



Industrial Base Analysis & Sustainment (IBAS) Program



Steel Founders Society of America
Fall Leadership Meeting
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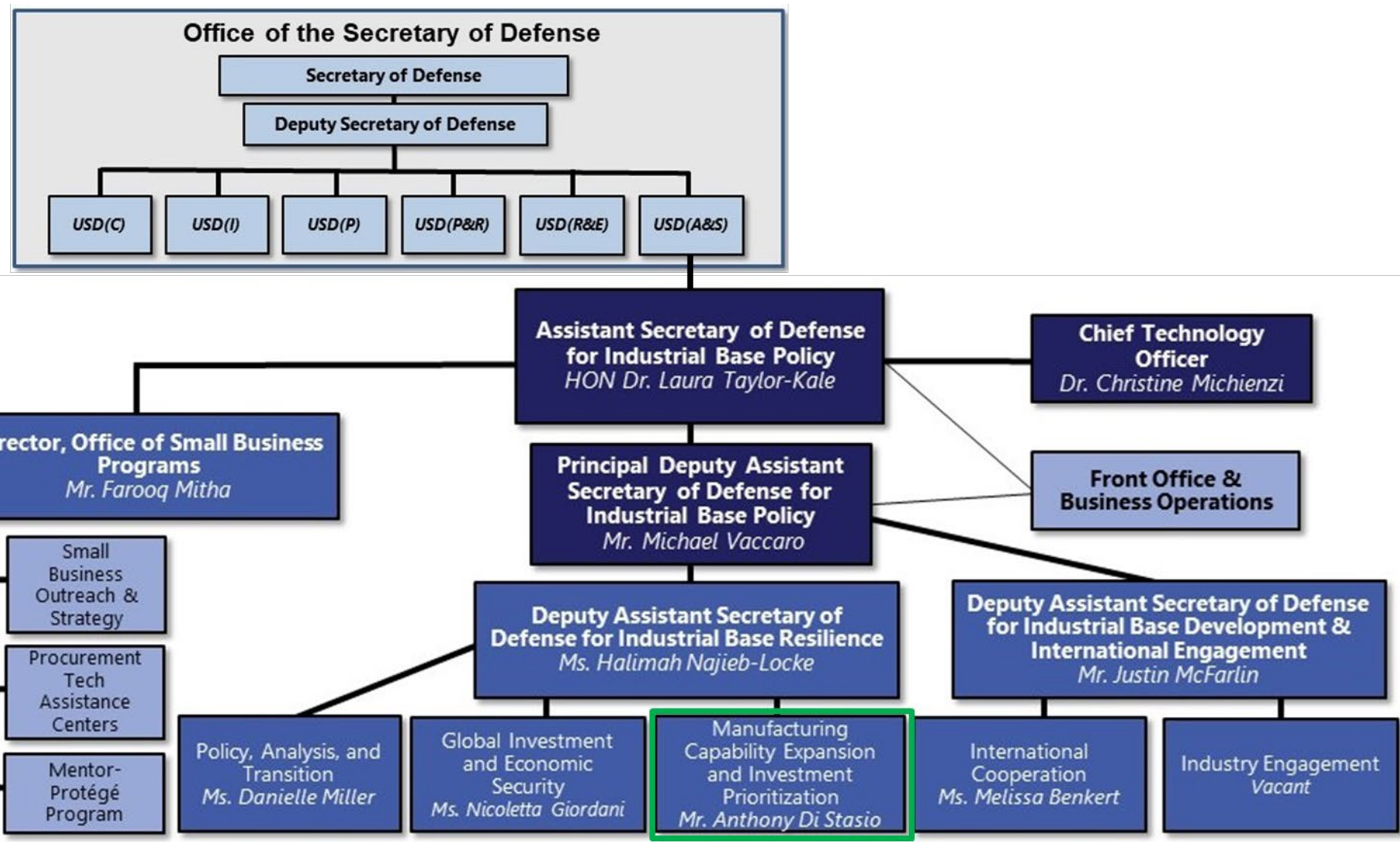
Overview

- **Importance of Castings & Forgings to DoD**
- **IBAS Program**
 - Mission, Vision & Priorities
 - What We Do & Industrial Based Policy Structure
 - Investments & Acquisition Vehicles
 - Capacity Investment Successes & Planned Projects
- **Summary**

Expanded use - Powerful authorities with built-in agility enables rapid pivot/re-tooling of programs



Industrial Base Policy Organizational Structure





IBAS Program Quick-Look

Building the “Next Generation of the Arsenal of Democracy” through execution of the Industrial Base Analysis and Sustainment (IBAS) Program

Mission: Strengthen the competitive posture of the U.S. Defense Industrial Base (DIB) in the era of great powers and global competition

Vision: A modern industrial base that fortifies traditional DIB capabilities and forges emerging sectors to respond at will to national security requirements

Priorities:

- **Prepare the defense industrial workforce** – Promote, elevate, and accelerate industrial talent pipelines
- **Ready the modern DIB** – Advance and sustain traditional defense manufacturing sectors
- **Prepare for the future** – Identify, attract, and cultivate emerging defense sectors
- **Assess and shape the risk** – Mitigate supply chain vulnerabilities within the global DIB
- **Build and strengthen partnerships** – across the global DIB

Statutorily Based

10 U.S. Code § 4817. Industrial Base Fund – IBAS Authorities

1. to support the monitoring and assessment of the industrial base
2. to address critical issues in the industrial base relating to urgent operational needs;
3. to support efforts to expand the industrial base; and
4. to address supply chain vulnerabilities.



Castings & Forgings (C&F) Strategic Situation

Functional View: Critical to Defense Capabilities

Casting and forging are fundamental components of manufacturing; without adequate domestic capacity DoD cannot sustain its current force or modernize critical platforms, systems, and weapons, including:

- All surface and subsurface naval vessels
- All aircraft and space systems,
- Ground combat and transportation systems
- Missiles, rockets, bombs, ammunition



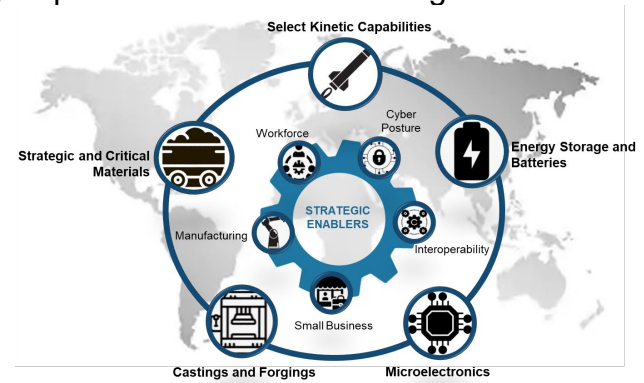
As Ukraine has demonstrated, modern warfare consumes massive quantities of C&F items. Existing C&F issues in shipbuilding, armored systems, artillery, aircraft complicated by *surge (industrial mobilization) requirements*:

- Artillery projectiles and tubes
- Anti-tank weapons, rockets, bombs, missiles, ammunition
- Jet and turbine engine parts due to accelerated flight mission tempo

To shore up our foundation for deterring aggression and campaign through challenges, the Department will urgently build enduring advantages across the defense ecosystem

...As we reinforce our defense industrial base and make supply chains more robust, the Department will work across communities so that our U.S. defense ecosystem can deliver warfighters sustainment at scale.

- National Defense Strategy



To be ready, DoD must act now to position itself to replenish and robust its stocks of cast & forged items for future near- and long-term fights ... and we must do so quickly



Castings & Forgings

Critical to the modern conflict and highly dynamic

C&F provide unique manufacturing attributes...



...But require investment to keep up with change



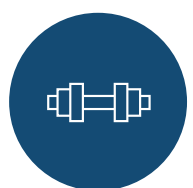
Scalability

Ability to mass produce



Predictability

Consistent output and quality



Performance

Strong, complex designs

New manufacturing processes and equipment are available that improve cost, performance, quality

Digital innovations to fully realize potential of workforce and equipment

Major advances metrology have enabled higher quality, cost effectiveness, and predictability

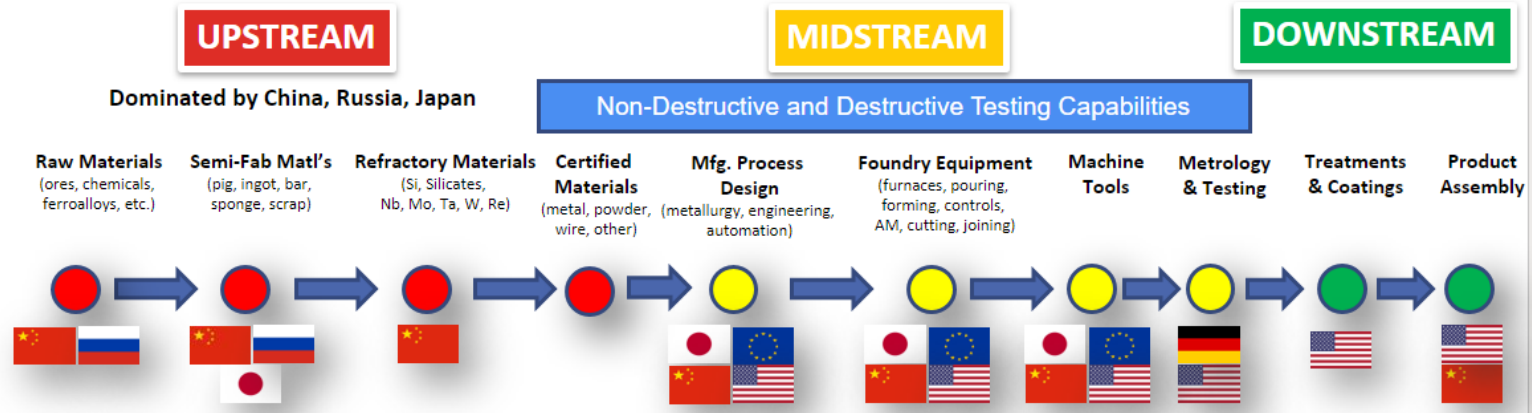
Timelines for industrial response must be shorter than in the past. Only way to get there is to take advantage of these innovations



Focus Area Quick-Look

Castings & Forgings (C&F)

C&F value chain contains a mix of partner and adversary global influence. Domestic workforce issues exist across C&F sector



- Strategic Context: C&F parts are critical to all DoD systems and weapons
- Key Sector Challenges/Issues: Foreign competitors dominate value chain, domestic workforce is shrinking, U.S.G. and DoD policies limit global competitiveness
- DoD Supply Chain Equities:
 - C&F parts in key systems are high importance/low-volume, need specialized materials
 - C&F products are essential components of machine tools used to make other products
 - Forgings are in 20% of the products in the U.S. GDP
- Major Actions:
 - Develop DoD C&F Investment Strategy: In formal coordination
 - Invest in the C&F industrial base to modernize/expand capacity: Investing ~ \$2B FYDP
 - Expand partnerships among U.S.G., industry, international bodies: Efforts beginning



2023 and 2024 IBAS C&F Initiatives

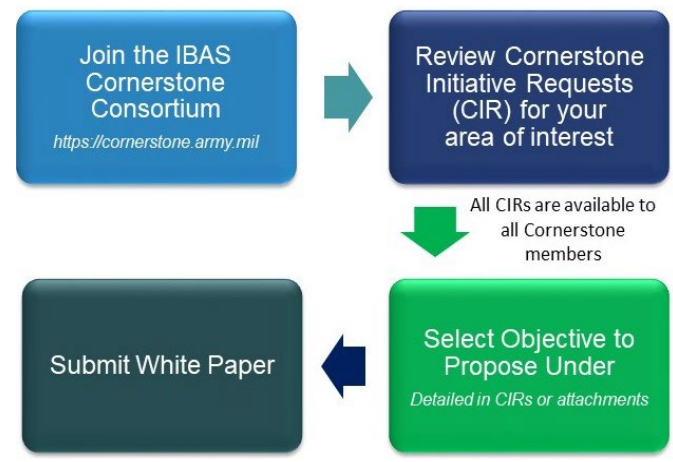
Initiative	FY23 (\$M)	FY24 (\$M)
Machine tool research	10.00	10.00
Large AM, "Digital Factory," "Born Qualified"	0.00	10.00
Joint C&F COE study and expansion	0.00	5.00
RAMP Lab	6.50	10.00
Enhanced Welding Lab	5.00	5.00
Computational Tools	5.00	5.00
Reduce reject rate	0.00	0.00
New AM alloys	0.00	0.00
Develop alloy and metalworking processes	0.00	15.00
Vendor Qualification Support	0.00	20.00
Robotic Welding Research	0.00	8.00
Develop explosion test capacity	0.00	2.00
Maturation of Magnesium Solidification Modeling Software	0.00	0.50
Improved Welding Process & Workforce	0.00	0.30
Digital X-Ray Automatic Defect Recognition	0.00	2.50



IBAS Acquisition Vehicles

Cornerstone Other Transaction Agreement (COTA)

- Established February 2018 to be a **Government-run**, integrated industrial base resiliency mechanism to create dynamic relationships across the defense industrial base
- Authority: 10 U.S. Code § 4022 – Authority of DoD to carry out certain prototype projects (formerly 10 U.S. Code § 2371b)
- DIB resiliency and supply chain assurance initiatives focus on “prototype” projects, capabilities, and capacities supporting a broad range of requirements
- COTA strengths:
 - Common IP, Data Sharing, and Management Agreement
- Current membership = 781
 - Streamlined membership and white paper submission process



Other Vehicles

- GSA
- Other Military Service and defense agency (DA) vehicles
- Build additional OTA Agreements

Cornerstone of the American Military Competitive Edge



Work with us!
<https://cornerstone.army.mil>



Industrial Capacity Investment Successes

Navy Propulsion Foundry Project

Partner(s)	DIB Sector(s)	Key Achievement(s)	IBAS Funding
<ul style="list-style-type: none"> Rolls-Royce Marine North America (RRMNA) 	<ul style="list-style-type: none"> Shipbuilding Machine Tools Advanced Manufacturing Materials 	<ul style="list-style-type: none"> Established a prototype production line to produce centrifugal castings including skills, know how, processes and methods related to centrifugal casting capability 	\$5.5M

Problem: U.S. depends on foreign sources for large cast/forged products which are foundational to defense systems and platforms

Solution: IBAS partnered with RRMNA to manufacture items it currently outsources (such as Stainless Steel parts and centrifugally cast Controllable Pitch Propeller hubs)

A propeller is readied for inspection at RRMNA's Pascagoula, MS foundry



Large-Scale Electron Beam Welding (EBW)

Partner(s)	DIB Sector(s)	Key Achievement(s)	IBAS Funding
<ul style="list-style-type: none"> U.S. Navy (USN) Dynetics Technical Solutions 	<ul style="list-style-type: none"> Shipbuilding Aircraft Workforce 	<ul style="list-style-type: none"> Provides superior quality welds and significant reduction in weld fabrication time vs arc welding De-risks CLB schedule - optimize fabrication to realize quality, cost, and fabrication schedule benefits 	\$14.7M

Problem: USN desired a viable alternative to traditional arc welds which were slow, low quality, and often required rework resulting in COLUMBIA (CLB) cost & schedule impacts

Solution: IBAS partnered with USN and Dynetics to establish a domestic source for classified, high-power EBW capability for fabrication of critical U.S. Navy Submarine and high performance aerospace components

A defense system component awaits entry to an EBW in Huntsville, AL





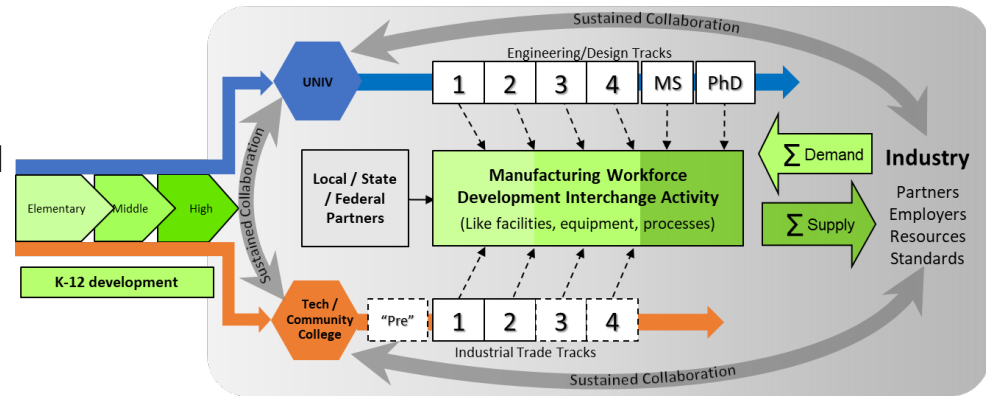
National Imperative for Industrial Skills

Building Capacity & Proven Solutions



- **Initiative launched in 2020 to invest in prototype projects for industrial workforce development (WFD)**

- WFD ecosystem model provides common touch point; targets all segments/interfaces
- Facilitates multiple approaches to industrial skills recruiting, ed. & training, retention
- Recognizes interplay of post-secondary education and training tracks
 - University—engineering and design
 - Career and technical—industrial trades



- **Key principle: active, sustained partnering with industry, academia, military departments, federal agencies, state governments**

- Builds partner communities through hands-on involvement and mutual benefit
- Increases program’s momentum through unified effort

- **Creating regionally focused activities to target capacity where skills are most needed**

- Delivers broad benefits to DIB (private industry) and organic IB
- Regional efforts established in New England and Virginia
- New regional projects planned for Great Lakes and West Coast

Projects stress-test all segments of ecosystem and multiple approaches to meet recruiting, education & training, and retention needs; delivering measurable outcomes in the initiative’s third year.



IBAS Investment Portfolio to Address Skills Imperative (as of July 2023)

IBAS National Imperative for Industrial Skills Funded Projects

- 1** *Electronic Manufacturing Technical Education. (Aeromarc, LLC).* MI, OH, AZ, CA, FL, IN, MA, MI, TX, and WI
- 2** *Defense Precision Optics Workforce Development & Technology Ecosystem. (American Center for Optics Manufacturing, Inc. [AmeriCOM]).* NY and NJ
- 3** *Interdisciplinary Center for Advanced Manufacturing Systems (ICAMS). (Auburn University).* AL
- 4** *System Engineering Technician Program (SET) (Auburn University).* AL and TX
- 5** *Shipbuilding Labor Market Analysis (Gulf Coast). (Govini).* AL, MS, FL, and LA
- 6** *Regional Test Bed CNC/CAD/CAM Program. (Institute for Advanced Composites Manufacturing Innovation (IACMI-The Composites Institute)).* TN and NM
- 7** *Accelerated Training in Defense Manufacturing (ATDM). (Institute for Advanced Learning and Research [IALR]).* VA
- 8** *Project MFG. (RD Solutions).* AL, CA, IL, LA, MS, NY, PA, SC, TN, VA, KS, MO, OH, TX, UT, WI
- 9** *NextGen Partnership for Submarine Shipbuilding Supply Chain Workforce Development. (SE New England Defense Industry Alliance [SENEDIA]).* RI, CT, MA, NH, VT, and ME

Map Legend

- ★ Headquarters
- Current Locations
- ⊘ Expected Locations



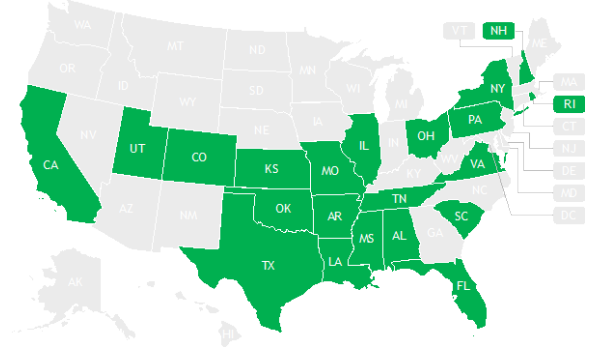
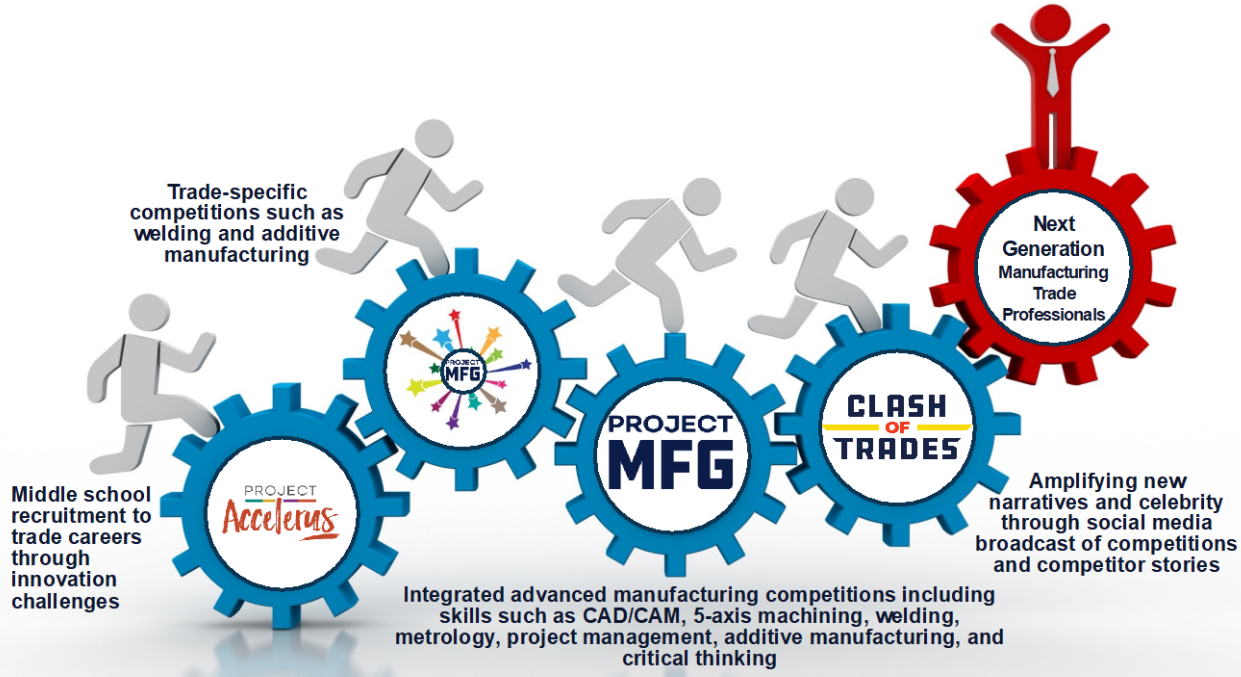
- 10** *Manufacturing and Skills Development Program. (Texas A&M Engineering Experiment Station [TEES]).* TX
- 11** *Pennsylvania Talent Pipeline Project. (TMG, Inc.).* PA
- 12** *Vermont Technical Manufacturing Collaborative (VTMC). (Vermont Technical College [VTC]).* VT
- 13** *ACENet. IACMI. NC, FL, KY, MI, NM, NY, RI, TN, TX, UT, VA, and WV*
- 14** *Labor Market and Supply Chain Analysis. (McKinsey/202 Group).* AL, SC, CA, and TX
- 15** *Workforce-CTE Data Analytics – Midwest. (Productive Resources).* IL, WI, and MI
- 16** *High Velocity Training Center. (BG Workforce Solutions).* AL and TX
- 17** *Shipbuilding Regional Industrialization Pilot. (TEES).* TX and CT
- 18** *Advanced Manufacturing Technologist Training. (Umass - Lowell).* MA

Skills Imperative efforts meet DIB-dense states' immediate needs and provide proof-of-concept demonstrations to support expansion—over \$290M invested to-date across 20+ projects



Project MFG

An Enduring Workforce Catalyst Activity



To date, over **175** schools / teams representing **29 states** and **6 allied nations**, featuring students from various community colleges with advanced manufacturing/technical programs, universities, and multiple high school and international technical trade programs, have participated in Project MFG competitions, totaling over 783 individual competitors.

Since its inception, Project MFG has awarded student scholarships and grants totaling almost **\$596,000** and tools/tooling prize awards totaling an additional **\$378,000+** for schools and competitors as of its May 2023 National Advanced Manufacturing and National Welding Championships.

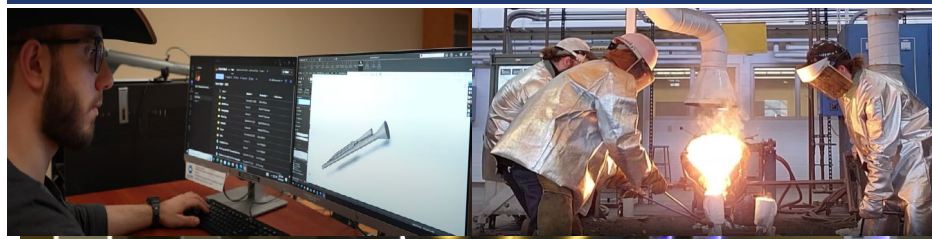
Making an immediate impact

- Changing what and how we teach and train advanced manufacturing
- Driving new engagement, partnerships, and investment at multiple levels at home and abroad
- Changing mindsets and perceptions through new narratives



All in Steel

Period of Performance Jan. '24 – May '28 (66 months)



All In Steel

Project Objective(s)

- To engage and attract future leaders in the manufacturing industry in a fun and challenging way.

Justification for IBAS Funding

- Workforce recruitment is a critical issue identified in the DoD in response to E.O. 14017 for the Casting and Forging Industry.

Primary Stakeholders

- Casting, forging, and additive manufacturers

Transition Target

- Steel component production industry

Rationale for Project

- Skilled labor shortage is one of the most significant challenges facing the manufacturing industry. The Cast In Steel competition has been proven to be the most effective way to outreach to the next generation workforce.

Anticipated Impact

- Securing a capable steel manufacturing supply chain to meet existing and planned requirements for economic and national security is critical. Enhancing the workforce's capability and availability will benefit the producing industry, their suppliers, their OEM customers and the DoD users.

Performer(s)

- Steel Founders' Society of America – Crystal Lake, IL
- Forging Industry Association – Independence, OH
- America Makes – Youngstown, OH

Raymond's Estimated Financial Information

Source	FY24 \$k	FY25 \$k	FY26 \$k	FY27 \$k	FY28 \$k	Total \$k
OSD	\$500	\$500	\$500	\$500	\$500	\$2,500
IBAS						

Technical Progress to Date

- Period of Performance
- January '24 – May '28



All in Steel

- What is the project?
 - All in Steel is an expansion of the supported Cast in Steel from 2023 to engage universities and students in steel casting with a Forged in Fire type competition. In 2024 the competition will challenge university teams to make a Halligan bar as a casting, forging, or additive product for the competition.
- Why is it being done?
 - Workforce recruitment is the highest priority critical issue identified by SFSA in our current strategic roadmap and in the DoD in response to E.O. 14017 for the Casting and Forging Industry.
- Who will it benefit?
 - Securing a capable Casting, Forging and Additive supply chain to meet existing and planned requirements for economic and national security is critical. Enhancing the workforce's capability and availability will benefit the producing industry, their suppliers, their OEM customers and the DoD users.
- How long will it take?
 - This will require a persistent programmatic effort but requires on modest funding.
- How much will it cost?
 - In 2023, the cost to DoD was \$200k. It is proposed for 2024 forward with the expansion to include forging and additive to require \$500k.
- Who will it transition to?
 - This should provide the steel component production industry throughout the entire supply chain to have more available and capable professionals.



Summary

- IBAS is armed with broad authorities to achieve National Security Strategy goals
 - Portfolio increase responds to findings from E.O.14017 analysis and recommendations
 - IBAS investments are part of an integrated investment strategy for the Industrial Base Support Directorate
 - IBAS partnering with lead Military Service and convening cross-service teams for successful execution across each technical area
 - Workforce effort supporting Columbia- and Virginia-class Submarine workforce requirements
- **We are here to learn how we can help**



IBAS is a central component of an integrated DoD strategy with the Defense Production Act to identify and mitigate critical needs across U.S. defense industrial base sectors



Key Points and Questions

- **Resilience is critical to our industrial and military capabilities**
 - Foundational capabilities are important, but we need more, and we need it quickly
- **What impacts is the EV transition having on the C&F sector?**
 - How concerned about this are you and your firms?
 - Is this transition creating / likely to create the impacts we need to ensure national survival?
- **What is your industry ready to do, and what help do you need from DoD and the federal government?**
 - Workforce development
 - Capital improvements
 - Policy and practice changes
 - Others I've missed?



Questions / Comments



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