



PE: 0607210D8Z

Industrial Base Analysis and Sustainment (IBAS) Program



National Defense Industrial Association
Manufacturing Division Meeting
17 February 2022

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Today's Talk



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- **IBAS Program Introduction**
- **Department of Defense Report: State of Competition within the Defense Industrial Base**
 - ***Workforce Efforts***
 - Training of Skilled Technicians to the Defense Industrial Base Report
 - Skills Imperative Projects
 - Project MFG –*Clash of Trades*
 - Department of Commerce Good Jobs Challenge
 - National Academy of Engineering Study
 - ***Industrial Base Priority Sectors***
 - Competition Report Sectors
 - EO 14017 Sectors
- **Discussion: NDIA / Govini Vital Signs 2022**
 - What are your top manufacturing issues?
 - How can the DoD support your business?

Executive Order 14017 Industrial Base Sectors

Kinetic Capabilities

Energy Storage and Batteries

Microelectronics

Castings and Forgings.

DoD Competition Report Industrial Base Sectors

Castings and Forgings

Missiles and Munitions

Energy Storage and Batteries

Strategic and Critical Materials

Microelectronics



Program Introduction



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Statutorily Based

10 U.S. Code § 2508. Industrial Base Fund

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

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** - Collaborate across the Global DIB

Significant Developments

- **Expanded use** - Powerful authorities with built-in agility enables rapid pivot/re-tooling of programs
- **Collaboration with allies** – Building out relationships around shared challenges
- **Workforce** - National Imperative for Industrial Skills (NIIS)
 - IBAS is viewed as a leader
 - Targeting DIB-dense states
 - Making gains in addressing shortages
- **Congressional Increases** - Lead to big dividends for DoD and program successes



DoD State of Competition Report

Directed by EO 14036



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“To improve and maintain competitive advantage as defense needs and technologies change, manufacturers must retain workers with defense-specific skills, upskill their workforces when needed, and access the skilled workers to modernize their production capabilities.”

“Today, DoD and other stakeholders are working to reconnect the workforce development (training and education) ecosystem, which includes students, to defense industry needs.”

“These efforts include helping to recruit and connect students and adult learners to defense manufacturing employment opportunities and incentives to develop the skill sets essential to defense supply chains.”

“These efforts will improve defense manufacturers’ access to skilled workers and their ability to respond to emerging defense business opportunities.”

DEPARTMENT OF DEFENSE REPORT

State of Competition within the Defense Industrial Base



Office of the Under Secretary of Defense for
Acquisition and Sustainment
February 2022



National Imperative for Industrial Skills



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- IBAS launched the National Imperative for Industrial Skills initiative (the Skills Imperative) in March 2020, to address critical DIB workforce development issues
- Our *Pilot Program Strategy* describes our progress to date

Workforce shortages undermine key elements of the national defense enterprise:

- *U.S. innovation lead—shortages jeopardize U.S. technical overmatch*
- *Build back supply chains—shortages imperil supply chain security and resiliency*
- *Production of DoD systems—shortages escalate cost increases and schedule delays*
- *Defense readiness and posture—shortages hollow out the force and degrade preparedness*

TRAINING OF SKILLED TECHNICIANS
for the Defense Industrial Base
PILOT PROGRAM STRATEGY

CLEARED
For Open Publication
Jan 03, 2022
Department of Defense
OFFICE OF PREPUBLICATION AND SECURITY REVIEW

Briefing to the
Senate Armed Services Committee
SEPTEMBER 2021


IBAS
Industrial Base Analysis and Sustainment Program

The estimated cost of this report or study for the Department of Defense is approximately \$ 1,500. This includes \$ 0 in expenses and \$ 1,500 in DoD labor.



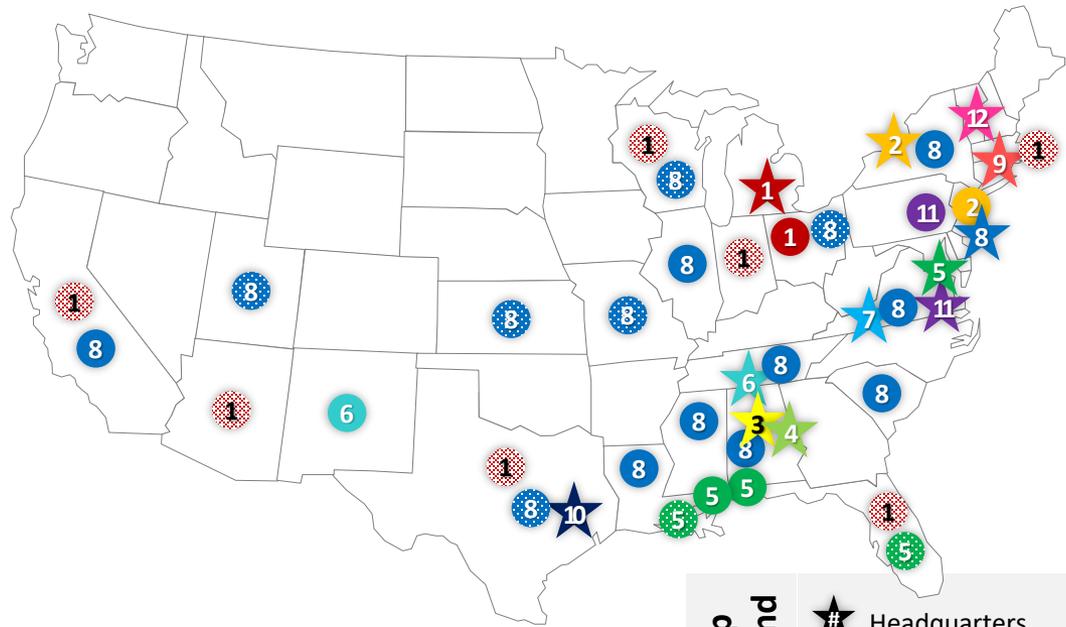
Skills Imperative Projects



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IBAS National Imperative for Industrial Skills Funded Projects

- 1** **Aeromarc, LLC - *Electronic Manufacturing Technical Education***
 Current: MI, OH
 In Discussion/ Planning/ Execution: AZ, CA, FL, IN, MA, MI, TX, WI
- 2** **American Center for Optics Manufacturing, Inc. (AmeriCOM) - *Defense Precision Optics Workforce Development & Technology Ecosystem***
 Rochester, NY and NJ
- 3** **Auburn University - *Interdisciplinary Center for Advanced Manufacturing Systems (ICAMS)***
 Auburn, AL
- 4** **Auburn University - *System Engineering Technician Program (SET)***
 Auburn, AL
- 5** **Govini - *Shipbuilding Labor Market Analysis (Gulf Coast)***
 Planning: AL, MS
 Anticipated: FL, LA
- 6** **Institute for Advanced Composites Manufacturing Innovation (IACMI-The Composites Institute) – *Regional Test Bed CNC/CAD/CAM Program***
 Knoxville, TN and NM



- 7** **Institute for Advanced Learning and Research (IALR) - *Accelerated Training in Defense Manufacturing (ATDM)***
 Danville, VA
- 8** **RD Solutions - *Project MFG***
 Complete: AL, CA, IL, LA, MS, NY, SC, TN, VA
 Anticipated: AL, CA, IL, LA, MS, NY, SC, TN, VA, KS, MO, OH, TX, UT, WI
- 9** **SE New England Defense Industry Alliance (SENEDIA) - *NextGen Partnership for Submarine Shipbuilding Supply Chain Workforce Development***
 RI, CT, MA

Map Legend	
★	Headquarters
●	Current Locations
⦿	Expected Locations

- 10** **Texas A&M Engineering Experiment Station (TEES) - *Manufacturing and Skills Development Program***
 College Station, TX
- 11** **TMG, Inc (Sub to IALR) - *Philadelphia Region Workforce Pipeline Pilot Project***
 VA, PA
- 12** **Vermont Technical College (VTC) *Vermont Technical Manufacturing Collaborative (VTMC)*** VT



Project MFG: Clash of Trades



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- Project MFG is a catalyst that helps elevate the next generation of highly skilled trade professionals by changing mindsets, fostering community preparedness and challenging how the critical skills needed to succeed in modern advanced manufacturing are taught.
- Competitions feature single and integrated technologies such as welding and additive manufacturing.
- Challenges also include team competitions using multiple technologies to create a product that requires integrated manufacturing.



"We lack the people to build our Navy's next generation submarines and ships. We, as the U.S. Government can buy all these weapons systems, but we can't build them without the people." - RADM Scott Pappano PEO SSBN



Good Jobs Challenge



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- \$500M funded under American Rescue Plan Act
 - Administered by Department of Commerce Economic Development Agency
 - Grant applications were due February 10th
- Building and strengthening systems and partnerships that bring together employers who have hiring needs with other key entities to train workers . . .
 - for in-demand skills that lead to . . .
 - quality jobs that provide good pay, benefits, and growth opportunities and connect . . .
 - unemployed or underemployed workers to existing and emerging job opportunities.
- Leverage federal and non-federal funds to expand reach
- Produce concrete, measurable impact (e.g., # job placements, wage gain)



Seven of the 12 IBAS Skills Imperative projects have submitted grant applications, either as the lead organization or as a partner.

<https://eda.gov/arpa/good-jobs-challenge/>



NAE Study and Workshop



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Strengthening the Talent for National Defense: Infusing Advanced Manufacturing in Engineering Education

Virtual Workshop:
February 24th and 25th



- *DAY 1: Thursday, February 24, 2022, from 11:00am-4pm ET*
- *What can government/industry collaborations do to advance manufacturing and its workforce?*
- *What does industry need to advance manufacturing?*

- *DAY 2: Friday, February 25, 2022, from 11:00am-4pm ET*
- *How can we deliver effective undergraduate manufacturing education?*
- *How can we foster coalition, cooperation, and paths forward?*

<https://www.nationalacademies.org/event/02-24-2022/workshop-infusing-advanced-manufacturing-in-engineering-education>



Priority Industrial Sectors



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BRIEFING ROOM

Executive Order on American Supply Chains

FEBRUARY 24, 2021 • PRESIDENTIAL ACTIONS

By the authority vested in me as President by the Constitution and the laws of the United States of America, it is hereby ordered as follows:

Section 1. Policy. The United States needs resilient, diverse, and secure supply chains to ensure our economic prosperity and national security.

Pandemics and other biological threats, cyber-attacks, climate shocks and extreme weather events, terrorist attacks, geopolitical and economic competition, and other conditions can reduce critical manufacturing capacity and the availability and integrity of critical goods, products, and services.

Resilient American supply chains will revitalize and rebuild domestic manufacturing capacity, maintain America's competitive edge in research and development, and create well-paying jobs. They will also support small businesses, promote prosperity, advance the fight against climate change, encourage economic growth in communities of color and economically distressed areas.

More resilient supply chains are secure and diverse — facilitating great domestic production, a range of supply, built-in redundancies, adequate stockpiles, safe and secure digital networks, and a world-class American manufacturing base and workforce. Moreover, close cooperation on resilient supply chains with allies and partners who share our values will foster collective economic and national security and strengthen the capacity to respond to international disasters and emergencies.

Therefore, it is the policy of my Administration to strengthen the resilience of America's supply chains.

EO14017 Industrial Base Sectors

Castings and Forgings

Energy Storage and Batteries

Microelectronics

Kinetic Capabilities

DoD Competition Report Industrial Base Sectors

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Strategic and Critical Materials

DEPARTMENT OF DEFENSE REPORT

State of Competition within the Defense Industrial Base



Office of the Under Secretary of Defense for Acquisition and Sustainment

February 2022



Castings and Forgings

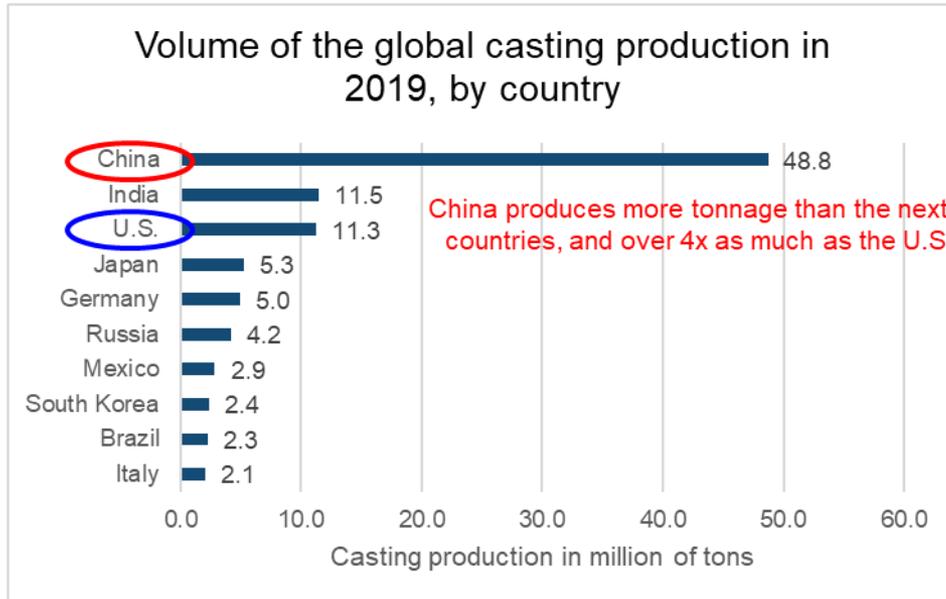


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Cast and forged products are critical to defense and are used in almost all platforms, most subcomponents, and machine tools and other production equipment.

However, between 1984 and 2018, the U.S. lost 1,600 foundries and over 4,400 metal casting facilities. These changes in the industry have displaced over 324,000 workers since the mid-20th century.

And...



Source: <https://www.statista.com/statistics/237526/casting-production-worldwide-by-country/>

NEWS | Feb. 4, 2022

DASD (Industrial Base Policy) Addresses Forging Industry Association Members

The Deputy Assistant Secretary of Defense for Industrial Base Policy (DASD(IBP)), Mr. Jesse Salazar, was the opening keynote speaker at the Forging Industry Association's 2022 FIA Lobby Day on February 2nd. The two-day event, offered Forging Industry Association (FIA) members an opportunity to discuss crucial industry issues that directly impact their business with leaders from Washington, D.C.

"Forgings are dispersed across many critical applications in defense – from flight critical structural and rotating parts, to missiles, and our large diameter gun tubes," said Mr. Salazar. "The U.S. casting and forging industry faces challenges related to capability and capacity, workforce, our own government policies, and intellectual property." Mr. Salazar further highlighted the Department of Defense's (DoD) commitment to building a more robust domestic manufacturing capacity and casting and forging in particular as captured in DoD's response to Presidential Executive Order (E.O.) 14017, *America's Supply Chains*.

The one-year report will be published on February 24, 2022. Mr. Salazar previewed some of the content, specifically around the forging industry and its importance to DoD's mission. Castings and forgings are directly addressed in DoD's report as one of the five focus areas prioritized by the Department for this assessment.

The DoD's E.O. 14017 report will capture key challenges faced by the castings and forgings sector, such as the need to build domestic capacity for producing large cast and forged products needed for defense systems, machine tools, and manufacturing systems. Between 1984 and 2018, the U.S. lost 1,600 foundries and over 4,400 metal casting facilities. A DoD survey, conducted by the DoD, found that two-thirds of North American casting and forging firms have annual revenues under \$25 million and three-quarters have fewer than 100 employees. These changes in the industry have displaced over 324,000 workers since the mid-20th century.

The E.O. 14017 report will outline strategic recommendations and addresses other pressing challenges faced by the industry through investment strategies, applied research, workforce initiatives, policy and procedure reviews, and more.

As Mr. Salazar noted in his remarks to the FIA, "The forging industry is critical to DoD's long-term success." Continuing industry engagement such as the FIA Lobby Day, as well as the strategic roadmap outlined in the DoD's E.O. 14017 report, are vital efforts to improve resilience in the forging sector through collaboration with industry partners.

"The U.S. casting and forging industry faces challenges related to capability and capacity, workforce, our own government policies, and intellectual property," stated Mr. Jesse Salazar, Deputy Assistant Secretary of Defense for Industrial Policy.



Machining and Machine Tools



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IBAS partnered with ORNL and IACMI to create America's Cutting Edge (ACE) in order to address the diminishing capability in the U.S. to design, make, and use advanced machine tools.

ACE Training Program

- Curriculum supports 67 in-person participants and 1,952 on-line CNC course registrants
- Completed 8 in-person bootcamps in 2021

Tap Test Technology (2021 R&D 100 Awards Finalist)

- Tap Test is a system designed to improve the performance and cost effectiveness of both existing base and new machine tools
- More than \$2M in annual savings have been achieved in U.S. machine shops using NC program modifications based on tap test results.

COVID-19 Response

- Created new tooling now used to create millions of mask filters, face shields and clips for COVID-19 protection



IBAS Partners

- *Department of Energy/Oak Ridge National Lab (ORNL)*
- *Institute for Advanced Composites Manufacturing Innovation (IACMI)*

<https://iacmi.org/workforce/programs/americas-cutting-edge/>



Strategic and Critical Materials



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*“The U.S. must ensure a domestic supply of the **critical materials** essential to U.S. defense programs*

Critical materials manufacturing is capital- and time-intensive. Mining and processing concerns are risk-averse while capital recovery times are long.

Furthermore, pricing of mined material is inelastic while downstream manufacturers more rapidly change suppliers and product formulations to obtain the lowest cost source. Companies are disincentivized from spending money on a project without surety of a profit in the long run. Changing the structure of the supply chain for these materials is difficult without government incentives and partnerships with the private sector.

Policy interventions should be tailored to the unique market failures of a given strategic and critical material market, with a strong emphasis on partnerships with the private sector and accelerating the development of diversified and reliable sources of supply.” - DoD State of Competition within the Defense Industrial Base



Selected IBAS Activities

- Heavy Rare Earth Elements processing
- Rare Earth Recovery from Coal Ash
- Carbon Industrial Base Enhancements
- Cold Rolled Aluminum
- Aligned with DPA Title III in broader DoD approach to enabling the domestic supply chain for REE and related down-stream products



Kinetic Capabilities



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“Kinetic capabilities: Includes Precision Guided Munitions (PGMs), Hypersonics, and Directed Energy (DE). Key components (e.g., critical energetics, microelectronics) are almost exclusively produced by foreign entities, including adversarial nations.” – *From Federal Register call for comments to EO 14017 report*

“Our competitors have expanded the definition of competition into economic and informational areas, and aggressively advanced their own military capabilities to hold our homelands at risk, both kinetically and non-kinetically.

“We must outpace our competitors by accelerating our own efforts to transform our culture, including factoring homeland defense into every strategy, plan, force management, force design, as well as the aspects of acquisitions and budget so we can deter in competition, de-escalate in crisis, and defeat in conflict.” - Air Force General Glen D. VanHerck, Commander, U.S. Northern Command



Selected IBAS Activities

- Directed Energy Supply Chain Assurance
- Hypersonics Industrial Base Capabilities



Microelectronics

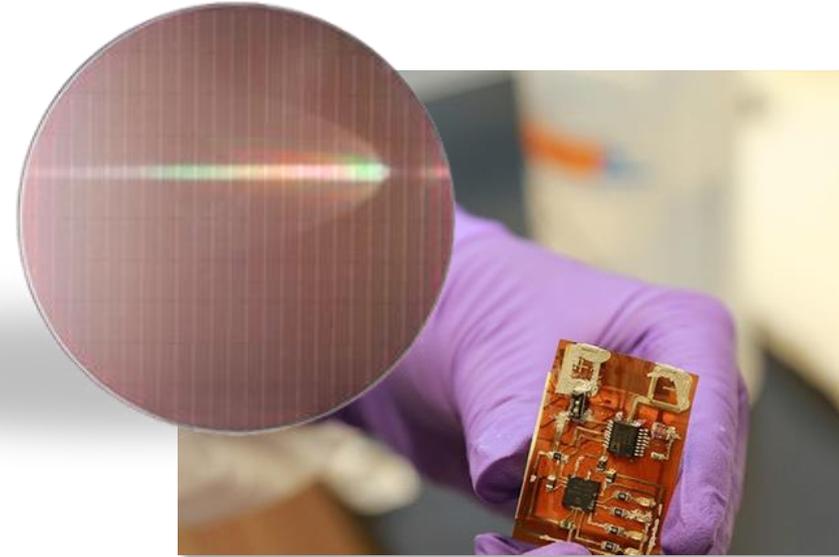


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*“Because of targeted incentives and heavy government subsidies by countries in the Pacific Rim, primarily China, U.S. manufacturers have lost much of their capability to produce **microelectronics**, remaining active only in the design phase.*

“As a result, DoD has found it challenging to secure technology for state-of-the-art microelectronics and to sustain domestic production for legacy microelectronics critical to U.S. military systems.

“Irrespective of the U.S. longstanding record of sustained innovation, countering the efforts of adversary nations and market forces to regain the domestic capacity to meet national demand for microelectronics and reduce reliance on Pacific Rim will take a whole-of-government response.” - DoD State of Competition within the Defense Industrial Base



Selected IBAS Activities

- Lead Free Electronics
- Radar Supply Chain Resiliency
- Silicon Interposer Packaging
- Alignment and collaboration with Defense Microelectronics Cross Function Team



Discussion: Vital Signs 2022



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What are your top manufacturing issues?

How can the DoD support your business?



OVERALL SCORES				
Condition	2019	2020	2021	Change, 2020 – 2021
Demand	82	88	94	● +6
Production inputs	66	66	67	● +1
Innovation	69	69	69	● 0
Supply chain	60	71	63	● -8
Competition	92	88	88	● 0
Industrial security	49	49	50	● +1
Political & regulatory	78	76	72	● -4
Productive capacity & surge Readiness	80	67	52	● -15
Overall health and readiness	72	72	69	● -3

Figure 0.1

Factor score key				
● -6 and worse	● -1 – -5	● 0	● +1 – +5	● +6 and better

PRODUCTION INPUTS SCORES		
Overall factor	2021	Change, 2020 – 2021
Costs of goods and services	58	● -14
Access to strategic materials	43	● +8
Workforce productivity	63	● -1
Workforce compensation	97	● +2
Workforce diversity	76	● 0
STEM talent pool	95	● +3
Security on-boarding	36	● +8
Overall Production Inputs Scores	67	● +1



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Questions and Information

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OUSD(A&S) Office of Industrial Base Policy