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U.S. Adversaries Deepening Defense-Industrial Integration, Dual-Use Technology Transfers

KEY TAKEAWAYS

- Mounting evidence suggests U.S. adversaries are shifting away from standard arms transfers and favoring licensed production and limited co-development of advanced weapon systems.
- Russia's dependence on Chinese technology and receptivity toward joint ventures signals a new phase in bilateral defense cooperation. Iran and North Korea, challenged by international sanctions and viewed by Moscow and Beijing as junior partners in their nascent alliance, continue to leverage their exposure to Russian and Chinese systems to build out their own defense-industrial bases.
- Fragmentation persists because distrust over intellectual property, divergent time horizons, and each nation's respective institutional reticence constrain full interoperability.
- These dynamics suggest that China, Russia, Iran, and North Korea will continue to find ways to evade institutional roadblocks posed by sanctions, and future U.S. forces may confront systems coproduced by multiple adversaries.

CRINK Alliance Project

This periodic report assesses the contours of the emerging alliance of the United States' four primary adversaries: China, Russia, Iran, and North Korea (CRINK). Based on open-source research, this 'CRINK Alliance Project' offers analysis of how this axis is disrupting or reshaping the Operational Environment. Its purpose is to help military leaders and policymakers discern whether, how, and when these countries' interests align and diverge; anticipate potential friction points; and seize opportunities to counter their joint efforts to threaten the United States and its interests.

INTRODUCTION

For the past few decades, U.S. adversaries have strengthened their bilateral arms sales and defense-industrial cooperation to counter perceived U.S. dominance. For example, Russian manufacturing expertise flowed into Chinese J-20 stealth fighter jet blueprints throughout the 2010s.[1] Similarly, Russian ballistic missile technology shared with Iran accelerated its development of drones

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like the Shahed from 2022 until the present.[2] Licensed production—where one state manufactures another's weapons or components under a formal agreement—has long served as a barometer of trust as well as industrial and strategic integration. This paper examines the acceleration and enhancement of these sales—and transfers of dual-use technologies, components, and other supplies for adversary systems—and explores the implications of this trend for the U.S. Army.

CHINA: A PRAGMATIC BUT CAUTIOUS PARTNER

Evidence of overt China-Russia joint development or licensed production of advanced weapons systems remains limited. Nevertheless, a pair of recent Reuters wire service investigations suggest strong collaboration on the Garpiya-3 attack and surveillance drone now used by Russia in Ukraine.[3] Chinese drone experts worked alongside IEMZ Kupol, a Russian military R&D firm—first in China, then in Izhevsk, Russia, where it is based—making more than half a dozen visits to the country since 2024.[4] The Russian and Chinese firms and the subcontractors involved were promptly targeted by U.S. sanctions.[5]

Defense collaboration between China and Russia is a two-way street, highlighting a pragmatic, transactional partnership whereby Beijing shores up Russian drone production while gaining access to Moscow's niche military expertise. Recently leaked documents detailed Chinese interest in Russian air assault capabilities, leading to agreements for Moscow to provide training, vehicles, and hardware, presumably for an invasion of Taiwan.[6] Chinese-assembled weapons are less vital to Russia than China's components, tools, and processing technology.[7]

An obstacle to greater collaboration has been decades-long friction between China and Russia regarding Chinese reverse engineering of Russian military equipment and hardware, such as the development of the J-11B from the Su-27 airframe and the HQ-9 surface-to-air missile derived from the Russian S-300.[8] Such tech transfers are likely to continue on a case-by-case basis given both countries' military needs, lack of alternative suppliers, and shared opposition to a U.S.-led international order.[9] As Chinese Foreign Minister Wang Yi remarked earlier this year, "The pragmatic cooperation between China and Russia has continued to deepen and become better and better, injecting vitality into the development of relations between the two countries."[10]

Figure 1: Chinese Unmanned Combat Aerial Vehicle, 3 September 2025. (Source: CNS, https://www.youtube.com/watch?v=boDMmQtUtdM)

RUSSIA: DEPENDENCE DRIVING TECH TRANSFERS AND LICENSED PRODUCTION

Russia's defense-industrial base, weakened by sanctions and an exodus of talent, is increasingly reliant on CRINK partners—above all China—for survival. The head of Ukraine's Foreign Intelligence Service estimates that 80 percent of the critical electronics in Russian drones come from Chinese suppliers, and Chinese firms like Xiamen Limbach have reportedly collaborated with Russia's Almaz-Antey to design and coproduce the Garpiya long-range unmanned aerial vehicle (UAV).[11] These cases suggest an early example of licensed joint production of advanced weapons platforms.

Moscow's willingness to enter such arrangements underscores its lack of alternatives, and the scale of its ambitions reveals the depth of this dependency. Chinese inputs have become central to Russia's defense output. President Putin has boasted that Russia produced or delivered 140,000 drones in 2023 and aims to scale to 1.4 million annually, a target almost inconceivable without Chinese electronics, machine tools, and technical expertise.[12] At the same time, parallel agreements with Iran to indigenize Shahed drone production inside Russian Tatarstan, drawing on Chinese components, show that Moscow is willing to blend inputs from other U.S. adversaries to sustain battlefield demands.

Figure 2: (above) Remains of a Shahed 136 Drone in Kyiv, 12 May 2023. (Source: Kyiv City State Administration, https://tinyurl.com/mry3vrrh); (below) Shahed 171 Simorgh UAV at Iran's National Aerospace Park, 28 September 2020. (Source: M. Sadegh Nikgostar, Fars Media Corporation, https://tinyurl.com/3kc6w235)

IRAN: REBUILDING DEFENSES VIA CRINK ALLIES AMID SANCTIONS

Iran's defense cooperation with Russia and China is widening beyond drones and arms sales. Russia and Iran ratified a Treaty on Comprehensive Strategic Partnership in October 2025, signaling closer alignment in the years to come.[13] The treaty commits both sides to sustained coordination in defense-industrial production, intelligence and counterterrorism cooperation, energy infrastructure, finance, and scientific exchange—sectors that provide pathways for transferring materials, components, and know-how with both civilian and military applications. While not a mutual defense pact, the agreement lowers barriers to technology sharing and joint problem-solving under sanctions pressure. It builds on the 2021 Iran–China Strategic Cooperation Agreement, which though unpublished, is reported to encompass energy investment, infrastructure development, financial integration, and

security cooperation. These arrangements provide Tehran with access to Chinese components, materials, and technical expertise critical to sustaining missile and unmanned aircraft systems (UAS) programs under sanctions pressure.[14]

Recent conflict dynamics have intensified Tehran's reliance on CRINK-enabled technology flows. Iran's "10-Day Conflict" with Israel significantly degraded its missile production capability, including facilities supporting the Fath-360 close-range ballistic missile.[15] Israeli strikes in October 2024 destroyed Iran's planetary mixers—a critical dual-use industrial tool for producing solid rocket fuel—creating a production bottleneck that Tehran cannot resolve domestically.[16] As a result, Iran is increasingly dependent on foreign industrial equipment, materials, and technical expertise, much of it sourced indirectly or directly from U.S. adversaries. Recently leaked documents revealed that Iran plans to acquire 48 Sukhoi Su-35 fighter jets from Moscow, presumably to bolster vulnerabilities in its air defense network exposed during the war.[17]

NORTH KOREA: AMBITION WITHOUT CLEAR EVIDENCE OF CRINK COPRODUCTION

North Korea appears increasingly engaged in selective defense-industrial cooperation on foreign dual-use technologies while preserving regime control, but there is little indication that it is moving toward joint development or licensed production of advanced weapons systems with other U.S. adversaries. Recent North Korean weapons exhibitions—featuring claimed advances in AI-enabled loitering munitions, ballistic and cruise missiles, hypersonic systems, naval platforms, armored vehicles, and nuclear-powered submarines—underscore the regime's ambition to integrate external technologies into domestically branded systems, even when coproduction remains opaque.[18, 19, 20] Available reporting suggests that Russian-origin technologies or expertise may have contributed to North Korea's latest Hwasong-20 intercontinental ballistic missile, pointing to knowledge transfer rather than overt joint manufacturing.[21] Such cooperation is consistent with a model in which Pyongyang acquires specific components, materials, production techniques, or testing data—many of them dual-use—rather than complete weapons systems. This approach allows North Korea to accelerate development timelines while limiting dependence on foreign partners.

North Korea's engagement with CRINK partners is shaped by deep strategic caution, tightly managing dual-use technology diffusion that enhances military capabilities while minimizing political and strategic exposure. China, for example, has periodically enforced UN Security Council sanctions when it suited Beijing's interests, including restricting jet fuel exports after North Korea's 2016 nuclear test.[22] These experiences reinforce Pyongyang's preference for compartmentalized cooperation focused on dual-use inputs rather than sustained industrial integration. In practice, North Korea is willing to accept military assistance, components, and technical expertise from almost any partner, provided it retains control over the terms, sequencing, and downstream use of the technology. Its "juche" ideology is often misread as strict economic self-sufficiency; instead, it functions as a doctrine of information and influence control. This makes it compatible with discrete defense-industrial collaboration—particularly the transfer of materials, machine tools, electronics, software, and propulsion technologies that have both civilian and military applications.

IMPLICATIONS FOR THE U.S. ARMY

Understanding the extent and diffusion of dual-use technology sharing—through licensed production and limited co-development—across the CRINK alliance will have direct and significant effects on U.S. Army readiness, planning, force design, and technology development cycles.

- ***Technology diffusion accelerates adversary modernization.*** Even absent formal CRINK-wide programs, the acceleration of sharing defense-related inputs shortens our adversaries' modernization timelines and may erode traditional U.S. technological advantages on the battlefield.
- ***Future conflicts may feature CRINK composite systems.*** The Army might face "composite" adversary platforms that blend Russian airframes, Chinese electronics, Iranian modifications, and North Korean components—complicating intelligence-gathering and attribution, countermeasures, and targeting.
- ***Transactional cooperation still creates operational risk.*** While mistrust over intellectual property and divergent strategic goals limit full integration, transactional co-development ensures that adversaries can plug critical gaps quickly when needed, enabling surge capacity in wartime or crises relevant to U.S. Army operations.
- ***Adversaries may shift toward licensed production and joint development.*** Recent moves toward licensed manufacturing and limited co-development signal a departure from bilateral or limited arms sales toward deeper defense-industrial collaboration, increasing the scale, sustainability, and survivability of adversary forces.
- ***Army planning and force design will need to adjust.*** Expanded defense-industrial co-production among our adversaries—especially of UAS, missile systems, and aerospace platforms—suggests the U.S. Army can anticipate faster adversary regeneration rates and more adaptive enemy kill chains, reinforcing the need for resilient ISR, counter-UAS, electronic warfare, and integrated air and missile defense capabilities.

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