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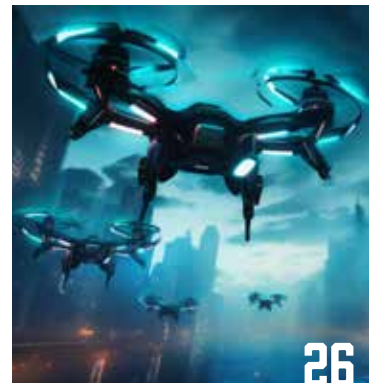
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# HOW CAN ALLIES HELP WITH US DEFENSE PRODUCTION?

## FROM THE EDITOR

### THE NATIONAL DEFENSE INDUSTRIAL STRATEGY (NDIS)

has already had a positive impact on the defense production industry since it was released in January 2024.

Laura Taylor-Kale, assistant secretary of defense for industrial base policy, recently spoke at the 2024 Sea-Air-Space maritime exposition to further highlight the four priorities outlined in the NDIS: building resilient supply chains, investing in workforce readiness, leveraging flexible acquisition strategies, and enabling economic deterrence.

While most of those priorities are being tackled primarily within the U.S. borders, Taylor-Kale believes we can build a resilient defense supply chain with a little help from our friends. AUKUS, a trilateral security partnership for the Indo-Pacific region among the U.S., U.K., and Australia was formed in 2021 to help exchange technologies among the three nations. AUKUS isn't the only partnership forming to help defense production as Norway is expanding its capacity to produce 155mm artillery rounds and Germany's Rheinmetall is working to build a munitions factory in the Ukraine. Taylor-Kale also announced there are agreements in place with India and Japan to coproduce and acquire advanced capabilities while efforts to reach agreements are underway with South

Korea and the Philippines.

Forming good relationships could also help with economic deterrence as Congress has named Australia and the U.K. along with Canada as domestic sources eligible for the Defense Production Act – those who can apply for grants and make proposals to the Defense Industrial Base Consortium.

However, another priority may need to get the focus for the others to be achieved.

"There is a global challenge for a skilled workforce," said Taylor-Kale at 2024 Sea-Air-Space. "I hear this all the time, not just from American industry and our colleagues here, but also from international industry as well as our international partners. Younger generations generally show less interest in pursuing manufacturing careers or lack the science, technology, engineering, and math skills needed for industrial work."

So while the NDIS has only been in place for a few months and the positive impact has been felt, more workers will be needed, domestic and foreign, to knock out the four priorities laid out in the strategy.

*Jake Kauffman*

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### Mobix Labs establishes technical advisory board

**Mobix Labs Inc.** created a technical advisory board to assess existing and new technologies, corporate strategy, and potential acquisitions.

Led by **Jim Aralis**, the company's chief technology officer, inaugural board members include Greg Winner, VP of product development and GM for cellular infrastructure at InnoPhase Inc., a fabless semiconductor company; Jay Standiford, a long-time engineering executive and consultant; and Frank Thiel, founder of Kolvenier Solutions, a business and technology consulting company.



**FOR MORE:**

<https://mobixlabs.com>



Jim Aralis

### Clearspeed appoints Blersch SVP of Government Innovation

**Clearspeed** appointed **Donald (Don) J. Blersch** to SVP of Government Innovation. Blersch will lead delivering Clearspeed's artificial intelligence-powered (AI-powered) risk assessment solutions across agencies, drive strategic development to meet stakeholder needs, and empower a team of government relations experts.

Blersch brings more than 35 years of public sector experience in developing, implementing, and advising on technology-led programs to address the nation's top global security challenges. With multi-agency experience, including NASA, the National Oceanic and Atmospheric Administration (NOAA), the Central Intelligence Agency (CIA), the Office of the Director of National Intelligence (ODNI), the National Reconnaissance Office (NRO), the Missile Defense Agency (MDA), and the U.S. Department of State's Bureau of Diplomatic Security, Blersch led the implementation of technology innovation while advising the executive leadership bench on security disciplines, enabling the department to meet vital national security responsibilities with a well-vetted and trusted workforce, hyperfocused on the protection of sensitive, classified information.

Blersch's successes with the U.S. government align with Clearspeed's commitment to helping organizations modernize vetting and build trust faster, by assessing risk quickly and accurately, with unbiased technology that can be used anywhere throughout the vetting process.



**FOR MORE:**

<https://www.clearspeed.com>



Don Blersch

### CONTRACTS

**BAE Systems Land & Armaments LP**, Sterling Heights, Michigan, is awarded a \$181,888,089 firm-fixed-price modification to a previously awarded contract for Amphibious Combat Vehicles (ACV). The total cumulative face value of the contract is \$2,732,764,209. Work will be performed in York, Pennsylvania (60%); Aiken, South Carolina (15%); San Jose, California (15%); Sterling Heights, Michigan (5%); and Stafford, Virginia (5%), with an expected completion date of July 2026.



**FOR MORE:**

<https://www.baesystems.com>

**Teledyne FLIR**, North Billerica, Massachusetts, was awarded a \$14,968,625 firm-fixed-price contract for clip-on thermal weapon sights. Bids were solicited via the internet with one received. Work will be performed in North Billerica, Massachusetts, with an estimated completion date of Jan. 31, 2025.



**FOR MORE:**

<https://www.flir.com>



## Columbia Helicopters appoints Balevic as president & CEO

Columbia Helicopters appointed David Balevic to president & CEO. Balevic will succeed Michael Tremlett, who is departing the company to pursue other opportunities.

Columbia Helicopters is a leader in heavy and super heavy-lift helicopters and manufactures, provides sustainment services for, and operates the Model 234, CH-47D Chinook, and Model 107-II tandem-rotor helicopters. Their principal customers include the U.S. military, foreign allied militaries, and U.S. and foreign civil protection agencies.

Balevic brings more than 35 years of leadership experience across the aviation industry to Columbia. He previously spent eight years at CHC Helicopter, where he served as the senior vice president for Engineering & Operations before being promoted to president & CEO in August 2019.



David Balevic



FOR MORE:

<https://www.colheli.com>

## Ammunition market

The ammunition market is estimated to grow by \$5.17 billion during 2022-2027. The growth will accelerate at a compound annual growth rate (CAGR) of 4.29% during the forecast period. The escalation of geopolitical tensions and cross-border issues is significantly propelling market expansion within the ammunition industry. Increasing military budgets and personnel bolstering, particularly in regions impacted by conflicts such as the Middle East and Asia, including South Korea, Russia, and Japan, are driving the demand for large-caliber ammunition. Heightened R&D investments and technological advancements are further fueling revenue growth. The surge in demand for small and medium-caliber weapons is attributed to regional unrest and conflicts. Ukraine's recent announcement to boost military spending by \$8.3 billion amid the Russia-Ukraine war underscores the market's trajectory toward sustained growth, fueled by heightened demand for ammunition.



FOR MORE:

<https://www.technavio.com>



## Iten Defense appoints Damon Walsh as CEO



Damon Walsh

Iten Defense announced Damon Walsh as its new CEO. Walsh succeeds CEO and co-founder, Lex Watson, who'll remain on the company's board of directors and in an active advisor role.

Walsh is a defense industry executive with more than 40 years of cross-functional leadership experience. His background includes 25 years of service in the U.S. Army, including 12 years as an Infantry and Special Forces officer at multiple levels of command and staff. He was then selected for duty in the Army Acquisition Corps and served his final 13 years in uniform in a wide variety of contract and program management assignments including Rock Island Arsenal; DCMC-Haiti; U.S. Special Operations Command; DCMA Iraq; and as the commanding officer of the Lima Army Tank Plant/DCMA-GDLS. Following his time as an Army officer, Walsh served in senior roles at several companies including Force Protection, Jet Hot – High Performance Coatings, and SYNEXUS. He recently served as chairman of the Board and co-founder of Mission Solutions Group.



FOR MORE:

<https://www.itendefense.com>



# WHAT'S HAPPENING WITH CMMC?

Over the course of the past year, one of the most common questions we have received is, “What’s happening with CMMC? Is there a rule yet?”

The exciting news is rulemaking for CMMC is moving and it is really coming. The slightly less exciting news is the final CMMC rule is still in the works, and the details of when implementation and the mandate will go into effect are still to be determined. Conservative estimates are forecasting the U.S. Department of Defense (DOD) Fiscal Year 2025 (this translates to late 2024 in the regular calendar year).

## Didn't I hear it was published?

The verbiage surrounding CMMC rulemaking may sound confusing. The DOD published a proposed rule on December 26, 2023. The proposed rule requires two months of public comment, followed by 180 days of review or addressing the comments. When the DOD publishes the final rule, it will take effect after 60 days. The proposed rule is a major step forward in CMMC coming to fruition. The public comment period ended on February 26, 2024. The DOD only received 368 public comments, which is less than half that of the first draft of CMMC.

## What happens next?

The publication of the final rule will not translate to a requirement that all companies must be CMMC-certified by September 30, 2024, or by the end of 2024. There will be a roll-out period for CMMC to start appearing in contracts. The current rule provides for companies who receive their NIST 800-171 conformance statement now to be converted to a CMMC-certificate after the rule is published. Contractors delaying their compliance and certificate risk losing DOD contracts because companies with a CMMC certification will be viewed as less risky.

## What should you be doing now?

The best thing right now is to make sure your organization is compliant with NIST SP 800-171r2 standards. Stay up to date with CMMC rulemaking, and be prepared to undergo your CMMC third-party assessment. Additionally, reach out to your contracting officers to understand their position on CMMC certification and when they expect CMMC certifications from their contractors. Complete as much as possible now so that when the CMMC rush begins, your company is ready and in the lead.

## What about NIST SP 800-171r3?

You may be hearing some questions in the industry regarding NIST SP 800-171r3. NIST has stated they will release this revision to NIST 800-171 in the second or third quarter of 2024. Many contractors want to know if their CMMC assessment will be against revision two or revision three.

The CMMC proposed rule refers specifically to revision two, and DFARS 252.204-7012 points generally to the most current version of NIST 800-171. Contractors should focus on revision two now. There will be time for the industry to transfer to the newer revision three, but for the first round of CMMC assessments it is looking like 800-171r2 will be the key. Do not try to take on revision three now, particularly if you are not yet done with revision two compliance.

It is a complicated rulemaking and standard-updating landscape. If you would like to learn more about NIST 800-171, feel free to visit our website: <https://www.smithers.com/services/audit/nist-800-171>.

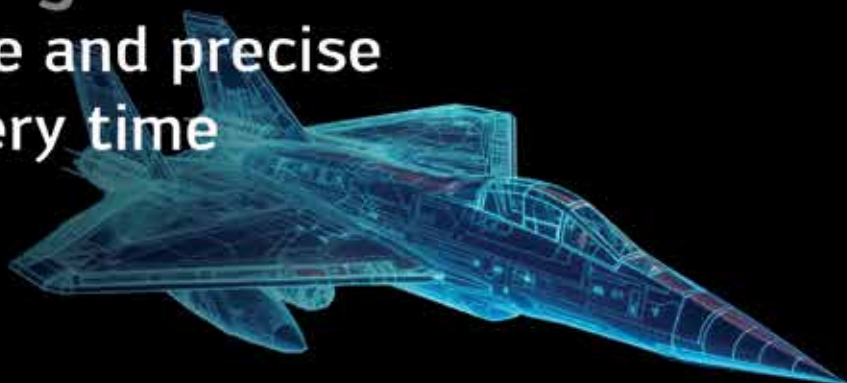


About the author: Robert McVay is a senior consultant for information security services in Smithers Quality Assessments Division. <https://www.smithers.com>



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# ELECTROCHEMICAL RIFLING

Extrude Hone breaks down why the latest technology isn't always the greatest when it comes to firearm manufacturing.

By **Bruno Boutantin**

**W**hile firearms manufacturers strive for perfection, the devil lurks in the details. Deburring and rifling emerge as critical aspects in this pursuit for the best finish for firearms – particularly crucial when delving into the intricacies of barrel rifling.

Two critical operations – gun barrel polishing and rifling – take center stage in handguns and long barrels.

Rifling is a nuanced process significantly influencing the accuracy and stability of a bullet's trajectory. The machined spiral grooves within the barrel impart a rotational motion to the bullet upon firing, enhancing its stability and accuracy – factors increasingly critical with greater shooting distances.

A review of the traditional methods of rifling pros and cons offers a better understanding of the benefits of electrochemical (EC) rifling.

## Traditional barrel-rifling

Traditional rifling means leverage mechanical rifling, based on cutting or deformation. Some examples include:

Cut rifling, also called hook rifling: A carbide tool generates the groove in several steps, one groove at a time. In comparison to the button rifling cutting, the process creates burrs but less stress. It's slow and costly because it requires multiple passes to achieve deeper grooves. Cut rifling works well when precision is needed.

Broach rifling: A metal-cutting solution, the broach includes multiple teeth, allowing a single pass instead of multiple ones with the cut-rifling process. It's an efficient manufacturing process but expensive because of the broaches' cost.

Button rifling: A cold-forming process pulling the button through the barrel creating lands and grooves. It doesn't



Extrude Hone employee Thomas Jaeschke stands in front of an ECO+ machine holding a dynamic EC rifling fixture.



generate burrs but puts stress on the barrel. It's a prevalent process, especially in manufacturing, by volume, thanks to its short time cycle.

**Hammer forging:** This pushes a blank on a mandrel and the resulting quality is one asset of this method but it requires high investment.

### The science behind EC rifling

EC rifling uses the material's dissolution and Faraday's law of electrolysis. The mass of metal dissolving is proportional to the number of electrical charges transferred to the electrode.

Electrolytic machining (ECM) is a subtractive method operating on the principle of anodic metal dissolution via an external DC power source.

One of the critical features of ECM is there's no contact between the tool (-) and the workpiece (+). The shape of the tool cathode determines the shape of the material removal. ECM is an imaging method. Extrude Hone uses insulating material where no work is needed, leaving the conductive material visible in areas where the material removal process occurs. The groove accuracy depends on the cathode design and the machining precision.

An electrolyte solution ( $\text{NaCl}$  or  $\text{NaNO}_3$ ) handles charge transfer in the working gap to allow the dissolution. The resulting electron current releases metal ions from the workpiece. The removed material comes as hydroxide, is rinsed out of the gap by the electrolyte flow, and must be removed from the electrolyte by an appropriate separating device. Extrude Hone's process uses a large chamber filter press to ensure a clean electrolyte returns to the machine.

This EC rifling process is a departure from traditional processes as it delivers barrel rifling quality and productivity surpassing conventional capabilities. EC rifling is optimal for superior gun finishing, heightened productivity, and impeccable quality.

### Cathodes

The electrochemical process employed by EC rifling ensures creation of precise, polished grooves without any physical contact, applying zero stress to the barrel.

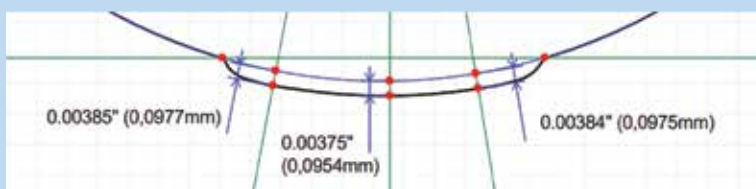
The overall groove geometry is perfectly under control, and the cathode, the tool, isn't subject to mechanical wear and

## LONG BARREL AND HANDGUN BARREL CASE STUDIES

### CASE STUDY LONG BARREL

Dynamic EC rifling for a 12"-barrel, caliber 308 Winchester (7.62mm).

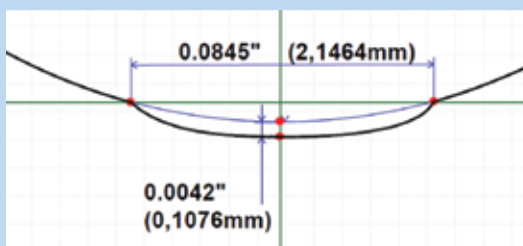
Operation:	Rifling	Operation:	Polishing (1 step)
Length of barrel:	12" (300mm)	Material removal:	0.0039" (0.1mm)
Feed rate:	5.7"/min (144mm/min)	Starting roughness:	Ra 8 $\mu$ (3.2 $\mu$ m)
Twist:	1:10	Final roughness:	Ra 2 $\mu$ (0.08 $\mu$ m)
Cycle time:	144sec/cycle	Feed rate:	3.1"/min. (80mm)
Pieces/cycle:	3	Cycle time:	400sec/cycle
Output/hour:	60 pieces	Pieces/cycle:	3
		Output/hour:	30 pieces



### CASE STUDY HANDGUN

State EC rifling for a 5" barrel.

Operation:	Rifling
Length of barrel:	5" (125mm)
Cycle time:	70sec/cycle
Pieces/cycle:	4
Output/hour:	205 pieces



only some electrical wear. The cathode is consumable.

This approach mitigates concerns associated with traditional barrel rifling methods, where stress and potential deformities may compromise the firearm's performance over time.

Several cathode designs to produce the grooves are available. Land/groove cathodes and the polygonal design are for


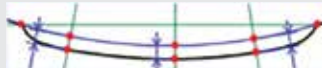
static and dynamic EC rifling.

### Various barrel configurations

One of the critical advantages of EC rifling lies in its adaptability to various rifling configurations. Whether static or dynamic, Extrude Hone's EC rifling delivers in conventional rifling with a smooth transition between lands and valleys and polygonal rifling. Polygonal rifling offers



## WHAT YOU CAN EXPECT FROM STATIC AND DYNAMIC EC RIFLING

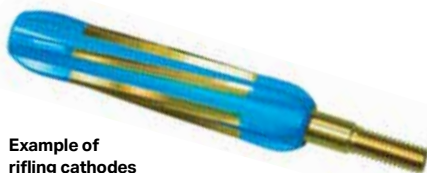
	STATIC ECM	DYNAMIC ECM
<b>Barrel length</b>	Max. 160mm [6.3"]	100mm to 800mm [4" to 31.5"]
<b>Groove profile</b>		
<b>Caliber</b>	0.127" to 0.5"	0.127" to 0.5"
<b>Pieces/cycle</b>	4 pieces/cycle	3 pieces/cycle
<b>Feed rate</b>	Not relevant	~135mm/min.
<b>Cycle time</b> [0.1mm groove depth]	45 sec. [ECM]/25 sec. changeover	See productivity
<b>Profile</b>	Land/groove & polygonal	Land/groove & polygonal
<b>Application</b>	Rifling	Rifling & polishing
<b>Feature</b>	Progressive rifling (twist + depth)	Progressive rifling (twist + depth)
<b>Productivity*</b> <b>@ barrel length</b>	@1-shift: 430k pieces/a @2-shift: 860k pieces/a	@150mm [5.9"]: 370k pieces/a @300mm [11.8"]: 245k pieces/a @600mm [23.6"]: 145k pieces/a @800mm [31.5"]: 115k pieces/a

\* 250 Working days, 2 shifts a 10h, 85% Efficiency

benefits such as a better gas seal and reduced stress on the bullet.

**Static EC rifling**

Static EC rifling is tailored for handguns, providing an ideal solution for shorter barrels. In that configuration, a static cathode seats on the tooling base plate. The principle is to bring the barrel on top of the cathode and immobilize it to ensure good anodic contact. When the barrel is secured, the electrochemical cycle can start. The application's current require-



Example of  
rifling cathodes

ment, directly related to the surface to be processed, drives the generator capacity. Different generator power sizes allow various current-demanding applications or the possibility of simultaneously processing multiple parts/barrels.

**Dynamic EC rifling**

Designed to tackle the rifling needs of longer barrels, dynamic EC rifling caters to the diverse requirements of the firearms industry.

In this alternative configuration, the cathode travels down through the barrel at a given feed rate and twists from the top of the machine. When the cathode enters or exits the barrel because of current variation, some potential groove deformation could occur. The tooling includes extra barrel extensions that are

Extrude Hone's ECO+ machine  
for dynamic EC rifling.

**Perfect barrel rifling for superior firearms**

Extrude Hone's electrochemical rifling (ECR) distinguishes itself by offering a level of precision and quality beyond the capabilities of traditional methods. With a legacy spanning more than two decades, EC rifling has consistently delivered superior results in rifling quality.







## EC rifling's history in the US

CATION Corp. patented a method and apparatus for the EC rifling of gun barrels in 1986 (United States Patent US4690737A) that was then assigned to Robert Bosch Corp. in 1990 and ultimately reassigned to Surftran Manufacturing LLC.

Extrude Hone took over the Robert Bosch Surftran Division, including the product lines electrochemical machining (ECM) and thermal deburring (TEM) in 2000.

Extrude Hone had previously established a business for ECM units by distributing AEG Elotherm in North America in 1974, starting to manufacture ECM machines in 1975. Extrude Hone then established an ECM business in Buxheim, Germany, and conducted additional acquisitions in the ECM field (VMB Vorrichtungen- und Maschinenbau Babenhausen GmbH and DIVA-TEC GmbH) before consolidating all ECM businesses under Extrude Hone GmbH in 2007.

continuous with the barrel to absorb the deformation, leaving a perfect barrel. Extrude Hone's dynamic rifling machine can accommodate three 800mm barrels.

One specific point about dynamic ECM is as the cathode travels back and forth through the barrel, plastic from the cathode glides at the surface of the barrel bore to ensure cathode centering. As a

result, the plastic wears out. Using specific materials and cleverly designed removal inserts makes for easy cathode maintenance and reduces the consumable cost per part.

Extrude Hone's EC rifling offers an efficient and precise rifling process. It takes 70 seconds to do polygonal rifling on an 86mm handgun barrel with consistent, high-quality results.

Benefits of the EC rifling process include:

- No stress is applied to the barrel, eliminating the need for stress relief and manual straightening operation as with the traditional methods.
- The possibility to process different materials (hard or soft) with the same tooling and, in most cases, the same setup.
- Flexibility in a progressive twist, which is impossible with the other methods.
- Productivity, the machine can process three barrels per cycle at a 5" feed rate, almost twice as much as the hammer forge productivity.

## Consistent quality for firearms manufacturing

Tailor your machine selection to specific needs. The electrochemical machine should offer versatile configurations for EC rifling, static, or dynamic (up to 800mm barrel length). Regarding large



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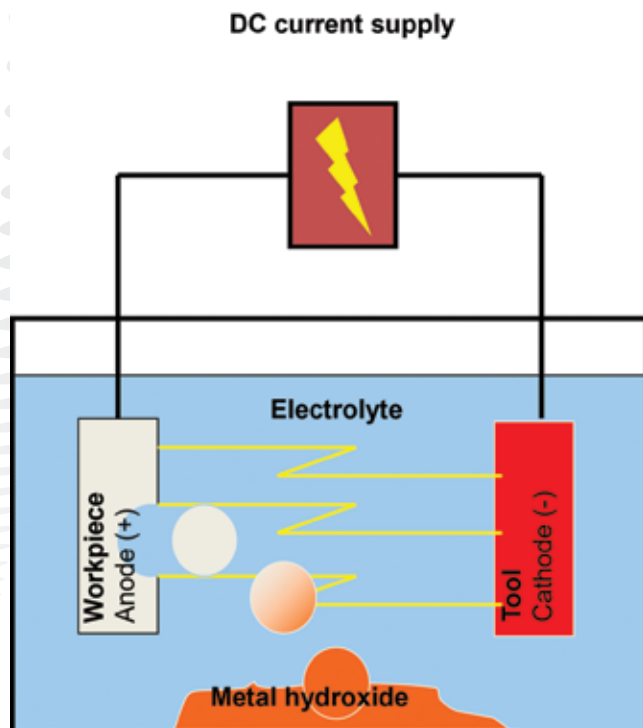
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volume production, the machine should be robot loading/unloading ready.

The benefit of an electrochemical machine is the ability to switch from a rifling configuration to a deburring one, depending on the manufacturer.

Imagine you have some gun breech requiring fine selective deburring in specific areas. Extrude Hone systems enable the user to switch from the rifling tooling to the gun breech deburring tooling, select the alternative program from the preset library, and go. From there, users can run different campaigns to maximize assets.

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Contract shop services are available in the U.S. and Europe for those unable to invest. Using our contract capabilities gives customers our experience and support to ensure quick turnaround and uncompromised quality.

At Extrude Hone, our goal is to enhance efficiency and help produce flawless parts. **DM**

*About the author: Bruno Boutantin is market & business development director for Extrude Hone Group.*



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## DEEP HOLE DRILLING SOLUTIONS

**SINGLE FLUTE GUNDRILLS** can machine straight, deep holes and hold excellent finishes. This tool is a general-purpose drill designed for deep hole drilling in most materials, can be custom fit to each application, and is available in various carbide grades and coatings to optimize tool life and chip evacuation/formation. The tool length ranges from 0.093" (2.4mm) to 1.5" (38.1mm) and in custom lengths.

**SOLID CARBIDE SINGLE FLUTE GUNDRILLS** are deep hole drills that can run at higher feed rates than conventional gundrills. They don't require whip support for lengths up to 80x the cutting diameter, and are highly polished, aiding in maximizing chip evacuation. These tools can be designed with special end forms to meet custom requirements. Special coatings are chosen based on the application to enhance overall tool performance.

**DOUBLE JET GUNDRILLS** keep constant coolant on the cutting edge during the entry, in the cut, and breakthroughs while machining. This tool allows the coolant fluid jet to assist in breaking the chip. The diameter range of the double jet gundrill is 0.250" (6.35mm) to 1.5" (38.1mm) and it's available in customer specific lengths.

**SOLID CARBIDE TWIST DRILLS** are available in lengths up to 30x diameter and to custom lengths and are reversed-engineered for specific applications.

**DOUBLE CRIMP GUNDRILLS** can obtain double the feed rate compared to the single flute gundrill. Based on geometric angles, clearances, and back taper, the double crimp gundrill can reduce chip load by 50% and achieve higher penetration.

**TWO-FLUTE TWO-HOLE GUNDRILLS** are used for high penetration deep hole applications. The body is milled out of bar stock which maximizes the rigidity reducing the body deflection at higher rpm.



**Star SU LLC**

<https://www.star-su.com>

### Solid carbide twist drills features

- Sculptured flute geometry for superior chip control
- Polished beyond cutting area flutes for enhanced chip evacuation
- Standard H6 tolerance on shank and cutting diameter
- Proper speeds and feeds result in longer tool life and better chip evacuation
- Geometries vary based on materials being machined
- Coolant feed range: 0.075" (0.9mm) and up

### Single flute gundrills coolant hole style configurations

#### Kidney Shaped Hole (KDS)

- For cutting diameters under 0.315" (8mm)

#### Dual Hole Configuration (TCH)

- For cutting diameters 0.315" (8mm) and greater

#### Single Hole (GDS)

- For diameters 0.551" (14mm) and greater



Kidney shaped coolant hole (right), dual hole configuration (middle), single hole (left)

### Solid carbide single flute gundrills diameter range

0.039" [1.00mm] to 0.060" [1.52mm]

0.061" [1.53mm] to 0.070" [1.78mm]

0.071" [1.79mm] to 0.200" [5.08mm] and greater

#### Range of overall length of flute

Up to 7.00" [178mm]

Up to 10.00" [254mm]

Up to 11.25" [286mm]

Star SU's single flute gundrills, solid carbide single flute gundrills, double jet gundrills, solid carbide twist drills, double crimp gundrills, and two flute two hole gundrills.



### Double crimp gundrills size range

- Diameters 0.188" (4.78mm) to 0.563" (14.3mm)
- Available in custom length

#### Common materials machined

- Aluminum
- Iron



Top view of solid carbide twist drills

### Two-flute two-hole gundrills size range

- Diameters 0.25" (6.35mm) to 2.00" (50.80mm)
- Custom lengths up to 48" (1,219.20mm)



Top view of double crimp gundrills



# 2024 MANUFACTURING GROUP VIRTUAL EVENTS

## MAY

<b>May 30</b>	Machine Tool Builders Roundtable
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## JUNE

<b>June 12</b>	Cornerstone Consulting
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<b>June 20</b>	Lunch & Learn
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<b>June 27</b>	Industry 4.0/Shopfloor Connectivity Roundtable
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## JULY

<b>July 10</b>	Cybersecurity
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<b>July 18</b>	Lunch & Learn
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<b>July 25</b>	Additive Roundtable
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## AUGUST

<b>August 7</b>	Laurie Harbour EV Market
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<b>August 15</b>	Lunch & Learn
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<b>August 29</b>	Cutting Tool Roundtable
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## SEPTEMBER

<b>September 4</b>	Automation II Roundtable
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<b>September 19</b>	Lunch & Learn
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<b>September 26</b>	MedWorld Advisors
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## OCTOBER

<b>October 17</b>	Lunch & Learn
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<b>October 23</b>	Richard Aboulafia - 2
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<b>October 31</b>	Leaders in Manufacturing Roundtable
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## NOVEMBER

<b>November 13</b>	Government Policy and Manufacturing
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<b>November 20</b>	Robot Roundtable
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<b>November 21</b>	Lunch & Learn
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## DECEMBER

<b>December 4</b>	Supply Chain
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<b>December 12</b>	Metrology Roundtable
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<b>December 19</b>	Lunch & Learn
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EdgeX4  
PCD tooling

# PURSuing CERTIFICATIONS TO SECURE DEPARTMENT OF DEFENSE CONTRACTS

In the quest to diversify its business, West Ohio Tool received AS9100D certification and CMMC Level 2 compliance.

By **Melissa Schiller**

**O**riginally launched in a one-room garage, West Ohio Tool, a women-led business based in Russells Point, Ohio, has grown to become a leading U.S. manufacturer of custom carbide, PCD, and CBN tooling.

Founder Kerry Buchenroth worked at a Honda engine plant before discovering in five years' time that he could leave the corporate world and launch his own operation, recalls his daughter and West Ohio Tool CEO Kaci King.

"We started a business," she says. "It was on the back of the one-car garage that my mom now uses as a potting shed. It was so small; they had no room for equipment other than some small table-top tools. My dad attended a woodworking show and saw his first tool – a cutter grinder – and said, 'I'm going to have one of these,' and my mom rolled her eyes."

Despite her initial skepticism, the operation began to grow and moved from the garage to a remodeled chicken coop. The business eventually relocated to its Russells Point facility and broke into industrial automotive manufacturing, leveraging Buchenroth's connections at Honda.

Today, West Ohio Tool continues diversifying its business, recently entering the firearms space. The company initially produced .50-caliber chamber reamers for an Ohio-based military gun manufacturer.

"Dad grew the business in automotive because that was his passion," King says. "We still very much like that – we like connecting our team with the idea we're not just making tooling, but we're making a cutting tool part that makes brakes for families to go home and be safe together in the evening. Connecting that vision is important for us, but now we're also in defense and firearms, which has really been fun for us to diversify."

## Certify and diversify

The West Ohio Tool team had a clear goal in mind when expanding to the defense space: contracting with the U.S. Department of Defense (DOD). The company's focus is aerospace and space systems manufacturers, but the major operations wouldn't even have a conversation with West Ohio Tool until the company received AS9100D certification for its quality management system.

"It allows us to finally go knock on the doors of these big aerospace and space systems guys that are manufacturing airplanes and space satellites," King says of the certification. "We can now finally entertain that business."

King describes certification as a set of standards that must be followed to assure manufacturers certain processes are followed and they're receiving high-quality parts.



Chamber reamers produced by West Ohio Tool.





**West Ohio Tool's range of equipment used to produce reliable, precision tools includes:**

- Vollmer QWD 760H 5-axis CNC wire erosion machines
- Studer S31 CNC O.D. grinders
- Walter Helicheck Pro automated measuring machines
- Walter Helitronic Power 5-axis CNC grinders with robotic loader
- Walter Helitronic Power+ 5-axis CNC grinders with robotic loader
- Walter Helitronic Power Diamond rotary erosion machine with robotic loaders
- Eurotech PG100 cutting tool inspection system
- Zoller Smart Check 450 universal measuring machine
- Helitronic Power 400 tool grinding machine

West Ohio Tool previously obtained ISO 9001 certification, which King says is a less stringent standard that acts as a baseline.

"Once you pass that, there's a whole other realm of requirements, but we had the basic stuff done," she says. "Then it was implementing tougher things, so now we no longer have an ISO audit. Normally, people who are ISO or AS9100, you're required to have audits every so often to pass to make sure you're staying up to snuff. Because the AS9100 is tougher, that audit replaces the ISO and certification automatically covers both."

West Ohio Tool was also awarded Cybersecurity Maturity Model Certification (CMMC) 2.0 Level 2, which aligns with DOD guidelines ensuring the company is protected from inside and outside cybersecurity risks. West Ohio Tool had video cameras and key fobs installed at every office door, for example, as part of the certification process.

"If somebody breaks in, they want to make sure that nobody's gaining blueprints of anything they ordered," King

says. "It's just as tough on the internal side as far as data. No one on the production floor is allowed to have a phone and none of the machines can connect to the Internet. There's a long laundry list of things. We're undergoing probably \$30,000 of software purchases to monitor and audit our server all the time."

West Ohio Tool was CMMC Level 1 certified and took proactive steps to secure CMMC Level 2 compliance before it becomes a DOD requirement.

"It's going to be required by the Department of Defense soon, and we're ensuring those foundational pieces are met to ensure we can do business and gain their respect and the opportunity to do work," King says.

### Exceeding expectations

West Ohio Tool has carved out its place in the market by providing value and exceeding expectations.

The company finds solutions to cut cost – not necessarily the upfront cost of the tool, but the cost per hole, for example.



West Ohio Tool CEO Kaci King (front, center) with the rest of the company's team.

## CUTTING TOOLS



"If someone has a tool that only lasts 10,000 holes, we can create you a different tool that lasts a million holes," King says. "That cost divided over the number of holes should significantly reduce. That's our current mission. We love helping people solve problems other companies haven't been able to. We like

to support our customers all the time, no matter what, whether it's at their facility or face to face. And then we always say that we're quicker than the industry standard for delivery."

King hopes these differentiating factors can continue driving West Ohio Tool's growth, which is why the business



invested in the certifications and cybersecurity compliance.

"Gaining those multi-year contracts and becoming a cutting tool supplier for both subcontracts and prime contracts is a big goal," she says.

The company plans to continue investing in equipment and automation to meet current demand and prepare for the influx of work when the DOD contracts are finalized.

West Ohio Tool uses automation, in part, to offer competitive pay for its workers.


"For 34 years, all we know is a family-owned business," King says. "As a result, we don't have a second or third shift, and our goal isn't to add one. As owners, we have to continue to invest in automation so we can continue to make products and get those products out. All our major grinding machines, except for one, either has an internal loader or robot of some type that can do automation throughout the night. Yes, we love people, but we like to pay our people better than everybody else. We aren't the standard facility that gets 100 people and pays them \$10 an hour. We would rather have five guys at \$30 an hour. We expect a lot from them, but that's a result of their knowledge, their

STATIONARY AND MAGNETIC


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## ADDING VALUE


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WPS Zero  
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Employees working on  
West Ohio Tool's shop floor.

## CUTTING TOOLS



dedication.”

West Ohio Tool has spent several years investing in equipment, technology, software, and certifications to secure contracts with the government, and like her father, King is driven by passion.

“I love the moon and the stars,” she says. “Ever since I was a kid, I was that science nerd who always loved NASA and the moon, so it ties in for me no differently than my husband’s passion for firearms. We’ve had a lot of people in our family that have been in the military and involved in wars. So, being able to provide cutting tools for firearm manufacturing or big guns on ships or space satellites, it just lights us up. It makes coming to work fun. Time flies when you get to do what you enjoy.” DM

*About the author: Melissa Schiller is senior editor of Defense and Munitions.*



**West Ohio Tool**  
<https://westohiotool.com>





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# NEW HAMPSHIRE'S NEW MANUFACTURING FRONTIER

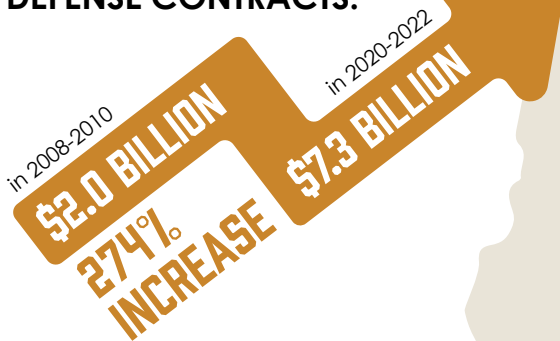
Defense manufacturing continues to increase in Live Free or Die State.

**845** PRIVATE COMPANIES  
RECEIVED PRIME  
DOD/DHS CONTRACTS

MILITARY DEFENSE INFRASTRUCTURE:

<b>5,917</b>	<b>1,115</b>	<b>849</b>
INDIVIDUALS	ACTIVE-DUTY MILITARY PERSONNEL	DOD CIVILIAN EMPLOYEES

AVERAGE ANNUAL  
DEFENSE CONTRACTS:



YEARLY DOD/DHS  
CONTRACTS:

**\$881 MILLION**

BAE System

**\$78 MILLION**

L3 Technologies

**\$47 MILLION**

Sig Sauer

**\$29 MILLION**

Methuen Construction

**\$29 MILLION**

Creare



DEFENSE  
CLUSTER  
ECONOMIC  
IMPACT:

**47,392**

jobs

**6.9%**

of state's employment

**28,428**

direct jobs

**\$4.3**

billion in income

**18,964**

indirect or induced jobs

**8.6%**

of state's total income

### Gold WSM37G thread milling grade

Tiger-tec Gold WSM37G grade offers innovative coating technology in thread milling. The new grade, with a layer structure consisting of a carbide substrate, a wear-resistant TiAlN layer, and a multi-layer aluminum oxide layer ( $Al_2O_3$ ), delivers superior temperature resistance. The gold-colored ZrN top layer reduces friction and indicates any wear. Advantages for users are significantly higher cutting parameters and longer tool edge life. In some tests, the grade increased tool life up to 100%, with far fewer radius corrections. The grade offers maximum productivity when used in conjunction with multi-row thread milling cutters.

Tiger-tec Gold WSM37G grade delivers consistent results in the production of standard-compliant blind-hole and through-hole threads. It's compatible with all Walter thread milling cutters and can be used universally with all ISO materials: P, M, K, N, S, and H up to 55HRC, from a nominal diameter of 16mm or UNC 3/4". The indexable inserts combine chip breakers specifically developed for thread milling with two proven geometries: universal D67 for maximum tool life quantity and



D61 with anti-vibration land for operational smoothness even in difficult conditions.



**Walter USA LLC**

<https://www.walter-tools.com/us>

### 3-axis machining center

The VMX30Di 3-axis machining center delivers speed, performance, and precision to any machining application. With a 15,000rpm spindle and BIG-PLUS CAT40 spindle taper, the VMXDi series has been designed to help job shops focusing on batch production or die/mold work be more productive and profitable.

Equipped with the new direct drive spindle, the VMXDi series boasts a better surface finish, quieter spindle, reduced heat transfer, and less head growth. It also provides reduced chip-to-chip time and faster spindle acceleration and deceleration.

The VMX30Di is equipped with the Hurco control powered by WinMax software and the UltiMotion motion system. The control helps support multiple programming methods: conversational programming, NC programming, and a Hurco-specific feature called NC/Conversational Merge to further optimize efficiency. The control features 4GB RAM, 128GB solid state drive, and 10,000 block look ahead.



**Hurco**

<https://www.hurco.com>

### Horizontal drag finisher

The FM HDF 4000 and FM HDF 2000 are available in a batch unit configuration, or a semi-automated version that includes indexing load/unload for one-piece flow production. The adjustable tailstock mechanism allows for parts ranging from 2" to 48" in length, making the machine fully scalable for job requirements. Up to 10 individual parts may be processed at a time. With the foot-pedal-operated parts release mechanism, loading and unloading are one-hand operations, even on the batch unit.

Color touchscreen and digital PLC are standard features, with a user-friendly interface for setting machine parameters. Both the machine turret and workholding chucks rotate during operation, allowing for shorter process times. A stack light tower for monitoring machine status is also standard.

The frame is constructed of welded heavy-duty structural steel members, painted for durability. The machine cladding is heavy powder-coat steel plating with aluminum extrusion. The air-operated machine cover is made of heavy, see-through Lexan for optimal operator safety. A light curtain and safety interlocks are available as options for additional safety considerations.

The process chamber is constructed of stainless steel, and includes integral cooling jackets for additional cooling of dry process media for optimum performance and longevity.



**Bel Air Finishing**

<https://belairfinishing.com>

An AI generated image shows drones soaring over a city, illustrating future warfare.

# THE FUTURE OF WARFARE

By **Frank Braski**

The use of artificial intelligence and machine learning in defense & munitions manufacturing.

**T**he Deputy Director of DARPA's Information Innovation Office at the Department of Defense (DOD) recently disclosed, "Artificial intelligence (AI), machine learning (ML), and autonomy are being used by about 70% of DARPA's programs in some form or another."

Development of AI and integration into all aspects of warfighting is a top priority to avoid being caught off guard by novel methods or technological advancements made by near peer adversaries. To sustain, overmatch, and achieve these objectives, DARPA is seeking innovative ideas and capabilities for all domains from industrial, business, and academic sectors. We collectively need to heed this call to use our imaginations to create a safer, more resilient future, through the thoughtful application of AI in each of our endeavors.

AI futurists and pundits were predicting it'd be the 2030s, or even 2050s before we'd have computer systems that

could potentially pass the human-fooling Turing Test. In 2023, it happened. The advent of Large Language Models (LLMs), Generative Pre-trained Transformers (GPTs), and the maturing of ML neural networks, deep reinforcement learning, and generative adversarial networks (GANs) have changed everything.

In the evolving landscape of global defense and munitions, the integration of AI stands as a transformative force, reshaping strategies, tactics, and the very essence of military operations. We'll delve into the critical role AI plays within the defense sector, attempting to offer a comprehensive overview for business and military professionals, decisionmakers, and policymakers. This primer aims to illuminate the potential, challenges, and ethical considerations of AI in defense and munitions, setting the stage for a deeper exploration.

## Transforming tactics

AI in defense isn't new, and adoption

of AI in military contexts is a leap into a new era of warfare. AI's capacity to process vast amounts of data, learn from experiences, and make predictions or decisions at speeds unattainable by humans is revolutionizing defense mechanisms and strategies worldwide. From autonomous drones to AI-driven cybersecurity defenses, the applications are as varied as they are impactful.

**Smart munitions**, equipped with AI, are redefining precision and efficiency on the battlefield. These systems, capable of adjusting their trajectory in real-time to hit specific targets, minimize collateral damage and maximize operational success. The ethical dimension emerges as a crucial discussion point, raising questions about the future of human oversight in combat decisions.

**Loitering munitions** represent a significant leap forward, merging the capabilities of drones and missiles to create systems that can independently





search for and engage targets. This autonomy introduces a level of flexibility and responsiveness previously unattainable, challenging traditional defense strategies and necessitating new countermeasures.

The Internet of Things (IoT) extends the battlefield beyond the physical realm, connecting devices, vehicles, and sensors in a unified network. This interconnect-edness enhances situational awareness and operational coordination but also introduces vulnerabilities, such as increased exposure to cyber-attacks, necessitating advanced AI-driven security solutions.

**Cyber warfare**, an increasingly pivotal aspect of modern conflicts, benefits significantly from AI. AI algorithms can detect patterns indicative of cyber-attacks, protect critical infrastructure, and even conduct offensive operations. The dynamic nature of cyber threats demands continuous learning and adaptation, where AI excels.

#### AI in logistics, supply chain management

The efficiency of military operations is heavily reliant on logistics and supply chain management. AI's predictive analytics can optimize supply routes, manage in-

ventory, and forecast needs, ensuring forces are adequately equipped while minimizing waste. This operational efficiency can be a decisive factor in prolonged engagements.

#### Ethics, legal considerations

As AI becomes more autonomous, the ethical and legal implications become more complex. The delegation of lethal decisions to machines raises profound questions about accountability, morality, and the risk of unintended consequences. Balancing technological advancement with ethical considerations is imperative for responsible AI integration into defense strategies.

The dual-use nature of AI technologies – applicable in civilian and military contexts – further complicates the ethical landscape. Technologies developed for civilian purposes can be repurposed for military use, and vice versa, blurring the lines between peaceful and martial applications and raising concerns about proliferation and escalation.

#### Training and adaptation

The integration of AI into defense necessitates technological adaptation and a shift

in mindset among military personnel.

Training programs must evolve to equip soldiers with the skills needed to operate alongside AI systems, fostering a symbiotic relationship between human intuition and machine intelligence.

#### Cooperation and regulation

Yet another Cold War has begun. Added to the race for space, energy, communications, and cyber security dominance, AI's industrial tech titan masters fall under two economic regimes. Of the 7 global AI superpowers, the U.S. has four (Microsoft, Google, IBM, and Meta) and China has 3 (Bytedance, Alibaba, and Tencent). An argument could be made to add nVidia and Musk's companies as two more in the U.S. column. As more nations invest heavily in AI military capabilities, the potential for an arms race looms large. This competition underscores the need for international cooperation and regulation to prevent escalation and ensure AI is used responsibly and ethically in military contexts.

#### Conclusion

The journey into the AI-enhanced future of defense and munitions is fraught with challenges and opportunities. The potential of AI to augment defense capabilities is undeniable, yet it demands a careful, ethical approach to harness its benefits while mitigating its risks.

By providing a comprehensive understanding of AI's role in defense and munitions, it can foster informed discussions and strategic thinking among military professionals, policymakers, and technology enthusiasts. The future of warfare is already here, being shaped by the innovative integration of AI. It's important to navigate this new terrain with wisdom, foresight, and a commitment to the ethical use of this technology to ensure a safer, more civilized tomorrow. **DM**

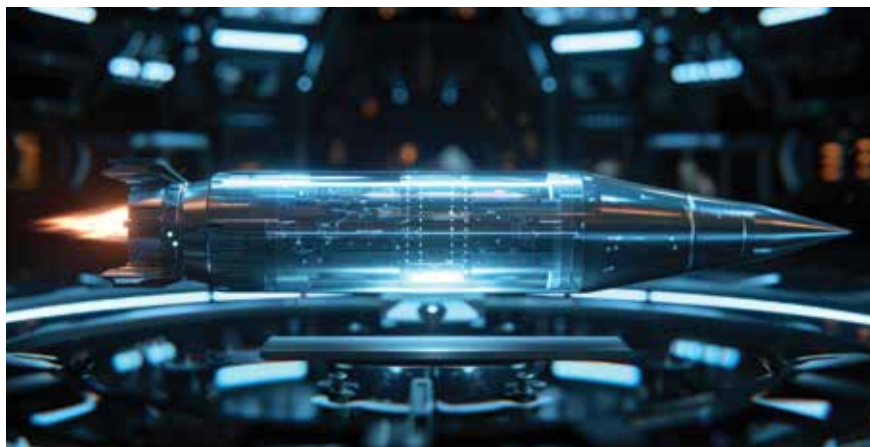
About the author: Frank Braski, chief evangelist for GenAI & IoT at Softura, has more than three decades of experience in AI, IoT, military applications, and manufacturing innovation featuring global engagements with IBM, Microsoft, and Google, and a notable role with the U.S. Army Futures Command, focusing on autonomous and AI/ML applications for defense.



**Softura**

<https://www.softura.com>

**“AI, ML, AND AUTONOMY ARE BEING USED BY ABOUT 70% OF DARPA’S PROGRAMS IN SOME FORM OR ANOTHER.”**



An AI generated image shows a future war concept of a missile hologram.



# Elastomeric shock PROTECTION SOLUTION FOR SHIP MOUNTED IFF

Hutchinson provides a speedy, effective alternative after early modeling suggested the U.S. Navy's recommended Cablemount system could fail under testing.

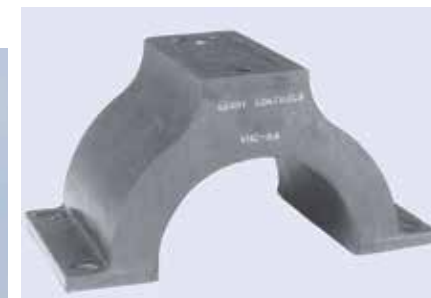
By **Tim Russell**

**H**utchinson has more than 80 years of experience designing effective solutions to help ensure military technology continues to function properly under stressful and dangerous situations. We know full well how this work can make the difference between a mission's success or failure, and we take that responsibility to heart.

## Challenges in shock protection

When a U.S. Navy contractor needed a shock protection solution for its shipboard identification friend or foe (IFF) device, they reached out to Hutchinson. An IFF is an identification system designed for command and control, using a transponder to identify the broadcaster of an interrogation signal. It enables military interrogation systems to identify aircraft, vessels, vehicles, or forces as either friendly, neutral, or hostile, and to provide their bearing and range from the interrogator. It's an essential tool for naval operations, and must continue to perform optimally, even in conditions of intense shock and vibration.

The Navy required the system meet Mil-DTL-901E, Grade A requirements, and they were set on using a Cablemount system to provide shock protection for the IFF. The contractor wanted to be sure the system could meet shock-attenuation requirements before moving forward.



**Above:** Hutchinson's Barry VHC-Series mounts

**Left:** From left to right, the Japan Maritime Self-Defense Force Atago-class guided-missile destroyer JS Ashigara, the Ticonderoga-class guided-missile cruiser USS Shiloh, the Arleigh Burke-class guided-missile destroyer USS Rafael Peralta, the Ticonderoga-class guided-missile cruiser USS Antietam, and the Lewis and Clark-class dry cargo ship USNS Washington Chambers steam in formation in the Philippine Sea.

### Analyzing the Cablemount system

The first step was to set up and run electronic models of the Cablemount solution using BarrySoft Advanced 6 Degrees of Freedom software, providing rigid body shock, vibration, and static force analysis to test a protection/isolation system under different levels of shock. This rigorous modeling method showed the Navy's recommended Cablemount solution ran far too close to shock limits under testing, with little to no safety factor – leaving no room for possible error.

These results meant the Cablemount system would likely fail in real-life shock testing, risking failure in real-world applications. It was clear ensuring the safety and efficacy of the IFF device in the field meant identifying another option to present as an alternative.

### Identifying a superior solution

After continued modeling with BarrySoft Advanced, Hutchinson's team determined our Very High Capacity (VHC) elastomeric solution was a much more resilient – and safer – solution to provide shock protection for the IFF device. The VHC-Series mounts are special purpose, mid-frequency isolators specifically designed to protect

sensitive equipment in situations where high-level shock and vibration inputs are likely. They are used primarily to protect electronic equipment installed in mobile equipment and subjected to off-road environments, such as ground vehicle electronics, shipboard equipment, shipping containers, and equipment installed in transportable shelters.

The VHC elastomeric mount boasts a large deflection capacity to provide superior shock attenuation. It features a buckling design with compression to shear-stiffness

ratio of 2:1. It's made of steel (grounding strap beryllium copper) combined with Barry LT Compound as a resilient element, to operate between -67°F and 180°F (-65°C to 82°C), and remain resistant to fungus and ozone.

Using finite element analysis (FEA) to demonstrate the relative structural integrity of the Cablemount and VHC solutions, Hutchinson presented the results to the customer, explaining how the properties of both solutions contributed directly to the test results.

## Excellence and innovation

Since 1943, Hutchinson Aerospace and Industry has been providing parts and systems meeting the unique challenges of the combat surface and subsurface naval environment. The company has earned its reputation as the global leader in protecting naval equipment and systems, managing shock loads and isolating structure-borne noise in naval environments. Whether applying existing products to meet new challenges, or developing new and advanced solutions from scratch, Hutchinson is always finding ways to advance technology in motion, shock, and noise control for the evolving demands of the defense industry.

At Hutchinson, great pride is taken in the expertise and problem-solving creativity of the company. People rely on Hutchinson parts and solutions to keep them safe and their equipment operating at full capacity, and Hutchinson continues to innovate to provide even greater reliability and protection.





### The DSSM evaluation

Compelled by the data, our customer procured the VHC system to test side-by-side with the Navy's recommended Cablemount system. The Hutchinson team traveled with the contractor to the National Technical Systems (NTS) in Virginia, where rigorous testing of both solutions was conducted using the Deck Simulating Shock Machine (DSSM).

The DSSM was designed to measure the effects of simulated underwater explosions on electronic equipment, and any

new shipboard isolated electrical equipment required to undergo shock testing prior to installation aboard a Navy ship. Naval Sea Systems Command (NAVSEA) engineers use the test results to verify a system's ability to withstand a shock force from an explosion or blast in accordance with military specifications.

The DSSM for Mil-DTL-901E, Grade A testing confirmed our team's findings – the Cablemount system quickly broke and failed the shock test. Next up was the VHC elastomeric solution, which made it

through DSSM testing successfully with positive results.

### Implementation and impact

The customer's ultimate decision was made for them by the testing and resulting data. The contractor chose Hutchinson's VHC system to provide the Navy with a solution to reduce shipboard shock levels in its electronics, contributing to long-term safety and efficacy of the ship mounted IFF. Our customer's custom base system, incorporating our VHC elastomer part, is currently in production.

Because the Hutchinson team identified an existing elastomer product as a viable solution, we saved our customer valuable time and money. Our ability to pull our existing VHC-series mount off the shelf for turnkey use in this application kept the customer's program on schedule and on budget. ■■

*About the author: Tim Russell is the regional sales engineer, US Northeast / defense aftermarket sales manager for Hutchinson Aerospace and Industry who can be reached at 508.417.7000.*



**Hutchinson Aerospace  
and Industry**

<https://hutchinsonai.com>

*Barry VHC-Series mounts are special purpose, mid-frequency isolators designed to protect sensitive equipment when high level shock and vibration inputs are expected.*

### Benefits of Barry VHC-Series mounts

- Large deflection capacity provides superior shock attenuation
- Can be used as stabilizers for tall equipment packages
- Maximum loads apply when mount will be subjected to an 18" freefall.
- Larger loads can be accommodated for less severe shock inputs.
- Buckling design
- Steel construction
- Compression to shear-stiffness ratio 2:1
- Designed to carry static loads in the axial direction, but can accommodate dynamic inputs in the radial direction
- Attenuates 18" freefall shock input to approximately 12G's



Above: The Ticonderoga-class guided-missile cruiser USS Chancellorsville, right, steams in formation with the Japan Maritime Self-Defense Force Atago-class guided-missile destroyer JS Ashigara while operating in the Philippine Sea.

### Cold forming machine

The FORMAX 2000 (FX2000) cold former advances the original FORMAX by raising performance and precision to a higher level. The FX2000 design combines zero-clearance heading slide guiding, straight across transfer, sealed heading slide liners, precision linear feed, quick-change offline setup, and advanced computer controls into a forming system delivering close-tolerance parts to net or near net shape.

The FX 2000, along with the addition of certain specials, can produce brass/steel pistol shell casings at more than 250 parts per minute (ppm). The machine can also be configured to produce second draw rifle tubes in brass or steel material.

FORMAX pioneered the quick-change concept with a Formapak system that can be removed from the machine and set up externally on a Formapak setup fixture. The Formapak is one unit incorporating the diepak, punchpak, transfer, transfer camshaft, cutter, and quill. After installation of the Formapak, computer controls simplify the adjustment of machine settings. Motor drives make accurate and repeatable kick out adjustments during this automated process.

The zero-clearance heading slide is a 2-axis design using fixed liners providing zero clearance during the work stroke of the machine. The zero clearance heading slide guidance system precisely aligns punches to dies so part concentricities are held to tight tolerances.

The FX2000 cold forming machine is designed with heading slide liners sealed to prevent foreign materials from damaging the liners and causing excess/premature wear.

Linear feeding makes traditional feed roll designs obsolete by delivering superior cut-off blank accuracy without the need for a stock gauge. The linear feed grips are designed to handle the full range of wire diameters so only one set of grips is needed, unlike traditional feed rolls. Linear feed also delivers more precise blanks while eliminating the problems associated with feed clutches and brakes.

The FX2000's zero clearance transfer system moves blanks across the dies and is designed for greater machine speed and consistency than traditional transfers.



**National Machinery**

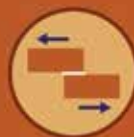
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FX2000 Die area

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### Automated bending cell

The automated Flex Cell offers highly efficient bending in combination with the TruBend 7050 press brake. Operators can dock the mobile robot cell onto the bending machine and operate it automatically in a few simple steps. The machine can run autonomously for several hours, helping companies handle order surges and combat labor shortages. The combined footprint of the Flex Cell and the TruBend 7050 is under 10m<sup>2</sup> (108ft<sup>2</sup>), compact enough for most production environments.

The Flex Cell has a double-sized material buffer ensuring it has enough material to feed the TruBend 7050 throughout a night shift. A vacuum combination gripper on the robot arm enables fast and safe loading and unloading. Using the TRUMPF TecZone Bend software, a bending program can be created in just a few seconds. The operator can program the robot with an app and the teach panel, making the TruBend 7050 quick and easy to set up. With automatic double-sheet detection, the Flex Cell can recognize if unprocessed material has stuck together during loading and then eject it, reducing rejects and saving resources.

The Flex Cell is suitable for components with a format ranging from 600mm x 400mm to 70mm x 50mm. It can process sheet metal of between 0.7mm and 6mm in thickness.



**TRUMPF Inc.**

<https://www.trumpf.com>



**ABOVE:** The Flex Cell can be docked onto the TruBend 7050 from TRUMPF in just a few simple steps. This allows automated operation of the highly productive bending machine.



**LEFT:** With the Flex Cell, an industrial robot loads and unloads the TruBend 7050 independently.

PHOTOS COURTESY OF TRUMPF

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# 3D PRINTED VALVE ASSEMBLY FOR U.S. NAVY SUBMARINES

Hunt Valve to deliver copper-nickel valve assembly in less time, at higher quality than traditional sand-casting.

**H**unt Valve, a Fairbanks Morse Defense (FMD) company, was awarded a contract by the Maritime Sustainment Technology and Innovation Consortium (MSTIC) to produce a 3D printed valve assembly for installation on U.S. Navy submarines. Using additive manufacturing (AM) to create the 70 lb valve assembly – the first 3D printed assembly to be installed on a U.S. submarine – will provide the Navy with a product meeting or exceeding the quality produced through traditional sand-casting in about two-thirds less time.

“The use of additive manufacturing assembly with copper-nickel for large valve production is a real step forward for our industry,” says Andrew Pfister, vice president, Aftermarket and Product Development at Fairbanks Morse Defense.

Until recently, AM for submarine components has only been possible for small parts and pieces, and applications for challenging alloys such as copper-nickel have been rare. Sand-casted copper-nickel is highly porous and often results in a high fall-out rate which challenges delivery time. In contrast, valve bodies created through 3D printing have dramatically higher first-time yields, accelerating production and delivery timeframes since the manufacturer doesn’t need to build in additional production time to account for the fall-out rate.

Hunt Valve’s contract with MSTIC will allow the 3D valve to be installed on any U.S. submarine class. The expanded use of AM is expected to speed the production of components for the Navy fleet by up to 75%, making the process an attractive option for increasing produc-

tion efficiency and gaining greater control over the defense industrial base supply chain, as foundries would be able to focus on larger components.

“Innovative technologies such as AM are essential for building the submarine industrial base to overcome supply chain challenges,” Pfister says. “By scaling AM, we can reduce shipping from other parts of the world and increase the speed of production at home – which positively impacts the Navy’s overall strategic goal to deliver a 300+ fleet.”

The valve assemblies are being de-

veloped by Hunt Valve in collaboration with Lincoln Electric. The valve body will be 3D-printed by Lincoln Electric by stacking layers of copper-nickel together to create the final product. Once printed, the valve body is delivered to Hunt Valve to manufacture the remaining components using the standard manufacturing method and then assemble all the parts to create the full valve assembly.



**Fairbanks Morse Defense**

<https://www.fairbanks-morsedefense.com>



PHOTO COURTESY OF FAIRBANKS MORSE DEFENSE



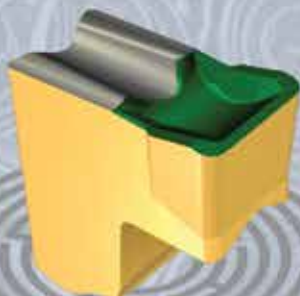
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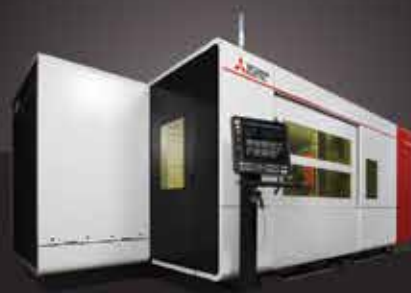
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