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Learning from the Adversary: Insights from the Early Russian Rotary-Wing Campaign

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The rotary-wing attack platform differs from fixed-wing air power in both form and function – in many militaries it is not an air asset at all, but fire support with rotors, tasked and controlled by the ground scheme of manoeuvre it serves. Nowhere is this clearer than in Russia, which has no separate rotary-wing air doctrine: army aviation follows inherited Soviet combined-arms principles, planning helicopters centrally as an extension of the ground fight.[1] By Western standards, that arrangement was rigid and overly centralised. It prevented multi-domain integration –SEAD/DEAD, integrated early warning, and shared command and control (C2) – and became the thread running through the losses that followed.

Those losses were heavy. By the summer of 2023, 58 Russian military helicopters had been lost in combat since the invasion of Ukraine, roughly one-quarter of the ~234 active rotary-wing airframes in the pre-war fleet.[2,3] Early analysts cited several probable factors for the high initial loss rate: air-denial stalemate in the medium-altitude regime where fixed-wing assets operate, overestimation of Russia's ability to run an air campaign, or the inferiority of Russian technology.[4] Closer analysis shows the high attrition was not merely a product of air power's diminished relevance or technical inferiority, but of the doctrine, C2 mechanisms, and tactics, techniques, and procedures (TTPs) underlying their employment.

Viewed from 2026, the obvious objection to revisiting those figures is that they are old. The lessons, however, have aged well. Their value lies less in what they say about Russian helicopters than in what the following three years reveal: how fast a force in contact corrects itself. The operative issue is tempo. A military at war learns in days: it gets feedback the moment a tactic fails, and pays for it immediately, so it corrects fast. An alliance at peace learns in years, because change moves through requirement, procurement, and fielding cycles

Helicopter Category / Model	Pre-Invasion Active Fleet (IISS)	Visually Confirmed Losses (2022–2023)	Percentage Lost of Active Fleet
Ka-52 Alligator (Attack)	75	32	42 %
Mi-24 / Mi-35 Hind (Attack)	95	14	14 %
Mi-28 Havoc (Attack)	64	12	18 %
All Models Combined	~234 (Total Active)	58	25 %

A breakdown of helicopter fleet attrition from 2022 to mid-2023.

rather than through contact with the enemy. Russia's rotary-wing campaign is therefore most useful to NATO not as a catalogue of an adversary's failures, but as a measure of adaptation rate, and a benchmark NATO must exceed from a standing start.

This article assesses why so many Russian helicopters were destroyed in the opening weeks and asks what it means for the viability of NATO rotary-wing doctrine and TTPs in a future conflict. It analyses the technical specifications and operational tactics of a peer competitor to identify operational, doctrinal, and technical deficiencies that could exist within the Alliance.[5]

Operational Vulnerabilities, Threat Vectors, and Tactical Compression

The effect of sensor, weapon, or geographic and environmental limitations which force an aircraft into closer proximity to the front line is termed tactical compression. Russian forces faced exactly this, and it significantly accelerated their attrition. Each threat below narrowed the band in which a helicopter could survive.

During the initial phase, the Russian fleet sustained catastrophic damage, with Man-Portable Air-Defence Systems (MANPADS) posing the greatest threat.[6] Exploiting the low-altitude profiles of Russian sorties, they accounted for roughly 50 % of confirmed shootdowns.[7] Their lethality lies in passive infrared (IR) guidance, which often bypasses outdated Russian Aircraft Survivability Equipment (ASE).

Surface-to-Air Missiles (SAM) such as the SA-13 Gopher and SA-11 Gadfly caused fewer losses, owing to their minimum engagement altitudes.[8] To evade them, Russian units flew 'nap-of-the-earth' profiles, hugging the terrain and mitigating the SAM threat but forcing aircraft into the lethal envelope of short-range air defences and small-arms fire. The losses proved the trade-off ineffective.

Massing compounded the problem. Flying six to eight helicopters together to concentrate firepower produced large, low, loud formations over occupied areas. These formations were easy to see and hear, and exposed to concentrated small-arms fire. Such engagements accounted for 20 % of Ka-52 losses, in which armour and flares offered little protection against high-volume kinetic fire.[9] These losses forced the first significant adaptation. The Ka-52 withdrew behind the demarcation line, firing less accurate unguided rockets.[10]

Finally, an unexpected threat emerged in the Anti-Tank Guided Missile (ATGM). Systems such as the Stugna-P were used in direct-fire mode against hovering or low-flying helicopters, tracking with precision wherever line of sight could be maintained.[11] The lesson is that rotary-wing aircraft need laser warning receivers alongside electronic countermeasure suites, of the type fitted to the AH-64 Apache, to survive a direct kinetic engagement.[12]

Technical Vulnerabilities, System Failures, and De-Modernisation

This conflict has forced a re-evaluation of platforms once marketed as world-class, and a comprehensive reassessment of vertical-lift survivability in large-scale peer conflict. The attrition cannot be dismissed as a testament to Ukrainian tactical proficiency alone; it reveals a systemic misalignment between Russian doctrine, equipment, and battlefield reality.[13,14]

A decisive factor was the inadequacy of Russian ASE. Field evidence suggests flare-dispensing systems were frequently deployed ineffectively or failed to trigger automatically against modern IR threats.[15] Reliance on manual, pre-emptive deployment, rather than automated reactive countermeasures, exposes a significant lag in the Russian military-industrial complex's ability to update electronic threat libraries. Its failure to account for the multi-spectral seekers of Western-supplied MANPADS has effectively neutralised Russia's perceived technological edge.

Chronic structural vibrations in the Ka-52 compounded the problem, degrading gyroscopic stabilisation and high-resolution optical sensors.[16] By blunting long-range target acquisition, these flaws fed tactical compression, forcing crews to operate in lethal proximity to the forward edge of the battle area, and turning sophisticated assets into targets for low-cost, asymmetric weapons.

The deeper strategic revelation for NATO is the Russian defence sector's dependence on Western-sourced microelectronics.[17] Embargo and supply-chain disruption have created a critical scarcity of high-end semiconductors and thermal-imaging components, driving a de-modernisation of the fleet most visible in the decline of night operations.[18] As Russia cedes the night-time advantage it once claimed, Ukraine has secured a window for manoeuvre under darkness – enabled by its integration of superior Western electro-optical (EO) sensors and night-vision equipment.

Command, Control, and Doctrinal Rigidity: The Failure of Integration

Beyond technical malfunctions, the decimation of Russian rotary-wing assets stems from a systemic failure to adapt its inherited Soviet-era doctrine to a high-intensity, multi-domain battlefield. Battlefield reality forced Russian crews into decentralised decision-making their doctrine never prepared them for. Centralised control remains the doctrinal default, but a fractured communications and intelligence architecture left crews unable to exercise it.[19] Disconnected and improvising, they made isolated decisions that led to many of their losses.

Doctrine and TTPs compounded these failures. Russian practice uses helicopters in close support of ground manoeuvre, saturating targets to enable the main effort. Standard weapons-delivery profiles, such as the pop-up manoeuvre to release unguided rockets, turned aircraft

A Javelin anti-tank guided missile launches from its firing post. Weapons designed to defeat armoured vehicles have seen use against low-flying aircraft into high-visibility and static targets for MANPADS.[20] That large formations operated in daylight over open terrain suggests a significant gap in training on terrain masking and low-level flight.

Most damaging was the absence of multi-domain integration. There is little observed evidence of SEAD/DEAD missions in support of rotary-wing operations, and no manned-unmanned teaming (MUM-T) to push a sensor forward for reconnaissance or electronic warfare (EW). Crews were left with limited situational awareness and therefore vulnerable to ambush. Without a unified digital battlespace, ground units could not pass real-time fires and intelligence. Russian C2 remained anchored in localised, attrition-based paradigms that never evolved towards Multi-Domain Operations (MDO).[21]

Recommendations for NATO's Rotary-Wing Force

The evidence points to an urgent requirement: NATO should recalibrate rotary-wing doctrine and TTPs around the lessons of the Ukrainian theatre. Even the most formidable assets slide towards obsolescence without rapid-cycle technological and doctrinal adaptation, or within fractured C2. Three findings carry directly into Alliance capability development.

Survivability: Russian flare dispensers failed against multi-spectral seekers because the threat library behind them could not keep pace. To avoid tactical compression, rotary-wing platforms must find, fix, and target from a distance – which demands advanced target acquisition and ASE and EO/IR sensors kept current with the electromagnetic spectrum.

The Russian fleet's degradation shows how quickly the inability to secure microelectronics erodes operational capability. NATO must ensure resilient supply chains that support the rapid updating of self-protection sensors and countermeasures against increasingly sophisticated MANPADS and anti-tank systems.

Reach: Russia's gap was not a lack of drones. It used them as artillery spotters, enabling Russia's reconnaissance-strike complex.[22] But that complex was built around artillery rather than aviation. It corrected ground fires, while the rotary-wing force operated outside it. Russia implemented few measures to link the drones it already fielded with its rotary-wing force. Such coordination did not require full manned-unmanned teaming (MUM-T), a capability yet to be widely fielded, but even basic integration might have prevented the tactical compression that followed.

Autonomous Collaborative Platforms (ACP) and Air-Launched Effects (ALE) could meet that same requirement, but without the limits of cockpit-controlled teaming. An uncrewed system flown from the cockpit still consumes the crew's attention and remains bound by the datalink, but an autonomous system can extend the range of sensors and weapons when integrated with rotary-wing platforms.[23] When unmanned systems perform high-risk reconnaissance and EW tasks, the crewed platform can remain outside the lethal envelope and use them as a force multiplier. Industry is designing the concept already.[24]

Integration: The absence of a unified digital battlespace left Russian crews unable to draw on ground-unit fires and intelligence in real time. For NATO, the speed of its own doctrinal adaptation is decisive. The choice is to integrate or be isolated. Superior airspeed and lift can broaden Alliance reach, but the linchpin is a unified Joint All-Domain Command and Control (JADC2) framework.[25] Linking sensors and shooters across domains lets Alliance forces detect and neutralise threats from standoff distances. A synchronised C2 architecture also ensures airspace deconfliction and reduces fratricide in a saturated electromagnetic environment.

Conclusion

The observations in this article are not exhaustive. They are offered as a catalyst for a more urgent examination of NATO's vertical-lift capabilities, and for the institutional question behind it. That question is not whether the Alliance knows what to fix. The findings above are neither novel nor contested, and the capabilities that answer them are already the subject of Alliance programmes. It is whether NATO can translate a lesson identified into a fielded capability on a timeline set by the operational environment, not the procurement cycle. Nothing in the Ukrainian theatre suggests that timeline will lengthen to accommodate the Alliance. The work ahead is therefore institutional as much as technical. It should begin now. ●

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