

The Defense Intellectual Capital Base

Bringing our 'A' Game

15 August 2023



The Defense Intellectual Capital Challenge

Manufacturing Demographics*

- Current Workforce – 12.5 M
- Median Age – 44 years
- Median hourly pay -\$30
- Women – 25%
- White – 68%
- Anticipated deficit by 2030 – 2.1 Million

Manufacturing “Ecosystem” Drivers**

- Decades of offshoring - undermined capability, and society has lost touch with manufacturing as a viable career in the US.
- Lack of local demand - has eroded training and education pipelines – K-12, Community College, and University.
- Majority of our heavy industries are located in areas with declining population base.
- Engineering disciplines are now required at the shop floor technician.
- Manufacturing is viewed as “hard/blue collar” work vs. college graduate work
- Both new skills and traditional skills required for evolving manufacturing technologies.

STEM and Execution Skillsets

Government and Defense Industry - “Ecosystem” Drivers

- Intense Competition for Talent
- Salary Gap from Commercial Sector
- Security Clearance Requirements
- Shortage of Talent in the STEM Fields
- Desire for multiple careers – fewer lifetime employees
- COVID-19/Teleworking vs Team Environment
- Defense Budget Uncertainties

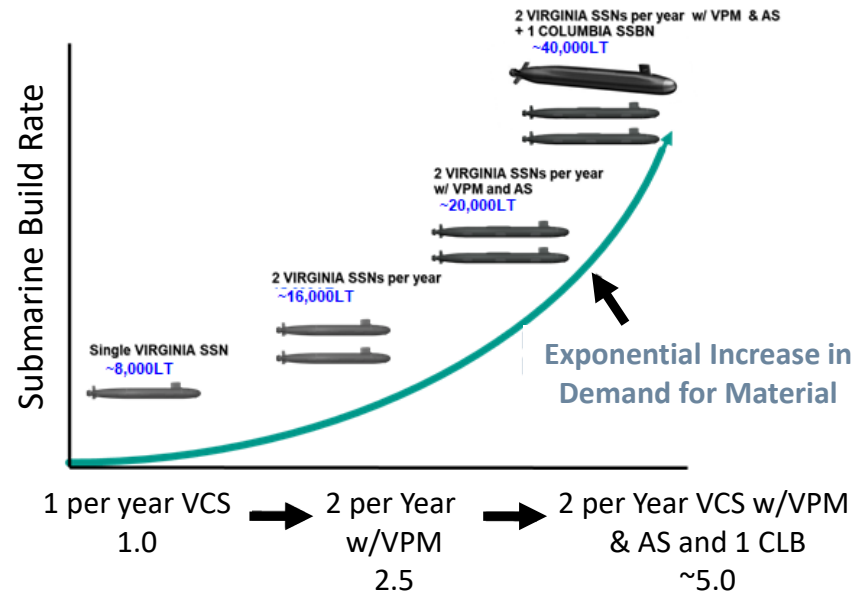
“Manufacturing and the Defense Industrial Base will face headwinds for 10+ years in the fight for talent – all levels”**

* Industries at a Glance: Manufacturing: NAICS 31-33 (bls.gov)

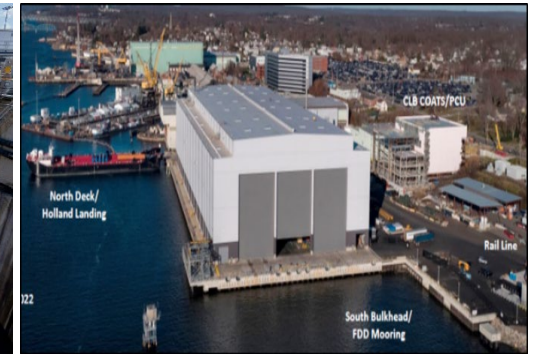
** OSD-A&S Office

Illustrative Example – The Submarine Industrial Base

- **Generational Increase in Workload**
- **Workforce Demands – new generation**
 - *Trades*
 - 20,000 Plus over next 2 decades
 - New Technology across the enterprise
 - *STEM*
 - 5,000-10,000 over next decades
 - Ship Design, Engineering
 - Modeling, AI
 - *Government* – 500 plus shortfall today
 - Project Management
 - Quality Assurance
 - Model-based Systems Engineering
- **Replacing Cold War Retirees**
- **Re-establishing supplier base**
 - ~350 Critical suppliers
 - ~5,000+ second/third tier vendors
 - ~16,000 total vendors
- **New Manufacturing Technology Training**
- **Next Generation Integrated Product Development Environment (IPDE)**



US Navy



GD Electric Boat

THE SUBMARINE ENTERPRISE is INVESTING OVER \$6 Billion this decade in New Facilities, Workforce Development, Technology, Supplier Development, Outsourcing, and Design Technology

Diversity – National Security Imperative

We need ALL Hands on Deck

- Our national population is **very diverse** – our adversaries' are **nearly monolithic**
- Diversity has **STRATEGIC VALUE** – Innovation blossoms when the team includes a rich mix of:
 - Gender, Ethnic and religious background
 - Academic Disciplines
 - Management, STEM, and Craftspeople
- Our pipelines to bring people into our 'ecosystem' are not tuned to pulling in under-represented groups
 - Barriers to success for HBCU/MSI's
 - Scalability and extent of STEM programs for elementary/middle schools



ARL Penn State

ARL Penn State UUV Autonomy Team - 2017

- **Mathematics**
- **Electrical, Mechanical, Aero Engineering**
- **Systems Engineering/Integration**
- **Psychology**
- **Human Factors/Display Technicians**
- **Coding**
- **Language Specialists**
- **Submarine Operations - Military**
- **Mechanics, Radio Control Operators**

Can we use a similar approach to sports development to attract young people to careers in STEM, Trades, and Supporting Skillsets?