximum of 130,000 troops from 51 allied and partner countries,[15] though they did not necessitate the air and naval components, as well as the land heavy equipment, necessary to cope with a peer adversary. For sure, from an operational point of view, it is much easier to plan and implement a major defence posture in Europe than in central Asia. Still, military mobility remains a priority issue for NATO, to the point

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11 Laura Kayali, "G7 Countries Pledge Long-Term Support for Ukraine", in *Politico*, 12 July 2023, https://www.politico.eu/?p=3333672.
12 "NATO to Boost Troops on High Alert to over 300,000 - Stoltenberg", in *Reuters*, 27 June 2022, https://www.reuters.com/article/instant-article/idUKKBN2O80R0.
13 NATO, *New NATO Force Model*, June 2022, https://www.nato.int/nato_static_fl2014/assets/pdf/2022/6/pdf/220629-infographic-new-nato-force-model.pdf.
14 Interview, 6 September 2023.
15 "Blood and Billions of Dollars: NATO's Long War in Afghanistan", in *Reuters*, 15 August 2021, https://www.reuters.com/world/india/blood-billions-dollars-natos-long-war-afghanistan-2021-08-13.

that even non-EU countries have joined the PESCO Military Mobility project to improve the related infrastructure and legal framework in Europe.

At the same time, the 2022 Summit led to the commitment by NATO to strengthen its Enhanced Forward Presence (EFP), first established in 2017 with four multi-national battalion-sized battle groups in Latvia, Lithuania, Estonia and Poland,[16] both in size and scope. Indeed, they are going to be upgraded to brigade-sized forces.[17] Moreover, under the enhanced Vigilance Activity (eVA) label, other four multinational battlegroups have been deployed in Romania, Bulgaria, Hungary and Slovakia, led respectively by France, Italy, Hungary and the Czech Republic.[18] Again, framework nations and other contributing allies are, in many cases, encountering serious hurdles as they attempt to keep a battle-ready force in theatre, given the shortages in troops and equipment that appear to affect all Allies except the US.[19] These land forces are integrated within a broader deterrence and defence posture which includes air policing of the whole European allies' airspace, standing maritime groups activities in the seas adjacent to Europe, and the integrated air and missile defence (IAMD).[20] Moreover, the Strategic Concept recognises space and cyber as operational domains where Article 5 may be invoked should an attack against allied assets occur, and sets the goal to integrate space capabilities within the Alliance's deterrence and defence posture by laying the ground for multi-domain operations. Meanwhile, the underwater environment is gaining more attention also within NATO.

Inevitably, NATO's ability to properly bolster its forward defence capabilities represents a crucial element in the credibility of its standing forces along the eastern flank as a conventional deterrent. At the same time, the Alliance is

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16 Each Battlegroup is led by a framework nation, respectively US (Poland), Germany (Lithuania), UK (Estonia) and Canada (Latvia).

17 "NATO Reaffirms Plan to Have 'Combat-Ready' Brigades in the Baltic States", in *LRT*, 11 July 2023, https://www.lrt.lt/en/news-in-english/19/2032611/nato-reaffirms-plan-to-have-combat-ready-brigades-in-the-baltic-states.

18 Website of the Ministry of Defence of North Macedonia: *NATO's Enhanced Forward Presence & Enhanced Vigilance Activities*, https://mod.gov.mk/natos-enhanced-forward-presence.

19 Robbie Gramer and Jack Detsh, "All Unquiet on NATO's Eastern Flank", in *Foreign Policy*, 13 April 2023, https://foreignpolicy.com/2023/04/13/nato-eastern-flank-battle-group-russia-poland-latvia-lithuania-estonia.

20 On NATO IAMD see, among others, Alessandro Marrone and Karolina Muti (eds), "Europe's Missile Defence and Italy: Capabilities and Cooperation", cit.

developing new regional plans that aim to blend with the national plans of front-line nations, though the former will require that the new Force Model effectively raises the number of high-readiness troops.[21]

7.2 Implications for Italy

The new NATO posture resulting from the war in Ukraine presents four major implications for Italian defence policy.

First, the recognition of NATO is not and will not be, at least for the mid-term, the multilateral framework where plan and conduct crisis prevention and management or stability operations in the wider Mediterranean region. This is a major turning point concerning the operational experience in Western Balkans, Afghanistan, and Libya from 1995 to 2021. Accordingly, Italy should think and plan its eventual military intervention out of the NATO framework, via either national mission, ad hoc groupings or EU operations.

Second, Italy has to recognise that NATO partnerships with countries in the wider Mediterranean will enjoy limited support within the Alliance in political, diplomatic, military and budgetary terms. Rome should make the best of this support, by leveraging NATO structures and institutions as much as possible, including the valuable niche capabilities it hosts, such as the NATO Centres of Excellence (CoE) on respectively on Security Force Assistance, Stability Policing and Maritime Research and Experimentation; the NATO Strategic Direction South Hub; the NATO Defence College. Allied institutions and entities can provide useful outputs in terms of partnerships and, broadly speaking, cooperative security towards the wider Mediterranean region, as well as a greater understanding within the Alliance of the security environment in Africa and the Middle East. Moreover, Rome should fully support the group of experts tasked to present a report on NATO partnership at the next Washington summit. But, once again, Italy should frame its defence and foreign policy towards the wider Mediterranean primarily outside of the Alliance framework,

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21   Ben Barry et al., "The Future of NATO's European Land Forces: Plans, Challenges, Prospects", in *IISS Research Papers*, June 2023, https://www.iiss.org/en/research-paper/2023/06/the-future-of-natos-european-land-forces.

at the national, regional and/or EU level, and seek synergy between a NATO supporting role and the leadership exerted elsewhere.[22]

The third implication for Italy concerns the need to start dealing with the NATO agenda for what it is and not for what Italy wishes it to be. Italian national security is directly affected by the alliance's priorities when it comes to Russia, China and the Info-Pacific, as well as space, cyber, emerging disruptive technologies, arms control and non-proliferation. As such, the NATO-EU strategic partnership represents a cross-cutting element crucial for all the aforementioned issues, also from an Italian perspective. Italy has to develop, clarify and present its position on these issues to constructively contribute to a NATO reflection in line with its national interests and the country's military, industrial and technological capabilities.

Fourth, when it comes to capabilities defence spending is a crucial element, and here the renewed NATO posture presents a basket of significant implications for Italy – which is often underestimated in the domestic public debate. While Italy's defence spending had been increasing slowly but rather consistently since 2015, reaching 1.38 per cent in 2023, growth has not accelerated as fast as in most other European allies after the 2022 Russian invasion of Ukraine – even including a country farther from the eastern flank and led by a progressive government such as Spain. As a result, it has been openly stated that Italy will not reach the two per cent guideline on defence spending as a share of GDP by 2024, contrary to what was agreed within the NATO Defence Investment Pledge ten years ago, nor by 2028 as it had been stated by the previous government and Parliament.[23] However, as other NATO allies make significant efforts in order to reach (and in many cases exceed) this threshold, the Vilnius summit communiqué has clearly stated that two per cent has l become a minimum requirement, rather than a goal for the most virtuous allies. With this threshold becoming a floor rather than a ceiling, Rome's defence spending lags behind in comparison with NATO standards and European allies, and this will challenge Italy's ability to maintain a prominent voice in the NATO context – despite

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22   See in this regard: Alessandro Marrone, "La NATO verso Vilnius e la difficile posizione dell'Italia", in *AffarInternazionali*, 15 June 2023, https://www.affarinternazionali.it/?p=5697.
23   Italian Ministry of Defence, *Documento programmatico pluriennale della Difesa per il triennio 2023-2025*, cit.

important Italian representatives in allied institutions such as the upcoming Chairman of the Military Committee Giuseppe Cavo Dragone.

In previous years, Italian policymakers have acknowledged the issue of a stagnating defence budget but have pointed to Italy's proactive role as a leading troop contributor in NATO's out-of-area operations such as KFOR, Resolute Support in Afghanistan and NATO Training Mission Iraq, as well as collective defence deployments, from contribution to Latvia eFP to F-35 air policing in the Baltic Sea, while also maintaining a wide array of high-end capabilities across all physical domains.[24] In other words, Italy has strongly supported a more balanced approach to burden sharing based on three complementary pillars: Cash, meaning the overall defence spending; Capabilities, including meeting the target of twenty per cent defence budget spent on procurement (currently Italy stands at 31,2 per cent);[25] Contribution to allied operations and activities. Such a "3C" approach has been endorsed over time by most allies as acknowledged by NATO Secretary General Jens Stoltenberg.[26] However, with deterrence and collective defence assuming a preponderant role among NATO's core tasks, the high Italian contribution to out-of-area operations will no longer compensate for a stagnating defence budget when it comes to political assessment of military burden sharing.

In the latest Multiannual Programming Document (*Documento programmatico pluriennale* – DPP), the Minister of Defence Guido Crosetto indicated that the armed forces' priority is the defence of the Italian state,[27] within a context of aggressive multi-polarism whereby NATO collective defence is the cornerstone of Europe's security and stability. Although for three decades Italy has prioritised international crisis management and stability missions and operations, according to the DPP they are now secondary. This is a reasonable and coherent implication from the Ukraine war and what it means for NATO and

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24   Elio Calcagno, "Italy's Defence Policy and Possible Points of Contact with Norway", in *IAI Papers*, No. 23|15 (July 2023), https://www.iai.it/en/node/17269.

25   Matteo Mazziotti Di Celso, "Dove e come investe la difesa italiana? Riflessioni sul DPP 2023-2025", in *Geopolitica.info*, 18 October 2023, https://www.geopolitica.info/?p=44410.

26   See for example NATO, *Press Conference by NATO Secretary General Jens Stoltenberg after a Meeting of NATO Defence Ministers*, 14 February 2018, https://www.nato.int/cps/en/natohq/opinions_151504.htm.

27   Italian Ministry of Defence, *Documento programmatico pluriennale della Difesa per il triennio 2023-2025*, cit.

Italy. Still, instability in the Middle East and Africa may require Italy to deploy assets within international operations exploiting multilateral frameworks other than NATO, as has recently happened in the Red Sea to protect the sea line of communications from Houthi attacks.

Against this backdrop, the question of how Italy's stagnating defence budget is spent qualitatively becomes ever more pressing. The Ukraine war has exposed substantial gaps throughout European militaries in terms not always of specific capabilities, but certainly in terms of capacity: ammunition stocks, number of weapon systems available and the national industries' ability to quickly ramp up production without clear international coordination and procurement commitments by governments. Despite the chronic budget constraints, Italy has managed to acquire and maintain good capabilities across domains, but more needs to be done. Ammunition stocks have never been a priority for Italy and should be brought to a level befitting a protracted, high-intensity conflict such as the one taking place in Ukraine. Furthermore, the wide-ranging modernisation drive already underway must deliver exquisite capabilities to the armed forces on a large scale, especially considering that the technological edge long given for granted by NATO forces has gradually been eroded in key areas, including emerging and disruptive technologies.

The war in Ukraine showed how mass is still a necessary precondition for victory in drawn-out conflicts between peer or near-peer forces. Mass, however, is not simply achieved by a number of troops, but by the amounts and quality of available equipment, large ammunition stocks, the ability to quickly move forces as needed, and adequate training beyond élite, front-line troops to bear high levels of attrition. Yet, a look at NATO's estimates for Allies' 2023 main categories of defence expenditure shows how Italy is still the country spending the most as a percentage of total defence expenditure in personnel expenses, while it is one of the countries spending the smallest percentage on operational costs (including education, training, exercises and maintenance).[28] While improvements have been made in terms of investment in major equipment and related research and development (R&D), these have come at the expense of training and maintenance rather than personnel costs. Italy cannot realistically

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[28] NATO, *Defence Expenditure of NATO Countries (2014-2023)*, 7 July 2023, https://www.nato.int/cps/en/natohq/news_216897.htm.

hope to achieve high levels of readiness across the military spectrum without investing adequately in training, exercises and maintenance. Italy's challenge in this regard is perhaps best exemplified by the inability to satisfy NATO's more recent requirements for the country to put three heavy brigades at the alliance's disposal. Indeed, Italy currently fields only two – the Ariete (armoured) and Garibaldi (mechanised)[29] – both suffering from serious readiness issues due to the scarce quantity and reliability of the available C-1 Ariete MBTs, which are today wholly outdated.[30] The war in Ukraine has prompted the government's long overdue decision to fill this gap, with plans to acquire Leopard 2 while a number of Ariete MBTs are to be modernised to extend their service life.[31] Such measures, however, will not bear fruits overnight; meanwhile Italy will have to contend with a partially inadequate force mix, especially in the land domain.

29   Paolo Valpolini, "The Italian Army Is Ready to Increase Quality and Quantity of Its Main Battle Tanks", in *EDR Magazine*, 2 August 2023, https://www.edrmagazine.eu/?p=31465.

30   Alessandro Marrone and Ester Sabatino (eds), "Main Battle Tanks, Europe and the Implications for Italy", in *Documenti IAI*, No. 20|07 (April 2020), https://www.iai.it/en/node/11536.

31   "Italy Plans to Buy Leopard 2 Tanks to Boost Ground Forces", in *Reuters*, 13 July 2023, https://www.reuters.com/business/aerospace-defense/italy-plans-buy-leopard-2-tanks-boost-ground-forces-2023-07-13.

8. The reaction in major European countries

by Michelangelo Freyrie

8.1 Germany – The Sondervermögenand changes in force structure

The war against Ukraine has come as a major shock to Germany's strategic outlook. Despite repeated calls for Berlin to exercise a leadership role in European security and defence affairs, German elites had forgone any attempt at conventional deterrence and increased military preparedness. Russia's invasion of its neighbour led to an increased awareness that large-scale conventional wars in Europe are not a thing of the past,[1] and that the German armed forces (*Bundeswehr*) are wholly unprepared for such an eventuality.[2] Social-democratic chancellor Olaf Scholz baptised this radical change to Germany's strategic environment as a "*Zeitenwende*", a turning of times.

Contextually, the chancellor announced an increase in defence spending via the creation of an off-budget 100 billion euro special fund (*Sondervermögen*) to plug the capability gaps of the Bundeswehr. The *Sondervermögen* should push German defence expenditures to two per cent of GDP, as set by NATO in 2014.[3] However, cuts in the regular budget, inflation and interest payments mean that Germany will spend around 1.7 per cent on defence in 2024, with the funds of the *Sondervermögen* expected to run out in 2025.[4]

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[1] Tobias Bunde, "Lessons (to Be) Learned? Germany's Zeitenwende and European Security after the Russian Invasion of Ukraine", in *Contemporary Security Policy*, Vol. 43, No. 3 (June 2022), p. 516-530, DOI 10.1080/13523260.2022.2092820.

[2] "German Army Chief 'Fed up' with Neglect of Country's Military", in *Reuters*, 24 February 2022, https://www.reuters.com/world/europe/german-army-chief-fed-up-with-neglect-countrys-military-2022-02-24.

[3] German Federal Government, *100 Billion Euros for a Powerful Federal Armed Forces*, 3 June 2022, https://www.bundesregierung.de/breg-en/news/special-fund-federal-armed-forces-2047910.

[4] Ifo Institute, *ifo Schnelldienst 07/2023: Budget Policy under the Sign of the "Zeitenwende" - What Do We Have to Do Without in Favor of Defense?*, July 2023, https://www.ifo.de/en/node/76592; "Ifo Institut analysiert Sondervermögen „Bundeswehr"", in *Bundeswehr-Journal*, 10 July 2023, https://www.

The budget increase has been only part of the reforms undertaken in the wake of the war. Germany's notoriously finicky procurement system has been partially slimmed down for the acquisition of some basic equipment.[5] Although there are no plans for reforming the Bundeswehr's procurement agency BAAINBw, the new policy privileges the purchase of defence assets already available on the market over the development of new systems, even if they do not completely adhere to the operational requirements of the armed forces.[6] Moreover, Defence Minister Boris Pistorius reportedly plans to propose changes on how parliament is involved in procurement decisions. Currently, the budgetary commission has to approve any expenditure above 25 million euros, which is said to significantly slow the procurement process.[7]

A big change brought on by the war has been a fundamental shift in German attitudes towards arms export in crisis zones. In the case of Ukraine, Germany has been especially careful to avoid any perceived "escalatory move" by providing hardware that Russia could interpret as a German involvement in the war (a topic that has been extensively discussed both by policymakers and the media).[8] International pressures peaked when Kyiv requested the delivery of German-made Leopard tanks from other European partners, which would have required Berlin's approval.[9] In early 2023, Germany relented and is currently directly and indirectly supplying a number of advanced and complex weapon systems to Ukraine. As of late summer 2023, Germany had become one of the major European backers of Ukraine, allocating 5.4 billion euros in military

bundeswehr-journal.de/?p=15949.

5   German Federal Office of Justice, *Bundeswehrbeschaffungsbeschleunigungsgesetz* (Federal Armed Forces Procurement Acceleration Act), 11 July 2022, https://www.gesetze-im-internet.de/bwbbg/BJNR107800022.html.

6   Ole Henckel, "New Procurement Strategies of the BAAINBW", in *ES&T*, 9 May 2022, https://esut.de/2022/05/meldungen/34006.

7   Nils Metzger, "Kommt der Pistorius-Turbo für die Bundeswehr?" (Is the Pistorius turbo coming for the Bundeswehr?), in *ZDFheute*, 30 April 2023, https://www.zdf.de/nachrichten/politik/bundeswehr-beschaffung-reform-pistorius-100.html.

8   Christoph Kehlbach, "Wann wird Deutschland Kriegspartei?" (When will Germany become a "war party"?), in *Tagesschau*, 26 January 2023, https://www.tagesschau.de/inland/innenpolitik/leopard-kriegspartei-101.html; German Federal Government, *Bundesregierung: Deutschland nicht 'Kriegspartei'* (Federal Government: Germany is not a 'war party'), 19 April 2023, https://www.bundestag.de/presse/hib/kurzmeldungen-943542. Concerns regarding the depiction of German weapons employed against Russian troops on major World War Two battlefields also reportedly played a role.

9   John Kampfner, "Germany's Change of Heart Is Now Pivotal to the War in Ukraine. Here's Why", in *The Guardian*, 15 May 2023, https://www.theguardian.com/p/z236y.

aid,[10] and German defence contractor Rheinmetall is even expected to build a new tank production and maintenance site in Ukraine.[11] Still, Berlin has made a point not to deliver new weapon types without previous consultation with major allies, especially the US.[12] The ongoing change in German defence export policy seems to regard only Ukraine, while a more traditional and restrictive position applies to most other third countries.

Germany also undertook some major changes to its force structure. It established a new joint command (*TerrFüKdoBw*) tasked exclusively with territorial and allied defence. Moreover, a new class of forces has been introduced to the land forces: the *MittlereKräfte* (middle forces), wheel-based mechanised forces designed for rapidity and autonomous redeployments towards the Eastern flank, especially the Baltic region.[13]

Finally, Germany has also led the establishment of the NATO European Sky Shield Initiative (ESSI), a 17-member for the coordinated procurement of modernised missile and air defence systems. The format, which has gained traction among central and northern European allies, has been heavily criticised by Italy and France for the preference of US and Israeli systems over designs by MBDA.[14] The project has also not been joined by Poland, whose relationship with Berlin is especially strained but which nevertheless hosted a Patriot battery from the Bundeswehr in 2023.[15]

Despite these changes, there are doubts whether Germany's political commitment to increased defence spending will persist over the next couple of years. The ruling coalition has until now proven unable to agree on enshrining

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10   German Federal Government, *The Arms and Military Equipment Germany Is Sending to Ukraine*, cit.

11   Frederik Pleitgen and Anna Cooban, "Rheinmetall Will Build and Repair Tanks in Ukraine, Says CEO", cit.

12   "Olaf Scholz knüpft Kampfpanzerlieferung an US-Zusage" (Olaf Scholz ties battle tank delivery to US commitment), in *Zeit Online*, 19 January 2023, https://www.zeit.de/politik/deutschland/2023-01/kampfpanzer-leopard-2-lieferungen-olaf-scholz.

13   Thomas Wiegold, "Mittlere Kräfte: Für den Einsatz (nicht nur) im Baltikum setzt das Heer auf ,Rad statt Kette'" (Medium forces: For operations (not only) in the Baltics, the army relies on wheels instead of chains), in *Augen Geradeaus!*, 8 March 2023, https://augengeradeaus.net/2023/03/mittlere-kraefte-fuer-den-einsatz-nicht-nur-im-baltikum-setzt-das-heer-auf-rad-statt-kette.

14   Federico Castiglioni and Michelangelo Freyrie, "European Defence and Italian-German Cooperation in the Wake of Putin's War", in *IAI Papers*, No. 23|12 (June 2023), https://www.iai.it/en/node/17143.

15   Alicja Ptak, "German Patriot Missile Batteries to Remain in Poland until End of Year", in *Notes from Poland*, 10 August 2023, https://notesfrompoland.com/?p=57749.

NATO's two per cent rule in law,[16] which will affect the ability of both the military and the industry to plan beyond the expiring date of the *Sondervermögen*. Still, for the time being, it is a valuable, massive surge of investments: Berlin's annual defence budget of around 57 billion euros will benefit from 19,2 billion euros in 2024, 30,6 billion in 2025 and 28,8 in 2027.

8.2 France – Budget increases and continuity in the defence discourse

The war against Ukraine presents a major dilemma for Paris. On one hand, France is well-positioned to be a major player in a strategic environment in which defence issues are again on the top of the European agenda.[17] On the other hand, the focus on the Eastern flank represents a stark departure from traditional French focus on Africa and the Middle East. This is reflected by the 2022 *Révue Nationale Stratégique* (National Security Review – RNS), which effectively puts territorial defence and the risk of a peer-to-peer conflict at the top of Paris' strategic imperatives.[18] The RNS has been criticised for its lack of prioritisation and a failure to clearly indicate whether the dangers stemming from the War in Ukraine effectively warrant a reallocation of resources away from other looming dangers (notably terrorism and the confrontation in the Indo-Pacific).[19] Nevertheless, Paris has recognised the disruption caused by the invasion of Ukraine.

The *Loi de programmation militaire* 2024-2030 (Military Programming Law – LPM) voted in the summer of 2023 embodies a shift in French defence allocations.[20] The LPM 2024-30 dedicates 413 billion euros over seven years, a

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16   Markus Decker, "2 Prozent der Wirtschaftsleistung für die Bundeswehr: Ampelplan ist umstritten" (Two per cent target for the Bundeswehr: traffic light plan is controversial), in *RND*, 14 August 2023, https://www.rnd.de/politik/zwei-prozent-ziel-fuer-bundeswehr-ampel-plan-ist-umstritten-ONRLF7PC6ZF7XHHLOYEJTERJN4.html.
17   Pawel Zerka, "The Case for Defence: How Russia's War on Ukraine Has Proved France Right", in *ECFR Commentaries*, 21 November 2022, https://ecfr.eu/?p=98816.
18   France's General Secretariat for Defence and National Security (SGDSN), *National Strategic Review 2022*, November 2022, https://www.sgdsn.gouv.fr/publications/revue-nationale-strategique-2022.
19   Federica Cavo, "La Francia programma il ritorno alla 'difesa del paese'", in *AffarInternazionali*, 27 March 2023, https://www.affarinternazionali.it/?p=5396.
20   French Ministry of Defence, *La LPM 2024-2030 définitivement adoptée par le Parlement*, 14 July 2023, https://www.defense.gouv.fr/actualites/lpm-2024-2030-definitivement-adoptee-parlement.

40 per cent increase compared to the previous framework budget. The budget growth will be gradual at first and peak after 2027, beyond the next presidential elections.[21] Although French analysts point out that these resources will be enough to plug existing capability gaps rather than undertake a true upgrade of the French military, the LPM indeed points towards the procurement of capabilities (MALE drones, the FCAS multirole fighter, combat helicopters, land assets) relevant for a peer-to-peer scenario. The costly modernisation of the national nuclear deterrent also confirms the French insistence that the "*Force de dissuasion*" remains the main pillar of countries' security and sovereignty, especially in the hypothesis of a peer-to-peer conflict.[22]

The Ukrainian experience and the relevance of combat mass in the war have also pushed the armed forces to reassess their approach to operations. Preparing for hypothetical high-intensity warfare with extreme human and material losses has become an important element in the national defence discourse,[23] connecting to a more general debate preceding the war on the need to create expendable combat mass.[24] This means both putting the French defence industrial base in the condition to surge production if needed (something Emmanuel Macron has misleadingly dubbed "war economy")[25] and the replenishment of military stocks[26] – even if France's transfer of military goods to Ukraine is reportedly far behind that of Germany or the United Kingdom.[27]

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21   Bernard Cazeneuve, Nicolas Baverez and Marlène Meunier, "La loi de programmation militaire 2024-2030, loi de réparation mais non de réarmement", in *Expressions par Montaigne*, 12 July 2023, https://www.institutmontaigne.org/node/10659.

22   See Elie Tenenbaum, "Armées françaises : les limites de la stratégie de club", in *IFRI Editorials*, 26 May 2023, https://www.ifri.org/fr/node/27415; French Presidency, *À Toulon, le Président de la République présente la Revue nationale stratégique*, 9 November 2023, https://www.elysee.fr/emmanuel-macron/2022/11/09/a-toulon-le-president-de-la-republique-presente-la-revue-nationale-strategique.

23   See, for instance: French Senate, "La nécessaire modernisation de la dissuasion nucléaire", in *Rapports d'information de l'Assemblée Nationale*, No. 560 (23 May 2017), https://www.senat.fr/rap/r16-560/r16-5601.html.

24   Raphaël Briant, Jean-Baptiste Florant and Michel Pesqueur, "La masse dans les armées françaises : un défi pour la haute intensité", in *Focus stratégique*, No. 105 (June 2021), https://www.ifri.org/fr/node/19981.

25   Cédric Pietralunga, "L'économie de guerre voulue par Emmanuel Macron prend du retard, selon un rapport sénatorial", in *Le Monde*, 9 February 2023, https://www.lemonde.fr/international/article/2023/02/09/l-economie-de-guerre-voulue-par-emmanuel-macron-prend-du-retard-selon-un-rapport-senatorial_6161132_3210.html.

26   Léo Péria-Peigné, "Military Stockpiles", cit.

27   Kiel Institute for the World Economy, *Ukraine Support Tracker*, cit.

8.3 Poland – Rising budget and personnel numbers

Warsaw has historically put a high premium on military preparedness. Pre-existing worries about Russian "neo-imperialist policies"[28] increased already after the 2008 invasion of Georgia and the 2014 war against Ukraine, and fears of aggression were worsened by the potential fallout of the 2022 conflict.[29] Poland is also among the most outspoken backers of Kyiv, which makes it a potential target for Russian retaliations. In the aftermath of Russia's large-scale invasion, Warsaw undertook a major push to modernise its military and grow its defence apparatus. The Homeland Defence Act of March 2022, which Parliament passed with just five abstentions and no opposition, offers the basis for two important upgrades to the Polish armed forces: an intensive recruitment drive and a significant rise in the defence budget, which was already above the NATO two per cent threshold.

First of all, the Polish armed forces are set to almost double: they should grow from the current 150,000 soldiers and 30,000 service people from the Territorial Defence Forces (*Wojska Obrony Terytorialnej* – WOT) to 250,000 regulars and 50,000 WOT members by 2035.[30] Regarding the latter, Ukraine's successful use of its territorial defence force has been perceived as a validation of such kind of forces.[31] Already in 2022, Polish recruitment offices reached a record of 13,472 new voluntary soldiers (although discharges were also higher than expected: almost 9,000).[32]

Second, the Polish defence budget is expected to balloon from 2.5 per cent of GDP in 2022 to 3.9 per cent in 2023. This rapid increase has been mostly driven by a splash in defence procurement, with billions of zlotys destined for the

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28   Mariusz Antoni Kamiński and Zdzisław Śliwa, "Poland's Threat Assessment: Deepened, Not Changed", in *PRISM*, Vol. 10, No. 2 (March 2023), p. 131-147, https://ndupress.ndu.edu/Media/News/News-Article-View/Article/3323942.

29   For instance, Polish territory was struck by a stray Ukrainian missile in late 2022, killing two people. See Matthew Karnitschnig and Wojciech Kość, "Meet Europe's Coming Military Superpower: Poland", in *Politico*, 21 November 2022, https://www.politico.eu/?p=2315658.

30   Michał Oleksiejuk, "The Key Premises of the Polish Homeland Defence Act", in *Pulaski Commentaries*, 18 March 2022, https://pulaski.pl/?p=21472.

31   Magdalena Kowalska-Sendek and Robert Sendek, "Lesson Right from the Front", in *Polska Zbrojna*, 15 July 2022, https://polska-zbrojna.pl/home/articleshow/37680.

32   Daniel Tilles, "Polish Armed Forces Recorded Highest Recruitment in 2022 since End of Compulsory Military Service", in *Notes from Poland*, 30 January 2023, https://notesfrompoland.com/?p=51785.

purchase of off-the-shelf new aircraft, armoured vehicles, land assets, short-range air defences (SHORAD), rotorcraft and air combat systems. While some of the deals involve traditional partners such as the US (which will provide 250 M1 Abrams tanks and 32 F-35 fighter aircraft),[33] Warsaw also upgraded its defence ties with South Korea in an effort to boost its modernisation drive, including through the acquisition of used equipment.[34] Still, it is estimated that sixty per cent of the procurement budget will go towards Polish companies and it is likely that Poland will uphold its long-standing "Polonisation" policy – i.e., a widespread use of joint ventures and local production of foreign designs to boost national DTIB.[35] It is noteworthy that Poland is set to receive up to 900 million euros in reimbursements from the European Peace Facility to substitute hardware donated to Ukraine, by becoming one of the major beneficiaries of the innovative use of this EU tool.[36] Still some critics question whether Warsaw's modernisation drive is really underpinned by an adequate strategic reassessment[37] and point out that current plans may not be financially sustainable in the medium to long term.[38]

Finally, since the onset of the war Polish relations with Germany have been mixed at best. Due to the contentious relationship between Warsaw has not joined the German-led ESSI, despite the call for stronger NATO involvement on the Eastern flank.[39] This is even more puzzling since Poland hosts the main staging areas for the flow of military goods to Ukraine and is thus perceived by Warsaw being a potential target for limited Russian missile and air strikes in case of escalating tensions. Warsaw has also proven unable to bridge differences

33 Andrew Eversden, "Poland to Receive 250 Advanced Abrams Tanks under $1 Billion Contract", in *Breaking Defense*, 25 August 2022, https://breakingdefense.com/?p=240739; John Hill, "Poland's F-35A Aircraft Begin Production", in *Airforce Technology*, 13 April 2023, https://www.airforce-technology.com/?p=236846.

34 Bartosz Sieniawski, "Controversy over Polish Military Purchases", in *Euractiv*, 9 February 2023, https://www.euractiv.com/?p=1876886.

35 Anastasia Cucino and Lorenzo Scarazzato, "The Impact of the War in Ukraine on Polish Arms Industrial Policy", in *WritePeace blog*, 2 June 2023, https://www.sipri.org/node/6307.

36 Łukasz Maślanka, "An EU War Chest: The Success and Uncertain Future of the European Peace Facility", in *OSW Commentaries*, 10 July 2023, https://www.osw.waw.pl/en/node/31674.

37 Sławomir Sierakowski, "The Strongest Army in Europe?", in *Project Syndicate*, 24 August 2023, https://www.project-syndicate.org/commentary/poland-pis-populist-government-military-procurement-by-slawomir-sierakowski-2023-08.

38 Anastasia Cucino and Lorenzo Scarazzato, "The Impact of the War in Ukraine on Polish Arms Industrial Policy", cit.

39 Poland Presidency, *Poland Expects Stronger NATO Presence on Eastern Flank*, 15 February 2023, https://www.president.pl/news/poland-expects-stronger-nato-presence-on-eastern-flank,64676.

with Berlin for instance scrapping plans for a Poland-based maintenance hub for Ukrainian Leopard tanks.[40]

8.4 Sweden

Sweden is arguably the EU country that has most radically altered its defence policy after Russia's invasion of Ukraine, together with Finland. The war has prompted Stockholm to scrap its long-standing neutrality policy, pushing it to lodge a request to join NATO in May 2023. The conditions set by the ruling Social Democrats largely follow traditional Swedish priorities, such as the refusal of hosting any US bases or the stationing of nuclear weapons.[41] Still, it represents a historic break from Sweden's foreign policy since 1814.

The decision to join NATO was endorsed by an overwhelming majority of parliament – 269 out of 349 lawmakers voted in favour, namely six out of nine parties represented in the legislature.[42] Almost immediately, Sweden's NATO bid has been tied to that of Finland, both for political and military reasons. The two countries are bound by a deep defence cooperation and the respective armed forces have long strived for interoperability in all domains, especially through the newly created Nordic Air Force.[43] The accession of just one of the two Scandinavian countries would effectively mean breaking off – or at least fatally weakening – existing cooperation.[44] Moreover, Sweden offers strategic depth to Finnish defences,[45] and its accession will transform Russia into the only Baltic country outside of NATO. In case of war, this will deny Russian naval access to St. Petersburg, home to the Baltic fleet and one of the few warm-water ports under its control. Additionally, Sweden's accession will improve the

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40   Sabine Siebold, "Berlin Scraps Plans for Joint Tank Maintenance Hub in Poland", in *Reuters*, 12 July 2023, https://www.reuters.com/business/aerospace-defense/german-ministry-says-tank-repair-talks-with-poland-ongoing-2023-07-12.
41   Mats Engström, "Adapting Ally: Sweden's Bid for NATO Membership", in *ECFR Articles*, 17 May 2022, https://ecfr.eu/?p=91860.
42   Jan M. Olsen, "Swedish Lawmakers Vote to Endorse Country Joining NATO", in *AP News*, 22 March 2023, https://apnews.com/article/859b734595b8e4bfe2956604c42e1231.
43   John Hill, "Sweden Stands as Outlier of the Newly Merged Nordic Air Force", in *Airforce Technology*, 29 March 2023, https://www.airforce-technology.com/?p=236518.
44   Robin Forsberg, Aku-M. Kähkönen and Janna Öberg, "Implications of a Finnish and Swedish NATO Membership for Security in the Baltic Sea Region", in *Wilson Center Articles*, 29 June 2022, https://www.wilsoncenter.org/node/111014.
45   Mats Engström, "Adapting Ally", cit.

prospects of NATO forces deployed to defend the Baltic countries by securing their sea lines of communication (SLOCs).[46]

For the Swedish defence ministry, entering NATO also represents a dramatic change in terms of working routines. While Stockholm has always been a close partner of the transatlantic community, actually having a formal political stake in the Atlantic Alliance and having access to infrastructures, planning and information loops of NATO is perceived as a true game-changer for the Swedish military authorities.[47] Joining NATO will be extremely beneficial to Sweden's defence industry, too. Swedish non-alignment up until 2022 means that the country has maintained a diverse and broad DTIB, covering all basic capabilities required by modern armed forces.[48] Swedish industry will be able to join NATO-related projects, as well as benefitting from a reduction in non-tariff trade barriers (such as security clearance issues for non-NATO companies and personnel) and being granted easier access to cooperative projects.[49] Stockholm is also striving to reach far more than two per cent in defence expenditures, in line with NATO objectives.[50]

Sweden's accession to NATO has been heavily affected by difficult negotiations with Turkey, which ended with a deal reached at the 2023 NATO Vilnius summit. Meanwhile, Finland has already joined NATO.

8.5 Implications for Italy

This overview shows that four major EU military powers have reacted very differently to the invasion of Ukraine. This is due to diverse starting points, exposure to the unfolding conflict and strategic cultures. Nevertheless, there

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46   Laura Kayali, "Sorry Russia, the Baltic Sea Is NATO's Lake Now", in *Politico*, 13 July 2023, https://www.politico.eu/?p=3330753.

47   Interview, 29 August 2023.

48   Tom Waldwyn, "Sweden's Defence Industry: NATO Membership Promises New Markets but Poses Challenges", in *Military Balance Blog*, 4 August 2023, https://www.iiss.org/en/online-analysis/military-balance/2023/08/swedens-defence-industry-nato-membership-promises-new-markets-but-poses-challenges2.

49   Gerard O'Dwyer, "Swedish Defense Industry Bosses Eye NATO Business Dividend", in *Defense News*, 18 January 2023, https://www.defensenews.com/global/europe/2023/01/18/swedish-defense-industry-bosses-eye-nato-business-dividend.

50   Ibid.

are several common elements that shape the respective responses to the war.

Table 3 | Reaction of four main EU military powers

Country	Data	2022	2023	Projected change 2022-23
Germany[51]	Defence budget (bn)	61	64	+4,92
	as % of GDP	1,49	1,6	+0,11
France[52]	Defence budget (bn)	42,4	43,9	+3,54
	as % of GDP	1,9	1,9	+0
Poland[53]	Defence budget (bn)	15,76	19,65	+24,69
	as % of GDP	2,4	3,9	+1,5
Sweden[54]	Defence budget (bn)	6,86	8,27	+20,57
	as % of GDP	1,2	1,4	+0,2
Italy[55]	Defence budget (bn)	25,9	27,7	+6,95
	as % of GDP	1,37	1,38	+0,01

First and foremost, these countries consider the war as a watershed for the international security environment, the strategic stability in Europe and their own national security. There is shared awareness that no return to "business as usual" is on the horizon. Accordingly, they made important decisions to adjust their military posture in a structural way. The Swedish decision to put an

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51   Thomas Gutschker, "Deutschland verfehlt Zwei-Prozent-Ziel deutlich" (Germany clearly misses the two per cent target), in *Frankfurter Allgemeine*, 21 March 2023, https://www.faz.net/18765274.html; Dominik Lenze, "Verteidigungsetat: Deutschland Verfehlt Nato-Zweiprozentziel Auch 2023" (Germany will miss NATO's two per cent target in 2023), in *Zeit Online*, 16 May 2023, https://www.zeit.de/politik/2023-05/nato-deutschland-zwei-prozent-verteidigungsausgaben; Christian Mölling and Torben Schütz, "Germany's Defense Budget 2024: The Planned Increase Is Not Yet Enough", in *DGAP Memos*, No. 3 (July 2023), https://dgap.org/en/node/39086.

52   French Ministry of Defence, *Livret de présentation de la Loi de programmation militaire 2024-2030*, 6 April 2023, https://www.defense.gouv.fr/actualites/livret-presentation-loi-programmation-militaire-2024-2030; Statista, *Dépenses oubliques de la défense en France 2017-2030*, May 2023, https://fr.statista.com/statistiques/575891; Trading Economics: *France - Military Expenditure (% of GDP)*, https://tradingeconomics.com/france/military-expenditure-percent-of-gdp-wb-data.html.

53   World Bank Data: *Military Expenditure (Current USD) - Poland*, https://data.worldbank.org/indicator/MS.MIL.XPND.CD?locations=PL; AFP, "Poland to Spend over 4 Percent of GDP on Defense in 2024", in *Al Arabiya English*, 5 September 2023, https://ara.tv/bdxrn; Marek Strzelecki and Justyna Pawlak, "Scope of Poland's Spending Spree in Focus as NATO Ups Defence Goal", in *Reuters*, 12 July 2023, https://www.reuters.com/world/europe/scope-polands-spending-spree-focus-nato-ups-defence-goal-2023-07-12; "Poland's 2024 Budget to See Big Spending on Defence, Social Benefits", in *Reuters*, 24 August 2023, https://www.reuters.com/world/europe/polands-2024-budget-see-big-spending-defence-social-benefits-2023-08-24.

54   John Hill, "Sweden's Defence Spending Suggests It Will Catch up to NATO Benchmark", in *Airforce Technology*, 3 April 2023, https://www.airforce-technology.com/?p=236683.

55   Own elaboration on DPP 2022 and ISTAT data.

end to more than two centuries of neutrality is the most evident example, but Germany's *Zeitenwende* and French pivot from counter-terrorism and counter-insurgency to territorial defence are important turning points for the respective defence policy and armed forces. As for Poland, its threat assessment changed already after 2014, but the 2022 war implied an acceleration and enhancement of various measures already on the cards.

Such a landscape has a clear implication for Italy: if all other countries in Europe undertake major adjustments, remaining close to the *status quo ante* February 2022 seems to be a risky, ill-conceived decision which goes against the shared outlook in Europe.

Second, all considered countries feature a commitment to increase the defence budgets to reach (and in some cases exceed) two per cent of GDP. This is in line with most NATO European allies, from Western to Eastern Europe, and from the High North to the Aegean Sea. As stated by the Vilnius Summit Communiqué, the two per cent threshold is more a floor than a roof; that means is the minimum with a view to further increases. As far as the Italian defence budget continues to increase at an extremely low pace – if any – such a European landscape has two major implications. If everyone else moves forward on military spending and Rome does not, then in reality, it is Italy that is lagging behind and even going backwards. That means Italian governments will have less and less influence on the NATO agenda and decisions, as well as on the filling of important positions such as Assistant Secretary General, which is going to open in a couple of years. Moreover, countries investing more in defence will have more leverage in terms of industrial and technological policies, particularly if they go for national solutions like in Poland and Germany, by reducing in comparison the Italian one to the detriment of Italy's DTIB, which does not benefit from a grow of its first domestic market.

Third, from Poland to France, and from Germany to Sweden, there is a push to plug relevant capability gaps for conventional, peer-to-peer conflicts. Again, this is perfectly in line with the Alliance's posture which will prioritise those capabilities in the NATO Defence Planning Process, also on the basis of the 2022 Strategic Concept and new force model. Major European partners will increasingly focus on these scenarios in terms of forces, planning, doctrine, training and exercise. The implication for Italy is peer pressure to adjust the

military posture accordingly or to become less and less relevant when it comes to joint capability development.

Fourth, there is a common tendency towards a quantitative increase and modernisation of existing military hardware, in some cases favouring off-the-shelf purchases. Mass is gaining importance, and numbers are growing across the board of capabilities together with a new mix of new and legacy platforms. The implication for Italy is somehow similar to previous ones. If the capacities of other European countries significantly increase and the Italian ones do not at the same pace, as a matter of fact Italy's military will dwindle in relative terms, within both NATO and EU frameworks, to the detriment of the country's position within bilateral and multilateral alliances.

Altogether, these elements point towards the same conclusions. Major European countries consider the security and stability of the Old Continent at stake and are changing and enhancing their posture accordingly to address the challenges stemming from the Russian invasion of Ukraine. In doing so, they contribute to a NATO collective defence fit for the purpose, within a general increase of commitment to Western security organisations – whether the Atlantic Alliance and/or the EU. If Italy does not undertake a similar path, there is a serious risk of being considered in Europe and North America as a minor partner – if not a free rider.

9. EU defence and strategic autonomy

by Karolina Muti and Stefano Silvestri

9.1 Implications for EU defence and strategic autonomy

9.1.1 The war and the evolution of the EU strategic autonomy concept

The war in Ukraine represented both a cold shower and a clarifying moment for the aspirations linked with the concept of EU strategic autonomy. The implications of the war for the implementation of an adequate level of EU strategic autonomy, notably in the field of defence, are both positive and negative. The concept of strategic autonomy and, therefore, of a more solid EU defence, are intrinsically correlated with the EU-United States and the EU-NATO relationships. Any increase or decrease in levels of EU autonomy calls into question these relationships, which mutually influence each other. The war demonstrated the need for effective EU-NATO cooperation, bearing in mind that the Alliance is responsible for the collective defence of its members, but not for their foreign policy. NATO, as a defensive alliance, plans for responding and reacting to threats, whereas foreign policy requires pro-activeness, which is more difficult.

On one side, the war in Ukraine proved the predominance of NATO for vital tasks such as collective defence and deterrence, showing that when a military confrontation with power as Russia is at stake, EU strategic autonomy may apply to the political sphere, but it certainly does not to the defence one.

On the opposite side, the conflict also proved how urgent the strengthening of EU defence is, in terms of capabilities, decision-making processes, structures and defence industrial base. The United States demonstrated a solid involvement in defending Europe's security through massive support to Ukraine and by

providing, organising and guiding unprecedented military, financial, and humanitarian aid to Kyiv. These circumstances, however, can change in the future, as signalled by the shrinking consensus among Republicans on supporting Ukraine and the difficulties experienced by the Biden administration in passing the latest aid packages through Congress. Such dependence on the United States' guidance in the context of the aggression on Ukraine exposed EU member states weaknesses and contradictions in the realm of defence and the defence industry. In parallel, Russia's invasion of an EU direct neighbour made the reasons for strengthening European defence very tangible, both as a European pillar in NATO and as a more capable and autonomous security actor, firstly in its Eastern and Southern neighbourhood.

The concept of EU strategic autonomy is, first and foremost, a political issue which needs to be defined based on existing constraints, namely: threats, resources, and the availability of necessary technology, materials and industrial capacities. Looking at the constraints, Russia's invasion of Ukraine has been a reality check for this concept, and the latter not surprisingly evolved in "open strategic autonomy", by recognising the realm of security, defence, technology and industrial links of EU member states and EDTIB with crucial non-EU partners, such as the US, the UK or Norway.[1] The primacy of this more pragmatic version of the concept has been dramatically demonstrated by the dire state of EU member states' arsenals, fast-draining stocks of defence equipment, slowness in ammunition production and supply, and difficulties in the EU decision-making process based on unanimity. Concerning the latter, the European Peace Facility (EPF) use in favour of Ukraine has been quite rapid in the first months after the outbreak of the conflict, but slowed down and witnessed vetoes in 2023. In parallel, the urgency of a stronger EU defence was made more evident than ever. Despite the fact that the war exposed the unpreparedness of European armed forces and EDTIB to confront a high-intensity, large-scale and heavy weapons-based conflict, with the relevance of even rudimental, mass disposable weapon systems, Europeans were rapidly able to organise around

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[1] Already since the outbreak of the Covid pandemics, a renewed awareness on what keeps the EU secure emerged, with increased attention on sectors such as technology dependence, supply chains, raw materials, energy security and space. This resulted also in acknowledging the vast interdependencies between defence and other sectors. The strategic autonomy concept was somehow enlarged, already in the aftermath of the pandemics, to address also supply chains, emerging disrupting technologies and energy.

a solid position of support, both military, financial and humanitarian, to the attacked Ukraine. Such support has lasted for almost two years and became a cornerstone of EU common foreign and security policy at large, against odds and difficulties in consensus-building among EU member states and tensions around the type of weaponry to be provided to Ukraine. The EU was able to put in place several mechanisms and instruments functional to the provision of help to Kyiv and is trying to boost its own EU defence capabilities, with mixed results.

However, at a strategic level, future aspirations for more strategic autonomy collide with the revisionist posture and goals of Russia. Their success will be ultimately measured against the Union's ability to define a comprehensive strategy towards Russia – as the largest threat to EU security – which is still missing. Moscow's behaviour is signalling that its stakes in Ukraine are very high, as is the price that the Kremlin is ready to pay to prevail. It seems that, through the ongoing invasion, Moscow is trying to reaffirm globally its great power status, aiming at exerting influence over the former Warsaw Pact countries and consequently breaking up the EU. Such an end game is incompatible with aspirations of European strategic autonomy, and the Union will have to consider such a scenario if it wants to successfully deal with Russia in the future.

9.1.2 The war and the EU defence initiatives jungle: Mixed outcomes and limited results

The 2022 EU Strategic Compass stated that Russia's aggression is "unprovoked and unjustified" and that it represents a "tectonic shift in European history".[2] The Compass was adjusted after the outbreak of Russia's war of aggression and adopted in March 2022. It mentions strategic autonomy just once, claiming that the Compass will "enhance the EU's strategic autonomy and its ability to work with partners".[3] The document refers various times to "decision-making autonomy of the EU", and mentions "technological sovereignty" twice. The Compass is undoubtedly a milestone for EU defence, containing measures and promoting policies that lead to incremental improvements, but such measures do not touch the high-level political dimension, from which depends on key

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2 Council of the European Union, *A Strategic Compass for Security and Defence*, 21 March 2022, p. 14, https://www.eeas.europa.eu/node/410976.

3 Ibid., p. 23. In the EU Global Strategy from 2016, strategic autonomy is mentioned five times.

decisions that could truly unleash the potential of EU defence efforts.

The Compass announced a number of initiatives in the defence realm, with, in most cases, a well-defined timeline and milestones. The war in Ukraine had an accelerating effect on some of them, such as the EU Space Strategy for Security and Defence and the update of the Maritime Security Strategy. Conversely, other policy instruments experienced delays.[4]

The war impacts on the emergence of a strengthened EU defence are rather mixed. The expectations of a watershed moment for EU defence, leading to both an acceleration of a further EDTIB consolidation driven by the harmonisation of requirements and joint procurement policies as well as the establishment of an adequate political decision-making body for CFSP and CSDP, have been largely frustrated. The reason is structural, underlying obstacles that always characterised the EU defence sector have not been eradicated, despite the "tectonic shift in European history" represented by the war in Ukraine. Such factors still include member states' reluctance to transfer sovereignty to the EU, reliance on the US and NATO security umbrella, competition among EU institutions and agencies, diverging industrial interests, and curbing the potential for political integration and industrial consolidation.

On one hand, the EU demonstrated enough flexibility to adapt existing instruments to rapidly changing needs, as has already been the case with PESCO since 2017. The EPF, launched in 2021 before the outbreak of the war as an extra-EU budget instrument, was originally planned to finance CSDP common missions and EU military support to partners with a particular focus on Africa.[5] The EPF was rapidly adapted to militarily assist Ukraine, 5.6 billion has been allocated to reimburse member states' donations, and its budget has been increased to 12 billion.[6] On the other hand, instruments such as the European defence industry reinforcement through the Common Procurement

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4 It is the case of the EU Hybrid Toolbox, due by 2022, and still unpublished because of divergences among EU member states and tensions about competencies inside EU institutions. See: Kenneth Lasoen, "Realising the EU Hybrid Toolbox: Opportunities and Pitfalls", in *Clingendael Policy Briefs*, December 2022, https://www.clingendael.org/node/15350.
5 Bruno Bilquin, "European Peace Facility: State of Play on 30 November 2023", in *EPRS Briefings*, December 2023, https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2023)757560.
6 Ibid.

Act (EDIRPA), which promised incentives to stimulate joint procurement of defence capabilities, experienced undue delays and considerable cuts in the originally planned budget.[7] EDIRPA aims to address the EU's most urgent and critical defence capability gaps and to stimulate member states to joint procurement.[8] This is particularly important considering the worryingly low level of EU collaborative defence investments, decreasing from 19 per cent (2019-2020) to 18 per cent (2021-2022), against the 35 per cent threshold indicated by EDA.[9] As the last CARD Report states, cooperation between EU member states in defence investments remains "the exception rather than the norm".[10]

Similar mixed results are visible in the case of the neo-established Act in Support of Ammunition Production (ASAP), launched specifically to address the shortages in missiles and ammunition production in Europe, supporting ramp-up initiatives, and thus improving the EU's ability to support the Ukrainian military.[11] ASAP has a budget of 500 million euros and was approved in July 2023 as part of a three-track proposal on ammunition[12] endorsed by the Council in March 2023. Despite the urgency and promise of delivering one million ammunition in the following 12 months contained in ASAP, the adoption of its work programme and the publication of the calls for proposals occurred only in October 2023, and by the end of November 2023, just 300,000 rounds of artillery were delivered to Ukraine.[13] If on the one hand, the decision-making process has been much faster than EU standards, it is still not up to speed with the reality of a war in Europe. In any case, it marks an important precedent as Union's direct investment in joint military procurement, beyond

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7   "EU Armaments Instrument EDIRPA - Less Money and More Delays", in *ES&T*, 7 July 2023, https://esut.de/en/2023/07/meldungen/43272.

8   Sebastian Clapp, "European Defence Industry Reinforcement through Common Procurement Act (EDIRPA)", in *EPRS Briefings*, November 2023, https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2023)739294.

9   European Defence Agency (EDA), *2022 Coordinated Annual Review on Defence Report*, November 2022, point 22, https://eda.europa.eu/docs/default-source/eda-publications/2022-card-report.pdf.

10   Ibid., point 28.

11   European Parliament and Council of the EU, *Regulation (EU) 2023/1525 of 20 July 2023 on Supporting Ammunition Production (ASAP)* (PE/46/2023/REV/1), http://data.europa.eu/eli/reg/2023/1525/oj.

12   The three-track proposal on ammunition envisages: delivery from existing stocks; joint procurement from industry; increasing production.

13   Sebastian Clapp and Jakub Przetacznik, "Question Time: State of Play – Ammunition Plan for Ukraine", in *EPRS At a Glance*, November 2023, https://www.europarl.europa.eu/thinktank/en/document/EPRS_ATA(2023)754602.

research and development.

In the short run, both EDIRPA and ASAP demonstrate an attempt by the EU to provide aid to Kyiv by better coordinating and boosting collective European defence procurement, but the level of ambition seems to be curbed by budget shortages, slow institutional processes, and internal tensions involving member states and EU institutions. Some experts assessed this EU defence condition as "the same old too little, too slow".[14] The current lack of a fast enough political decision-making process inside the EU clashes with the harsh reality on the ground in Ukraine, where the timing of the delivery of military and non-military aid is vital for Ukrainian defence.

Delays and budgetary constraints emerged for the approval of the longer-term EU defence initiatives as well, such as the European Defence Industry Programme (EDIP), which should contain financial incentives, regulatory waivers and a VAT exemption for joint procurement.[15] The budget issue reminds of the EDF, a potential game-changer measure for strengthening the EU defence with its initial planned budget of 12 billion euros, reduced then to 8 billion, thus curbing its ambition. The announced European Defence Industry Strategy (EDIS) experienced delays as well, and its publication has been postponed until 2024.[16]

9.1.3 Conclusion

The proliferation of EU defence initiatives started before the war in Ukraine. The latter, however, triggered an acceleration in the implementation of some measures, such as the EUSSSD, the adaptation of some other existing instruments to provide urgent aid to Ukraine (EPF), and the establishment of new ones (ASAP). Nonetheless, Russia's invasion of Ukraine has not scratched deeply rooted structural obstacles on the path to a strengthened EU defence, as proven by delays in the implementation of urgent measures (EDIRPA, EDIP,

14   Minna Ålander, "Mitigating Transatlantic Risks: ASAP or the Same Old Too Little, Too Late?", in *TEPSA Briefs*, November 2023, https://tepsa.eu/?p=5720.

15   Aurélie Pugnet, "EU Mulls Setting up Permanent Defence Industry Regulatory Waivers", in *Euractiv*, 29 June 2023, https://www.euractiv.com/?p=1946237.

16   Aurélie Pugnet, "Breton Confirms Delay of EU Defence Strategy Proposal to 2024", in *Euractiv*, 17 October 2023, https://www.euractiv.com/?p=1995109.

ASAP, EDIS), and budget cuts that curb its potential. Against this backdrop, the war in Ukraine still cannot be considered as a watershed moment for EU defence, since the tendency to maintain "a business as usual" logic remains strong, especially in member states and national industries.[17]

Despite the proliferation of strategies, toolboxes, and instruments, none of these addresses the underlying, crucial political issues: the difficulty of the EU Council to achieve unanimity, the absence of a common defence policy and adequate decision-making structure at the EU level that would be satisfactory (effective and fast enough) for both member states and EU institutions. The difficulty in achieving unanimity often results in no unanimity, thus no decision, or in curbing the range and potential of any decision since each member adds its caveats. Majority voting would facilitate the decision-making process, but, as the issue at stake is foreign and defence policy, it risks to divide the Union.[18]

It is obviously a highly political issue since it implies a transfer of power from member states to EU institutions, in the field in which the grip on sovereignty traditionally has been the strongest. Even those members most in favour of EU defence integration and cooperation are, in practice, still reluctant, when integration touches their foreign policy, economic, industrial, and technological interests. From an operational point of view, this translates also into a lack of an adequate chain of command for CSDP missions, and of an EU Chief of Defence. Establishing ad hoc chains of command for each CSDP mission makes the process more cumbersome, and slows down action, even when political will and consensus exist among member states.

These structural obstacles have not changed despite the outbreak of a full-scale war in Ukraine among peer adversaries. They continue to characterise the EU defence landscape and thus the prospects for more strategic autonomy. Two opposite trends still co-exist. The first one is an EU-driven push for consolidation of requirements, procurement policies, priorities, and of the EDTIB and the emergence of a common vision. The former is stimulated by

17   Andrea Locatelli, "EU Defence: Joint Capability Development", in Serena Giusti and Giovanni Grevi (eds), *Facing War: Rethinking Europe's Security and Defence*, Milan, Ledizioni, 2022, p. 35-46, https://www.ispionline.it/en?p=96347.
18   Stefano Silvestri and Adolfo Battaglia, *Guerra in Europa. Un Consiglio di Difesa come risposta a pericoli e declino*, Rome, Castelvecchi, 2022.

new instruments, such as the EDF, EDIRPA, ASAP (and less recently PESCO projects), and the latter by the approval and implementation of a number of security and defence-related strategies, a periodical common threat analysis, and intelligence sharing.[19] The second trend is one of fragmentation, reflecting single member states' preferences and cooperative-competitive dynamics among EU institutions and agencies (EC/DG DEFIS, EEAS, EDA, EUSPA, EU Council).[20] The war exacerbated these two trends, from one side increasing EU activism (notably of the Commission) in promoting instruments yet to be assessed in their effectiveness, and on the other side, the substantial increase in defence spending of key defence players, such as Germany or Poland, did not translate into more collaborative acquisitions, as it was mostly used to buy off the shelf weapon systems from extra-EU suppliers or domestically.

9.2 Implications for Italian defence policy

Italy, as one of the founders of the EU, had a foreign policy traditionally grounded in support of the EU integration process, including in its defence dimension. In light of the quality leap that occurred in this area, both in NATO and in the EU in the context of the war, the majority of Allies and EU member states are stepping up defence ambitions and, consequently, budgets.

The same cannot be said, unfortunately, about Italy's military spending, which should sustain Rome's augmented commitment to the Alliance and the potential acceleration of the EU defence efforts. Italy's defence budget is planned not only to stagnate but even decrease in terms of GDP in the upcoming years, in stark contrast with most of Rome's NATO and EU allies.[21] According to the Multiannual Programming Document 2023-2025 published by the MoD, Italy spent in defence 1.38 per cent GDP in 2023, and will spend

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19   For instance the EU Space Strategy for Security and Defence, the update of the Maritime Security Strategy, and the upcoming European Defence Industrial Strategy. See: European Commission, *European Union Space Strategy for Security and Defence* (JOIN/2023/9), 10 March 2023, https://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52023JC0009, and *An Enhanced EU Maritime Security Strategy for Evolving Maritime Threats* (JOIN/2023/8), 10 March 2023, https://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52023JC0008.
20   Karolina Muti and Elio Calcagno, "Critical Appraisal – Special Issue "European defence", in *Defence Studies*, Vol. 23, No. 4 (December 2023), p. 687-692, DOI 10.1080/14702436.2023.2277452.
21   Alessandro Marrone, "Dpp e investimenti, l'Italia non vada al ribasso", in *Airpress*, No. 148 (October 2023), p. 4-5.

1.30 per cent in 2024 and 1.26 per cent in 2025.[22] Such a prospect shows that defence is not a priority on the governmental agenda. Decreasing the defence budget in GDP terms, in countertrend with Allies in NATO and the EU, will be problematic for maintaining Italy's position in the EU defence realm, while other countries are heavily investing in defence, jeopardising the country's relevance at crucial negotiating tables – as well as the positioning of Italian companies in European industrial cooperative projects. It is also unclear how such a budget should suffice to bear the costs of stock replenishments, of augmenting the resilience of supply chains, and of next-generation equipment development and acquisition. In this context, EU defence initiatives such as EDF or EDIRPA are even more relevant for Italy to compensate for the future limited national resources and to strike an adequate balance between short-term and long-term needs.[23]

Moreover, despite pushing for more EU defence cooperation would be in Italian interest, being in the driving seat of European defence requires well-functioning institutional-industrial mechanisms and coordination, whereas Italy experiences structural challenges when it comes to timely coordination, both domestically and between Brussels and Rome, and in the identification of collaborative defence investment priorities.[24] This is due also to a shortage of dedicated personnel in the offices in charge of the EU programmes, both PESCO and EDF.[25] Italy's preference is also to concentrate the limited EU defence funding on fewer, more strategic projects.[26] In the upcoming years, it will be of uttermost importance for Italy to try to shape the emerging EU defence landscape, creating adequate mechanisms in the *Sistema Difesa* that would ensure regularity and orderliness of the process, lasting and functioning independently from changes in government.

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22 Italian Ministry of Defence, *Documento programmatico pluriennale della Difesa per il triennio 2023-2025*, cit.
23 Antonio Calcara, Andrea Gilli and Mauro Gilli, "Short-term Readiness, Long-term innovation: The European Defence Industry in Turbulent Times", in *Defence Studies*, Vol. 23, No. 4 (December 2023), p. 626-643, DOI 10.1080/14702436.2023.2277439.
24 Karolina Muti, "Stronger Together - Italy: A Lame Workhorse in the European Security and Defense Race", in *Expressions par Montaigne*, 2 March 2023, https://www.institutmontaigne.org/en/node/8176; Elio Calcagno, Alessandro Marrone and Michele Nones, "La Bussola strategica Ue e dodici sfide per l'Italia", in *Documenti IAI*, No. 22|06 (June 2022), https://www.iai.it/en/node/15558.
25 Alessandro Marrone, intervention at the webinar organised by Ares group on *National Visions of the EU Defence Industrial "Toolbox": The Cases of Italy and Sweden*, 12 January 2024.
26 Ibid.

10. The implications for the European defence industry

by Michelangelo Freyrie and Michele Nones

10.1 EU measures

10.1.1 The technology-driven integration model before February 2022

As explored in Chapter 7 of this study, the European Defence Technological and Industrial Basis (EDITB) was ill-equipped to face the consequences of a large-scale, high-intensity conflict on the continent. The war against Ukraine reversed thirty years of procurement policies, production and technological trends that have shaped (not only) Europe's approach to defence hardware. While the consolidation of a technological edge over potential adversaries has always been at the core of Western defence strategy,[1] the imperative of technological supremacy has been particularly hegemonic since the late 1980s.[2]

As such, the preference for fewer, precise, highly advanced weapon systems over the massive employment of low-medium tech solutions has had a double effect on the EDITB. First, it has led European markets to partially consolidate, and individual companies to strive for increased efficiency. This has meant not investing/maintaining redundant production sites, divesting from relatively low profitable and low demand segments such as the manufacturing of artillery shells and pursuing research and development (R&D) investments in high-end,

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1   In economic terms, Western Europe seems to historically favour a "capital-intensive" approach to warfare over "labour-intensive" strategies, favouring investments in hardware, infrastructure and know-how over the employment of mass. See Geoffrey Parker, "Introduction: The Western Way of War", in Geoffrey Parker (ed.), *The Cambridge History of Warfare*, 2nd ed., Cambridge, Cambridge University Press, 2020, p. 1-14.

2   Antoine Pietri and Benoît Rademacher, "Impact des nouveaux modèles économiques industriels sur les équipements des armées", in *Étude de l'IRSEM*, No. 64 (December 2018), https://www.irsem.fr/institut/actualites/etude-de-l-irsem-n-64-2018.html.

products.[3] Second, the emphasis on technological prowess has also shaped the way the European Union has tried to jumpstart defence cooperation and integration among member states.

The common definition of required capabilities and the establishment of R&D programmes have been the areas in which EU defence has gone farthest and has been hailed as key to mid and long-term integration.[4] Frameworks for R&D cooperation, such as the Permanent Structured Cooperation (PESCO) and the European Defence Fund (EDF) have until recently enjoyed a broader political consensus and have been easier to implement than common procurement procedures and definition of common requirements, let alone industrial consolidation. This is not to say that there is a lack of pan-European armament cooperation, but organisations such as the *Organisation Conjointe de Coopérationen matière d'Armement* (OCCAR), NATO's Support and Procurement Agency (NSPA) and the European Defence Agency (EDA) through its Ad-Hoc Project Arrangements (PAs) have mostly supported single multinational endeavours.[5] All in all, joint procurement remains the exception, rather than the norm: the 2022 Common Annual Review on Defence (CARD) reports that only 18 per cent of all investments in defence programmes carried out by the EDA participating member states are carried out cooperatively.[6]

10.1.2 A shift to joint production and procurement: the EU's three-track approach

The war against Ukraine and the latter's boundless need for ammunition, modern equipment and NATO-standard weaponry has changed the picture. The European Union has provided more than 5,6 billion euros in military aid to Ukraine by financing transfers of weapon systems and equipment from

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3 See, for instance, the advice given to companies, in the defence market prior to 24 February 2022. Eric Ciampi and Archag Touloumian, "Defense Industry: Who Will Win the Digital Services War?", in *Oliver Wyman Insights*, November 2020, https://www.oliverwyman.com/our-expertise/insights/2020/nov/manufacturing-industries-2030/by-sector-new-challenges/defense-industry.html.

4 Raluca Csernatoni, "The EU's Defense Ambitions: Understanding the Emergence of a European Defense Technological and Industrial Complex", in *Carnegie Papers*, 6 December 2021, https://carnegieendowment.org/publications/85884.

5 Jan Joel Andersson, "Buying Weapons Together (or Not). Joint Defence Acquisition and Parallel Arms Procurement", in *EUISS Briefs*, No. 7 (April 2023), https://www.iss.europa.eu/node/2959.

6 EDA, *2022 Coordinated Annual Review on Defence Report*, cit.

member states with the European Peace Facility (EPF),[7] an off-budget fund gradually increased to 12 billion euros that was rapidly repurposed as the main instrument with which Brussels backs Ukraine's war effort.[8] The EPF committee and the EEAS-hosted clearing houses have been allowed to coordinate transfers by EU member states and at least partially reimburse the provided aid.[9]

Figure 3 | EU defence programmes (2018 prices, billions of euros)

	Initial 2021-27 allocations	Modified allocations after 2022
■ ASAP	0	0,5
■ EDIRPA	0	0,3
■ EPF Financial Ceiling	5	10,5
■ EDF Budget	8	7,7

Note: The EPF Financial Ceiling is made up of national contributions, determined by the GNI.
The EDF Budget comes from the Commission's Multiannual Financial Framework.

Europe's shallow defence stocks have, however, proven insufficient to provide enough resources to support Ukraine's long-term needs. In particular, Ukraine's extensive use of artillery (both 155mm rounds and missile systems) has put a particular strain on the European and transatlantic productive capacities.[10] Recognising the risks associated with uncoordinated, national responses to the surging demand for defence items, the EU has crafted new tools to guarantee military aid to Ukraine and the replenishment of national stockpiles does not lead to crippling competition between MoDs on the European market, a further decrease of systems interoperability and to an overreliance on non-EU suppliers and technologies.

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7   Kiel Institute for the World Economy, *Ukraine Support Tracker*, cit.
8   Council of the EU website: *European Peace Facility*, https://europa.eu/!3jNYwR.
9   Bruno Bilquin, "European Peace Facility: Ukraine and Beyond", in *EPRS At a Glance*, November 2022, https://www.europarl.europa.eu/thinktank/en/document/EPRS_ATA(2022)738221.
10   Léo Péria-Peigné, "Military Stockpiles", cit.

The first measure put forward by the EU was the so-called European Defence Industrial Reinforcement through Common Procurement Act (EDIRPA), designed to support member states in establishing joint procurement mechanisms for defence goods.[11] The earmarking of 500 million euros should have covered additional administrative and technical costs incurred when engaging in multinational procurement processes.[12] The successive political agreement axed EDIRPA's budget to a meagre 300 million euros.[13] After almost one year of discussions, the involved parties finally found a compromise on the potential eligibility of non-EU companies and actors, thus allowing for some limited exceptions for allied countries such as the US.[14] EDIRPA should be substituted in the long term by a permanent instrument, not limited to ammunition and missiles, to be included in the European Defence Investment Programme (EDIP), which, however, still needs to be negotiated.

EDIRPA, which should be voted on by the EU Parliament before the 2024 elections, is a package of structural measures which required extensive negotiations and is expected to have long implementation times. As such, in 2023 the Council decided to complement the Act with a so-called "three-track approach" to boost ammunition production and immediately raise the level of support for Ukraine.[15] Track 1 consists of an invitation to member states to transfer part of their ammunition stocks to Ukraine,[16] reimbursed with funds from the EPF, while Track 2 parallelly foresees the joint procurement by member states of 1 million ammunition rounds.[17] Track 3 represents the most consistent step, and has materialised through the so-called Act in Support of Ammunition Production (ASAP). The Act itself has mainly a twofold approach to the issue: on one hand, it monitors potential bottlenecks in ammunition and missile

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11   European Commission website: *Act in Support of Ammunition Production (ASAP)*, https://defence-industry-space.ec.europa.eu/node/453_en.

12   Sebastian Clapp, "European Defence Industry Reinforcement through Common Procurement Act", cit.

13   European Commission, *European Defence Industry: Commission Welcomes Political Agreement on Support for Common Procurement Between Member States*, 28 June 2023, https://ec.europa.eu/commission/presscorner/detail/en/ip_23_3554.

14   Council of the EU, *EU Defence Industry: Council and European Parliament Agree on New Rules to Boost Common Procurement*, 27 June 2023, https://europa.eu/!7Dr9TN.

15   Alexandra Brzozowski, "EU Proposes Three-Track Approach to Secure Ammunition for Ukraine, Support Industry", in *Euractiv*, 2 March 2023, https://www.euractiv.com/?p=1888130.

16   By July 2023 donations have reached a worth of 1 billion euros.

17   Council of the EU, *Delivery and Joint Procurement of Ammunition for Ukraine*, 20 March 2023, https://europa.eu/!4jfxJp.

production; on the other, the proposal of the Commission aims at allocating 500 million euros to financially support and boost related production capacities.[18]

10.1.3 Consequences for existing programmes and policies

It may be too soon to talk about a shift of focus from R&D projects to joint procurement and production. First of all, it is noteworthy that most of the initiatives, and certainly the majority of allocated funds, mainly pertain to the supply side of the defence markets (see Table 4).

Table 4 | EU measures to boost defence production after 24 February 2022

	Allocated funds (M euros)	Supply side	Demand side
EDIRPA	300		x
ASAP[19]	500	x	
Track 1 – Reimbursement of artillery ammunition transfers to Ukraine (EPF funds)[20]	1,000	x	
Track 2 – Joint procurement of artillery ammunition (EPF funds)[21]	1,000		x
Previous packages of EPF military support	3,600	x	

By reimbursing transfers and acting on bottlenecks and production capacities, the EU essentially tries to decrease the cost of military aid to Ukraine for member states, while only a few measures actively try to shape the overall demand for military goods (such as changing the incentives that shape procurement decisions). This may turn out to be problematic if one considers that the core issue at the heart of European defence expenditure is precisely fragmented demand.[22] Even worse, current supply-side measures are short-term and do

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18 European Commission, *Proposal for a Regulation on Establishing the Act in Support of Ammunition Production* (COM/2023/237), 3 May 2023, https://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52023PC0237.

19 European Commission, *Defence: €500 Million and New Measures to Urgently Boost EU Defence Industry Capacities in Ammunition Production*, 3 May 2023, https://ec.europa.eu/commission/presscorner/detail/en/ip_23_2569.

20 Council of the EU, *Ammunition for Ukraine: Council Agrees €1 Billion Support under the European Peace Facility*, 13 April 2023, https://europa.eu/!grhNB9.

21 Council of the EU, *EU Joint Procurement of Ammunition and Missiles for Ukraine: Council Agrees €1 Billion Support under the European Peace Facility*, 5 May 2023, https://europa.eu/!nTfjjD.

22 See Lucas Hellemeier and Michelangelo Freyrie, "Leaving Defenselessness Behind", in *International Politics and Society*, 16 June 2023, https://www.ips-journal.eu/topics/european-integration/leaving-

little in terms of rationalisation and aggregation of productive capacities, as little is done to streamline value chains, optimally allocate resources and foster economies of scale.[23]

However, it is clear that without an increase in the EU's resources or cuts to other programmes, every new instrument will require a remodulation of existing defence initiatives. The EDF is projected to be the instrument which will be subject to most cuts. To a certain extent, this has already happened: ASAP will be financed with resources previously allocated to EDIRPA and EDF (see Table 5). Doubts also remain on the future of EDIP, a longer-term incentive which should substitute EDIRPA, but whose negotiation is still in its infancy.

Table 5 | Sources of financing of appropriations under the ASAP (millions of euros)

	2023	2024	Total
EDIRPA	157	83	240
EDF	-	260	260
Total	157	343	500

Source: European Commission, Proposal for a Regulation on Establishing the Act in Support of Ammunition Production, cit.

10.2 Implications for Italy

The measures launched by the EU in the wake of the Russian war against Ukraine have a series of implications for Italy. The emergency measures undertaken after February 2022 are naturally aimed at a very specific task: boosting the output of 155mm artillery shells and missiles to replenish depleted stocks and provide long-term sustainable aid to Ukraine. Nevertheless, one should remember that these policies are essentially aimed at the supply side of the equation and do not contribute to a long-term consolidation of demand. Moreover, 155mm ammunitions are far easier to produce than complex

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defenselessness-behind-6775.
23   Gaspard Schnitzler, "EDIRPA/EDIP: Risks and Opportunities of Future Joint Procurement Incentives for the European Defence Market", in *Ares Policy Papers*, No. 81 (March 2023), https://www.iris-france. org/wp-content/uploads/2023/03/ARES-81-Policy-paper.pdf.

weapon systems. As such, a system of reimbursements and targeted financing would not necessarily bring EU defence integration forward when it comes to more advanced systems.

10.2.1 Demand-side measures:
A temporary boost in need of institutionalisation

As an important producer of artillery shells, Italy stands to benefit from the aforementioned measures. Rome could exploit existing EU programmes to boost its consistent capacities in terms of artillery ammunition production,[24] including the Vulcano one by Leonardo – which is the only type of smart long-range artillery ammunition produced in Europe, especially considering the ambitious requirements on reserves and stock put forward by NATO at the Vilnius summit.[25] Nevertheless, measures designed to aid Ukraine and increase the production of long-fires ammunition do not necessarily help the integration of European defence, on the contrary. If EU budgets remain unaltered, these policies will come at the expense of initiatives – such as the EDF – in which Italy has heavily invested, both politically and industrially, with the hope that such projects would result in a new generation of European-made defence hardware on which the demand from EU member states could converge on. Only structured institutional measures that bundle and rationalise European demand for defence goods, such as the development of the European Defence Capability Consortia (EDCC) and full implementation of the recommendations included in the CARD, can lead to structural optimisation of available production capacities.

10.2.2 Supply-side measures:
The open question of third countries involvement

Delays in the negotiation of EDIRPA also show disagreements between individual member states on the opportunity to keep European defence markets reasonably open to companies from third countries, something Italy

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[24] Italy hosts three 155mm productions sites: at Domusnovas (Sardinia), Colleferro (Latium) and Baiano di Spoleto (Umbria). See Hannah Aries, Bastian Giegerich and Tim Lawrenson, "The Guns of Europe: Defence-industrial Challenges in a Time of War", in *Survival*, Vol. 65, No. 3 (June-July 2023), p. 7-24, https://doi.org/10.1080/00396338.2023.2218716.

[25] NATO, *Vilnius Summit Communiqué*, cit.

(like Germany) has long advocated for against a more protectionist French position. Rome has overall adopted a quite balanced position: it favours a continuous relationship with US and British companies (also due to the strong Anglo-Saxon industrial ties of major Italian companies) but is also concerned that excessive use of "off the shelf" solutions will undermine the EDITB by virtue of a lock-in effect. Indeed, given that weapons systems have, on average, long service time spans, their current acquisition often discourages the procurement of alternative goods due to the complexity of maintaining multiple logistical chains and support systems.[26] While Eastern and Northern member states discount this issue due to the urgency of rapidly rearming, as demonstrated in the European Sky Shield controversy,[27] countries like France and Italy advocate for a long-term approach to improve the competitiveness of the EDTIB at the global level and the level of (shared) technological sovereignty over advanced systems. There should be a different approach on one hand for short-term, short-term initiatives coping with urgent requirements, and on the other hand for those long-term and permanent. When medium-long-term requirements and needs have to be addressed, it is reasonable that EU financial incentives should benefit the EDTIB.

Squaring the circle requires a robust backing of EDIRPA and EDIP, the two instruments that can structurally rationalise the demand side of European defence markets and move the debate beyond a simple question of market access, putting the question of synchronisation and coordination of procurement policies at the centre of European defence affairs. Moreover, Italy should advocate for a significant increase in the budgets allocated to existing EU defence initiatives and organically integrate them into the established EU defence architecture. EDF, in particular, is the most important EU initiative, aims for the growth of the European know-how through co-financing of R&D

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26   Michele Nones, "The Risks to European Defence of Non-coordination", in Alessandro Marrone et al., *The Russia-Ukraine War, Security in Europe and European Defence*, Rome, IAI, November 2022, p. 29-32, https://www.iai.it/en/node/16243.
27   The German-led European Sky Shield Initiative was heavily criticised by both Italy and France because it focuses on the procurement of US and Israeli-made missile defence systems, rather than EU-made hardware. German and central European decision-makers felt that the necessity to close the capability gap was too urgent to wait on a complicated European agreement that could accommodate the requests from all European industrial actors. See Héloïse Urvoy, "Homemade or Imported - France and Germany Have Different Strategies on Air Defence Systems", in *Euronews*, 29 June 2023, https://www.euronews.com/2023/06/29/homemade-or-imported-france-and-germany-have-different-strategies-on-air-defence-systems.

activities and should become the mainstay of the EU initiatives, which appear to be too fragmented and with insufficient budgets to achieve meaningful results.

10.2.3 The limits of the intra-European market and the 2009 defence market directives

The achievement of economies of scale also requires a comprehensive re-examination of the 2009 defence market directives,[28] which do not properly address the distortions of the European market structure. On one hand, under directive 2009/81/EC,[29] European cooperative projects are subject to the same competition rules as national or third-country products. This provision has become obsolete since the EU has decided that defence cooperation, both in procurement, research and development, is a priority in its own right (e.g. to boost the EDTIB's productive capacity and develop some form of technological autonomy). This political choice should be reflected by favouring hardware developed within EU collaborative projects in procurement processes.

On the other hand, directive 2009/43/EC[30] effectively prevents European defence products from becoming truly competitive due to heterogeneous and burdensome rules on intra-European transfers, including for IP and immaterial goods. Current rules do not allow for the development of a truly European market when it comes to components, spare parts and subsystems, all of which still need to comply with customs clearings and national certification procedures. This, of course, also means that productive capacities and supply chains are fragmented along national borders. Abating such non-tariff barriers should be a priority, and Italy should support this effort.

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28   For a deeper analysis, see: Alessandro Marrone and Michele Nones, "The EU Defence Market Directives: Genesis, Implementation and Way Ahead", in *Documenti IAI*, No. 20|18 (September 2020), https://www.iai.it/en/node/12156.

29   European Parliament and Council of the EU, *Directive 2009/81/EC of 13 July 2009 on the Coordination of Procedures for the Award of Certain Works Contracts, Supply Contracts and Service Contracts by Contracting Authorities or Entities in the Fields of Defence and Security*, http://data.europa.eu/eli/dir/2009/81/oj.

30   European Parliament and Council of the EU, *Directive 2009/43/EC of 6 May 2009 Simplifying Terms and Conditions of Transfers of Defence-related Products within the Community*, http://data.europa.eu/eli/dir/2009/43/oj.

10.2.4 EU support for spare productive capacities

Finally, the EU should consider provisions with which it could ensure that companies maintain a certain amount of spare productive capacities in times of crisis. A market-oriented business is likely to strive for the maximal use of its infrastructures, meaning that it will end up saturating its assembly lines leaving no room for manoeuvre in case of surging demand. Being inherently tied to the working of defence markets, it is the EU that should ensure the presence of spare productive capacities, and Italy should support this effort.

11. The US reaction in terms of procurement and defence industrial policy

by Seamus P. Daniels*****

Russia's invasion of Ukraine in February 2022 spurred a massive military assistance effort by the United States government to arm and equip the Ukrainian armed forces in defence of their homeland. The war and the subsequent American response to it, however, exposed vulnerabilities within the US procurement system and defence industrial base, particularly in their capacity to produce and field munitions. These limitations have been highlighted by concerns over US readiness and the industry's ability to replenish stocks. More significantly, the Department of Defense (DoD) and Congress have taken steps to mitigate risk and rejuvenate the industrial base. While they are still in the early phases of their implementation, these policies and future reforms could have significant ramifications on US capabilities moving forward in its competition with China in the Indo-Pacific theatre, the pacing challenge identified by the 2022 National Defense Strategy.

This chapter assesses American procurement and defence industrial base policy in the context of the United States security assistance programme to Ukraine. It first explores the substance of military aid packages to Ukraine. The chapter then discusses concerns over and limitations in DoD's current procurement policies and the defence industrial base and their implications for strategic competition with China. It concludes by addressing policies adopted by DoD and Congress to respond to these shortcomings and rejuvenate the defence industrial base.

11.1 US military assistance to Ukraine

As of 27 December 2023, the United States under the Biden administration has provided more than 44.2 billion US dollars in security assistance to Ukraine since

* The views expressed in this chapter are solely those of the author and do not necessarily represent those of the Center for Strategic and International Studies (CSIS).

24 February 2022.[1] That aid has included a wide variety of different platforms, weapons systems, munitions, and other equipment for a range of mission sets.[2] The composition of security assistance packages has also evolved as the Biden administration decided several times to send capabilities it had not previously shared with the Ukrainian military to mitigate the risk of escalation. This equipment has notably included M142 High Mobility Artillery Rocket Systems (HIMARS),[3] a Patriot air and missile defence battery and missiles,[4] M1 Abrams tanks[5] and cluster munitions.[6] The United States also decided in September 2023 to deliver ATACMS missiles to the Ukrainian military, which used them to strike Russian forces in October, after the Biden administration initially refused to provide them. Thus far, Washington has not relented to Ukrainian requests for F-16 aircraft, although DoD has agreed to train Ukrainian pilots and ground crews to use F-16s to be possibly provided by allied and partner nations.[7]

The United States has primarily relied on two mechanisms to provide military aid to Ukraine: Presidential Drawdown Authority and the Ukraine Security Assistance Initiative (USAI). The former allows for the "speedy delivery of defense articles and services from [DoD] stocks to foreign countries and international organizations to respond to unforeseen emergencies".[8] Equipment provided

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1 In total, the Biden administration has provided more than 44.9 billion US dollars in security assistance to Ukraine since taking office. See US Department of State, *U.S. Security Cooperation with Ukraine*, 27 December 2023, https://www.state.gov/u-s-security-cooperation-with-ukraine; and *Fact Sheet on U.S. Security Assistance to Ukraine*, 27 December 2023, https://media.defense.gov/2023/Dec/27/2003366049/-1/-1/1/UKRAINE-FACT-SHEET-27-DEC.PDF.

2 For a current list of US equipment provided to Ukraine since the beginning of the war, see the two documents cited in the footnote above.

3 Joe Gould, "US Will Send HIMARS Precision Rockets to Ukraine", in *Defense News*, 1 June 2022, https://www.defensenews.com/pentagon/2022/06/01/us-will-send-himars-precision-rockets-to-ukraine; Elian Yousif, "HIMARS Marks Evolution in US Weapons Transfers to Ukraine", in *Stimson Commentaries*, 2 June 2022, https://www.stimson.org/?p=59053.

4 Dan Lamothe and Karen DeYoung, "Biden Administration to Send Patriot Missile System to Ukraine", in *The Washington Post*, 21 December 2022, https://www.washingtonpost.com/national-security/2022/12/21/patriot-missile-system-ukraine-russia.

5 Lara Seligman, "U.S. to Send 31 Abrams Tanks to Ukraine, in Major Reversal", in *Politico*, 25 January 2023, https://www.politico.com/news/2023/01/25/u-s-to-send-31-abrams-tanks-to-ukraine-in-major-reversal-00079437.

6 Mark F. Cancian, "Cluster Munitions: What Are They, and Why Is the United States Sending Them to Ukraine?", in *CSIS Critical Questions*, 10 July 2023, https://www.csis.org/node/106265.

7 Barak Ravid, "U.S. Not Planning to Announce Long-Range Missiles Decision during Zelensky Visit: Source", in *Axios*, 15 September 2023, https://www.axios.com/2023/09/15/atacms-long-range-missiles-zelensky-ukraine-biden.

8 US Department of State, *Use of Presidential Drawdown Authority for Military Assistance for Ukraine*, 27 December 2023, https://www.state.gov/use-of-presidential-drawdown-authority-for-military-

under a drawdown is generally delivered much faster than under other authorities – in a matter of days or even hours – because DoD already has the capabilities or services on hand.[9] Since August 2021, the Biden administration has exercised its drawdown authority 54 times (as of 27 December 2023) to provide over 24 billion US dollar worth of equipment to the Ukrainian military.[10]

As opposed to drawdown authority which pulls from existing DoD stocks, USAI authority enables the US government to "[procure] capabilities from industry or partners" for the Ukrainian armed forces.[11] The fund was first established by Congress in the 2016 National Defense Authorization Act and operates as a transfer account, under which DoD later designates funding from Congressional appropriations towards a range of equipment, services, and support to Ukraine.[12] Assistance funded under USAI takes longer to deliver than drawdowns because it typically involves starting a new contracting process to procure those items.[13] Congress has provided 18 billion US dollars for USAI in Fiscal Year (FY) 2022 and FY 2023.[14]

In August 2023, the Biden administration requested an additional 24 billion US dollars in Ukraine-related funding, including 13.2 billion US dollars for defence activities, as part of a broader supplemental request, but Congress failed to take action.[15] Congress has similarly not acted on the administration's October request to provide 106 billion US dollars in supplemental funding for Ukraine, Israel, and border security (including 18 billion to replace DoD stocks and 12 billion for USAI) as Ukraine-related assistance is intertwined in domestic political

assistance-for-ukraine.

9   Ibid.

10   US Department of Defense, *Biden Administration Announces New Security Assistance for Ukraine*, 27 December 2023, https://www.defense.gov/News/Releases/Release/Article/3627179; Christina L. Arabia, Andrew S. Bowen and Cory Welt, "U.S. Security Assistance to Ukraine", cit.

11   US Department of Defense, *Biden Administration Announces Additional Security Assistance for Ukraine*, 7 September 2023, https://www.defense.gov/News/Releases/Release/Article/3518903.

12   Mark F. Cancian, "What Does $40 Billion in Aid to Ukraine Buy?", in *CSIS Commentaries*, 23 May 2022, https://www.csis.org/node/65464.

13   US Department of Defense, *Biden Administration Announces Additional Security Assistance for Ukraine*, cit.; David Vergun, "DOD Official Describes How Security Assistance Gets to Ukraine", in *DOD News*, 19 April 2022, https://www.defense.gov/News/News-Stories/Article/Article/3003989.

14   Christina L. Arabia, Andrew S. Bowen and Cory Welt, "U.S. Security Assistance to Ukraine", cit.

15   Mark F. Cancian, "Aid to Ukraine: The Administration Requests More Money and Faces Political Battles Ahead", in *CSIS Critical Questions*, 15 August 2023, https://www.csis.org/node/106778.

negotiations over border security measures.[16] DoD conveyed to Congress that existing funds for security assistance to Ukraine would be exhausted by the end of December, and the last tranche of equipment was announced on 27 December 2023.[17] Since that announcement, national security officials have provided an "incredibly stark" assessment to lawmakers of Ukraine's prospects in the conflict if Congress fails to provide additional assistance.[18]

11.2 Concerns and vulnerabilities in the US defence industrial base

The United States' provision of significant quantities of assistance has prompted concerns not only over the short-term impacts on military readiness and the defence industry's ability to replenish stocks of equipment sent to Ukraine, but also over the long-term viability of the industrial base to meet DoD's demands in an era of strategic competition with China. The war in Ukraine has exposed shortcomings within the United States defence acquisition enterprise at large.

DoD officials have played down concerns over military readiness in the short term, attesting that the United States' provision of assistance from its existing stocks has not degraded the ability or resources of its own forces to fight. Undersecretary of Defense for Acquisition and Sustainment Bill LaPlante outlined that the Department's leadership rigorously scrutinises that drawdowns of US equipment will not hurt readiness or increase risk.[19] The leadership of the military services similarly monitor the impact of drawdowns and industry supply chain capacity on their capabilities and readiness.[20]

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16   Christina L. Arabia, Andrew S. Bowen and Cory Welt, "U.S. Security Assistance to Ukraine", cit.

17   John M. Donnelly, "Key US Fund for Ukraine about to Be 'Exhausted'", in *CQ Roll Call*, 18 December 2023, https://rollcall.com/?p=737440; US Department of Defense, *Biden Administration Announces New Security Assistance for Ukraine*, cit.

18   Monica Alba and Julie Tsirkin, "'Incredibly Stark': Biden Aides Give Lawmakers a Grim Assessment of Ukraine without More Aid", in *NBC News*, 19 January 2024, https://www.nbcnews.com/politics/white-house/incredibly-stark-biden-aides-give-lawmakers-grim-assessment-ukraine-ai-rcna134792.

19   Joseph Clark, "DOD Maintains Readiness as U.S. Assists Ukraine", in *DOD News*, 29 August 2023, https://www.defense.gov/News/News-Stories/Article/Article/3508690.

20   Ellen Mitchell and Brad Dress, "Is Helping Ukraine Reducing US Preparedness, Security?", in *The Hill*, 28 January 2023, https://thehill.com/?p=3832541.

Congress has also readily appropriated funding – nearly 26 billion US dollars – for DoD to replenish stocks of equipment provided to Ukraine under the President Drawdown Authority.[21] As of 22 November 2023, DoD has obligated almost 17 billion US dollars of that funding in contracts to replace capabilities, notably including 155mm ammunition, Javelin, and Stinger stocks, among other equipment.[22]

However, the primary challenge to meet both the demand for munitions and capabilities from Ukrainian forces in the field as well as replace DoD's stocks rests in the defence industry's ability to scale up production. This issue became apparent early on as the Ukrainian military swiftly exhausted stocks of Javelin and Stinger missiles – which the US military last procured in FY 2005 – before DoD and industry partners could develop a plan to increase capacity to produce the missiles at scale.[23] While Ukraine had requested 500 Javelin missiles and 500 Stinger missiles per day, it would reportedly take five years' worth of production at recent capacity levels to replace the number of Javelin missiles sent to Ukraine over the first ten months of the war and 13 years to replenish Stinger stocks.[24] Similarly, Ukraine is reportedly expending between 6,000-7,000 artillery shells daily while the industry can only produce only produce 28,000 155mm shells per month (although that is recently up from 15,000 shells per month).[25]

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21   Christina L. Arabia, Andrew S. Bowen and Cory Welt, "U.S. Security Assistance to Ukraine", cit.

22   US Department of Defense, *Ukraine Security Assistance*, 22 November 2023, https://www.acq.osd.mil/news/spotlight/Ukraine%20Infographic_22NOV2023_v2.pdf.

23   US Department of Defense, *Reprogramming Action: Ukraine Replacement Transfer Fund Tranche 1*, 1 May 2022, https://comptroller.defense.gov/Portals/45/Documents/execution/reprogramming/fy2022/ir1415s/22-15_IR_Ukraine_Replacment_Transfer_Fund_Tranche_1.pdf; Lee Hudson, Paul McLeary and Connor O'Brien, "Pentagon Scrambles to Replenish Weapons Stocks Sent to Ukraine", in *Politico*, 22 March 2022, https://www.politico.com/news/2022/03/22/pentagon-scrambles-to-replenish-weapons-stocks-sent-to-ukraine-00019333.

24   Eric Lipton, "From Rockets to Ball Bearings, Pentagon Struggles to Feed War Machine", in *The New York Times*, 24 March 2023, https://www.nytimes.com/2023/03/24/us/politics/military-weapons-ukraine-war.html.

25   Samuel Petrequin, "EU to Speed Up Deliveries of Howitzer Shells for Ukraine", in *AP News*, 2 March 2023, https://apnews.com/article/995a403bc39c4a8d63975f9be4aaf3b7; Haley Britzky and Oren Liebermann, "Ukraine Is Burning through Ammunition Faster than the US and NATO Can Produce It. Inside the Pentagon's Plan to Close the Gap", in *CNN*, 17 February 2023, https://www.cnn.com/2023/02/17/politics/us-weapons-factories-ukraine-ammunition; Joseph Clark, "DOD Announces $175M in Additional Security Assistance for Ukraine", in *DOD News*, 6 September 2023, https://www.defense.gov/News/News-Stories/Article/Article/3517088; Joseph Ataman and Clare Sebastian, "Ukraine Is Firing Shells Faster than Can Be Supplied. Can Europe Catch Up?", in *CNN*, 17 September 2023, https://www.cnn.com/2023/09/17/europe/ukraine-shell-supplies-intl.

The barriers to boosting industrial output include depleted and cold production lines, supply chain issues, long lead times, an inadequate workforce, and the lack of a consistent demand signal from the DoD and Congress over the years.[26] In part, these challenges stem from the consolidation of the American defence industry after the Cold War which, in line with a concerted effort by the US government, saw the number of major contractors within the industrial base shrink dramatically. The remaining firms have "prioritized efficiency over resiliency", according to Undersecretary LaPlante, and "allowed production lines to go cold" as part of a "just-in-time mindset" that only maintains low inventory until production is poised to begin.[27] This in turn has contributed to a contraction in the number of smaller, mid-tier suppliers within defence supply chains that produce components and sub-components that make up the larger platform or system.[28] Only single companies exist in some cases as the source for specific subcomponents, thereby limiting the broader industrial base's ability to scale up when requested by DoD.[29] Consequently, there are longer lead times to manufacture certain capabilities, like Javelin, Stinger, and GMLRS missiles which "can take two or three years to produce".[30]

Finally, the lack of a consistent demand signal from the US government at times for certain equipment has discouraged industry from investing in increasing production capacity, particularly for munitions.[31] Munitions funding often serves as a "bill payer" when the services and DoD are forced to make tradeoffs within their budgets because it's considered "fungible money".[32] As a result of this start-stop funding, companies closed many production lines.[33]

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26   Eric Lipton, "From Rockets to Ball Bearings", cit.; US Department of Defense, *DOD Releases First-Ever National Defense Industrial Strategy*, 11 January 2024, https://www.defense.gov/News/Releases/Release/Article/3643326; US Department of Defense, *National Defense Industrial Strategy*, 11 January 2024, https://www.businessdefense.gov/NDIS.html.
27   David Vergun, "Official Says Just-in-Time Deliveries Fail in High-End Competition", in *DOD News*, 16 March 2023, https://www.defense.gov/News/News-Stories/Article/Article/3331657.
28   Jeff Link, "The Ukraine War Shows the US Military-Industrial Complex Isn't Battle Ready", in *Wired*, 19 July 2023, https://www.wired.com/story/ukraine-future-of-war-mom-and-pop-military-industrial-complex.
29   Seth G. Jones, "Empty Bins in a Wartime Environment. The Challenge to the U.S. Defense Industrial Base", in *CSIS Reports*, January 2023, https://www.csis.org/node/103398.
30   David Vergun, "Official Says Just-in-Time Deliveries Fail in High-End Competition", cit.
31   Lee Hudson, Paul McLeary and Connor O'Brien, "Pentagon Scrambles to Replenish Weapons Stocks Sent to Ukraine", cit.
32   Eric Lipton, "From Rockets to Ball Bearings", cit.
33   Doug Cameron, "U.S. Struggles to Replenish Munitions Stockpiles as Ukraine War Drags On", in *The Wall Street Journal*, 29 August 2023, https://www.wsj.com/articles/u-s-push-to-restock-howitzer-shells-

These near-term concerns have prompted broader worries over the US military's ability to sustain a fight against a strategic competitor like China, particularly in terms of its munitions inventory. A series of wargames conducted by the Center for Strategic and International Studies (CSIS) around a scenario involving a Chinese invasion of Taiwan found that munitions use was high, and the US would exhaust its long-range precision missiles in a matter of weeks (and earlier for some munitions types).[34] In his analysis of the issue, a CSIS Report, concluded that the "U.S. defense industrial base is not adequately prepared for the competitive security environment that now exists" and is "currently operating at a tempo better suited to a peacetime environment".[35] The challenges currently facing the US defence industry consequently have serious ramifications for Washington ability to deter and compete with China over the mid-to-long-term.

11.3 Seeking solutions through procurement and industrial policy

While the war in Ukraine exposed these vulnerabilities within the national defence industrial base, it has simultaneously served to spur the US defence enterprise to take action to mitigate risk. DoD Comptroller Mike McCord acknowledged this fact, noting "Ukraine has certainly informed us of the lack of flexibility in our industrial base."[36] The government, including both DoD and Congress, and the defence industry have taken steps to strengthen the acquisition system to not only respond to the Ukraine conflict but also provide greater resilience moving forward. As Douglas R. Bush, assistant secretary of the Army for acquisition, logistics and technology stated, the United States is "both modernizing our industrial base while we're ramping up production".[37]

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rockets-sent-to-ukraine-bogs-down-f604511a.

34   Seth G. Jones, "Empty Bins in a Wartime Environment", cit., p. 1; Mark F. Cancian, Matthew Cancian and Eric Heginbotham, "The First Battle of the Next War Wargaming a Chinese Invasion of Taiwan", in *CSIS Reports*, January 2023, p. 136, https://www.csis.org/node/68386.

35   Seth G. Jones, "Empty Bins in a Wartime Environment", cit., p. 1.

36   David Vergun, "Emphasis in DOD 2024 Budget Includes Munitions", in *DOD News*, 15 March 2023, https://www.defense.gov/News/News-Stories/Article/Article/3330612.

37   Joseph Clark, "DOD Focuses on Readiness, Modernization as It Arms Ukraine", in *DOD News*, 7 August 2023, https://www.defense.gov/News/News-Stories/Article/Article/3486053.

In January 2024, DoD issued its first-ever National Defense Industrial Strategy (NDIS), which identifies the challenges facing the industrial base and "offers a strategic vision to coordinate and prioritise actions to build a modern defense industrial ecosystem".[38] The NDIS highlights the significance of a "robust and resilient" industrial base for the US military and outlines four primary lines of effort: building resilient supply chains, enhancing workforce readiness, adopting flexible acquisition strategies, and achieving economic deterrence.[39] The recommendations included under each of these lines of effort ultimately seek to make the industrial base "dynamic, responsive, state-of-the-art, resilient, and a deterrent to our adversaries".[40]

Congress and DoD have also taken measures to provide a consistent demand signal to industry – at both the prime and sub-tier level – that the government will regularly procure munitions. In the 2023 NDAA, Congress granted DoD multiyear procurement authority for munitions programmes, which will "keep the assembly lines running and employees working, along with cost efficiencies".[41] MYP contracts allow for two to five years' worth of procurement for a given piece of equipment without having to appropriate new funding each year.[42] According to DoD, this will fulfil multiple objectives, including helping to shift the industrial base from a peacetime production footing to an improved surge capability and "providing defense contractors a longer and more stable time horizon for planning and investing in production".[43] These contracts will enable the Army to increase artillery shell production to as high as 70,000 per month, although it will take 12-18 months.[44]

The government has also taken more direct steps to strengthen industrial base and supply chains using funds from the Defense Production Act. Congress appropriated 600 million US dollars in May 2022 to "support [the] expansion

38 US Department of Defense, *National Defense Industrial Strategy*, cit., p. I.
39 Ibid., p. 7.
40 Ibid., p. 10.
41 David Vergun, "Emphasis in DOD 2024 Budget Includes Munitions", cit.
42 Ronald O'Rourke, "Multiyear Procurement (MYP) and Block Buy Contracting in Defense Acquisition: Background and Issues for Congress", in *CRS Reports*, No. R41909 (20 December 2023), https://crsreports.congress.gov/product/details?prodcode=R41909.
43 US Department of Defense, *Defense Budget Overview. Fiscal Year 2024 Budget Request*, March 2023, p. 2-12, https://comptroller.defense.gov/Budget-Materials/Budget2024.
44 Haley Britzky and Oren Liebermann, "Ukraine Is Burning through Ammunition Faster than the US and NATO Can Produce It", cit.

of the missile production base and [… expand] domestic capacity of strategic and critical minerals".[45] Since the beginning of the war, DoD has executed 746 million US dollars in funding for solid rocket motors, missiles and munitions, and strategic and critical materials.[46]

The management of stockpiles of strategic and critical materials has also been a growing point of emphasis for DoD and Congress. The NDIS called for increasing existing stockpiles and creating new ones to "act as shock absorbers for the supply chain and help to mitigate near-term risks".[47] Congress has taken steps to bolster and manage the National Defense Stockpile, first created in 1939 to limit a "dangerous and costly dependence […] upon foreign sources or a single point of failure for supplies […] in times of national emergency", by appropriating funding for the stockpile in FY 2022 and FY 2023, as well as by enacting reforms in the FY 2024 NDAA that include authorising multiyear procurement of critical minerals processed domestically.[48]

As a signal of its long-term commitment to strengthening the industrial base and acquisition enterprise, DoD and the services have enacted some organisational and process reforms as well. The Department created the Joint Production Accelerator Cell under the Office of the Under Secretary of Defense for Acquisition & Sustainment (OUSD A&S) with the objective of "building enduring industrial production capacity, resilience, and surge capability for key defense weapon systems and supplies".[49] The Air Force also "started to change the way it buys missile systems" in part to grow the number of suppliers that produce components.[50]

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45   Mark F. Cancian, "What Does $40 Billion in Aid to Ukraine Buy?", cit.

46   US Department of Defense, Ukraine Security Assistance, cit.

47   US Department of Defense, *National Defense Industrial Strategy*, cit., p. 17-18.

48   See 50 U.S.C. 98 Section 2(b), *Strategic and Critical Materials Stock Piling Act*, enacted 7 June 1939, as amended through 22 December 2023, https://www.govinfo.gov/content/pkg/COMPS-674/pdf/COMPS-674.pdf. See also Cameron Keys, "Emergency Access to Strategic and Critical Materials: The National Defense Stockpile", in *CRS Reports*, No. R47833 (14 November 2023), https://crsreports.congress.gov/product/details?prodcode=R47833; Stephanie Barna, Alex Hastings and Daniel Raddenbach, "2024 NDAA Maintains Focus on Supply Chain", in *National Defense Magazine*, 1 February 2024, https://www.nationaldefensemagazine.org/articles/2024/2/1/2024-ndaa-maintains-focus-on-supply-chain.

49   Tony Bertuca, "DOD Establishes Joint Production Accelerator Cell to Work Industrial Base Issues", in *Inside Defense*, 15 March 2023, https://insidedefense.com/share/217396.

50   Eric Lipton, "From Rockets to Ball Bearings", cit.

Finally, with a more consistent demand signal from the government, industry has also taken steps to expand production with greater capacity, more factor shifts, new equipment, and efficient supply chains.[51]

While the United States government and defence industry have enjoyed some early progress as a result of these policies, further action is required to effectively rejuvenate the industrial base. The war in Ukraine served as a wake-up call for the US to bolster industrial capacity and procure and maintain sufficient stockpiles. Its ability to implement reforms and new policies will have significant implications for its strategic competition with China.

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[51]   Doug Cameron, "U.S. Struggles to Replenish Munitions Stockpiles as Ukraine War Drags On", cit.

12. Nuclear deterrence, arms control and non-proliferation

by Ottavia Credi and Stefano Silvestri[*]

12.1 Implications for nuclear deterrence, arms control and non-proliferation

Russia's invasion of Ukraine brought nuclear weapons back onto the scene.[1] The possibility of a nuclear war, which had not seriously been discussed since the end of the Cold War, suddenly came up as a scenario highly discussed amongst experts and media outlets.

Since the beginning of the conflict, Russia has gone through a redefinition of the role of nuclear weapons in its deterrence doctrine, due to a substantial weakening of its conventional forces.[2] Russia's nuclear doctrine considers tactical nuclear weapons as potentially complementary to conventional weapons – so much so that Moscow employs the same command and control (C2) and information systems for conventional weapons and tactical nukes.[3] Russia reserves the right to resort to first use should the "very existence" of the country be at risk – be that caused by acts of aggression involving conventional or unconventional weapons.[4]

Ever since the first use of the atomic weapon, the expression "nuclear taboo" referred to a normative prohibition of its use due to the complete destruction

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[1]   Interview, 18 September 2023 B.
[2]   Dimitry Adamsky, "Russia's New Nuclear Normal", in *Foreign Affairs*, 19 May 2023, https://www.foreignaffairs.com/node/1130352.
[3]   Interview, 18 September 2023 A.
[4]   Mary Beth D. Nikitin, "Russia's Nuclear Weapons: Doctrine, Forces, and Modernization", in *CRS Reports*, No. R45861 (21 April 2022), https://crsreports.congress.gov/product/details?prodcode=R45861. A no-first-use policy binds a country never to be the first nation to use nuclear weapons in any conflict; therefore, first use would imply a country does employ nuclear weapons before any other nation involved in a given conflict.

and disruption these systems can cause. The risk of a nuclear war is not and has not been high, even following Moscow's aggression – yet, it may be higher than at other times in history.[5]

12.1.1 Nuclear rhetoric

Since the start of the conflict, the Kremlin made several nuclear-related threats in public fora.[6] In the first nine months of the conflict alone, Russian President Vladimir Putin explicitly referred to the possibility of breaking the nuclear taboo three different times. In February 2022, he announced that Russia's nuclear deterrence forces were on "high alert"; in September, when he decided on a partial mobilisation of Russian forces, Putin threatened nuclear retaliation in case Russia's territorial integrity was jeopardised; a few weeks after such announcement, he made explicit reference to the US use of the nuclear weapon in Japan, citing it as a "precedent".[7]

Russia continues to reference its nuclear power because it cannot display sufficient power for its purposes on any other front, be it conventional weaponry or finances. Putin's unceasing resort to nuclear threats is therefore consistent with its conduct and demonstrates the extent to which his leadership depends on the outcome of this war.[8]

The US chose to underplay Russia's nuclear threats and declare that a potential use of nuclear weapons by Russia might not be met by American resort to its nuclear arsenal.[9] In doing so, the Biden administration had one, paramount goal: encouraging NATO allies to continue supplying Ukraine with conventional weaponry and equipment. Yet, the repeated reference to nuclear weapons throughout the ongoing conflict may instil in non-nuclear capable countries

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[5] Interview, 19 September 2023.

[6] Dimitry Adamsky, "Russia's New Nuclear Normal", cit.

[7] Andrew Roth et al., "Putin Signals Escalation as he Puts Russia's Nuclear Force on High Alert", in *The Guardian*, 28 February 2022, https://www.theguardian.com/p/kp9em; Pjotr Sauer, "Putin Announces Partial Mobilisation and Threatens Nuclear Retaliation in Escalation of Ukraine War", in *The Guardian*, 21 September 2022, https://www.theguardian.com/p/ma76k; "Putin: United States Created Nuclear Precedent by Bombing Japan", in *Reuters*, 30 September 2022, https://www.reuters.com/article/ukraine-crisis-putin-nuclear-idAFS8N2Z80FY.

[8] Interview, 18 September 2023 B.

[9] Interview, 18 September 2023 A.

the dangerous conviction that these capabilities represent a guarantee for a country's security and stability, potentially triggering a wave of horizontal nuclear proliferation.[10]

12.1.2 A losing game of compellence

Russia's decision not to employ a nuclear weapon (so far) could be attributed to two main explanations. Firstly, the most likely scenario of nuclear use from Russia would be at a cross-border site across the two countries, which would have inevitable, dramatic consequences on the Russian territory, too. Secondly, NATO's nuclear deterrence seems to be working.

On the opposite side, Moscow is losing credibility each time it makes a nuclear threat, falling in the so-called "exhaustion of nuclear deterrence": the more it advances nuclear threats which are not followed by nuclear use, the more its threats are discredited.[11]

Russia is also failing in terms of compellence, namely the ability to convince an adversary to do something by threatening the use of force. Although Moscow has been threatening severe consequences for any country providing military support to Ukraine, Western allies never showed signs of suffering intimidations and continued to provide unwavering assistance throughout the ongoing conflict.[12]

12.1.3 Let not regimes collapse

Nuclear deterrence, arms control and non-proliferation have traditionally been conducted in a regime-based nuclear order. In the last few years, and before the Ukraine war started, such orders began to collapse. Looking back to 2002, the George Bush administration withdrew from the Anti-Ballistic Missile (ABM) Treaty. In 2014, the Obama administration accused Russia of violating the terms of the Intermediate-Range Nuclear Forces Treaty (better known as the INF Treaty) and, four years later, the Trump administration formally declared the

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10   Ibid.
11   Interview, 19 September 2023.
12   Interview, 18 September 2023 A.

US exit from the agreement. The conflict in Ukraine is increasing international tensions, especially in terms of confrontation between Russia and NATO. As a consequence, arms control and non-proliferation efforts are suffering.[13]

Today's nuclear order is mostly based on the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), which came into force in 1968 and still represents the cornerstone on which the related arms control regime rests.[14] The NPT has a threefold objective: preventing the proliferation of nuclear weapons, promoting nuclear disarmament, and encouraging the spread of nuclear energy and technology for peaceful purposes. The Treaty distinguishes between militarily nuclear states (namely China, France, Russia, the United Kingdom and the United States) and non-militarily nuclear states (all others).

The NPT is subject to a review cycle, with Review Conferences (RevCons) being held every five years to make a general assessment of the Treaty's implementation. The first session of the Preparatory Committee (PrepCom) working towards the 2026 NPT RevCon suggested a palpable difficulty in reaching common decisions, especially with Russia's allegation that existing arms control and non-proliferation treaties should be interpreted according to the contingent political situation and Poland's declaration that its national security prevails any international treaty.[15] Given the ongoing tensions concerning nuclear security, it is unlikely the NPT 2026 RevCon will lead to major achievements, or the adoption of a final document.[16]

With its brutal invasion in 2022, Russia blatantly violated the Budapest Memorandum, namely an agreement through which in 1994 Russia, the UK and the US committed to provide security guarantees to Ukraine in exchange for Kyiv's renunciation of its nuclear arsenal and its membership in the NPT, whilst binding Moscow to respect the "independence and sovereignty and the existing borders of Ukraine".[17] Such a flagrant contravention may have further

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13   Ibid.; Interview, 19 September 2023.
14   *Treaty on the Non-Proliferation of Nuclear Weapons*, 1 July 1968, https://treaties.unoda.org/t/npt.
15   UN Office for Disarmament Affairs website: *Treaty on the Non-Proliferation of Nuclear Weapons -Preparatory Committee for the 2026 Review Conference First session (2023)*, http://meetings.unoda.org/node/67442.
16   Interviews, 18 September 2023 B and 9 October 2023.
17   *Memorandum on Security Assurances in Connection with Ukraine's Accession to the Treaty on the Non-Proliferation of Nuclear Weapons*, Budapest, 5 December 1994, https://treaties.un.org/Pages/

consequences on the nuclear non-proliferation regimes at large, especially as non-nuclear weapon states may respond to the image of Ukraine being brutally invaded by Russia by associating nuclear weapons with an idea of stability, security and independence.[18]

Such a precarious treaty-based architecture was further weakened at the beginning of 2023. In February, President Putin announced Russia would suspend its participation in the New Strategic Arms Reduction Treaty (New START), namely the last standing bilateral arms control agreement between the US and Russia. Experts assessed that in the event the US and Russia were left without any bilateral strategic nuclear arms control agreement, their respective arsenals would likely duplicate.[19] In May 2023, Moscow announced its withdrawal from the Conventional Armed Forces in Europe (CFE) Treaty.[20] Lastly, in October, the Duma revoked Russia's ratification of the Comprehensive Nuclear-Test-Ban Treaty (CTBT), raising concern over the threat of nuclear tests besides proliferation risks.[21] Whilst it does not automatically imply Moscow will resume nuclear testing, such a decision does represent another disheartening step towards a regime-free nuclear order.

Whilst Russia believes entertaining nuclear negotiations would imply making a great concession on its part, the US has higher stakes in holding arms control talks.[22] In the meantime, dialogues between Washington and Moscow are taking place at a low diplomatic level.[23] Whether and when it will be possible to re-establish a global regime-based nuclear order is an intensely debated issue amongst experts. Whilst some claim it is highly unlikely the major powers will be willing to engage in arms control and non-proliferation negotiations anytime

showDetails.aspx?objid=0800000280401fbb.

18 Aldo Zammit Borda, "Ukraine War: What Is the Budapest Memorandum and Why Has Russia's Invasion Torn It Up?", in *The Conversation*, 7 March 2022, https://theconversation.com/ukraine-war-what-is-the-budapest-memorandum-and-why-has-russias-invasion-torn-it-up-178184.

19 Matt Korda, "If Arms Control Collapses, US and Russian Strategic Nuclear Arsenals Could Double in Size", in *FAS Articles*, 7 February 2023, https://fas.org/?p=9030.

20 Gabriela Iveliz Rosa Hernández, "Russia Formally Withdraws from CFE Treaty", in *Arms Control Today*, June 2023, https://www.armscontrol.org/node/13609.

21 Filipp Lebedev and Mark Trevelyan, "Russian Lawmakers Vote to Scrap Ratification of Nuclear Test Ban Treaty", in *Reuters*, 18 October 2023, https://www.reuters.com/world/europe/russian-duma-passes-law-revoke-ratification-nuclear-test-ban-treaty-2023-10-18.

22 Interview, 19 September 2023.

23 Ibid.

after a potential ceasefire, others believe not only that talks will resume in fairly rapid times but that it is paramount to engage in discussions whilst the conflict is still ongoing to avoid letting arms control and non-proliferation being overshadowed by the risk of a nuclear arms race. A point on which there seems to be a commonality of views concerns the actual relevance of (re-)establishing a regime-based nuclear order, which is in the interest of both nuclear and non-nuclear states.

12.1.4 The Belarus file

On July 2022, President Putin claimed its intention to deploy part of its tactical nuclear arsenal in Belarus. Moscow intends to maintain complete authority over any warhead stationed in Belarus during times of peace but foresees the possibility of sharing its power with Minks in the event of a war. Such a decision should be interpreted as a mere political move: whilst the transfer of Russian nukes 300 kilometres West has almost no value from a military perspective, it does increase Moscow's control over Minsk.[24]

There is currently no accurate information concerning a transfer of Russian non-strategic nuclear weapons (NSNWs) to Belarus. Whilst President Lukashenko claims Minsk has already received Russian nukes, the most corroborated theory foresees Russia implementing its decision at the end of 2023.[25] Should Putin's declaration of intent actually turn into the transfer of nuclear weapons to Belarus – a non-nuclear-state member of the NPT – it would signal a clear threat of horizontal proliferation, besides a *de facto* violation of the Treaty's Articles I and II.[26]

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24 Ibid.; Interviews, 18 September 2023 A and 9 October 2023.

25 Interviews, 18 September 2023 A and 19 September 2023.

26 Art. I states that nuclear-weapon member states must not transfer nuclear weapons or control over such weapons to any recipient; Art. II declares that each non-nuclear-weapon member state must not receive the transfer of nuclear weapons or control over such weapons from any transferor.

12.2 Implications for Italian defence policy

12.2.1 Italy's role in multilateral regimes

Italy's foreign and defence policy is intrinsically framed within its alliances, first and foremost the EU and NATO. Only the latter has a full nuclear triad based on strategic bombers, intercontinental ballistic missiles and submarine-launched ballistic missiles, comparable to the Russian triad. Within the Union, only Frances holds a limited nuclear deterrent based solely on two pillars – submarines and bombers. The Atlantic Alliance considers nuclear weapons "a core component of [its] overall capabilities for deterrence and defence, alongside conventional and missile defence forces".[27] The 2022 Strategic Concept pays more attention than its predecessors to nuclear deterrence due to its relevance in light of the Russian invasion of Ukraine. The possibility that Russian tactical nuclear weapons may be deployed in Kaliningrad, coupled with their recent alleged deployment in Belarus, has also been taken into account.

Reconciling NATO commitments and non-proliferation objectives has historically been a source of concern for Italy, which has often resulted in an attitude of inertia. At a time of global uncertainty, when scenarios of nuclear uses are being debated, it is crucial for Italy to reaffirm its commitment towards the Atlantic Alliance. Besides obvious strategic implications, it is a matter of responsibility as a member of NATO's nuclear sharing agreement, according to which Rome hosts approximately 30 B61 tactical gravity nuclear bombs between the Aviano and Ghedi Air Bases.[28] These bombs are today assigned, under a dual key regime, to US and Italian fighter bombers Tornado. The latter is going to be replaced in this role by the F-35. All three European NATO allies which will continue to provide aircraft for this mission – Italy, Germany, and the Netherlands – will fly the F-35, which is the same platform carrying this mission for the US.

27   NATO, *NATO's Nuclear Deterrence Policy and Forces*, 30 November 2023, https://www.nato.int/cps/en/natohq/topics_50068.htm.
28   International Campaign to Abolish Nuclear Weapons (ICAN) website: *Italy*, https://www.icanw.org/italy.

Once the conflict has ended, and while firmly continuing to ensure full alignment with NATO's doctrine and related responsibilities, Rome could explore the possibility of taking on a more proactive role in multilateral non-proliferation fora. For instance, following the path traced by Germany and Norway, Italy could consider participating as an observer country in the meetings of the members of the Treaty on the Prohibition of Nuclear Weapons (TPNW), in order to further deepen its internal dialogue on nuclear disarmament whilst avoiding to commit to agreements that could potentially weaken regimes of which Rome is already a loyal member.[29]

12.2.2 Safety implications

Besides the security implications of nuclear tensions, Rome should consider the potential dangers arising from safety-related incidents that may affect radiological and nuclear (RN) facilities. The most discussed case since the beginning of the conflict consists of the Zaporizhzhia site, located approximately 450 kilometres from Kyiv. The Russian offensive, and especially the destruction of the Kakhovka dam, severely reduced the water supply needed to keep the plant's reactors in a cold state.[30] Since the destruction of the dam, the International Atomic Energy Agency (IAEA) has been working to ensure the availability of bodies of water to maintain the power plant in a stable status.[31]

RN events are characterised by a cross-border dimension, which implies the possibility of a potential incident having repercussions in territories distant from the area where the outburst is registered.[32] Given the increased nuclear risk Europe has witnessed since the beginning of the war on Ukraine, Italian defence and security institutions should reflect upon their preparedness in terms of dealing with RN threats – be they intentional or accidental. Against this background, an encouraging signal came from the Italian Civil Protection

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29 Ludovica Castelli, "Italy and the Nuclear Ban Treaty: A Hesitant Opening?", in *IAI Commentaries*, No. 22|27 (June 2022), https://www.iai.it/en/node/15570.

30 Kevin Carboni, "Che cosa sappiamo sulla situazione della centrale nucleare ucraina di Zaporizhzhia", in *Wired*, 3 July 2023, https://www.wired.it/article/ucraina-nucleare-russia-centrale-zaporizhzhia-sicurezza.

31 International Atomic Energy Agency (IAEA), *Update 174 – IAEA Director General Statement on Situation in Ukraine*, 20 July 2023, https://www.iaea.org/node/116360.

32 Nazzareno Santilli speaking at the event "Rischi e minacce CBRN nel nuovo scenario internazionale", Cluster CBRN-P3, Rome, 12 October 2023.

which, in March 2022 – only a few days after the beginning of the conflict – released a new National Plan for the Management of Radiological and Nuclear Emergencies (*Piano nazionale per la gestione delle emergenze radiologiche e nucleari*).[33] The plan details the national entities involved in the management of RN incidents, as well as the different phases of the emergency response, thus representing a key strategic document for Italy's internal safety and security policy.

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[33]   Civil Protection Department, *Piano nazionale per la gestione delle emergenze radiologiche e nucleari*, 9 March 2022, https://www.protezionecivile.gov.it/static/da3c780d38a2f1abe6d0cf618c93a467/piano-nazionale-gestione-emergenze-radiologiche-nucleari-20220309-21_1.pdf.

Conclusions and implications for Italy

by Alessandro Marrone and Michele Nones

The Russian war against Ukraine represents a dramatic, complex military phenomenon extremely relevant for European and transatlantic security and, therefore, for Italy, its defence policy and armed forces, as well as national industries. Clausewitz's well-known quote still applies to such phenomenon: the nature of war, its essence and purpose are unchanging, but its character and the conduct of warfare are constantly evolving. Thus, the identification of implications for Italy from the ongoing conflict shall bear in mind the peculiarities of the belligerents and the unique circumstances in terms of geography, forces, strategies and several other variables.

Against this backdrop, ten implications are particularly important from an Italian point of view and, to some extent, are worthy to consider for other major European countries, with regards to:
1. NATO role for Italy and Italian role in the Alliance;
2. EU defence and open strategic autonomy;
3. A larger and better Italian military budget to prioritise the "defence of state" core task;
4. The air domain: air superiority, air and missile defence, drones and counter-drones;
5. The land domain: C4ISR, battlefield transparency and a high-low mix in a combined arms framework;
6. The naval domain: vertical launch systems, missiles' stocks and types, integrating and countering underwater systems (UXS);
7. Space: redundancy, protection from non-kinetic threats and collaboration with allies and civilians;
8. Cyber: tech and human resources, public-private partnerships, and active defence;
9. The industrial dimension at the Italian level;
10. EU defence industrial initiatives.

1. NATO role for Italy and Italian role in the Alliance

The first group of implications concerns Italian defence policy within the Atlantic Alliance.[1] After Russia's invasion of Ukraine, NATO is and will be mainly focused on countering the Russian threat. Therefore, Italy should think about and plan its possible military intervention in the wider Mediterranean region outside of the NATO framework via either national missions, ad hoc groupings or EU operations. Surely, Italy should better leverage the Alliance's strengths when it comes to cooperative security, such as NATO partnerships and the centres of excellence and other bodies and agencies it hosts. Still, when it comes to Africa and the Middle East, Rome has to seek synergy with the Atlantic Alliance and leadership in other avenues, starting from bilateral relations up to the EU level.

At the same time, Italy needs to start dealing with the NATO agenda for what it is and not for what Italy wishes it to be. Italian national security is directly affected by the Alliance's priorities regarding Russia, China, and the Info-Pacific, as well as space, cyber, emerging disruptive technologies, arms control and non-proliferation. Italy has to develop, clarify and present its position on these issues to constructively contribute to a NATO reflection in line with its national interests and the country's military, industrial and technological capabilities. The NATO-EU strategic partnership represents a cross-cutting element crucial for all the aforementioned issues, and Italy should further push to develop and implement such a partnership.

A top priority of the NATO agenda and Italian national security is deterrence vis-à-vis Russia across the conventional, missile and nuclear spectrum. With respect to Ukraine, allied deterrence worked to prevent a nuclear escalation by Moscow despite the setbacks repeatedly experienced by its armed forces, up the retreat from Kherson city a few months after the province was annexed to the Russian Federation. Nevertheless, NATO's deterrent did not compel Russia to freeze the conflict. As underlined in the introduction of this study, a conventional war involving nuclear power is taking place in Europe. This is particularly worrying for NATO, insofar allied deterrence aims to prevent not only nuclear but also

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[1]   For more details see chapter 7 of this study.

conventional wars in Europe. Therefore, allies have to reflect on how to enhance NATO deterrence across the military spectrum and prepare for defence should the former fail. Italy, as part of the nuclear sharing agreement, host of US tactical nuclear weapons and owner of dual-capable aircraft, shall play a meaningful role within the transatlantic strategic reflection on the conventional-missile-nuclear spectrum of deterrence and defence in Europe.

2. EU defence and open strategic autonomy

The war in Ukraine represented both a cold shower and a clarifying moment for the aspirations linked with the concept of EU strategic autonomy.[2] On one side, it proved the predominance of NATO for vital tasks such as collective defence and deterrence, showing that when a military confrontation with a power like Russia is at stake, EU strategic autonomy may apply to the political sphere, but it certainly does not to the defence one. On the opposite side, the conflict also proved how urgent the strengthening of EU defence is, in terms of capabilities, decision-making processes, structures and defence industrial base. Italy should work within the Union to achieve such a strengthening, bearing in mind that Russia is the greatest threat to Europe's security and that Europeans will have to cope with it whatever US administration will be in charge in the next four years. At the same time, Rome should seek an "open" strategic autonomy by supporting and encouraging the EU in leveraging the number of security, defence, technology and industrial links of member states and industries with crucial non-EU partners, such as the US and the UK.

Moreover, to be in the driving seat of European defence requires well-functioning institutional-industrial mechanisms and coordination at national level, whereas Italy experiences structural challenges. Today and in the upcoming years it is of utmost importance for Rome to contribute to shaping the emerging EU defence landscape. Thus, Italy should create adequate mechanisms and ensure regularity and orderliness of the decision-making and implementation process, allocate adequate human resources to relevant branches of MoD, and timely work on ongoing and future EU defence initiatives, from PESCO and EDF to the upcoming European Defence Industrial Programme.

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2   For more details see chapter 9 of this study.

3. A larger and better Italian military budget to prioritise the "defence of state" core task

The implications on the Italian defence budget are crucial with regard to NATO, EU and, above all, to national security. The war in Ukraine has prompted most European countries to steadily increase their military expenditure, from Spain to Eastern Europe and including France, Germany and Poland – but Italy has not done it. The NATO Vilnius summit has declared the two per cent GDP a floor rather than a ceiling; still, Rome is lagging behind, and this hampers its position and influence within the Alliance. Similarly, in the EU, as defence industrial initiatives increase and/or accelerate, Italy's stagnating budget jeopardises the country's relevance at crucial negotiating tables – as well as the positioning of Italian companies.

Above all, defence spending is a matter of national security. In the 2023 Multi-Year Programming Document, the Italian Minister of Defence indicated that the armed forces' priority is "the defence of the state". This is a reasonable and coherent implication from the Ukraine war and what it means for NATO and Italy. The 2023 Document also launches or confirms a number of modernisation and procurement programmes, often related to high-intensity, large-scale and near-peer conflicts. Italy has to walk the talk by steadily increasing its defence budget to reach the two per cent threshold by respecting the commitment made by the Italian Parliament in 2022 to do it by 2028. Timing is essential in order to both fill urgent gaps in certain areas in light of the implications from the Ukraine war and to support the broader adaptation of Italian armed forces to face the threats, risks and requirements of an international security environment marked by a protracted, large-scale, high-intensity war at the borders of NATO and EU.

Improving the quality and breakdown of military expenditure is crucial too, for both Italy and Europe. A key implication from the war in Ukraine concerns the need for adequate amounts and quality of readily available equipment, large ammunition stocks, the ability to quickly move and sustain forces operating at high intensity as needed, and proper, widespread training beyond elite troops. All these elements require an increase in the percentage of the Italian budget devoted to operational costs, including training, exercises and maintenance, by

containing the personnel costs. Italy also necessitates to sharply reduce armed forces' current deployment for internal security tasks which have nothing to do with the "defence of state", namely operation *Strade Sicure*, which has to be closed to preserve a warfighting mindset and not waste precious training and/or deployment resources given the limited pool of personnel. Indeed, one implication of the war in Ukraine concerns the importance of factors such as motivation, morale, leadership, organisation and training of forces, including lower-rank officials, non-commissioned officers and soldiers: an ensemble of intangible but crucial elements which has to be cultivated systematically and in advance.

Any kind and amount of increase of Italian military personnel should be instrumental in increasing the operational output with respect to the priority core tasks for the armed forces identified by both the law and the DPP: defence of state; collective deterrence and defence within NATO; international operations, primarily but not exclusively in the Euro-Atlantic area and the wider Mediterranean region. Selection, recruitment and retention of military personnel should also be managed in order to lower the average age of servicemen and servicewomen and to fill the most urgent gaps in terms of skills and expertise to ensure operational readiness – particularly combat one. Against this backdrop, the proposed establishment of 10,000 strong reserve forces is worthy only if it will be structured, trained, and equipped to reinforce the active force – and not civil protection.

4. The air domain: Air superiority, air and missile defence, drones and counter-drones[3]

The fact the war unfolded mainly in the land domain should not lead to the under-estimation of airpower. Indeed, the modalities of land warfare in this conflict un-directly demonstrate the relevance of air superiority: without it, victory becomes far more difficult to achieve and exceedingly costly in terms of blood and treasure. The casualty rate suffered by Ukraine over the last two years would be extremely difficult to sustain in Western Europe and the US for

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[3] For more details see chapter 2 of this study.

a much shorter period of time. Therefore, a first implication is that ensuring air superiority, at least temporarily and/or over certain areas, remains a crucial task for NATO members, including Italy. This, in turn, increases the relevance of 5th and 6th generation fighter aircraft as well as of a range of stand-off weapons.

The second implication is that IAMD was vital for the Ukraine war effort in many ways and would be vital for any Western country in a scenario of peer-to-peer conflict. First, to deny enemy air superiority and defend own one. Second, to protect deployed forces, military logistics, civilian critical infrastructures and the civilian population as probable centre of gravity of the opponent's air campaign. NATO IAMD and Italian contributions to it are worth the price of investments in adequate, advanced, multi-layered capabilities. This also includes electromagnetic spectrum operations, since electronic warfare is assessed as a key element of the Russia-Ukrainian war and a source of concern for Western militaries. At the same time, Italy, together with other NATO allies, should invest in airpower to overcome adversary IAMDs. The best way to protect allied infrastructure and population is not to destroy one by one the "arrows" of Russian airpower – missiles, bombs or drones – but the "bows" in terms of aircraft, missile systems, airfields, command and control centres, logistics and defence factories, and this requires allies to overcome Russia own air defences and perform classic offensive counter air operations.

The third key implication is that the combination of crewed and uncrewed assets, as well as a variety of effectors, significantly multiplies the impact of air campaigns at tactical and operational levels. There is a strong push worldwide to produce armed drones of different sizes, costs, and performances to be fully integrated into air, land and naval warfare in a multi-domain perspective. At the same time, their attrition vis-à-vis robust air defences also calls for the development of faster, stealthier and more lethal combat air systems, acting alone or as an adjunct to fighter aircraft. In Italy, much work has to be done to acquire and effectively integrate armed drones across the three services, as well as to invest in future uncrewed combat air systems. At the same time, much effort is required in developing effective electronic countermeasures, cyber capabilities, and advanced counter UCAS (including high-power microwave and laser) against lower spectrum drones, given on the one hand their lethality and, on the other hand, the unsustainable effort to neutralise these weapons with kinetic kill systems due to the limited availability and high cost of the latter.

5. The land domain: C4ISR, battlefield transparency and a high-low mix in a combined arms framework[4]

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A first implication regards Command Control Communication Computing Intelligence Surveillance Reconnaissance (C4ISR). Flexibility and mobility of forces, timely exploitation of local advantages, a combined arms approach and rapid Observe Orient Decide Act loop, thanks to effective C4ISR, proved to be crucial in Ukraine. Tactical engagements have shown how innovative technology, in particular UAS, can have an enormous enabling effect at every command echelon. The strengthening of ISR capabilities with tactical drones and the exploitation of the electromagnetic spectrum can increase the lethality of smaller infantry units of manoeuvre when they act in concert with armour, artillery and fire support. This broadly confirms the embrace of mission command by Western military doctrines.

A second implication concerns the increased transparency of the battlefield thanks to new ISR techniques, making ground units more lethal and precise by augmenting frontline attrition. Long fires, loitering munitions and UAS have also become far more precise, greatly reducing "safe havens" in the rear. Increased precision and rapid-fire actions of artillery mean that ground forces are likely to operate in a more scattered manner, again requiring flawless C4ISR. This new setting is causing armed forces to re-balance between combat mass, firepower and technological sophistication. This will also force a reappraisal of manoeuvre warfare, which may become more and more based on mini-micro drones and indirect fires, requiring almost certainly a review of the organisation of land units as well as the related doctrine, tactics and procedures.

A third implication regards the importance of land units being meshed in a combined arms framework with an appropriate high-low mix of capabilities. Short-range air defence, long-range artillery or closed air support will not be effective if not integrated in such a way they mutually reinforce the respective effects and compensate for possible system-specific shortcomings and vulnerabilities. This will require Italy and other NATO armies to adopt

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[4] For more details see chapter 1 of this study.

a balanced procurement policy, combining expendable systems (such as loitering munitions, one-way attack and/or first-person view UAS) with sophisticated, high-value hardware such as main battle tanks. This should enable the acquisition of greater mass, a key implication from the Ukraine war, through more numerous and cheaper assets providing cost-effective solutions. Finally, in a peer-to-peer confrontation, one should expect safe havens to effectively stop to exist, requiring additional investments in force protection, starting with air and missile defence with a focus on counter-UAS. Vice-versa, the difficulties met by Ukrainian forces in the 2023 summer counteroffensive have highlighted the importance of being able to engage the enemy in depth via a proper quantity of longer-range systems.

Last but not least, the war in Ukraine makes it more urgent for the Italian army to regularly train and exercise also through live activities, including with regard to long-range artillery. Pragmatic solutions have to be found either in Italy, by coping with local oppositions, or abroad.

6. The naval domain: Vertical launch systems, missiles' stocks and types, integrating and countering UXS[5]

The most evident implication for many European navies is the need for a shift back to high-intensity naval warfare after decades of focusing more on maritime security and crisis management tasks in permissive or semi-permissive environments. Accordingly, procurement and force structure planning should point to an increase in both firepower and mass. In particular, the number of VLS represents a clear gap in Europe. Italian navy concepts for its future destroyers – the DDX programme – rightly seem to aim at building the largest and most armed surface combatants in Europe since the Cold War, fitted with as many as 80 VLS cells: nearly twice the amount fitted on the Andrea Doria-class destroyers currently in service.

However, the limited missile stockpiles at the disposal of European navies negatively affect their true potential in a protracted exchange of fire with a

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[5] or more details see chapter 3 of this study.

peer-level adversary, as well as with non-state actors such as the Houthis able to field anti-ship capabilities at a scale requiring costly and advanced countermeasures. Italian and other European navies have to review their procurement policies and priorities as they need to establish adequate levels of all categories of ammunition stocks: anti-air and anti-ship missiles, land attack missiles, heavy and light torpedoes, artillery shells with a special focus on long-range and guided versions. There is also a clear need to develop and field both hypersonic weapons and the systems to counter them, all the more since the Russian navy will soon be able to field ship, submarine – and air-launched hypersonic anti-ship missiles – and other navies will follow.

A third implication from the war in Ukraine is the integration of unmanned air, surface and underwater systems in naval warfare. The advent of more numerous, diverse and capable UXS requires the Italian navy to evolve and integrate these new tools seamlessly into an already complex fighting force. The concepts presented in the Future Naval Combat System 2035, published in 2021, are certainly a step in the right direction. But more needs to be done in concrete terms, including to embark fixed-wing and rotary-wing drones. At the same time, new instruments are needed to tackle the growing UXV threat: massive and swarm-like drone attacks, combined with missiles in some scenarios, could overwhelm current systems and defences. In the long term, the use of expensive anti-air missiles to intercept and neutralise cheap drones is not a sustainable strategy: novel, more cost-efficient countermeasures should be fitted to warships accordingly, including high-power microwave and laser.

7. Space: Redundancy, protection from non-kinetic threats and collaboration with allies and civilians[6]

A first implication from the war in this operational domain regards the redundancy of space systems. To achieve an acceptable level of resilience and avoid interruptions in SSA capabilities and services, Italian and European militaries should also operate a higher number of cheaper satellites so that if a national asset is attacked, others with the same function can take over its task

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6   For more details see chapter 4 of this study.

and guarantee the continuity of service. As opposed to an exquisite capability, redundancy is given by larger numbers and lower costs. At an operational level, the resilience of Italian military space systems should be pursued also by developing responsive space capabilities, in order to rapidly launch at least a small satellite into orbit to substitute a damaged or malfunctioning one and to keep spare satellites already in orbit. Against this backdrop, public-private partnerships in the space domain should move forward, also in terms of pre-set agreements to mobilise commercial assets not only in peacetime, as already happens in Italy, but also at times of crises or conflict.

A second implication for Italy is the need for higher protection from non-kinetic threats, such as attacks through cyberspace, electromagnetic spectrum, and radiofrequency, to both civil and military space systems. This is particularly true for the ground segment, which is the most vulnerable to cyber-attacks. The conflict has highlighted the need to have resilient space systems that are able to withstand jamming and spoofing attacks and to develop more advanced cyber defence and attribution capabilities.

The war in Ukraine has also underlined the need for better collaboration and information-sharing with allies in space. In 2023, Italy joined the Combined Space Operations Initiative, an exclusive club of like-minded states led by the US aimed to deepen interoperability in areas such as SDA, mission support from space, and space launches. Italy should leverage these growing links with the US military to develop knowledge and doctrinal innovations by creating synergies and best practices. In line with what emerged from Ukraine, the Italian MoD also needs to coordinate better with civil stakeholders. Against this backdrop, involving specialised civilian personnel would help to better adapt to new developments and contribute to fill the gap of space skills and expertise, which is a systemic challenge for all actors in Italy – and to some extent in Europe.

8. Cyber: Tech and human resources, public-private partnerships, and active defence[7]

The war in Ukraine shed new light on the relevance of the cyber domain in a conflict. Italy should invest in cyber security, defence and deterrence. This includes information and communication, quantum, and artificial intelligence technology. At the same time, Italy should increase its pool of human resources working in cyber security and defence within public entities. The institution of the Network Operations Command within the MoD, followed by the establishment of the National Cybersecurity Agency, represents positive steps in this direction but needs appropriate and sustainable staffing.

A second key implication from the war in Ukraine is the importance of public-private cooperation in the cyber domain. Private companies represent a key element in enhancing cyber defence and resilience. They can act at a much faster pace than public institutions, can count on a wide pool of highly trained personnel, and – differently from state actors – their operations are not automatically perceived as escalatory measures. There is a need for increased coordination amongst governmental and private organisations responsible for Italy's defence and security in the cyber domain. To this end, it will be important to explore sensible ways in which private companies can serve the public interest whilst guaranteeing the reliability of their services.

Last but not least, in recent years Italy has taken important steps towards active defence in cyberspace, especially in light of the war in Ukraine. A 2022 law introduced a series of provisions aimed at conducting intelligence operations in cyberspace meant to counter attacks under well-defined circumstances. The 2023 MoD Multi-Annual Programming Document hints at the possibility of operating within the entire cyber spectrum, hence conducting both offensive and defensive operations, while the current Chief of Defence Strategic Concept confirms this choice and provides further guidance. Italy should move forward on this path in terms of doctrine, operations and capabilities, especially in light of a conflict fought in Europe with an important cyber dimension.

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[7] For more details see chapter 5 of this study.

9. The industrial dimension at the Italian level[8]

The aforementioned points in the land, air, naval, space and cyber domains present, to a different extent and in various ways, multiple industrial implications for Italy. The current and future evolution of Italian armed forces shall fully take into account the war in Ukraine and adjust accordingly to force planning, capability development and procurement. In doing so, Rome should follow the guidelines and targets of the NATO defence planning process and contribute to aligning the EU Capability Development Plan in a complementary and synergic way to the Alliance approach. Against this backdrop, a number of key points should be underlined concerning the industrial implications, primarily at the Italian level.

A multiannual financial framework with adequate production volumes for procurement programmes is needed to carry out capital investments, such as the purchase of new machinery or hiring and training qualified personnel, aimed at coping with the new reality of a large-scale war in Europe. In particular, the Italian Multiannual Programming Document lacks both financial dimension and certainty in its implementation. Thus, Italy should adopt a multiannual procurement budgetary law – already proposed in recent years – to overcome such a harmful situation.

In addition, force planning and procurement should adjust to a reality where the war in Ukraine will continue and, above all, European countries have to increasingly deter and defend against a Russian threat that materialised in a dramatic way on Ukrainian territory. This entails, among other things, increasing volumes and accelerating the acquisition of the capabilities deemed necessary – including those outlined in the 2023 DPP. The document allocated 4 billion euros, even if spread over 14 years, to acquire Leopard 2A8 tanks, initiated the acquisition of 21 HIMARS rocket launchers with associated logistics and ammunition, and launched the procurement of armoured infantry fighting vehicles, short-range air defence systems (808 million euros), as well as UAS for the air force.

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[8]   For more details see chapter 6 of this study.

Maintenance, repair, overhaul and upgrade activities should also step up in terms of quantity, quality and timing to cope with the aforementioned necessity to ensure a larger percentage of available capabilities, fit for the purpose, out of the equipment held on paper. Production of spare parts and ammunition should receive greater funding according to precise conditions to be agreed upon in current and forthcoming procurement programmes. The additional 70 million euros allocated in 2023 to replenish the army's stocks of ammunition of various calibres should be seen as only an initial step of a far larger effort. The MoD contracts shall also evolve to ensure greater rapidity and flexibility of execution, also in order to ramp up production as necessary, i.e. by financing tailored training of related workforce. Finally, the MoD should handover to the industry some peacetime logistic and maintenance activity, obviously excluding field support, in order to focus servicemen and servicewomen on their core warfighting mission. Altogether, these pragmatic measures would help to increase domestic industrial capacity, taking into account the limits and addressing the weaknesses of the Italian public-private ecosystem.

Last but not least, the experience of the Ukrainian armed forces and the actual use of weapon systems on the battlefield will likely be a major factor in future procurement policies, as well as research and development, particularly with regard to the land sector. Italian institutions and companies can and should play a role in tightening industrial relations between Ukraine and the European defence technological industrial base.

A broader and longer-term adaptation is also needed. The idea of a "war economy" does not resonate in the Italian public debate. Nevertheless, a more realistic, fact-based and systematic discourse shall be put forward by Italian institutions in order to help public opinion correctly understand the role of aerospace, security and defence industry for national interests and security, as well as for Italy's foreign and defence policy. In this context, private sector investments in factories, supplies, talents, and technologies shall be supported and rapidly implemented despite criticisms by a minority but vocal part of the public opinion.

10. EU defence industrial initiatives[9]

The war in Ukraine has shown that industrial production capacity remains a crucial element to be considered in defence planning and procurement. Most European countries have committed to a structural increase in defence expenditures. Yet pursuing only national solutions would prevent the development of a mature and scalable European industrial and technological base (EDTIB) within the next decade. An improvement in industrial defence integration, particularly from the demand side, will be crucial in this regard.

The measures launched by the EU in the wake of the Russian war against Ukraine are aimed at a very specific task: boosting the output of 155mm artillery shells to replenish depleted stocks and provide long-term sustainable aid to Ukraine. European countries shall definitively augment the stocks of the whole range of ammunition for land, naval and air combat systems, as well as increase their interoperability and rationalise their storage facilities. In particular, Italy should exploit existing EU programmes to boost its capacities in terms of artillery ammunition production, including the Vulcano ones produced by Leonardo.

Still, actions designed to aid Ukraine and increase ammunition production do not necessarily help European defence industrial integration. Only structured institutional measures that bundle and rationalise EU demand for defence goods, such as the full implementation of the recommendations included in the Coordinated Annual Review of Defence, the establishment of the European Defence Capability Consortia envisaged by EDIRPA, and the framing of European Defence Investment Programme to prioritise joint procurement, can lead to structural optimisation of available production capacities. In addition, PESCO should be used for joint capability development projects aiming at addressing the military needs underlined by the war in Ukraine over the mid-long term – i.e., concerning missile defence or naval combat systems. As one of the major implications from the conflict is the need to increase European procurement and thus industrial output, EU institutions and government should walk the talk in terms of real, robust, timely and long-term contracts. Moreover, Italy should promote a greater EU commitment to "Europeanise" the

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[9]   For more details see chapter 10 of this study.

security of supply at the political, military, technological, industrial, financial and regulatory levels. That means removing all kinds of obstacles to European supply chains, also with regards to transfers of components and spare parts, maintenance and logistic support.

Despite the urgency of adapting to the military needs caused by the war in Ukraine, delays in the negotiation of EDIRPA show disagreements among member states on the opportunity to keep European defence markets reasonably open to companies from third countries. Against this backdrop, agreements on the security of supplies in crisis and war times among EU members and partners would help to implement open strategic autonomy. Obviously, there should be a different approach on one hand for short term, short span initiatives coping with very specific urgent requirements, and on the other hand for those long term and permanent: when the latter has to be addressed, it is reasonable that EU financial incentives should benefit the EDTIB. Against this backdrop, Italy should advocate for a significant increase in the budgets allocated to existing and future EU defence initiatives, namely EDF and EDIP, and for their more organic integration in light of the upcoming European Defence Investment Strategy. Expanding and stabilising the Union's investments in defence R&D is necessary to let member states fill the gap with strategic competitors and stimulate aggregation of demand as well as specialisation and consolidation of supply – two crucial elements to enable Europe to face the Russian threat to its collective security.

List of acronyms

ABM	Anti-Ballistic Missile
ACN	Agenzia per la Cybersicurezza Nazionale (National Cybersecurity Agency)
AF	Air Force
AI	Artificial Intelligence
AP	Associated Press
ASAP	Act in Support of Ammunition Production
ASAT	Anti-satellite weapon
ASBM	Anti-ship Ballistic Missile
ASI	Agenzia Spaziale Italiana (Italian Space Agency)
ATACMS	Army Tactical Missile System
A2/AD	Anti-Access/Area Denial
BASIC	British American Security Information Council
BTG	Battalion Tactical Group
CAN	Center for Naval Analyses
CARD	Common Annual Review on Defence
CASD	Centro Alti Studi per la Difesa (Italian Centre for High Defence Studies)
CEPA	Center for European Policy Analysis
CERT-EU	Computer Emergency Response Team European Union
CFE Treaty	Treaty on Conventional Armed Forces in Europe
CFSP	Common Foreign and Security Policy
CNAIPIC	Centro Nazionale Anticrimine Informatico per la Protezione delle Infrastrutture Critiche (National Cybercrime Centre for Critical Infrastructure Protection)
COA	Comando Operazioni Aerospaziali / Aerospace Operations Command
CoE	Centres of Excellence
COR	Comando Operazioni in Rete (Cyber Operations Command)
COS	Comando Operazioni Spaziali (Space Operations Command)
CSDP	Common Security and Defence Policy

CSIS	Center for Strategic and International Studies
CTBT	Comprehensive Nuclear-Test-Ban Treaty
C2	Command and Control
C3	Command, Control and Communication
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance
DDoS	Distributed Denial of Service
DG DEFIS	Directorate-General for Defence Industry and Space
DoD	United States Department of Defense
DPP	Documento Programmatico Pluriennale (Multiannual Programming Document)
DTIB	Defence Technological Industrial Base
EC	European Commission
EDA	European Defence Agency
EDCC	European Defence Capability Consortia
EDF	European Defence Fund
EDIP	European Defence Industry Programme
EDIRPA	European Defence Industry Reinforcement through the Common Procurement Act
EDIS	European Defence Industry Strategy
EDTIB	European Defence Technology and Industrial Base
EEAS	European External Action Service
EFP	Enhanced Forward Presence
EO	Earth Observation
EPF	European Peace Facility
EPRS	European Parliamentary Research Service
ESA	European Space Agency
ESSI	European Sky Shield Initiative
EU	European Union
EUISS	European Union Institute for Security Studies
EUROPOL	European Union Agency for Law Enforcement Cooperation
EUSATCEN	European Union Satellite Centre
EUSPA	European Union Agency for the Space Programme
EU SSSD	European Union Space Strategy for Security and Defence

eVA	enhanced Vigilance Activity
EW	Electronic Warfare
FBI	United States Federal Bureau of Investigation
FCAS	Future Combat Air System
FY	Fiscal Year
GBAD	Ground-based Air Defence
GDP	Gross Domestic Product
GLONASS	Globalnaya Navigazionnaya Sputnikovaya Sistema (Global Navigation Satellite System)
GMLRS	Guided Multiple Launch Rocket System
GPS	Global Positioning System
HARM	High-speed Anti Radiation Missile
HIMARS	High Mobility Artillery Rocket System
IADS	Integrated Air Defense System
IAEA	International Atomic Energy Agency
IAMD	Integrated Air and Missile Defence
INF Treaty	Intermediate-Range Nuclear Forces Treaty
INTERPOL	International Criminal Police Organization
ISR	Intelligence, Surveillance and Reconnaissance
ISTAT	Istituto Nazionale di Statistica (National Institute of Statistics)
ISW	Institute for the Study of War
IT	Information Technology
LEO	Low Earth Orbit
LPM	Loi de programmation militaire (Military Programming Law)
MALE	Medium Altitude Long Endurance
MANPADS	Man-Portable Air Defense Systems
MBT	Main Battle Tank
MILAN	Missile d'Infanterie Léger Antichar (Light Anti-tank Infantry Missile)
MMI	Marina Militare Italiana (Italian Navy)
MoD	Ministry of Defence
MoU	Memorandum of Understanding
MYP	Multiyear Procurement
NASAMS	National Advanced Surface-to-Air Missile System

NATO	North Atlantic Treaty Organization
NBCR	Nuclear, Biological, Chemical and Radiological
NCIA	NATO Communication and Information Agency
NCP	Non-commissioned Officer
NDAA	National Defense Authorization Act
New START	New Strategic Arms Reduction Treaty
NPT	Treaty on the Non-Proliferation of Nuclear Weapons
NSNW	Non-strategic Nuclear Weapon
NSPA	NATO's Support and Procurement Agency
OECD	Organization for Economic Cooperation and Development
OCCAR	Organisation Conjointe de Coopérationen matière d'Armement (Organisation for Joint Armament Cooperation)
OUSD A&S	Office of the Under Secretary of Defense for Acquisition & Sustainment
PA	Project Arrangement
PESCO	Permanent Structured Cooperation
PMC	Private Military Company
PNT	Positioning, Navigation and Timing
PPP	Public-private Partnership
PrepCom	Preparatory Committee
REACTS	Responsive European Architecture for Space
RevCon	Review Conference
RN	Radiological and Nuclear
RNS	Révue Nationale Stratégique (National Security Review)
R&D	Research and Development
SAR	Synthetic Aperture Radar
SATCOM	Satellite Communications
SDA	Space Domain Awareness
SHORAD	Short-range Air Defence
SICRAL	Sistema Italiano per Comunicazioni Riservate ed Allarmi (Italian System for Secure Communications and Alerts)
SIGINT	Signal Intelligence
SLCM	Sea-launched Cruise Missiles

SLOC	Sea Lines of Communication
SMD	Stato Maggiore Difesa (Chief of Defence Staff)
SSA	Space Situational Awareness
SST	Space Surveillance and Tracking
STM	Space Track Message
TPNW	Treaty on the Prohibition of Nuclear Weapons
TTP	Tactics, Techniques and Procedures
UAV	Unmanned Aerial Vehicle
UAS	Unmanned Aerial System
UGS	Ufficio Generale Spazio (General Office for Space)
UK	United Kingdom
UN	United Nations
US	United States
USAI	Ukraine Security Assistance Initiative
USNI	United States Naval Institute
USV	Unmanned Surface Vehicle
UUV	Uncrewed Underwater Vehicle
UXV	Unmanned (air/ground/sea/undersea) Vehicle
VAT	Value-added tax
VDV	Vozdušno-desantnye Vojska (Russian Airborne Troops)
VLS	Vertical Launching System
WOT	Wojska Obrony Terytorialnej (Territorial Defence Forces)

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Russia-Ukraine War's Strategic Implications

This IAI study offers a holistic analysis of the conflict and its implications for the armed forces of European countries, as well as for NATO, EU defence, aerospace and defence industry in the Euro-Atlantic area. The first section of the document investigates the key features of the conflict across the five operational domains: land, naval, air, space and cyber. It also assesses allied military supplies to Ukraine and the defence industry's difficulties in Europe and US to ramp up production as required by the war. In the second section, the study discusses a range of direct and indirect implications of the conflict. In the NATO context, the overarching priority is on collective deterrence and defence with consequences on the other core tasks of the Atlantic Alliance, as well as on capability targets and allied armed forces' deployment. In the EU, strategic autonomy is evolving into a "open" concept and new instruments and funds have been launched, as European defence needs to deal with the Russian threat. Changes in the defence policy of major European countries are then summarised, as well as developments in US procurement and industrial strategy. A specific focus is devoted to nuclear deterrence in light of a conflict initiated by a nuclear power. The conclusions rather dive on recommendations for Italian defence policy. The paper is the result of the joint effort of a research team coordinated by IAI's Defence Program. Two years after the start of the Russian invasion of Ukraine, it aims to contribute to understanding that dramatic turning point for Euro-Atlantic security.