Iran's Military Drone Program: Security Implications and Policy Responses

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Brief Analysis

A former CENTCOM chief joins two arms experts to discuss the capabilities of Iran’s drones, the gaps

in current efforts to curb their proliferation, and the pressing need for a regional air defense architecture that can counter them.

*On April 20, The Washington Institute held a virtual Policy Forum with Gen. Kenneth McKenzie Jr. (USMC, Ret.), Damien Spleeters, and Valerie Lincy. McKenzie is former head of U.S. Central Command, current executive director of the Global and National Security Institute at the University of South Florida, and author of the recent Institute paper '**Striking Back: Iran and the Rise of Asymmetric Drone Warfare in the Middle East (https://www.washingtoninstitute.org/policy-analysis/striking-back-iran-and-rise-asymmetric-drone-warfare-middle-east)**." Spleeters is deputy director of operations at Conflict Armament Research. Lincy is executive director of the Wisconsin Project on Nuclear Arms Control. The following is a rapporteur's summary of their remarks.*

Kenneth McKenzie Jr.

Drone warfare is an asymmetric approach typically used by states that are unable to field modern fighter aircraft and other high-end capability systems. Drones, land-attack cruise missiles, and ballistic missiles are tools used by actors like Iran that are overmatched in many areas but seek innovative ways to respond effectively. Drones in particular give Tehran great flexibility and a measure of deniability without needing cutting-edge technology.

Over the past ten years, Iran has massively increased its inventory of drones, cruise missiles, and ballistic missiles to the point where it has effectively achieved overmatch against its neighbors—the ability to launch an attack that overwhelms their defenses. This enables the equivalent of combined arms warfare in the air, wherein drones can be launched to take out enemy radar systems before follow-on ballistic missile attacks occur. Right now, the United States and its regional partners are lagging behind in their ability to defend effectively against drones.

There is an old axiom of combined arms warfare that "fire without maneuver is indecisive, while maneuver without fire is disastrous." A regional conflict with Iran would not be a war of "maneuver" using tanks, infantry, or an invasion force because Tehran and its potential adversaries in the Middle East do not share a land border or possess large conventional expeditionary forces. More likely, such a conflict would be a "fires" war where drones, cruise missiles, and ballistic missiles are applied against military and nonmilitary targets. Yet without combining fire and maneuver, decisive results would remain elusive.

Iran regards its drone and missile capabilities as the crown jewels of its military, according them as much importance as its nuclear weapons program, if not more. While the nuclear program represents a potential future capability, drones and missiles provide the ability to hurt regional rivals today if Tehran chooses to do so.

To defend against these capabilities, the United States and its partners should take advantage of the current opportunity to build an integrated regional air and missile defense architecture. Countries in the Middle East have generally been unwilling to compromise on their sovereignty. Yet building an integrated defense requires only that they share information to build a common operational picture of the regional airspace. The progress made in this regard over the past several years has helped build trust among neighbors.

Another big factor was the 2021 decision to place Israel within U.S. Central Command's area of responsibility. This move has created opportunities to better integrate Israel's forces with other regional militaries, including through information sharing and developing common tactics and procedures.

Yet the United States and its allies must acknowledge that the air supremacy they have generally enjoyed since the Second World War is no longer uncontested, in large part because of the proliferation of drones. Washington needs to promote a collective approach to air defense in the region while continuing to work on technical solutions as well. Large drones are similar to airplanes in size and capabilities, so they can usually be countered using traditional air defense systems. Yet smaller drones present a more worrisome challenge and can be easily purchased and modified. In addition, Iran's military capabilities will likely improve as its drones and other systems are used by Russian forces in Ukraine.

Damien Spleeters

By conducting a careful visual comparison of drone components recovered in Ukraine and those used by Iran in the Middle East, Conflict Armament Research (CAR) has confirmed that drones used in Ukraine are of Iranian origin. Moreover, Russian and Iranian drones and other weapons used in Ukraine are heavily reliant on Western components and technologies. In the Iranian systems, CAR documented more than 500 components of over 200 different types, bearing the brands of more than seventy non-Iranian companies—more than 80 percent of which are incorporated in the United States. Many of these parts were recently manufactured, including a large number produced in 2020-2021. Most are electronic components, though the list also includes engines, antennas, and other items crucial to Iranian weapons systems.

Within a short time, CAR has observed efforts to decrease the supply chain footprint of Iranian systems. In addition, it has documented variants of three key modules found in the Iranian drones that Russia is using in Ukraine: their software-defined radios, inertial measurement units, and onboard computers. These variants denote a significant leap in engineering, particularly considering that they are for expendable systems; indeed, Iran's drones have improved in design and complexity, and its commitment to quality control is impressive. Variants also increase Tehran's resilience to sanctions.

Regarding the heavy use of components from U.S.-based brands, this should come as little surprise given that Iran and Russia do not have advanced domestic semiconductor industries. Moreover, some of the components that CAR documented are less heavily controlled or not subject to export restrictions. Even if using such components leads to inferior capabilities in Iranian drones, they are good enough for an expendable weapon system; in contrast, using higher-end components would create an increased footprint in acquisition networks and therefore more vulnerability to disruption.

Iran has also worked to conceal the provenance of some components and hinder tracing efforts, for instance by defacing markings.

The logical assumption is that Iran has been able to obtain such components because the multilayered, distribution-based nature of the industry precludes successful tracing. Yet CAR **has identified (https://storymaps.arcgis.com/stories/7a394153c87947d8a602c3927609f572)** certain technological chokepoints and diversion patterns in the Russian and Iranian acquisition mechanisms. Although diversion-proof control or full supply chain visibility may not be achievable, documenting and tracing weapon components used in Ukraine is critically important to identifying procurement patterns, adequately responding to observed diversions, and making evidence-based decisions on matters such as due diligence and export control.

Regarding the impact of U.S. sanctions and export controls, such efforts cannot be truly effective without field monitoring to document and analyze components found inside systems of concern. Before 2022, the United States was operating in the dark, issuing sanctions without knowing which entities were supplying which components and how they could be replaced after being targeted by sanctions. Today, more is known about each of these issues.

Valerie Lincy

There is no silver bullet to eliminate the Iranian drone threat. The state-run industries in the Ministry of Defense and Islamic Revolutionary Guard Corps (IRGC) that design and manufacture these drones are far too mature and diverse, able to draw on researchers from universities and private entities that provide help with research and development, as well as procurement.

Yet multilateral export controls and sanctions can still **limit and constrain (https://www.iranwatch.org/our-publications/roundtables/clipping-tehrans-wings-how-supply-side-controls-can-impede-iranian-drone-program)** the program. These measures have deprived Iran's defense industry of resources, forced it to extend development timelines, and imposed greater costs overall.

To further interrupt Iran's supply chain, sanctions and export controls should distinguish between low-end and high-end components. In most cases, low-end components are commercially available electronics that have many civilian applications and can be purchased in large quantities from distributors in less restrictive jurisdictions such as China. Very few of these components appear on export control lists. Better opportunities exist to limit imports of high-end items that would elevate Iran's drone program from "bronze" to "gold" medal contention, such as satellite-enabled data links, higher-resolution sensors, more advanced engines, electronic warfare equipment, and technologies that provide stealth and swarming capabilities.

Toward this end, more "catchall" export controls are recommended. Few if any of the components that Iran is importing for its drones are listed by the Missile Technology Control Regime (MTCR) or the Wassenaar Arrangement, which promotes transparency in conventional arms transfers and related dual-use goods and technologies. Both regimes have provisions that do not have to rely on a specific list of controlled items, but instead control unlisted goods whose intended end use is military- or proliferation-related.

Yet one should have realistic expectations about what the MTCR can achieve. Its list of controlled items is based on the consensus of its members, and this list is unlikely to expand. The United States, the European Union, Japan, and other advanced economies participate in these regimes and have national catchall controls in place. Yet the many countries that lack catchall controls have no legal basis to deny licenses, interdict transfers, or take any other blocking action related to Iranian drone procurement. Helping these countries create a basis for such controls would therefore be worthwhile.

Moreover, the EU has yet to make an independent effort to target the foreign suppliers of Iran's drone industry as a whole, versus just the drones going to Ukraine. The diverse set of domestic and foreign entities supporting the industry provide a lot of sanctionable targets. Current sanctions are mainly seen as a U.S. initiative; multilateral efforts would demonstrate that many other countries view the threat in the same way, thereby strengthening efforts to counter it.

Notably, China has become a major problem in the indirect supply of Western components to Iran. For example, UN investigations have found that engines and certain other components used by Tehran's Houthi partners in Yemen were manufactured in the West, transited through China, and wound up in Houthi drones received from Iran. This remains a weak link in efforts to constrain Iran's drone program.

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