Watts and Weapons: A New Strategic Nuclear Triad

By Armen Agas & Tom Cutler
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(Chris Morgan/Idaho National Laboratory via AP, File)

As NATO leaders prepare for their upcoming summit June 24-25 in The Hague, they should consider establishing a NATO Nuclear Innovation Council under the umbrella of a new Strategic Nuclear Triad to meet the evolving demands of modern warfare for electricity.

The Alliance's energy infrastructure, especially its dependence on vulnerable fossil fuel logistics and foreign-sourced nuclear fuel, requires that NATO rethink how it powers its militaries and more fully embrace nuclear innovation—not just for deterrence, but as a source of battlefield electricity.

Imagine a future conflict where directed-energy weapons sit idle unable to charge their lasers because NATO failed to deploy combat ready micro-reactors.

Surveillance drones are grounded because of inadequate tactical power storage and supply near the front lines. NATO's AI systems, sensors, and drone swarms underperform. Meanwhile, enemy attack drones, powered by small modular reactors (SMRs) housed in mobile containers, surge forward into NATO territory.

Nuclear weapons are a core component of NATO's overall defense capabilities in terms of deterrence and, if required, mass destruction but in this future scenario, the deciding factor could be whether NATO will have deployed sufficient strategic wattage to power advanced weapons systems.

The New Battlefield Runs on Electricity

For over a century, oil has powered the machines of war but the next generation of military technology—from laser weapons and railguns to AI-driven systems and high-end drones—relies on adequate supplies of electricity. Power is no longer a secondary source of energy; it is a frontline necessity.

Nuclear energy already powers naval warships. Efforts such as the U.S. Advanced Nuclear Power for Installations (ANPI) program are underway to develop reactors to power military installations in rear areas. But the next frontier is for mobile micro-reactors to deliver electricity directly to forward operating bases and battlefield systems. These reactors can reduce reliance on diesel convoys which are vulnerable to attack and provide the stealth and sustainability today's militaries demand.

To be sure, developing military-capable mobile reactors is a challenging task. Skeptics are correct that because these reactors would be limited in size to around 1 MW, large conflicts might require the use of multiple power units. Plus, the

reactors cannot be set up or relocated quickly, in part because of their radiation shields. Thus, more research and development is needed.

This is not just a technology problem - it's also a talent one. Cold War-era reactor experts are retiring, and the ranks of new nuclear engineers are insufficient to sustain a nuclear resurgence. NATO needs a transatlantic workforce strategy: joint military-academic fellowships, technical apprenticeships, and retraining pipelines. To this end, President Trump's May 23 Executive Order "Deploying Nuclear Reactors for National Security" is a step in the right direction as it aims to promote nuclear power for military bases and expand the U.S. nuclear work force.

Although NATO's military might is not to be underestimated, these are not merely technical concerns - they are strategic liabilities which cannot be fixed overnight.

Thus, NATO needs to adapt and implement new strategic visions if it is to catch up to Russia and China who have assumed global leadership in commercial nuclear technologies and innovation.

A New Strategic Triad

Traditionally, NATO's "nuclear triad" referred to the ability to deliver nuclear weapons by land, sea, and air. Today, a new triad is needed to match modern threats:

1. <u>Secure Nuclear Fuel Supply</u>

NATO's Achilles Heel could be unreliable sources of imported nuclear fuel as NATO countries remain dangerously dependent on Russian-enriched uranium.

Russia controls nearly 40% of the global market for nuclear fuel. Even after banning imports of Russian enriched uranium in 2024, the U.S. issued waivers to avoid supply shortages for its commercial reactors. France and other NATO members still rely on Russian fuel. Weaning off this dependence will take decades. Building new enrichment capacity and securing supply chains must be treated as strategic priorities - not commercial afterthoughts - and be accelerated.

2. Deployable Nuclear Generation

Small modular reactors and micro reactors can power expeditionary forces, Arctic outposts, and AI-driven weaponry. Projects like the U.S. military's "Project Pele" aim to field truck-sized nuclear reactors for forward bases. If successful, they could revolutionize tactical energy supply, but more must be done. Meanwhile, Russia dominates the Arctic with nuclear icebreakers, China is expanding its fleet and NATO risks being outpaced.

3. Enabling Electric Weapons and Space Power

Tomorrow's high-end systems—lasers, railguns, and orbital platforms—require high-density energy. Nuclear propulsion in space, already under development by Russia and China, offers maneuverability and endurance far beyond chemical rockets. NATO needs a coordinated effort to build nuclear-powered space assets to protect its satellite networks and maintain dominance in the final domain of warfare.

A NATO Nuclear Innovation Council

NATO must develop new mechanisms to galvanize innovation. It should establish a Nuclear Innovation Council: a civil-military body to coordinate research, deployment, and regulatory reform across the Alliance. This council could:

- Accelerate fielding of mobile nuclear power units;
- Develop AI-enhanced reactor design;
- Build a transatlantic nuclear talent pipeline;
- Standardize dual-use reactors for civilian and military applications;
- Promote nuclear-powered systems for space defense.

It would work alongside the NATO Innovation Fund to ensure energy innovation stays aligned with defense priorities.

Rebuilding the Nuclear Edge

Nuclear power can become the backbone of a broader economic resilience agenda, tied to reshoring supply chains and reducing energy vulnerabilities. Investing in uranium enrichment, supply chains, and advanced reactor design supports reindustrialization, reduces dependence on hostile regimes, and builds allied capacity.

The Cold War nuclear triad was about delivery systems. Today's nuclear triad must be about nuclear energy supply, generation, and deployment. Watts are the weapons of the future If NATO is to compete in the 21st century, it must recognize and act with an even greater urgency to innovate and incorporate nuclear energy into its arsenal of military power.

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