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July 2026

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THE NEXT GENERATION OF **US-MADE** MILITARY DRONES

Powerus is ready to scale production and provide soldiers with needed UAVs after selection into Drone Dominance Program.



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United States drone manufacturer Powerus and their MatrixFold drone get ready for Gauntlet II of the Pentagon's Drone Dominance Program. Inset photos courtesy of Powerus. Background image: Adobe Stock

Project Patriot Pipeline

Using veterans and their families to fill in the defense industrial base.

Workforce development and training have been top of mind across many manufacturing industries, and the defense industrial base (DIB) is no different. With the focus on establishing drone manufacturing in the United States, clearing the Navy's shipbuilding backlog, and replenishing stockpiles of weapons and other munitions, bodies are needed in factories and shipyards across the country. The Pentagon has established a new program, Project Patriot Pipeline, to help transition veterans, their families, and civilian contractors from military life into the civilian workforce for the DIB. With initiatives such as Golden Dome, shipbuilding, and kinetic capabilities, the workforce needs to be skilled in cybersecurity, engineering, manufacturing, and aviation maintenance. The Pipeline will "develop the talent required to accomplish its mission and support its core priorities, while also ensuring service members, military spouses, and civilians receive comprehensive career guidance and support."

The Under Secretary of War for Personnel and Readiness (USW(P&R)), Anthony J. Tata, is currently establishing an implementation plan, addressing:

- **Modernized access** - Connect service members, military spouses, federal civilians, and young people inclined to serve in mission-critical jobs, education, and career development opportunities, ensuring their skills align with the needs of the Department and the DIB through a new user-friendly digital platform.
- **Integrated policy and reduced regulations** - Determine ways new policies could incentivize service



From the editor
Jake Kauffman

members, military spouses, and civilian employees to specialize in critical skills within and outside of the Department to meet the nation's needs for readiness. Additionally, Secretary Pete Hegseth directed the USW(P&R) to find expedited ways to rescind cumbersome regulations that hinder the effectiveness of aligned Project Patriot Pipeline programs.

- **Strategic partnerships** - Establish new partnerships and strengthen existing partnerships that train, educate, or employ service members, military spouses, and civilians in critical skills, ensuring their development is aligned with critical national security needs.

We've covered multiple veterans joining and even leading the workforce in the DIB, whether it's Powerus COO Brett Velicovich featured in our cover story on page 14, or Isebard's Justin Baucum featured in our March 2026 issue. Hopefully, Project Patriot Pipeline inspires more veterans to follow Brett and Justin's lead into the defense workforce since the help is desperately needed.

Jake Kauffman

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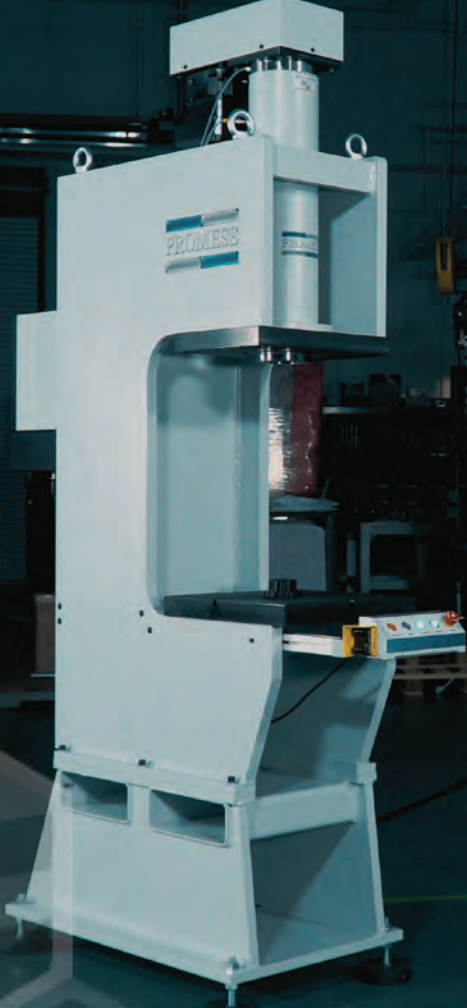


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APPOINTMENTS

Ontic, a leading supplier to the world's civil and military aircraft, appointed **Jean-Christophe (JC) Gallagher** as **CEO**. **Gareth Hall**, who has led Ontic for more than 10 years through its significant growth and expansion, will transition from CEO to **executive chairman**, where he'll continue to guide the company's long-term strategy and key relationships. Gallagher joins as CEO to further strengthen Ontic's leadership team, as the business continues to scale globally. Gallagher joins Ontic following a 20-year career at Bombardier, most recently serving as



Jean-Christophe (JC) Gallagher

executive vice president of aircraft sales and defense. He's widely recognized for delivering commercial success, leading large-scale organizational growth, and building strong, collaborative cultures. The transition process will take place progressively over the coming months, with Hall and Gallagher working closely together to ensure continued momentum across the business and ongoing support for Ontic's customers and partners, with a continual focus on providing availability and longevity to customers' fleets.

FOR MORE:

<https://www.ontic.com>

Parry Labs named Don Claussen CEO.

The appointment is the next step in a leadership structure Parry has been building toward as the company scales. Founder **John "JD" Parkes** assumes the

role of **executive chairman**, remaining full-time and focused on strategy, investor relationships, and the long-term direction of the company. Claussen brings more than 20 years of executive experience leading defense and technology organizations, including senior roles at L3Harris and Viasat, and most recently as CEO of ST



Don Claussen

Engineering iDirect, a global communications technology company, deploying dual-use technology with their commercial and U.S. government customers. A U.S. Army veteran, he served in uniform before his executive career. He later deployed to Afghanistan and Iraq on tactical communications programs and spent years working directly on deployed C4ISR systems. Under the new leadership structure, Claussen will assume responsibility for operating the business day to day, including

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execution, organizational alignment, and driving Parry's operating model across its five sites in Virginia, Alabama, Maryland, Texas, and Iowa. Parkes will remain full-time as executive chairman, focused on strategic growth, investor relationships, and the company's long-term direction.

FOR MORE:

<https://parrylabs.com>

Honeywell announced its board of directors has appointed **Jillian (Jill) Evanko**, CEO of Duravant LLC, to its **board of directors** as an **independent director and audit committee member**. Following the spin-off of Honeywell's Aerospace business, it's anticipated Craig Arnold, Bill Ayer, Scott Davis, and Deborah Flint will join the board of Honeywell Aerospace, and Evanko will serve on the Honeywell

board alongside current directors Vimal Kapur, Duncan Angove, Michael Lamach, Grace Lieblein, Indra Nooyi, Marc Steinberg, Robin Watson, and Stephen Williamson. Evanko has more than 25 years of experience across the industrial and manufacturing sectors. Prior to joining Duravant in January 2026, she spent nearly a decade at Chart Industries, Inc., most recently as president and CEO and chief financial officer. As CEO of Chart Industries, she oversaw the company's strategic direction across capital allocation, operational excellence, transformative acquisitions, and growth objectives to increase the company's market capitalization.

FOR MORE:

<https://www.honeywell.com>



Jillian
(Jill) Evanko

Divergent Technologies Inc. announces the expansion of its leadership team with the promotion of **Cooper Keller** to **chief operating officer (COO)**. Having joined Divergent as a key foundational member, Keller has played a critical role in establishing the company's operational capability. Cooper oversees all customer application functions, including application engineering, program management, supply chain, quality assurance, and production. His leadership has driven the customer adoption and production scale-up of the company's manufacturing platform DAPS (Divergent Adaptive Production System) and positioned the business to meet increasing demand.



Cooper Keller

FOR MORE:

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ASK THE EXPERT



QUESTIONS WITH JASON HOUCHINS

Walter's Key Account Sales Manager explains how Engineering Kompetenz is a promise of performance and partnership.

Q What does "Engineering Kompetenz" mean at Walter?

A Engineering Kompetenz is more than a slogan – it is Walter's commitment to helping customers achieve success through innovation, expertise, and precision. While machining has traditionally been associated with turning, milling, drilling, and threading, Walter believes true value lies in helping customers reach goals that once seemed unattainable. Engineering Kompetenz represents a promise to deliver solutions that not only meet today's requirements but also set tomorrow's benchmarks.

Q How does Walter help customers succeed?

A Walter's philosophy is built around customer success. The company works closely with customers to transform ideas and challenges into measurable results. Through collaboration, technical expertise, and a commitment to continuous improvement, Walter helps organizations improve speed, precision, and effectiveness. By working engineer-to-engineer, Walter enables customers to uncover opportunities and performance gains they may not have realized were possible.

Q What experience does Walter bring to the table?

A Experience is one of Walter's greatest strengths. With more than 380 years of combined expertise in toolmaking and machining, the company has built a reputation for quality, precision, and innovation. This heritage is reflected in every product and solution, from turning and drilling tools

to threading and milling technologies. Walter's long history provides customers with confidence that they are partnering with an organization capable of setting new standards in machining excellence.

Q Does Walter serve specific industries?

A Yes. Walter develops tailored solutions for a wide range of industries. Rather than offering a one-size-fits-all approach, the company evaluates each customer's unique requirements and recommends the combination of products and services best suited to their application. This industry-focused approach helps customers improve quality, reduce costs, and save time.

Q What makes Walter's product offering unique?

A Walter combines a vast portfolio of standard tools with a relentless focus on innovation. The company offers approximately 45,000 standard tools designed to help customers achieve exceptional results without excessive complexity. At the same time, innovation remains a driving force. More than 30% of Walter's sales come from solutions introduced within the last five years, demonstrating the company's commitment to staying at the forefront of machining technology.

Q How does Walter support manufacturing challenges?

A For highly specialized or demanding applications, Walter develops custom solutions designed around specific components and production requirements. These solutions are

engineered to increase productivity and deliver measurable improvements. Whether the challenge involves unique materials, tight tolerances, or complex geometries, Walter's expertise helps customers achieve results that standard approaches may not deliver.

Q What is Walter Multiply, and how does it benefit manufacturers?

A Walter Multiply is the company's comprehensive process optimization program. It extends beyond tooling to include production solutions, logistics, software, and customized training. Walter experts analyze entire manufacturing processes, identify opportunities for improvement, and help implement changes that increase efficiency. By enhancing every stage of the production chain, Walter Multiply creates value long before machining even begins.

Q What is the ultimate promise behind Engineering Kompetenz?

A The promise is simple: precision, innovation, and customer success. Backed by more than 200 patents, Walter provides the expertise and resources customers need to stay competitive. Engineering Kompetenz is the assurance that every solution is designed with one goal in mind – helping customers achieve outstanding results faster, more efficiently, and with confidence.



MORE INFO:
WALTER

www.walter-tools.com/en-us

Solutions to meet the challenges that lie ahead

For Walter, Engineering Kompetenz is a promise that is reflected in everything that we do and in all of our products: In standard tools for turning, drilling, grooving, milling and threading, as well as in our customer-specific tailor-made tools and customized complete solutions. Walter is equally characterized by its pursuit of innovation. More than 35% of Walter AG's turnover is achieved by tools that have been developed by its engineers in the last five years. With Walter, you always have the latest in technology. Now and in the future. We are already developing the metal machining processes of the future – and, together with you and our Engineering Kompetenz, are already transforming these into future-oriented solutions.



COMPACTORS TURN UP THE VOLUME

FOR EFFECTIVE CHIP MANAGEMENT

Jorgensen Conveyor and Filtration Solutions' latest technologies help increase lights-out automated production in the defense industry.

Edited by **ERIC BROTHERS**

Within the past two years, chip management has come to the forefront in the defense industry, among others. While the health and safety of employees, reclaiming coolant, and environmental consciousness are driving this need, the main contributor is the increase in lights-out automated production operations. Today's machine tools deliver higher production output (more parts, faster) while allowing for unattended production. Shops must deal with significantly more chips and the lost coolant those chips carry with them.

Additionally, to ensure the dependability and consistency of critical components, manufacturers produce them from single solid pieces of raw material rather than mixing processes such as casting with finish machining. Doing so eliminates any material variation problems in castings and maintains finished part integrity. Unfortunately, it also generates huge volumes of chips.

In many cases, defense manufacturers machine away about 80% of raw work-

piece material when producing parts. This amount is further compounded for those manufacturers running 24/7 part machining operations, which magnify the need for chip evacuation and management.

For one aerospace and defense company, the need for chip management stemmed from large volumes of chips, along with the costs associated with handling them and lost machine-tool coolant. Forklift drivers were required to transfer chips from the production floor to a dock area, and the company's waste hauler refused to accept the chips for recycling if they had excessive amounts of coolant in them.

The solution was a Jorgensen-SFH tailor-made system including bins, a hopper, and a shredder with a briquette compacting unit. The system accommodates the company's chip bins of all sizes for two large multi-axis vertical machining centers and other machining cells, eliminating the need for forklifts and replacing them with carts easily moved to a tipper unit.

The tipper accepts the chip bins and dumps them into the hopper which handles two bins' worth of chips at a time. The hopper, equipped with pushers, feeds the shredder, where they're prepared for the compacting unit. Throughout this process, the system additionally



At one aerospace and defense company, its Jorgensen-SFH system accommodates the company's chip bins of all sizes for several machine tools to eliminate the need for forklifts, replacing them with carts that are easily moved to a tipper unit.

recovers more of the cutting coolant from the chips, which is then returned to the machine tool tanks.

The company is one of the world's leading designers and manufacturers of high-performance electrical and com-

munications systems. Along with a vast product breadth, the company provides customers with higher levels of support in engineering and certification services for the commercial aerospace, military and defense electronics, industrial, test and measurement, and medical industries. The chip management system was for the company's connector manufacturing operations.

A unique aspect of the Jorgensen-SFH system is the hydraulic pushers located inside the hoppers. The pushers accommodate various chip geometries and materials. The hydraulic pushers are customized per application for further automated chip handling. When a bin is dumped into the hopper, the pushers with specific geometric ends force the chips into the shredder, cutting them into smaller uniform pieces.

Pusher end geometries change per application, and the number of pushers is also tailored to the process. Designs are spear- or fork-shaped depending on the chip material, and this customization is key to maximizing shredder efficiency. Proper chip sizing is critical, as it directly impacts briquetting performance.

While most shops benefit from chip compacting, there are instances where compacting can lessen the value of chips for recycling. For example, titanium and Inconel chips lose some of their value if briquetted. This isn't the case with aluminum, steel, and other common ferrous chips.

By briquetting these chips, shops also reduce their overall storage volume. Loose chips create spatial restraints depending on the shape and size, whereas shops save floor space when forming chips into briquettes. In some instances, chip volumes are reduced by a ratio of 9:1. This amount of savings carries over to less required truck space, thus lower handling costs to haul them to a recycler.

For many defense manufacturers, the main motivations to incorporate chip processing are easier chip handling, less chip storage volume, and better coolant recovery. Before being compacted, chips were upward of 20% moisture – an amount the waste hauler refused to take. For optimal coolant recovery, centrifugal chip wringers can dry chips to a moisture content of 4% or less. This



ABOVE: For many aerospace and defense manufacturers, the main motivations to incorporate chip processing and briquetting, such as that from Jorgensen-SFH, are easier chip handling, less chip storage volume and better coolant recovery. **LEFT:** Loose chips create spatial restraints depending on the shape and size, whereas shops save floor space when forming chips into briquettes with the Jorgensen-SFH system.

percentage is even further reduced in the briquetting process.

Smaller-sized briquetters allow shops to feed their machine tool chip conveyor directly into them for compacting. However, for defense manufacturers with more than 10 machine tools, a larger centralized system more efficiently handles the larger volumes of chips. Outfitting each machine with its own compactor in those instances would be cost-prohibitive.

Many defense shops these days want absolutely no chips stored in their facilities. This eliminates the need for storage and frees up the space for production. In those instances, Jorgensen-SFH replaces the larger chip bin with a small hopper and feed system, sometimes including a shredder, with vacuum capability. Essentially, a centralized vacuum sucks and transports the chips up to 1,000ft along a pneumatic vacuum conveyor moving them into larger chips bins or compactors.

To eliminate the manual labor of moving chips from machines to the compacting system, Jorgensen-SFH can also apply autonomous mobile robots (AMRs) to transport them. In other applications, shops will use hinged steel belt convey-

ors to transport chips from machines to the centralized compacting system. Centralized systems allow for effective chip handling in lights-out production environments.

European defense manufacturers have been struggling with chips for decades, and there are many systems more than 30 years old still in use. In the U.S., however, briquetting, for the most part, has been popular, mainly because of chip size and volume. Lately, more defense companies are establishing closed-loop networks with recyclers and foundries to further increase the efficiency of their chip management operations.

Whether in the defense industry or any other manufacturing sector, the necessity for better chip management continues to grow, and today's advanced chip shredding, wringing, and briquetting systems are an ideal solution. They allow these manufacturers to efficiently handle large volumes of chips while reducing costs through machine-tool coolant recovery and increased chip recycling value. **DEM**



**Jorgensen Conveyor
and Filtration Solutions**

<https://www.jorgensenconveyors.com>

HYBRID MILLING MACHINE

LUMEX Avance-25 combines selective laser sintering with high-speed milling.

The LUMEX Avance-25 metal laser sintering hybrid milling machine is a powder bed metal additive manufacturing (AM) platform with subtractive machining capability. The machine combines selective laser sintering (SLS) with high-speed milling (HSM), commonly called hybrid AM.

REVOLUTION IN METAL PROCESSING

Metal laser sintering uses a laser beam to melt metal powder, and high-speed, high-precision machining uses end mills. These processes are repeated to produce the designed shape in one process on a single machine. Matsuura's hybrid technologies achieve machining accuracy and surface finish comparable to machining centers, surpassing the capability of conventional metal 3D printers.

HIGH-SPEED OPERATION

The build speed is greatly increased by employing high-output laser, optimized Galvano control/sintering conditions, improved powder distribution, etc. The latest specifications produce a maximum build speed of 16cc/h with a 500W laser; 35cc/h with a 1kW laser. The milling time is also greatly

reduced through pre-milling powder suction and optimal path creation with the LUMEX CAM software. The reduction of processing time is achieved in the sintering and milling phases.

REDEFINING THE MANUFACTURING PROCESSES

The LUMEX series manufactures parts in near-net shape and 3D objects with complex interior structures and creates components with hollows, 3D meshes, and free-form surfaces. In addition, deep ribs, impossible to machine with machining centers, can be produced without using EDMs. This advanced technology is gaining attention not only in the die and mold industry but also in the aircraft and medical industries.

LUMEX DEDICATED CAM SOFTWARE

LUMEX CAM is CAM software dedicated to the LUMEX metal 3D printer series. Metal laser scan and milling paths can be created with ease. The

laser scan and milling path simulation function helps to check the created paths before processing starts.

STEP MACHINING PROCESS

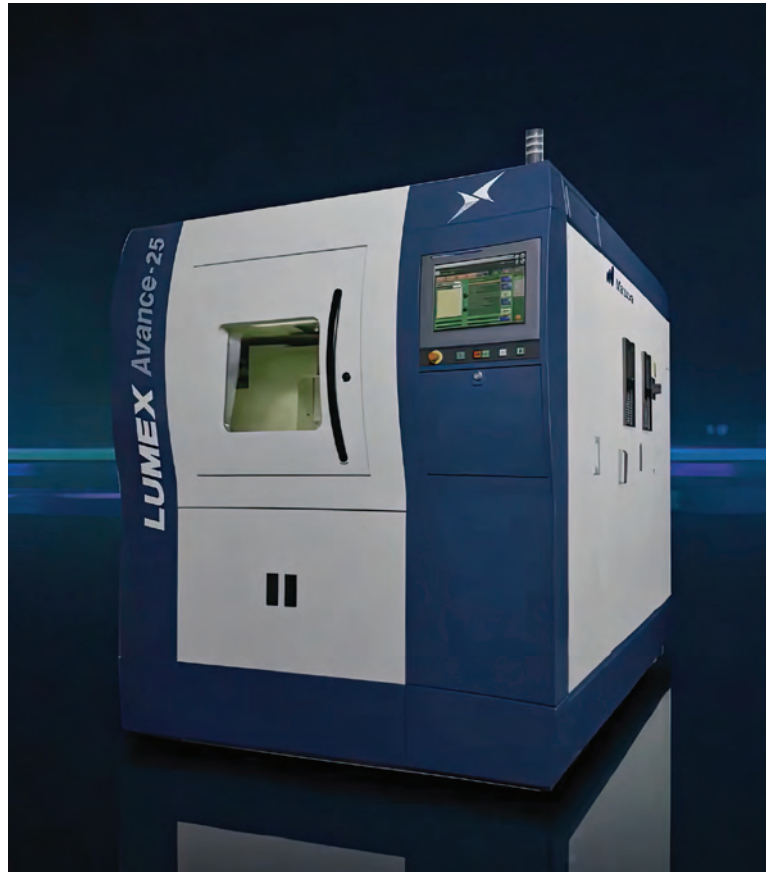
By repeating the process of laser processing – semi-finishing – finishing, discoloration of the finish surface as well as steps which may occur between a milled layer and a laser processed layer due to heat shrinkage can be prevented. Such a function has been developed and given the name Step Machining Process.

PRE-MILLING POWDER SUCTION

By removing metal powder around the built part before starting milling, a faster milling speed and a large-diameter tool can be used to shorten the milling time. At the same time, surface finish is improved with less tool wear, enabling efficient manufacture.



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SCAN TO



REGISTER

THE NEXT GENERATION OF **US-MADE** MILITARY DRONES

Powerus is ready to scale production and provide soldiers with needed UAVs after selection into Drone Dominance Program.

By **JAKE KAUFFMAN**

Brett Velicovich remembers the first time he saw a drone. He was an intelligence analyst for the United States Army serving in the mountains of Afghanistan and was assigned to a Special Operations unit living in an old Taliban prison on an airfield when one of the operators started flying an AeroVironment Raven, which cost around a quarter of a million dollars at the time. From that moment on, Velicovich was in awe and is now the co-founder of Powerus, a U.S. manufacturer of unmanned aerial vehicles (UAVs) just granted entry into the next phase of the Pentagon's Drone Dominance Program.



Brett Velicovich,
co-founder of Powerus

Velicovich recognized how hard it was for warfighters to carry all the equipment necessary to operate drones during his time in the Army, and knew their platform needed to be more mobile, so the MatrixFold multi-purpose attack drone was developed.

"Soldiers need to move fast; they need to move with speed, they don't necessarily have a big truck to lug all this stuff with them, so it's all about modularity," Velicovich says. "The Matrix Fold provides soldiers with this extreme modularity. This thing basically folds up almost to half its size, like a piece of paper, yet has the same strength and capability as others in our Matrix line."



TOP PHOTO: Powerus' MatrixFold was selected to compete in Gauntlet II of the Drone Dominance Program, taking place this summer.

ABOVE: Powerus' xFold Dragon drones can transport palletized supplies, heavy equipment, and oversized payloads to remote or contested locations for logistics, firefighting, and large-scale infrastructure deployment.

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INDEX *better.parts.faster. every.job.faster.*



The modularity extends to the components used to make the MatrixFold. Like others in their Matrix line of drones, the MatrixFold features easily interchangeable parts, so if the Armed Forces buy them and keep them in storage, the systems won't become obsolete. Velicovich saw this a lot when the Army would try to

use drones they had stored, only to find they were outfitted with older-generation parts, motors, and controls. Because of this, Matrix-T drones are used extensively in target training since they can be shot down, then have parts replaced and return to the training exercises. Tracking down those interchangeable parts can be

MORE ON GAUNTLET II

Scan the QR code to stay up to date on Gauntlet II of the Drone Dominance Program.



difficult because Velicovich says the U.S. drone supply chain needs serious attention. During his service, Velicovich's team would constantly jockey with other units to get more drones, but there was a limited supply, and new drones weren't being manufactured quickly. The Ukraine-Russia conflict highlighted that Ukrainian manufacturers were able to manufacture hundreds of thousands of drones per month, while the U.S. was only manufacturing a few hundred a year.

"The supply chain requires two things: it requires capital from companies willing to spend it and the buyers willing to buy at those levels," Velicovich says. "I think we're starting to see that now, finally, and the Drone Dominance Program is a beautiful example."

We've discussed the Drone Dominance Program in previous issues of *Defense and Munitions*. It's the billion dollar Pentagon initiative to procure and field tens of thousands of low-cost, one-way attack drones, with the aim of accelerating combat capability and strengthening the U.S. drone manufacturing base. Powerus' MatrixFold was selected to compete in Gauntlet II of the Drone Dominance Program, taking place this summer. Powerus says winners of the Program must demonstrate the ability to produce capable, low-cost, secure supply chains for small uncrewed aerial systems (sUAS) at scale, enabling the U.S. military to integrate these capabilities into future acquisition pathways. Following qualification, the next parts of Gauntlet II involve a production and delivery test to prove manufacturing readiness and identify the most capable systems for scaling and fielding. The Gauntlet test event concludes with the delivery of sUAS orders to the winners.

"We're thrilled to be chosen out of the number of companies for the program," Velicovich says. "I'm a big fan of the Drone Dominance Program and the

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people who created it, because you can tell they understand what our country actually needs in terms of scaling production. We've sold hundreds of Matrix drones to various military soldiers; it's proven itself, and that's why they keep buying from us. We're not coming in with a system many soldiers aren't already familiar with, and so we're excited already because we have stuff that works, and in the end, the technology is going to speak for itself."

On the other side of the drone spectrum is how to defend against them, because the U.S. isn't the only country conducting drone warfare. Shooting a nearly million-dollar missile at a drone costing \$20-30 thousand isn't sustainable. Just jamming a drone's signal doesn't always work either, and, as we discuss in our article with ANELLO Photonics in this issue, most combat is done in GPS-denied environments. Powerus also develops, manufactures, and sells drone defense systems, and Velicovich believes a layered approach is needed to fully combat drone warfare with electronic warfare systems, kinetic interceptors, various spoofers, and more. Powerus' Guardian-1 Interceptor is described as their "Matrix drone on steroids" by Velicovich, and flies vertically instead of horizontally while being more powerful and faster than their Matrix drone. It's equipped with radar and a counter-UAS sense and detect suite from partner company Digital Force Technologies.

"If you were to go to the Ukrainian-Russian front lines, the primary method the Ukrainians use is shooting down with interceptors. Thousands of interceptors are being built across that country every single month; that's the same thing we need to do here, but again, it's not the only thing. You should have a layer," Velicovich says. "Those things are fast, and the speeds at which they can move are just incredible, and they're almost un-jammable. We know because we build them, we know how hard it is to take them down."

Powerus currently has more than 50 employees, but is hiring more engineers and supply chain experts as it scales up production for the Drone Dominance Program, expecting to be at 75 to 80 employees soon, with projections into the hundreds next year. Velicovich expects

good results from Gauntlet II and has lofty goals for Powerus going forward.

"We have the ability to increase the scale of production to meet the demands, and just like the Army chooses one or two manufacturers to supply all their soldiers with weapons, or boots, or helmets, we want to be that chosen supplier

for drones," Velicovich says. "Every single soldier needs to have a drone, whether you're an infantryman or you're somebody who's repairing roads, you can always find a reason to use a drone." **DBM**



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5 THINGS YOU NEED TO KNOW

5

THINGS YOU **NEED TO KNOW**
about supply chain security**2 Supply chain security starts with diversification**

Strategic investments, responsible mining partnerships, and long-term supplier relationships reduce risk and improve supply stability. CERATIZIT – with its parent company, the Plansee Group – supports supply diversification through partnerships and investments that secure access to tungsten resources outside of China.

Manufacturing depends on stable access to critical raw materials. For defense and aerospace industries, disruptions in the tungsten supply chain quickly impact production schedules, costs, and long-term competitiveness. As global pressures reshape manufacturing, supply chain security has become a strategic advantage. Here are five insights driving that shift.

1 Tungsten is more than a raw material

Tungsten is essential for cutting tools because of its extreme hardness, heat resistance, and wear performance. It's critical for machining defense components, aerospace alloys, hardened steels, and other difficult-to-machine materials. However, global tungsten supply is concentrated in only a few regions, creating potential vulnerabilities for manufacturers dependent on consistent tooling performance and inventory.

3 Recycling is a manufacturing security strategy

Recycling has become more than a sustainability initiative. It's also a critical part of supply resilience. Recovering tungsten from used carbide tools reduces dependence on newly mined raw materials while creating a more stable and traceable material stream. Through customer buy-back programs, advanced recycling processes, and strategic partnerships, recycled tungsten can be transformed back into high-performance tooling for continued industrial use.

4 Transparency and traceability matter

Defense manufacturers increasingly need confidence in where materials originate, how they are processed, and whether sourcing aligns with compliance and ethical standards.



Traceable supply chains help manufacturers reduce operational risk while improving consistency and accountability across production. Reliable sourcing partnerships and vertically integrated material strategies provide greater visibility throughout the supply chain lifecycle.

5 CERATIZIT controls the tungsten supply chain from the ground up

Supply chain security requires independence, direct control, processing expertise, and long-term infrastructure investment. Through its vertically integrated tungsten supply network in the United States, including Global Tungsten & Powders (GTP), CERATIZIT maintains access to every stage of tungsten processing, from raw material conversion to the

production of high-purity ammonium paratungstate (APT). This integration strengthens supply chain security while helping ensure consistent material quality for manufacturers producing critical defense and aerospace components. Combined with its position as the largest tungsten supplier in the Western world, CERATIZIT provides manufacturers with a stable, dependable source for one of the industry's most critical materials.

As global manufacturing pressures continue to evolve, supply chain security is inseparable from production security. For U.S. manufacturers, CERATIZIT's access to critical materials including tungsten provides a long-term strategic advantage.



For more information, visit **CERATIZIT.com**

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TALENT POOL

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- D.C. region ranked fourth best tech talent market in North America
- More than 300,000 people in the science and engineering sector
- Thousands of military veterans and active service members transitioning to civilian life with security clearances in hand



Arlington, Virginia, is home to the Pentagon and has the largest concentration of federal contractors in the nation. Northern Virginia companies were awarded more than \$100 billion in federal contracts in 2024, exceeding California and Texas combined.

8 of the nation's top 10 leading defense contractors maintain a significant presence in Arlington:

CORPORATE HEADQUARTERS

for Boeing, RTX, Airbus U.S. Space & Defense, and Leonardo DRS

MAJOR OPERATIONS

for Lockheed Martin, General Dynamics, L3Harris Technologies, and more

TALENT INVESTMENT PROGRAM

- Investing more than \$2 billion to expand Virginia's tech talent pipeline
- Doubling the number of graduates each year in computer science and closely related fields
- Higher education institutions already produce roughly 12,000 tech-related degrees and certificates annually

KEY ORGANIZATIONS

Arlington hosts several key defense research and innovation organizations:

- Air Force Office of Scientific Research (AFOSR)
- Defense Advanced Research Projects Agency (DARPA)
- Office of Naval Research (ONR)



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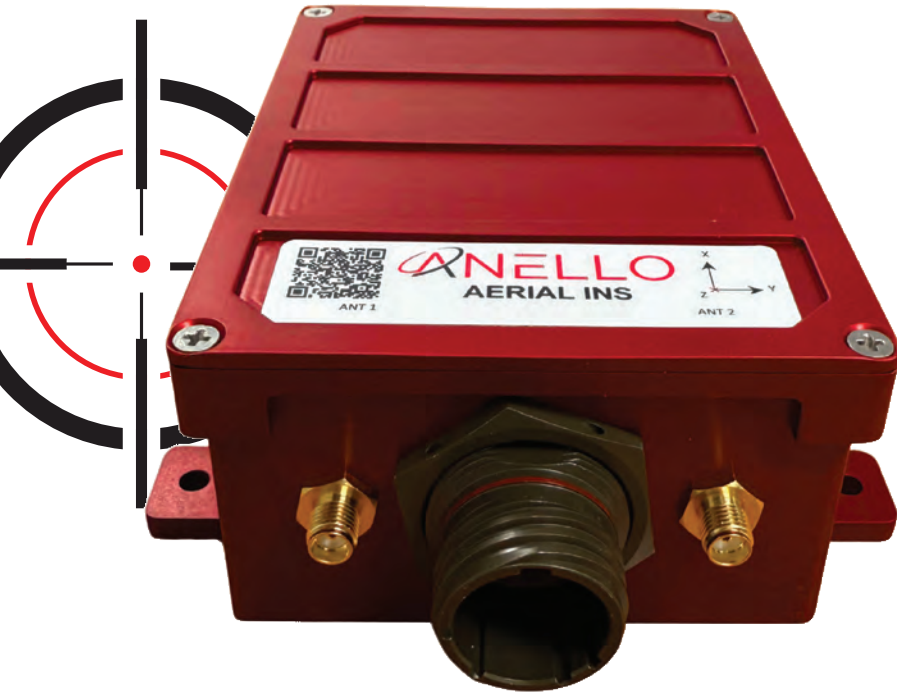


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A NEW LEVEL OF **ACCURACY** IN WARFARE

ANELLO Photonics' Silicon Photonics Optical Gyroscope (SiPhOG™) is helping the United States Armed Forces find their way.

By **JAKE KAUFFMAN**

Military autonomous aircraft, ships, and vehicles all must reach their targets safely, but how is that possible now with so much GPS jamming, spoofing, and denying actions being deployed by our adversaries? Autonomous warfare prevents injuries and deaths of warfighters, but they need GPS to know where to go. It's been brought to a head during the Ukraine-Russia conflict and continues to affect military operations in the news today. The realization is that GPS won't be available in conflict areas.

There are two solutions to solve this problem. One is using a high-end fiber optic gyroscope, which has been used on Intercontinental Ballistic Missiles (ICBMs), submarines, and fighter jets for the past 30 years. The other is cameras or visual navigation, which needs a map to overlay the visual image as it's flying to know its location. However, visual navigation only works in perfect conditions. It doesn't work well over clouds, doesn't cover over water, snow, or sand and is affected by other natural elements on the battlefield.

Dr. Mario Paniccia has worked for more than 25 years in the photonics industry, previously for Intel, where he became an Intel Fellow and CTO & GM of their Silicon Photonics Group, working primarily in the semiconductor and data center markets before starting ANELLO Photonics as its CEO and co-founder. After four years of research and development, Paniccia and his team launched their Silicon Photonics Optical Gyroscope (SiPhOG™) and realized it had broad applications appeal to industrial and defense markets.

Paniccia describes how a gyroscope works based on a principle called the Sagnac effect. Essentially, a laser beam is sent into a lithium niobate crystal, which splits the light into two beams, and those two beams go around a coil in clockwise and counterclockwise directions. When the coil rotates one way, the light going in that same direction goes a shorter distance than the light going the opposite direction. They come back around, recombine, and interfere with each other. When those two beams interfere, the phase difference between the two beams is proportional to the path length difference. If one can measure the phase difference, one can then determine the rotation rate. The ANELLO SiPhOG can measure phase differences as small as 50 nanoradians (50×10^{-9} radians). In layman's terms, imagine you're on an escalator, it's moving; if you stand still, you go at a certain rate and distance. If you now start walking in the same direction, you'll go the same distance in a shorter amount of time. That's what happens as the coil rotates.

The first order of business for ANELLO was developing a high-precision, low-cost fiber gyroscope that could be produced in high volume. In the consumer market, gyroscopes used are based on a micro-electro-mechanical system or MEMS-based technology. They're cost-effective but very sensitive to temperature, vibration, and electromagnetic interference, which affects their accuracy and stability. These are typically measured in degrees per hour of bias or drift. This is usually good enough for your cell phone, wireless earphones, and smart watches, but in a combat zone, or where one needs precision navigation, a

few degrees per hour of drift could put a drone in another city. It gets interesting around half degrees per hour.

"When you go below this half degree per hour of bias, you get into what's called strategic grade, or navigation grade performance, and this is what's in fighter jets. If you go way down to 0.0001 degrees per hour, this is what is found in a submarine; you can go underwater for extended periods of time while maintaining decent accuracy," Paniccia says. "But that box providing the whole navigation solution used in submarines is very complex, is probably half the size of your desk, and it's a couple of million dollars. We saw this large gap in the market and said, 'What if we could develop a solution that sits in the middle, is still high-performance, but can be made for low cost and can be targeted to the high-volume autonomous market?' That's how ANELLO was started."

ANELLO Photonics was able to put all the optical components, such as splitters, couplers, phase modulators, detectors, TM filters, and other photonic components, into a 2mm x 5mm silicon chip, small enough to fit on a fingertip for their SiPhOG.

"When I put that together with electronics and a laser, I have the world's smallest optical gyroscope. It's small, rugged, low-power, very accurate, and has no moving parts," Paniccia says. "It's not susceptible to temperature, not susceptible to vibration, but more importantly, it's all assembled using pick-and-place machines.

This is the same way we

build PC boards and other electronics in the computer industry. So now we've radically changed the way we design and build fiber optic gyroscopes. No more big, bulky components, no more fiber splices, all processed in a high-volume manufacturing environment."

A full IMU (ANELLO calls theirs the ANELLO X3) has three SiPhOGs and is used for things moving in three dimensions, such as drones and boats. In addition, the ANELLO X3 has nearly three dozen other sensors, including accelerometers, temperature sensors, magnetometers, and barometers, in addition to the SiPhOG scope.

ANELLO Photonics has successfully tested its SiPhOG-based products with the United States military at White Sands Missile Range and other military events, under real jamming and spoofing conditions. Currently, ANELLO has products addressing land, air, and sea operations. The products are simple to install, use standard interfaces, are very robust, and can operate in harsh environments. The test results with customers have turned out well for Paniccia and his team at ANELLO Photonics.

"We developed technology that can't be jammed, can't be spoofed, and can navigate very accurately without any GPS, and then all of a sudden Ukraine happened, and then all of a sudden Israel happened, and now with Epic Fury, adversaries are jamming and spoofing all the time," Paniccia says. "I'm at the Pentagon and/or in DC now every couple of weeks. The demand is growing so fast that we can't make enough of these products to keep up with demand."

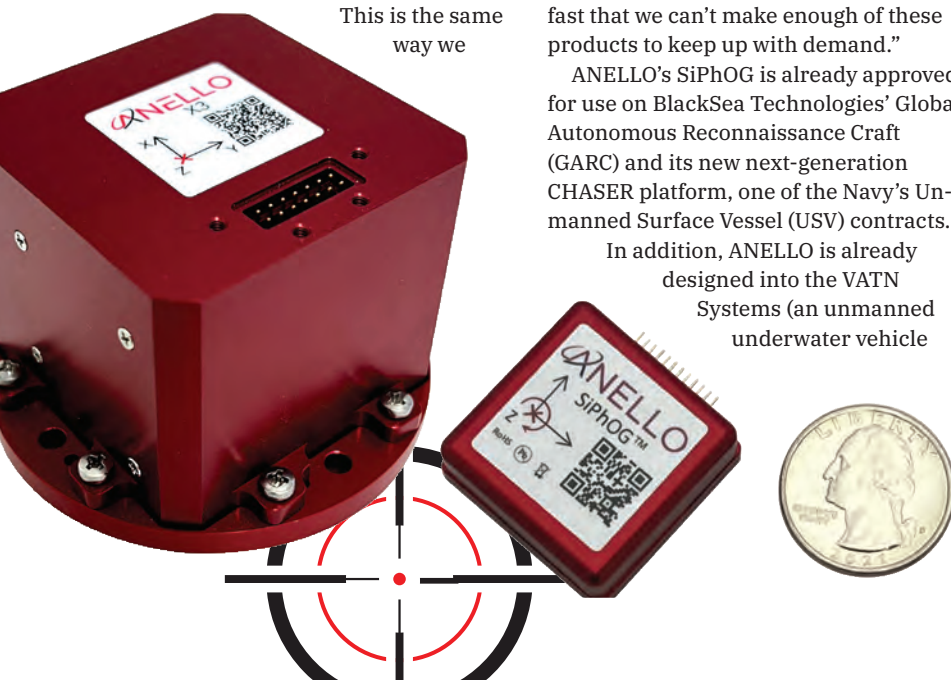
ANELLO's SiPhOG is already approved for use on BlackSea Technologies' Global Autonomous Reconnaissance Craft (GARC) and its new next-generation CHASER platform, one of the Navy's Unmanned Surface Vessel (USV) contracts.

In addition, ANELLO is already designed into the VATN Systems (an unmanned underwater vehicle

(UUV)) and is also enabling Havoc AI's autonomous fleets to navigate safely and effectively in GPS-denied or jammed environments. ANELLO also announced a strategic partnership with Firestorm earlier this year. The ANELLO team has successfully completed tests at Silent Swarm, along with the Navy SEALs' Combatant Craft Assault (CCA) system. The ANELLO technology is also already designed into multiple other drone platforms with the Marines that are not public, and the team is actively testing on land vehicles for the Army.

Recently ANELLO was awarded a \$20M APFIT contract to accelerate its SiPhOG production and integration into defense platforms. ANELLO also recently announced the closing of a \$25 million funding round led by MESH Ventures with participation from new investors Washington Harbour Partners alongside existing investors Lockheed Martin Ventures, Catapult Ventures, New Legacy Ventures, One Madison Group, IronGate Capital, and Mana Ventures. The roughly 35-person team at ANELLO Photonics expects to grow its headcount with the new funding round, going almost exclusively to building out its production team and manufacturing facilities.

"My board and I are all behind moving as fast as possible to get this technology to as many places and customers as possible. More importantly, we want to get SiPhOG technology into the hands of the warfighter because I think it gives the U.S. a huge strategic advantage. Today, we are basically flying blind, we are driving blind, we are boating blind, because there's no GPS," Paniccia says. "Now I think we realize it's a problem, because it's our war, it's not someone else's problem, so the feedback I am getting is, how do we get this technology to the warfighter faster? How do we accelerate our production ramp? How can we integrate this into more platforms and deliver to our customers faster? We at ANELLO are ready for this challenge and remain steadfast in our commitment to deliver. We at ANELLO are ready for this challenge, and we are and will continue to deliver." — D&M



ANELLO Photonics
<https://www.anellophotonics.com>

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The Makro•Grip Ultra base jaw can be used in conjunction with various Avanti top jaws to clamp round or pre-machined contours. In addition to the hardened Avanti top jaws with plain clamping step, the adaptation of standardized Avanti 125 top jaws made of aluminum and steel in heights of 46mm and 76mm is also possible. The Makro•Grip Ultra base jaw is individually secured by a threaded cap and can be moved independently of other clamping jaws.

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CNC TURN MILL

Making its North American debut at IMTS 2026, the INDEX G160 5-axis turn mill is built on a rigid, vibration-damping machine bed. The machine incorporates a pair of highly dynamic direct-drive spindles, available with bar clearances of 1.64" (42mm) or 2.56" (65mm). An upper tool carrier with a B-axis and direct-drive milling spindle enables full 5-axis machining, while two lower tool turrets can serve either of the machine's spindles.

Manufacturers not requiring robust 5-axis capabilities can optionally select to replace the milling spindle with an upper tool turret. The machine is easily integrated with a variety of automation solutions and offers an assortment of options. Together, these features allow the G160 to be optimized for a diverse range of small, complex parts across all industry segments.



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FLEXIBLE AUTOMATION SOLUTION

The Turn-Assist flexible automation solution is designed to simplify and optimize CNC turning operations. Engineered for reliable loading and unloading of turning machines, the Turn-Assist helps manufacturers increase spindle uptime, reduce manual handling, and achieve more consistent production results.

The Turn-Assist is available in multiple models, each tailored to different production needs. These models differ in robot payload, storage capacity, and system configuration, allowing manufacturers to choose the setup best matching their parts, machine type, and required level of autonomy. Whether the priority is compact automation for smaller parts or a higher-capacity solution for larger workpieces and longer unattended runs, there's a Turn-Assist configuration to fit the application.

The Turn-Assist combines user-friendly operation with the flexibility required in modern machine shops. It's designed to support a wide range of part types and batch sizes, making it an ideal solution for companies looking to improve efficiency while maintaining adaptability in their turning processes.

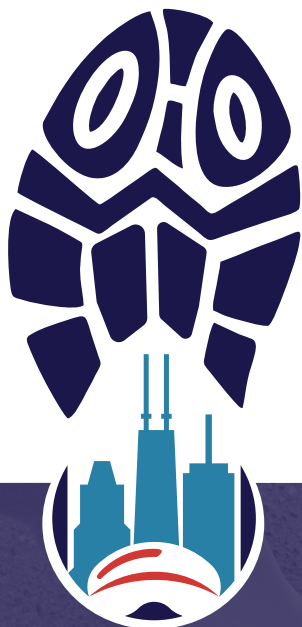
The Turn-Assist helps shops work smarter, increase output, and prepare for the future of CNC automation.



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Race Start

Wednesday, September 16
7:00 a.m.

Race Location

DuSable Harbor
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Pricing

5K: \$40 / \$45 day of
1 mile: \$30 / \$35 day of

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12:00 p.m. - 5:00 p.m.

Monday, September 14

10:00 a.m. - 5:00 p.m.

Tuesday, September 15

10:00 a.m. - 5:00 p.m.

Race Day Packet Pick-Up (DuSable Harbor)

6:15 a.m. - 6:45 a.m.

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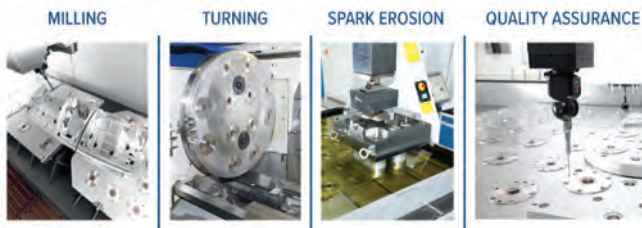
Zero Point clamping system: Cut setup time and gain flexibility

By Tom Dang,
VP at Lyndex-Nikken

In manufacturing, time is money – especially in shops doing high-mix, low-volume machining where frequent setups are the norm. If you're still spending too much time on setups, alignments, or fixture changes, a Zero Point clamping system offers a transformative solution your shop needs to be competitive.

WHAT IS ZERO POINT CLAMPING?

The Zero Point clamping system is a modern alternative to the conventional T-slot table, designed for precision, repeatability, and speed. Its quick-change capability supports lean manufacturing by reducing setup time and enabling flexible workflows across a wide range of applications.

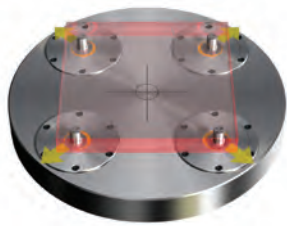


Unlike traditional workholding methods that require manual alignment, a Zero Point system locks and locates workpieces or fixtures quickly and precisely by referencing a defined zero point – making part changeover nearly instantaneous.

Zero Point Thermal Symmetry and Accuracy

☒ **Thermal symmetry – Fixed zero point in the center of the table**

Compensation for thermal expansion always symmetrical about the center axis. Fixed Zero point in the center of the table: Pitch errors can be compensated up to $\pm 0.05\text{mm}$ per clamping pot.



WHY IT MATTERS FOR SHOPS

For shops running a variety of parts on tight deadlines, Zero Point systems deliver clear advantages:

- **Dramatic reduction in setup times**

Traditional setups are time-consuming, often requiring manual alignment and multiple adjustments. Zero Point clamping systems streamline the process, cutting setup times by up to 90% – resulting in more spindle time and faster job turnaround.

- **Flexibility across operations**

Whether you're milling, turning, EDMing, or measuring, Zero Point systems adapt easily. They integrate with tombstones, subplates, pallets, or directly onto machine tables. That flexibility allows shops to create a modular setup that can handle diverse projects and materials.

- **Enhanced precision and repeatability**

With positioning repeatability of less than $2.5\mu\text{m}$, Zero Point clamping ensures each workpiece is clamped in the exact location every time. Once a fixture is dialed in and locked into position, it can be removed and reinstalled without losing zero. That consistency not only ensures better part quality but also eliminates costly errors due to misalignment.

- **Increased machine uptime**

Faster part changes mean less machine idle time. Zero Point clamping maximizes machine utilization, improving throughput and ROI on equipment investments.

- **Lean, scalable, and operator friendly**

Zero Point clamping systems support lean manufacturing principles by minimizing machine downtime and standardizing workflows. Simplified setups also reduce the need for highly skilled operators – allowing less-experienced operators to deliver consistent results.

CONCLUSION

For manufacturers aiming to improve efficiency and precision, a Zero Point clamping system is a smart investment to achieve quality parts on time. It delivers faster setups, repeatable accuracy, and increased machine uptime – resulting in measurable productivity gains and cost savings. Its modular, scalable design is built to meet the demands of high-mix machining and to future-proof your operations, giving your shop the flexibility to compete, grow, and adapt with confidence.

MORE INFO:
lyndexnikken.com



INCREASE MACHINE THROUGHPUT

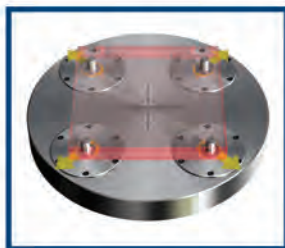
By Minimizing Setup and Changeover Time



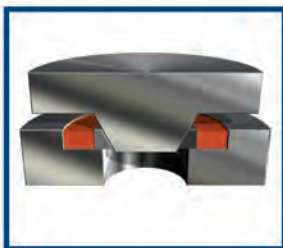
ZERO POINT CLAMPING SYSTEM

Traditional workholding setups are time-consuming and prone to error. Today's most efficient shops use Zero Point clamping systems - a modern alternative to T-slot tables. Zero Point clamping is modular workholding with the flexibility and diversity to hold any workpiece while maintaining high accuracy – drastically reducing setup and changeover time.

The uniformity of the Zero Point system streamlines your workflow for milling, turning, EDM, and measuring machines. This makes Zero Point clamping ideal for shops doing high-mix, low volume machining due to:



Thermal Symmetry – fixed zero point in the center of the table



High Repeatability – similar to HSK, the design achieves accuracy of less than 2.5 μm



Simple Assembly – few components & repeat accuracy for 1 million cycles



Pneumatic System – only 5.5 bar air pressure needed to release clamping studs

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BATTERIES FOR DEFENSE APPLICATIONS: TOWARD SAFETY AND SOVEREIGNTY

Ilika Technologies' product commercialization manager explores the performance, safety, resilience, and sovereign supply of batteries for the defense industry.

By **DENIS PASERO**

The wars in Ukraine and Iran have shifted the battery landscape from being very much focused on the electric vehicle (EV) and consumer electronics markets to becoming a critical and strategic defense focus. The rapid increase in the manufacturing of millions of drones is only one of many examples of modern warfare requiring novel high-energy storage solutions. This fast-increasing demand for batteries has initiated a worldwide competition and an explosion in the manufacturing capabilities for new, more efficient batteries produced with less expensive materials. At the same time, issues of national security and sovereignty have led governments worldwide to review their strategies in relation to the sourcing of battery technologies.

Batteries are nowadays deployed extensively across the four military domains, which are land, sea, air (including space), and cyberspace. On land, soldiers carry batteries to power surveillance and communications equipment, sometimes in conformal vest-like wearables, while vehicles may hold ancillary backup batteries in storage. The electrification of military vehicles has been slower than that of commercial and passenger automotive vehicles, but it's happening currently in hybrid diesel and battery pack systems.

A modern soldier could carry up to 15kg of hidden battery on the battlefield.

On sea, or rather underwater, batteries are essential to power autonomous uncrewed vehicles (AUVs), from small sub-sea drones carrying explosives to larger submersibles used for reconnaissance. In the air, drones of variable sizes have been the most visible war equipment of recent conflicts, but batteries also power autonomous platforms for surveillance

and satellites for navigation. In cyberspace, battery-powered data centers have rapidly multiplied. In brief, batteries provide autonomy, resilience, and stealth to modern conflict.

This rapid increase in demand for batteries has created serious concerns for governments intending to procure the most efficient latest technologies while keeping control of the supply chain and avoiding exposure to foreign countries. This article investigates how the worldwide battery sector can respond to increasing demands for performance, safety, and sovereignty.

KEY PERFORMANCE REQUIREMENTS

An essential requirement for the selection and procurement of batteries is their technical performance. Ahead perhaps of all specifications, battery energy density dictates how compact or heavy a piece of equipment will be. The higher the energy density, the more energy will be available in a given weight or volume, and energy means longer range; more powerful, long-lasting capabilities; higher endurance; and more effectiveness on the battlefield. Seen in a different way, a high energy density also enables a product designer to reduce the mass or size of a device without compromising its performance, helpful to reduce the burden on the soldier or vehicle and to enhance their maneuverability. The dominance of lithium-ion batteries in most applications, not only military, is the result of their superior energy density. Out of these, the nickel manganese cobalt (NMC) variety is particularly energetic but has safety drawbacks.

The location of two recent conflicts highlights the next requirement placed on batteries, namely, the environment



and temperature conditions. From extremely high temperatures in the Middle East to the sub-zero conditions in the Ukrainian winter, batteries are expected to keep working with as little de-rating as possible. This is tough on batteries, which perform optimally at a room temperature of 25°C or thereabout. At low temperatures, batteries become sluggish, lack power, and may not provide the current expected to get equipment started. At high temperatures, some of the flammable or combustible components may become unstable, expand in volume, initiate battery swelling, rupture, potentially leak, and, in extreme cases, cause violent incidents known as thermal runaway: this is when a battery has passed a point of no return, and no protection can stop it from catching fire and exploding. Solid-state batteries, a variety of lithium-ion batteries which don't contain the flammable electrolyte liquid, are best placed to resist high temperatures. Unfortunately, it's difficult to have batteries that perform consistently at extreme hot and cold temperatures. Pack manufacturers will need to design around this, providing cooling or heating mechanisms to optimize battery use.

Power characteristics are an additional priority referring to the speed of the energy delivered by the battery and the energy going back into it during recharges. For the former, high power is required for rapid current pulses such as those involved in modern communications, radars, and launching weapons. High temperatures are actually beneficial to increasing the power capabilities of a battery, as long as it's within safe limits. Charging speed is also impacted by the power performance of a battery: fast charging a battery is highly desired to avoid downtime and keep a high pace in operation, but fast charging is essentially only possible above 0°C, unless a heating system exists in the pack. In addition, fast charging a battery usually limits its operational life; in brief, the battery will expire sooner unless it's charged reasonably slowly in a matter of hours, for example, overnight.

There are significant chemical variations and types of primary or rechargeable (secondary) batteries, but none simultaneously provide high performance in the areas of power, energy, longevity,

and temperature tolerance. Equipment developers are ultimately asked to accept trade-offs in some of the characteristics, prioritizing those that are essential versus those that are just good to have. In addition, technical requirements are only one of several selection parameters. Non-technical requirements are also part of the selection process.

SAFETY AND RELIABILITY

Battery reliability is non-negotiable, as is the safety of the military personnel. Yet, batteries are very energetic objects, consisting of toxic chemicals that may catch fire or explode violently when placed in situations of abuse involving high vibrations, shocks, impacts, and high-temperature environments. Unfortunately, these are conditions often encountered in combat situations, uneven terrain, mechanical stress, or rough handling. Despite widely promoted examples of lithium-ion battery failures, product designers have been extremely successful at containing the potentially dangerous energy stored in batteries, and there are actually fewer cases of fires in EVs than in conventional petrol or diesel-based ones. The energy in batteries, however, has been contained by protecting the battery's chemicals with surrounding metallic parts and complex management systems in packs, but this increases weight. Hence, varieties of lithium-ion batteries with enhanced safety performance are highly sought after. The lithium iron phosphate (LFP) variety is particularly safe, but lacks in energy density, hence imposing another trade-off in terms of product selection. Solid-state battery technology, the next generation of batteries beyond lithium ion, is expected to provide a superior balance of safety and efficiency, reducing the compromise designers and users have to make.

SUPPLY CHAIN INDEPENDENCE

Possibly the more important non-technical concern related to batteries is developing a safe, ideally sovereign supply by limiting reliance on foreign sources, especially from non-ally governments. A key example is China, which extensively dominates the supply of batteries, particularly lithium-ion batteries, and the materials in them. China controls the reserves of graphite (key component in



ABOVE: Ilika engineer inspecting Goliath material.



LEFT: Ilika Goliath solid state cell.

the anode), as well as nickel and cobalt (in the cathode). China is the top producer of LFP batteries, which have become very cheap thanks to subsidizing from the Chinese government and over-manufacturing. No Western manufacturers can currently compete with such low prices and are stuck in scenarios where all roads eventually lead to China, even if production is deployed in Europe or the U.S. This reliance on foreign power to electrify Western defense capabilities is of great concern, and providing local solutions has become an urgent priority.

To conclude, battery technologies have recently transitioned from powering civilian and industrial applications, from EVs to consumer electronics, to becoming key to rapidly developing battery-powered military capabilities. Countries capable of sourcing supplies of high-performance, safe, and reliable batteries while maintaining some level of strategic autonomy will gain significant geopolitical and operational advantages in a rapidly evolving security environment. **DEM**



Ilika Technologies
<https://www.ilika.com>

About the author: Denis Pasero is a product commercialization manager at Ilika Technologies, a pioneer in solid state battery technology working with experts in the defense field for improved safety of batteries in the battlefield environment.

By **RON WEIGEL**

Quaker Houghton
impacts defense
readiness from factory
floors to frontlines.

DEFENSE MANUFACTURING IS ALWAYS A FLUID BUSINESS

IN THE PAST YEAR, THE DEFENSE INDUSTRY has confronted various challenges, from supply chain issues to production shortages. Although the global defense market is projected to grow to more than \$3.3 trillion by 2030 as countries look to boost their security, the current resource shortage is putting pressure on defense manufacturers to increase production to meet demand. In the United States, the defense manufacturing sector is expected to grow from approximately \$320.86 billion in 2025 to \$382.56 billion by 2030, reflecting a compound annual growth rate (CAGR) of 3.58%. As defense production scales and manufacturing processes advance, demand is rising for high-performance metalworking fluids, corrosion inhibitors, and surface treatments. This shift, along with a focus on resilient, localized supply chains, reinforces the metalworking industry's vital role in modern defense manufacturing.

COMBATING INDUSTRY CHALLENGES

Governments invest in defense to maintain deterrence and protection while spending adjusts to security changes. Defense manufacturing supplies military capabilities to safeguard citizens and territory, while also enabling countries to project influence and promote prosperity.

The global defense industry has a highly complex supply chain with multiple tiers of suppliers, but manufacturers still face increasing challenges. While many defense manufacturers work to strengthen supply chain resilience, higher demand will continue to affect the industry through time pressures, production & delivery cost management, and global supply maintenance.

Ensuring quality and reliability in sourcing parts, products, and components for manufacturing and aftermarket operations is also essential. Issues such as substandard manufacturing practices and inadequate testing procedures can threaten the integrity and performance of defense asset systems.

We're committed to helping manufacturers increase their productivity by thoroughly understanding their processes. Using specialized methods, our expert teams evaluate the process fluid life cycle and fluid management across the manufacturing site, asking the right questions to find ways to improve production and quality before recommending the best solutions. They'll also remain available to provide technical support and suggest cost-effective methods to assist the customer.

INCREASED PRODUCTIVITY

Quaker Houghton also features six different product groups, suitable for shell production, small ammunition manufacturing, as well as howitzer, rifle, and turret manufacturing, to meet the various needs of every customer. The product groups include forging, quenching, machining, cleaning, phosphating, and fire resistance, so Quaker Houghton can suggest multiple products covering all our customers' applications.

Customers benefit from increased productivity, minimized scrap, and maximized fluid performance due to Quaker Houghton's expertise and product solutions, which are key deliverables across the ammunition manufacturing value chain.

Under increasing pressure to boost productivity and

throughput, defense manufacturers seek long-term partners to address these challenges. Quaker Houghton is committed to delivering innovative solutions helping defense customers operate more efficiently.

Quaker Houghton's HOCUT product range, approved by defense OEMs, acts as a lubricant and coolant, reducing friction between the workpiece and the machine tool. Designed to meet modern metalworking challenges, these products extend fluid and tool life, optimize cycle times, eliminate health and safety concerns, and improve environmental impact through lower consumption and reduced foam and soap.

Favored by many aerospace and defense OEMs and suppliers, Quaker Houghton's soluble coolants and lubricants are versatile and designed for use with cast iron, compacted graphitic iron, stainless and carbon steel, aluminum alloys, superalloys (titanium, nickel, copper), carbides, and composite materials.

Since the 1970s, Quaker Houghton has been a key supplier of forging process fluids, expanding its product range to include unique forging lubricants. This product line features mineral oil-based and water-based graphite compounds for forging cylinder processes. Quaker Houghton's experts work with manufacturers to choose the right lubricant, enhancing productivity, and die life while reducing energy use, internal defects, scrap rates, and fire risks.

Forging Nosing is another product group providing maximized fluid performance. It includes graphite pre-coating forging fluids delivering the necessary lubrication, enhancing an improved EHS profile, lowering residue, improving biostability, and reducing consumption, ensuring a long system life. Quaker Houghton offers oil-based and water-based graphite, with the latter being ideal for defense applications, as dispersions of graphite water perform well in impact-type applications within closed dies.

The company also provides industrial solutions to meet required metallurgical properties and reduce distortion in heat-treated components in the defense industry. Its range of quenching oils and polymers ensures increased productivity,

lower total cost of ownership, up to 40% reduced consumption, and improved worker safety. Low-viscosity options help reduce usage and improve cleanliness.

Beyond product technology, Quaker Houghton offers process modeling, filtration, metering, and monitoring devices, as well as quenchant selection, customized proactive maintenance programs, and comprehensive technical service and training.

MINIMIZE SCRAP AND HAZARDS

Reducing scrap rate improves production costs, product quality, tool life, maintenance, and sustainability. Quaker Houghton's surface finishing line includes pretreatment, metalworking, and wastewater chemicals for manufacturing. Their surface pretreatment solutions optimize part performance, preparing metals and plastics for coatings with expertise to analyze and recommend improvements. These products offer good paint adhesion and corrosion protection, with nickel-free options for safety and cost savings.

The company also provides a wide range of cleaners, from maintenance to solvent and aerospace-approved options, designed for various cleaning processes, including single- or multi-stage spray washers, suited for different pressures and alkalinity levels.

In the defense sector, hydraulic machines are used regularly, requiring fire-resistant hydraulic fluids. These fluids reduce fire hazards, promote safety, and ensure compliance. They have higher flash points, lowering ignition risk during leaks or failures. One must use a well-known, tested fire-resistant hydraulic fluid (FRHF) meeting industry standards. These fluids improve worker safety, are biodegradable and less toxic, and extend equipment life.

MAXIMIZED FLUID PERFORMANCE

Many manufacturers still manually collect samples for lab analysis but results often become outdated by the time they're received. Some now use handheld refractometers for quick reading; however, these can foul easily, require recalibration, and introduce errors due to user subjectivity. To address these challenges, Quaker Houghton offers QH FLUID



INTELLIGENCE, a digital and automated fluid management solution. This comprehensive solution includes hardware with QH FLUIDTREND software, tracking and analyzing every stage of the fluid lifecycle. Gathering real-time process data provides manufacturers with clear visibility into fluid condition, consumption, and performance. The platform employs predictive and prescriptive analytics to detect issues early, automate corrective actions, and optimize maintenance schedules. It minimizes downtime, extends tool and fluid longevity, reduces operating costs, and minimizes waste.

A ONE-STOP-SHOP SUPPLIER

Quaker Houghton provides products and solutions backed by a skilled team, technical support, and global labs and R&D centers. Paired with its customer service, the company supports business operations, leading to improved machining performance, increased productivity, and lower total cost of ownership.

With a comprehensive portfolio, Quaker Houghton guides customers from selecting the right product to offering ongoing technical expertise for every application throughout the production process. Its industry and technical experts collaborate with customers to solve complex defense manufacturing challenges. **DEM**

About the author: Ron Weigel is the business development manager – aerospace for Quaker Houghton.



Quaker Houghton
<https://home.quakerhoughton.com>

IMTS 2026: GIE MEDIA'S MANUFACTURING SHOWCASE



The staff of *Aerospace Manufacturing and Design*, *Defense and Munitions*, and *Today's Medical Developments* announce the GIE Media Manufacturing Showcase taking place at IMTS 2026. Booth West #432636 will highlight four unmanned aerial systems (UAS) from Kratos plus the RoboTrex CNC machine tending robot from Metalcraft Automation Group. Meanwhile, visitors will be greeted by the Pivotal Helix eVTOL outside at McCormick Square.

AIRBORNE SAFETY AND SIMPLICITY

Outside IMTS 2026 at McCormick Square, experience Pivotal's **Helix** single-seat electric vertical take-off and landing (eVTOL) aircraft – a versatile, cloud-connected vehicle engineered to be the safest light eVTOL available. Designed for



recreation and short-hop travel, this personal aerial vehicle can take off and land on grass, asphalt, snow, ice – there's no landing gear, just a keel strip.

A 270° view and quiet operation allow pilots to become immersed in their natural surroundings, fostering a deep connection to the aircraft itself. A fault-tolerant design is bolstered by triple modular redundant systems for safety and reliability. The Helix's powerful capabilities are guided by intuitive controls through a simple user interface and a joystick.

pivotal.aero

AUTOMATED MACHINE TENDING FOR PRECISION AND EFFICIENCY

Booth West - #432636 will feature the **RoboTrex CNC machine tending robot** from Metalcraft Automation Group. Designed to minimize downtime and maximize output in production or prototype machine shops, it seamlessly integrates with any existing or new CNC machines. By automating the loading and unloading process, RoboTrex ensures consistent performance, reduces labor costs, and improves workplace safety.

lang-technik-usa.com; mtlcrautomationgroup.com



UNMANNED AERIAL PLATFORMS

Booth West - #432636 will highlight four unmanned aerial systems (UAS) from defense manufacturer Kratos. The **Valkyrie** is a multi-role Collaborative Combat Aircraft (CCA) designed to operate with Joint and Allied Forces. Flying since 2019, the Valkyrie continues to pioneer tactical unmanned aerial system (UAS) technology and collaborative manned-unmanned capability.

The **MQM-178 Firejet** delivers a high degree of versatility by providing the opportunity to test multiple weapon systems through one flexible and affordable aerial target system. First sold to the U.S. Army in 2013, the Firejet fills various end-to-end weapons-release training roles, including surface-to-air and air-to-air. The Firejet supports both U.S. and International customers, operating on U.S. ranges and around the world, primarily used in ground-based air and cruise missile defense scenarios.

The **BQM-177**, the U.S. Navy's next-generation Subsonic Aerial Target (SSAT), stands unrivaled in delivering realistic anti-ship cruise missile threat emulation. With its cutting-edge aerodynamic design, the BQM-177 serves as a high-performance target for system test and evaluation and live-fire training. As the sole source provider of sub-scale targets to the U.S. Navy, Kratos ensures that the BQM-177 meets the highest standards of performance and reliability.

The versatile design of the **BQM-167**, in production for over 20 years as the U.S. Air Force premier sub-scale aerial target, supports various mission requirements. It accepts a wide array of internal and external payloads, including radar cross-section (RCS) augmentation, infrared (IR) augmentation, towed targets, and other special payloads and mission systems, making it the mainstay aerial target for the U.S. Air Force.

kratosdefense.com

Pivotal, Lang Technik, Metalcraft
Automation Group, Kratos



COMPANY	PG#
Ceratizit USA	18-19
Erowa Technology Inc.....	17
Greenleaf Corp	6
IMTS 2026	13
INDEX Corp.....	15
Kennametal Inc.....	35
Lyndex-Nikken Inc.....	26-27
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**DEFENSE
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NO MISTAKE ON THE LAKE

Cleveland Gear and Hellan Fluid Systems cut the ribbon on an expanded facility and new machining technology for the naval industry.

By **JUSTIN MCCOMBS**

Cleveland Gear Co. Inc. and Hellan Fluid Systems, a division of The Hellan Strainer Co., have called Cleveland, Ohio home for more than 180 years combined, sharing a building but filling different needs for the defense industry. Hellan Fluid Systems is a long-standing supplier of engineered fluid filtration equipment to the U.S. Navy and other defense applications, while Cleveland Gear specializes in precision gearing solutions for demanding industrial and defense environments. They recently celebrated a 20,000ft² expansion of their facility, which will feature \$5 million worth of machining solutions from Mazak Corp. The expansion was the brainchild of Brook Trout, a quality manager at the facility who has since retired, but not before planting the seed with upper management.

"He came to me and said, 'You know, we should engage the Navy and get a grant from the Navy to expand

our manufacturing base in support of shipbuilding.' That was three years ago. He was the single greatest impetus behind the building we're in, the machines that you see behind us, and the emphasis to grow manufacturing at Cleveland Gear and Hellan Strainer," Phillip Haynes, group president of The Hellan Strainer Co., says.

The ribbon-cutting nearly coincided with the commissioning of the U.S.S. Cleveland, a Freedom-class littoral Navy combat ship, which took place three days prior to the ribbon-cutting, a few blocks away in Cleveland Harbor. The U.S.S. Cleveland features more than a million dollars' worth of components from Hellan Strainer and Cleveland Gear.

The expansion houses a Mazak Integrex E1250 V/8 with a Pallettech system and a Mazak HCN, allowing Cleveland Gear and Hellan Strainer to expand the amount of contracted work they can do for the Navy.

"It's a machining capability very few manufacturing centers have, and we're delighted to have it, and the Navy is exceptionally excited to see us get these machines going, because we have a literal boatload of work to do," Haynes says.

Since Trout first planted the seed for expansion three years ago, Cleveland Gear and Hellan Strainer's business has nearly doubled and is projected to double again in the next two years. They're planning to build another manufacturing facility across the street in the next 18 months with approximately 50 more machines and the ability to cast and make

Above: (Left to right) Phillip Haynes, group president of The Hellan Strainer Co.; Councilman Richard A. Starr; and Dana Lynch, president, Cleveland Gear, cutting the ribbon on a 20,000ft² expansion at their facility in Cleveland, Ohio.

foundry parts for their own use. The investment in the facilities is also an investment in the Cleveland community, which caught the attention of city councilman Richard Starr, who helped get approval for the expansion with the city.

"Today is about growth, is about investment, is about jobs, and most importantly, is about believing in our city enough to continue to build here," Starr says. "Businesses make choices every day about where to invest resources, where to grow operations, and where they see their future. Today is a statement that we're here to stay. When a company expands, we're not just talking about additional square footage or equipment; we're talking about opportunity. We're talking about families gaining stability through employment. We're talking about people having access to careers that can change the trajectory of their lives."



Cleveland Gear Co. Inc.
<https://www.clevelandgear.com>



Hellan Fluid Systems, a division of The Hellan Strainer Co.
<https://www.hellanstrainer.com>



Mazak Corp.
<https://www.mazak.com>





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