LAND / COUNTER-UNMANNED AERIAL VEHICLES (C-UAS)

Army Puts $43M Bet On Next Gen Leonidas High Power Microwave Counter Drone Tech

Epirus' CEO says successful tests of the company's Gen II system capable of rapidly taking down swarms of drones could lead to an official program of record.

ERIC TEGLER / PUBLISHED JUL 17, 2025 6:28 PM EDT / 198 / ADD TWZ

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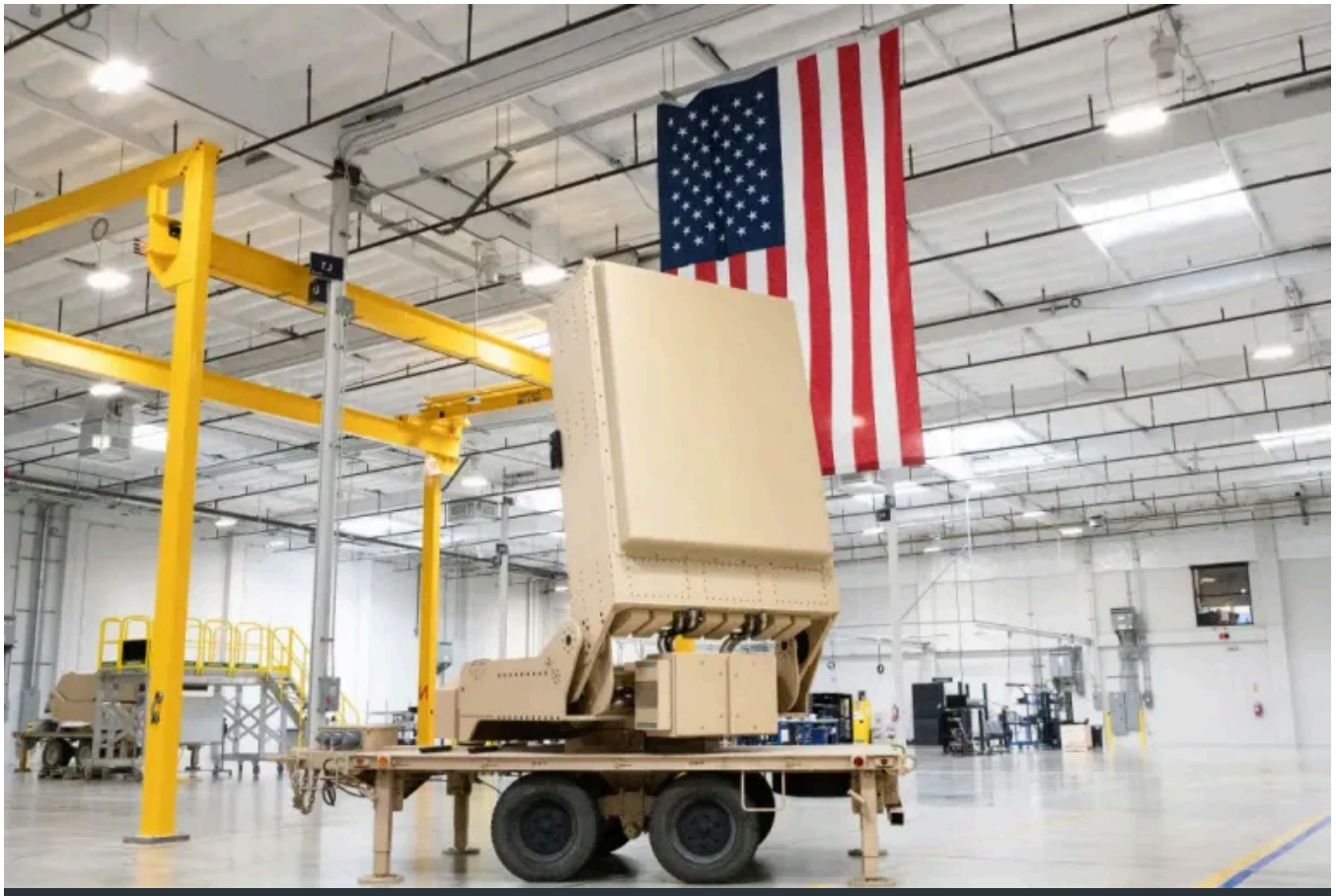
Today, high power microwave (HPM) system maker Epirus announced it has received a $43,551,060 contract from the U.S. Army's Rapid Capabilities and Critical Technologies Office (RCCTO) for delivery of two of its new advanced Generation II Leonidas HPM air defense systems along with associated equipment and spares for test events, with options for additional tests, components and support.

The Leonidas systems are being built now. The first is expected to be completed by the end of July and the second by the end of August, Epirus' CEO Andy Lowery revealed at a media roundtable attended by *TWZ* at the company's Washington, D.C., offices last week. A third system will be finished by late September.

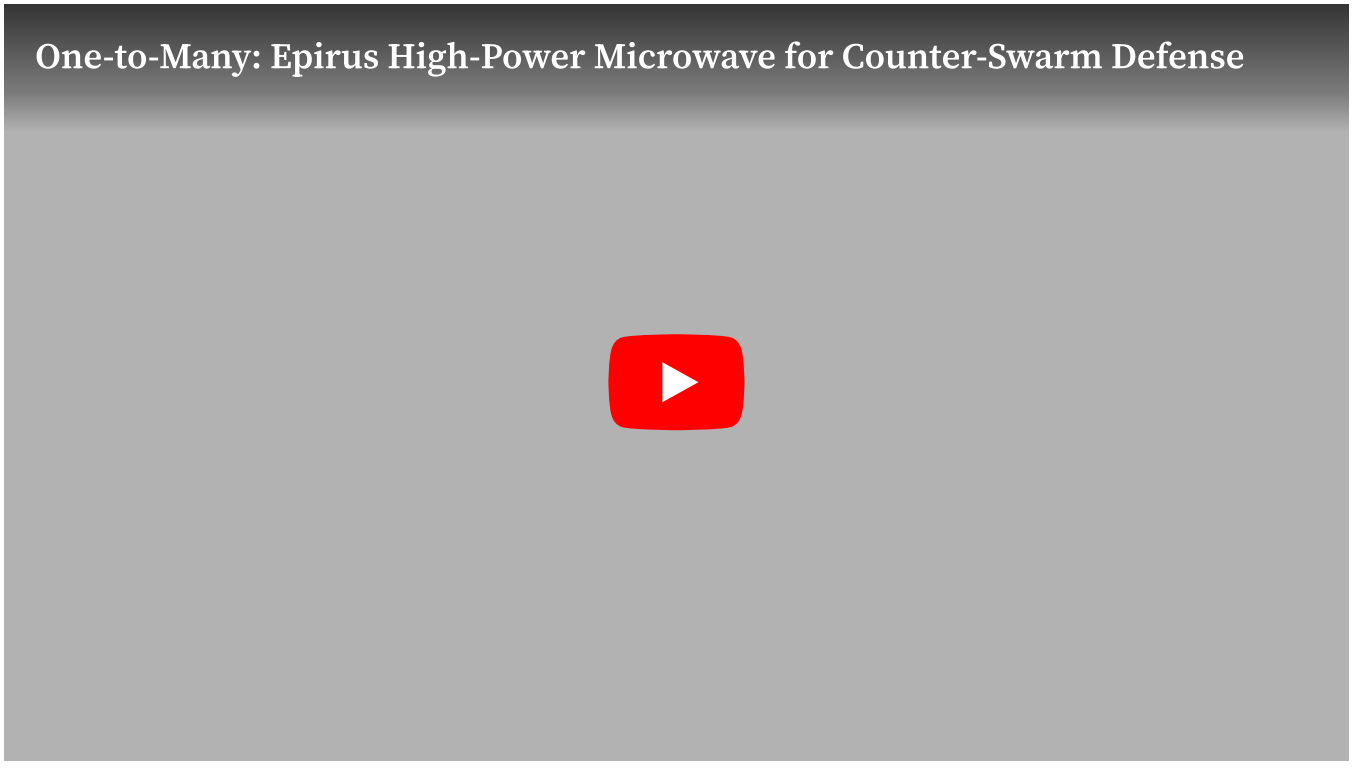


Leonidas at the Epirus plant. (Epirus)

The Army formally refers to the Leonidas HPM system as the "Integrated Fires Protection Capability High-Power Microwave" (IFPC-HPM) system. IFPC-HPM is intended for the critical low-altitude air defense (LAAD) role, defending installations, platforms, and formations.

Leonidas is largely aimed at defeating unmanned aircraft, including swarms of drones. It could also potentially be employed against more traditional aircraft, as well as low-flying cruise missiles, and robotic threats on the ground or on the water.

Epirus describes IFPC-HPM as an effective, cost-efficient electromagnetic interference system with a “one-to-many” capability to disrupt the electronics of multiple drones simultaneously. It does so by transmitting long-pulse microwave energy across multiple frequency bands, which overloads the electrical systems of drones that fly into the electromagnetic field it creates.



In view of the recent success of so-called ‘Trojan Horse’ drone attacks inside Russia by Ukraine and inside Iran by Israel, the Army and DoD writ large are eager to acquire defenses against pop-up swarms. These groups of drones could

threaten U.S. bases, sensors, ships, ports, communications, and wider military/civilian infrastructure abroad and here at home.

The Leonidas IFPC-HPM is part of a product line that also includes Leonidas Mobile, which features the company's HPM array integrated atop a Stryker vehicle system; Leonidas H_2O, a marinized system designed for counter-unmanned surface vessels and maritime counter-swarm; Leonidas Pod, a UAS-borne system for electronic attack; and an Expeditionary Directed Energy Counter-Swarm system for forward-deployed defense for the Marine Corps, which *TWZ* covered earlier this year.

Leonidas Mobile. (Epirus)

The Generation II (GEN II) systems that the RCCTO is acquiring build on the design of the first version of Leonidas. They also benefit from user feedback from the deployment of four GEN I system prototypes to the Middle East in 2024 and to the Indo-Pacific earlier this Spring.

The Army plans to test two of the GEN II systems at Naval Air Weapons Station China Lake in California in October. The tests will assess their cooperative fires capability and other engineering metrics. Epirus' CEO told the roundtable that, in his view, the tests will be "a defining moment" for the company. If the systems perform as expected, formal Army acquisition should follow.

Epirus CEO Andy Lowery. (Epirus)

Success with the Army would kickstart demand for IFPC-HPM and the other Leonidas-based systems in at least three emerging markets, according to Lowery. The first is the basic overseas LAAD requirement that the Army seeks to fill.

Lowery calls this the "Tower 22" scenario, a reference to a drone attack launched by the Islamic Resistance in Iraq that struck Tower 22, a U.S. military outpost in Rukban, northeast Jordan, in January 2024. The attack killed three U.S. soldiers and injured 47 others. If an Epirus system had been in place and properly engaged, the American losses would have been prevented, Lowery maintains.

He also cites the recent Israeli success in disrupting Iranian air defenses by attacking from within Iran with drones and loitering munitions as another demand driver in the overseas market, particularly in the Middle East. "I think that's one of the most urgent applications of our system – get to those Patriot [surface-to-air missile system] sites in CENTCOM [the U.S. Central Command area of responsibility] and put Leonidas next to every one of those sites."

Homeland defense represents a second market. Lowery opines that IFPC-HPM and other Epirus systems could logically be part of the layered homeland air defense envisioned in the Trump administration's Golden Dome initiative. Noting potential threats associated with the upcoming World Cup soccer series, which U.S. cities will host next June-July, he suggests there is a need for in-place HPM systems near the match venues and at the U.S. southern border.

Leonidas seen during testing inside an anechoic chamber. (Epirus)

Lowery also noted a recent meeting he had with Air Force Deputy Chief of Staff for Operations, Lt. General Adrian Spain, who expressed the service's urgent requirement for "point defense" for Air Force bases and flightlines. *TWZ* has extensively elaborated on the risks of drone attacks to USAF bases at home and abroad for years. As a result of the threat and the meeting, Lowery said that he thinks the Air Force is likely to begin leasing IFPC-HPM systems in 2026. Possible acquisitions by the Marines (ExDECS, Leonidas POD) and the Navy may follow upcoming demonstrations for both services.

The third market is in foreign military sales, spurred by developments in Ukraine and the Middle East. Lowery also noted the AUKUS Pillar II agreement, which has led to Epirus' participation in Australia's Project LAND 156, aimed at neutralizing small drones (up to 25kg) on the battlefield. Epirus' CEO says the company is "fairly confident" that it will be chosen as a supplier for the non-kinetic effector portion of the program. AUKUS is a trilateral Australia-United Kingdom-United States defense cooperation agreement.

Momentum for the sale of the latest version of the system is highly positive, Lowery told the roundtable. He added that the Army was "extremely happy" with the two previous experimental deployments of IFPC-HPM I systems in the Middle East and Indo-Pacific.

He characterized Epirus' discussions with the Army and DoD not as a question of whether they wish to move forward. "The question becomes, what do we move forward with?" he said.

Today, Epirus could produce 20 IFPC-HPM II systems per year at its Torrance, California, facility with relative comfort, Lowery says, and may be able to stretch to 30, if required. With a view to potential demand, the company is assessing additional production in proximity to the Army's Joint Counter-Small UAS University and Fires Center of Excellence at Fort Sill in Oklahoma.

Epirus HPM systems at its headquarters. (Epirus)

Prior to potential production, nailing down specific requirements, including maintenance, a curriculum for training, the deployed number of operators per system, and more, must be finalized with the Army.

Ensuring that IFPC-HPM II meets range expectations as part of a layered LAAD system is vital as well. Lowery confirms that the Army has defined a region called "Final Protective Fires," which is the inner core — around a kilometer — layer of protection.

"That's the layer that IFPC-HPM is designed to go into."

As *TWZ* has previously noted, radio frequency directed-energy weapons offer notable advantages over 'soft-kill' options, like electronic warfare jammers, given

that they can also bring down drones that are operating autonomously, or those using fiber-optic-cable guidance, by disrupting their onboard electronics.

However, Lowery stressed that Epirus does not view Leonidas simply as a directed energy or HPM system. He makes a point of referring to it as "weaponized electromagnetic interference."

Lowery explained that when Epirus began development in 2018, it was initially envisioned as a phased array version of a THOR-type (Tactical High-power Operational Responder) system. But after further developing IFPC-HPM GEN I, the company realized that Leonidas wasn't operating anything like THOR.

Leonidas, he says, doesn't destroy drones by narrowly targeting and overloading their capacitors like THOR. Lowery compares THOR to a "death ray." Leonidas, he explains, generates a very intense electromagnetic interference field (EIF).

The EIF formed by the system creates a dome or umbrella, which stretches out to what the Army calls "tactically relevant range" around the transmitter and hundreds of feet above ground at its apex. It does not target specific drones or even swarms. Instead, drones fly into the EIF on their way to their targets.

IFPC-HPM does this by extending an electromagnetic field through large periods of time. Traditional HPM puts out a massively powerful pulse for about 10 nanoseconds – shorter than the distance between one computer clock pulse and the next clock pulse – Lowery says.

Leonidas' HPM pulse extends to a millisecond, longer than even radars. "Imagine, a thousand clock cycles might be in that millisecond. The whole time that electromagnetic energy is just hitting and hitting that [target], confusing it to the point where the system shuts down. That's how the [Leonidas system] works."

Along with illustrating how Epirus' HPM concept works, Lowery made what should be considered a noteworthy claim:

"We found that electromagnetic interference can be smart ... It can figure out pathways into hardened areas if you get the carrier frequency pulses right. If everything is dialed in right, you can even penetrate what you might think to be a hardened, non-susceptible drone."

The ability to disrupt and down even electromagnetically shielded drones (or ground robots, uncrewed surface vessels, etc.) would present U.S. adversaries with a steep challenge if IFPC-HPM-type systems proliferate.

H20 HPM system undergoing tests. (Epirus)

In simple terms, the system consists of a phased-array antenna, supporting computer processing equipment, command-control links, a user interface, a trailer, and a transmitter. The heart of the transmitter consists of Line Replaceable Amplifier Modules (LRAMs), rectangular boxes which can scale in number to meet size, weight, and power requirements or desired range output.

The IFPC-HPM has about 150 LRAMs. Lowery explains that most of the system's high-value electronics are in the LRAMs. Upgrades would be sent primarily to these modules as well. As a rule of thumb, the system's size and range scale linearly with the number of LRAMs. For example, a 10 LRAM system would have 10 times less range than a 100-element system.

The IFPC-HPM GEN I is a close-range system used as a last line of defense. The GEN II version of the system increases the range to over double that of the first generation system. Expanding on the theme, Lowery gave an intriguing example when discussing the scalability and range.

If increased range were desired, Epirus could make a "25 LRAM by 25 LRAM" system, which would total 625 elements. Such a system, he said, would give roughly three times the range of the Gen II system. Lowery quickly added that "this is all theoretical" and that Epirus is not selling any 625-element systems today.

Epirus HPM systems have shown promising results in advanced testing. (Epirus)

Leonidas' scalability aligns with cost, as well. According to Lowery, LRAMs represent 65% of the cost of IFPC-HPM, with the remaining 35% sunk into other equipment, including the antenna's metal columns, trailer, positioner, and other

ingredients mentioned above. The open architecture and modularity of the system – from its LRAM complement to its phased array modules – make continuous software-defined improvements and upgrades possible.

Given that its modules fail individually, IFPC-HPM can still function when one or more are lost, and failed modules can be easily replaced. This means that a buyer does not need to buy two Leonidas systems (primary and backup) to support 99% mission availability. With replacement modules on hand, field maintenance should be relatively straightforward.

All of the above give it a sustainment cost much lower than traditional HPM or other directed energy systems, Lowery argues, putting the purchase price "between $10 and $20 million" per system.

"We think Leonidas is very reasonably costed. We didn't build this with exquisite parts and gold-plated apertures."

Epirus began re-engineering IFPC-HPM in 2022, in accordance with the Army's desire for improved performance. "Although [GEN I and GEN II] do the exact same thing, they are completely different," Lowery adds.

The new system produces 30% more power, can transmit continuously for much longer, and emits more heavy-duty pulses and cycles. It also exploits all the different cardinal signal polarizations, a capability that GEN I did not have. (Full signal polarization capability enables transmission of specially filtered waves.)

"We anticipate the range to be 2.5 times the range [of Gen 1] in the same size package," Lowery affirmed.

The changes, including increased peak power, called for a redesigned power supply structure, which now includes 800 pounds of lithium-poly batteries. The increased energy storage means that IFPC-HPM II can operate without any external power for up to 30 minutes of firing. Given that a typical engagement with one drone might take four seconds, Lowery says a 30-minute run with GEN II could take out many, many drones or guard against wave attacks.

In the field or at a base, operators can choose whether they plug in a 70 kW generator and go for continuous use or employ a 20kW generator to periodically charge the system batteries like charging a Tesla.

With GEN II also comes the ability to connect a pair of IFPC-HPM systems and fire them cooperatively. They would effectively operate as one, Lowery says, with a 2X linear increase in power and range. As noted, the cooperative fires capability will be tested at China Lake.

It's ironic, if predictable, that the capability that IFPC-HPM has apparently demonstrated is also a vulnerability. In response to a question about the system's electronic signature and its high value as a target, Lowery admitted.

"I have a lot of concerns about that. When the system is dormant or in standby, there's no signature, no radiation, maybe a little heat signature. There isn't a lot to target off of other than its metal and physical size."

"But if you transmitted with our system in Kyiv, they would be able to detect it in St. Petersburg. If they had a direction-finder, they'd be able to say, 'Hey, we had something 1,000 miles away just go off in the L-band.' It puts out a massive amount of energy, more electromagnetic interference energy than any other system in the world."

The ability for Leonidas to “shoot and scoot” is an attractive feature. (Epirus)

Given that IFPC-HPM II will be “as bright as the sun” when transmitting, the Army will have to develop a concept of operations for use at the combat edge to ensure survivability in the face of adversary attempts to wipe it out. Lowery says the service may develop “shoot-and-scoot” tactics, lighting IFPC-HPM up briefly to down drones or other threats, then immediately moving to another location to make the system harder to target by missile. Other attack risks, like drones dropping in from high altitude at high trajectories, will have to be considered, as well.

Lowery says that Leonidas was “born to be mobile” and that the IFPC-HPM system can go from a stowed position to a cold-start to up and firing in “between 15 and 20 minutes.” Epirus will have integration efforts for its various Leonidas-based offerings on multiple vehicles early next year, with a nod to increasing their survivability and expanding their range by making them mobile.

The sort of cat-and-mouse game that will play out with systems like IFPC-HPM is one that Lowery says has pervaded his career. Over the course of it, he has come to the realization that war is already being fought in a “6th domain,” which joins air, land, sea, space, and cyber. He calls the new domain “physical cyber.”

“The 6th domain war is a war of guerrilla robots, guerrilla warfare leveraging robots, autonomy, Qualcomm Snapdragon, and Nvidia processors.”

Ukraine, Israel, and Russia all now have service branches dedicated to drone warfare, Lowery notes. The U.S. military does not. But with the acquisition of IFPC-HPM and other counter-drone systems seemingly on the horizon, the possibility that America may stand up a dedicated robotic warfare service branch has increased.

Lowery asserts that if the U.S. military does not adopt such systems and a 6th domain mentality quickly, it will lose.

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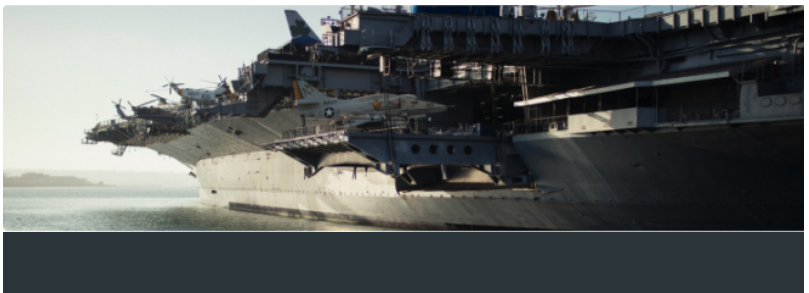

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