



# **DoD Electronics Priorities**

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**Acting Deputy Assistant Secretary of Defense**  
**for Systems Engineering**

**NDIA Electronics Division Kickoff Meeting**  
**Arlington, VA | January 18, 2018**



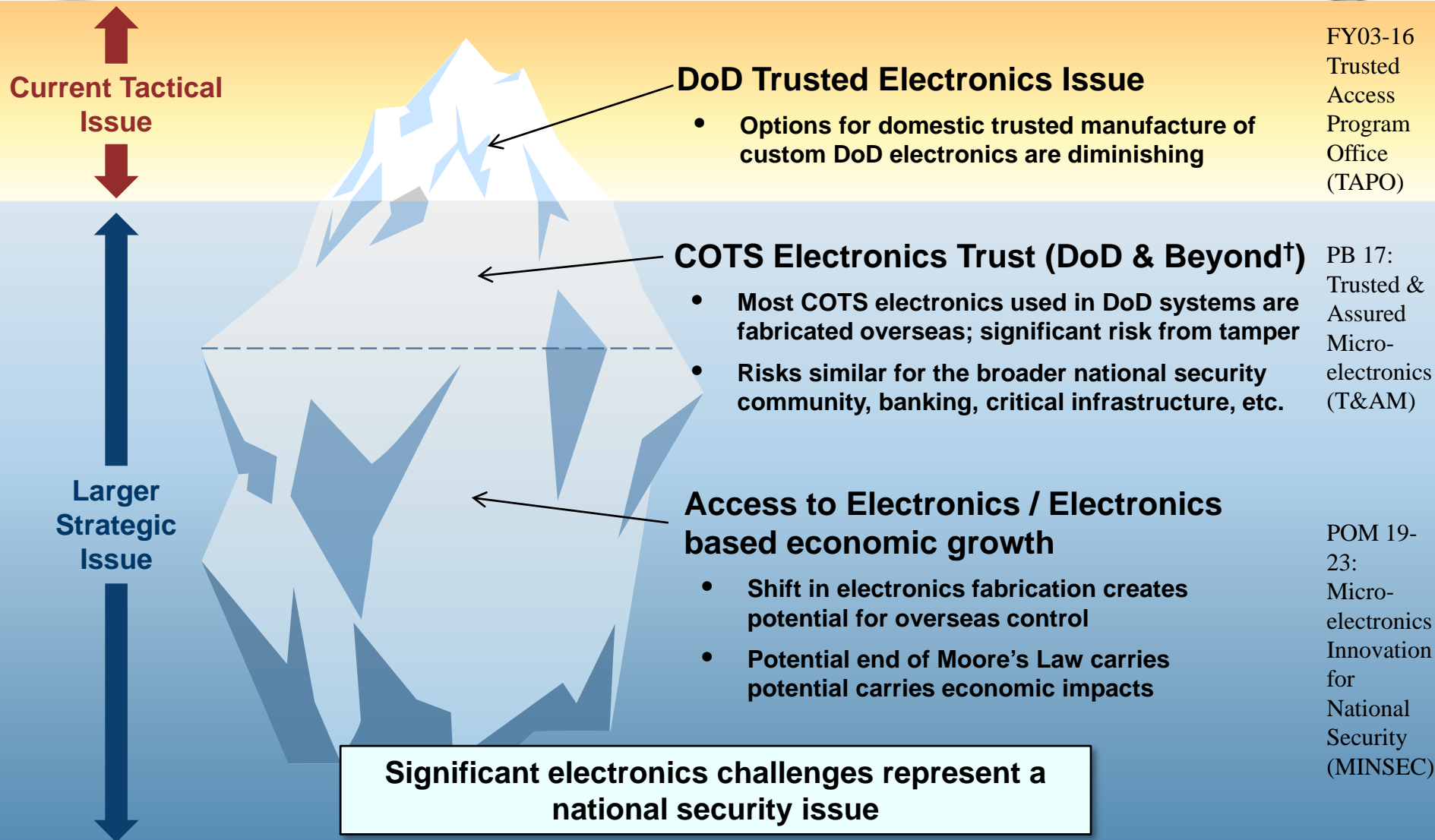
# Elements of a Strategy for Ensuring Access to Assured Microelectronics



- **Revised trust and assurance policy** to address state-of-the-art (SOTA) technology applications, use of commercial parts in DoD systems, and full life cycle vulnerability protection, beginning with secure design and protection of intellectual property (IP)
- **Healthy microelectronics verification and validation (V&V) capability**
- **Access to DoD/Government-unique needs**, including radiation-hardened by process and radiation-hardened by design technologies, in support of space and nuclear modernization
- **Adequate workforce expertise** and engagement with academia, Defense Industrial Base (DIB), and DoD user communities in prototyping, and development activities to build a domestic knowledge base for design and manufacturing of advanced microelectronics components
- **Research and Development (R&D) investment** to lead development of the next generation microelectronics
- **Reduced reliance on legacy parts** through military modernization, such as modern application-specific integrated circuits (ASICs) and systems-on-chips (SOCs), to replace obsolete systems in concert with the enactment of acquisition policies that promote rapid modernization, standards and best practices to facilitate validation and verification, supply chain tracking and risk assessment, and counterfeit detection
- **A Diminishing Manufacturing Sources and Material Shortages (DMSMS) foundry-of-last-resort capability**



# Electronics as a Strategic Issue



<sup>†</sup> Including the broader national security community, banking, critical infrastructure, commercial industry, etc.



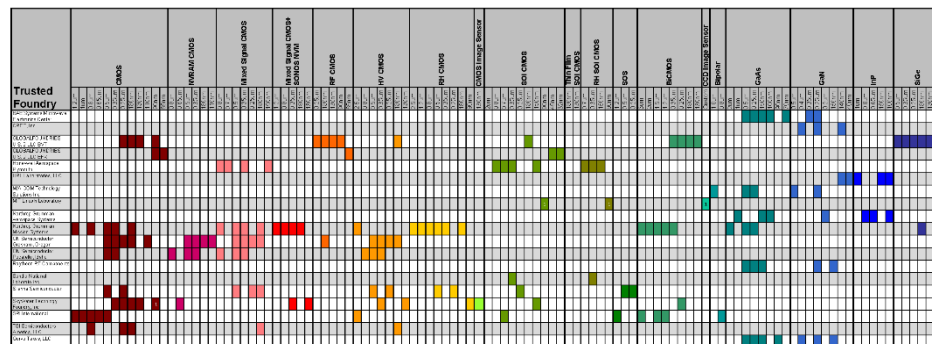
# Trusted Access Program Office (TAPO) Suppliers (DMEA)



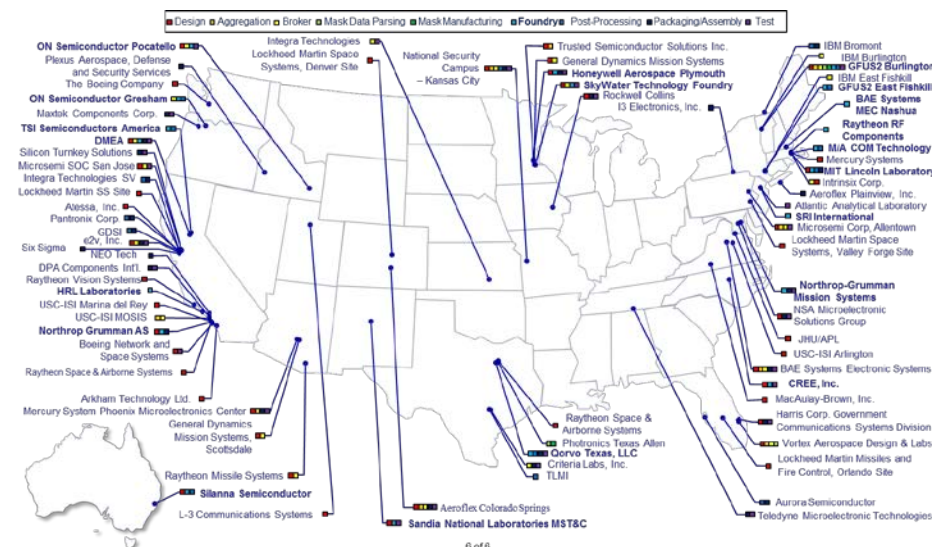
- DoD Trusted Foundry Program management has been consolidated at Defense Microelectronics Activity (DMEA) to include the TAPO

- Offers a range of processes from CMOS (>28nm), NVRAM CMOS, Mixed Signal CMOS, Rad-Hard CMOS, RF CMOS, SOI CMOS and an assortment of compound semiconductor processes
  - Working on access and accreditation for 14nm CMOS at GlobalFoundries
- Trusted Suppliers offer microelectronics design, fabrication and packaging services from 75 sources

## TAPO Process Offerings



## Trusted Suppliers (75)

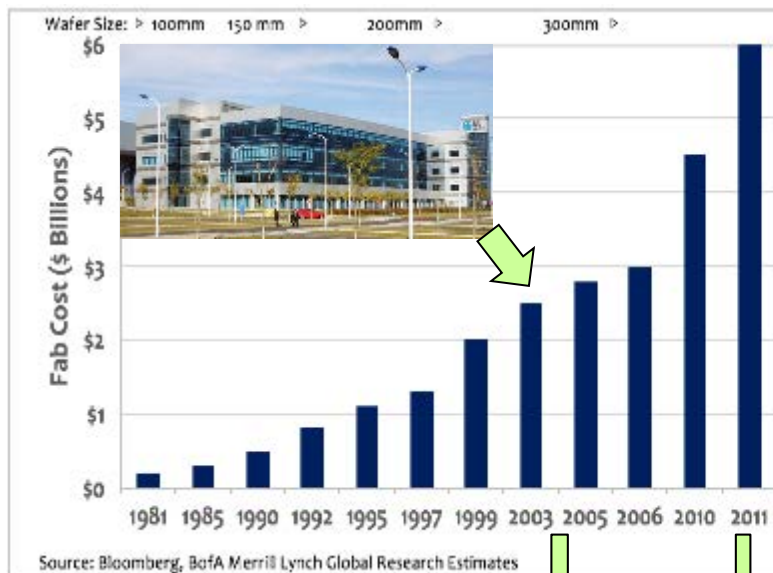


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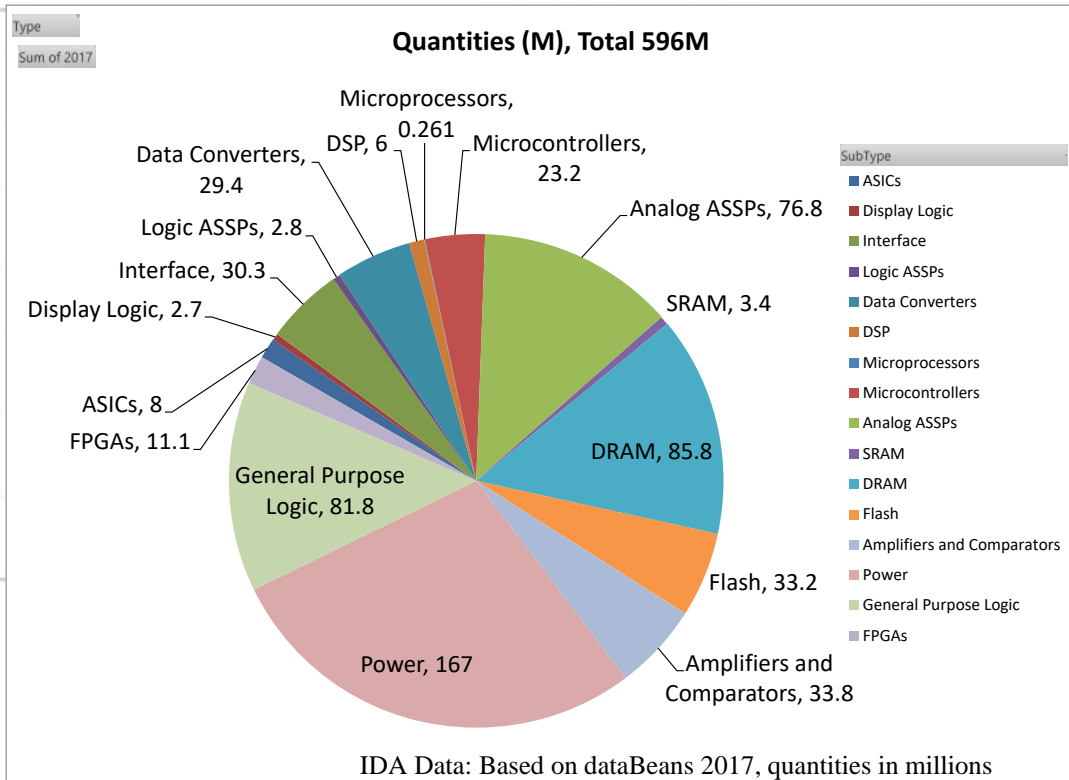
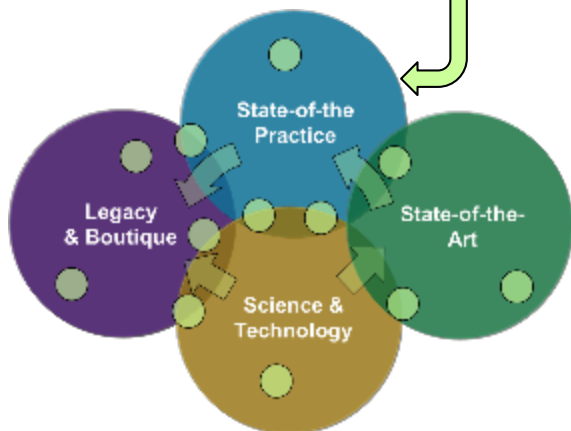
As of 2 January 2018



# DoD Needs Broad Spectrum of Microelectronics



## Increasing Fab Costs



DoD needs broad spectrum of microelectronic technologies crossing state-of-the-practice (SOTP), state-of-the-art (SOTA), and DMSMS domains (Joint Strike Fighter uses 100+ different process IP)





# DoD Long-Term Strategy Time Line

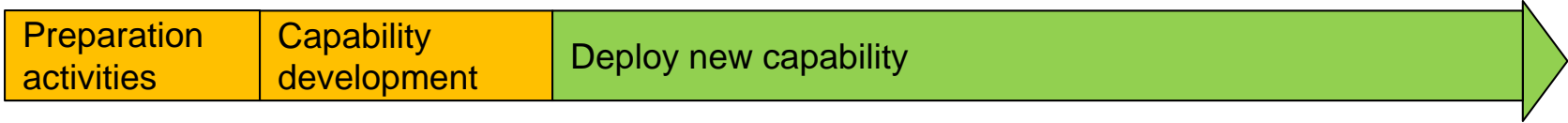


## Trusted Access Program Office Consolidation - Defense Microelectronics Activity (DMEA)

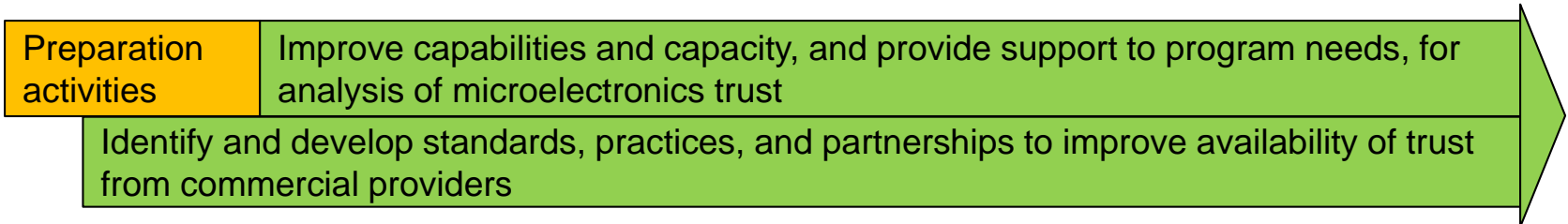


## Trusted and Assured Microelectronics Program:

### Alternate Source for Trusted Photomasks



### Verification and Validation (V&V) Capabilities and Standards for Trust



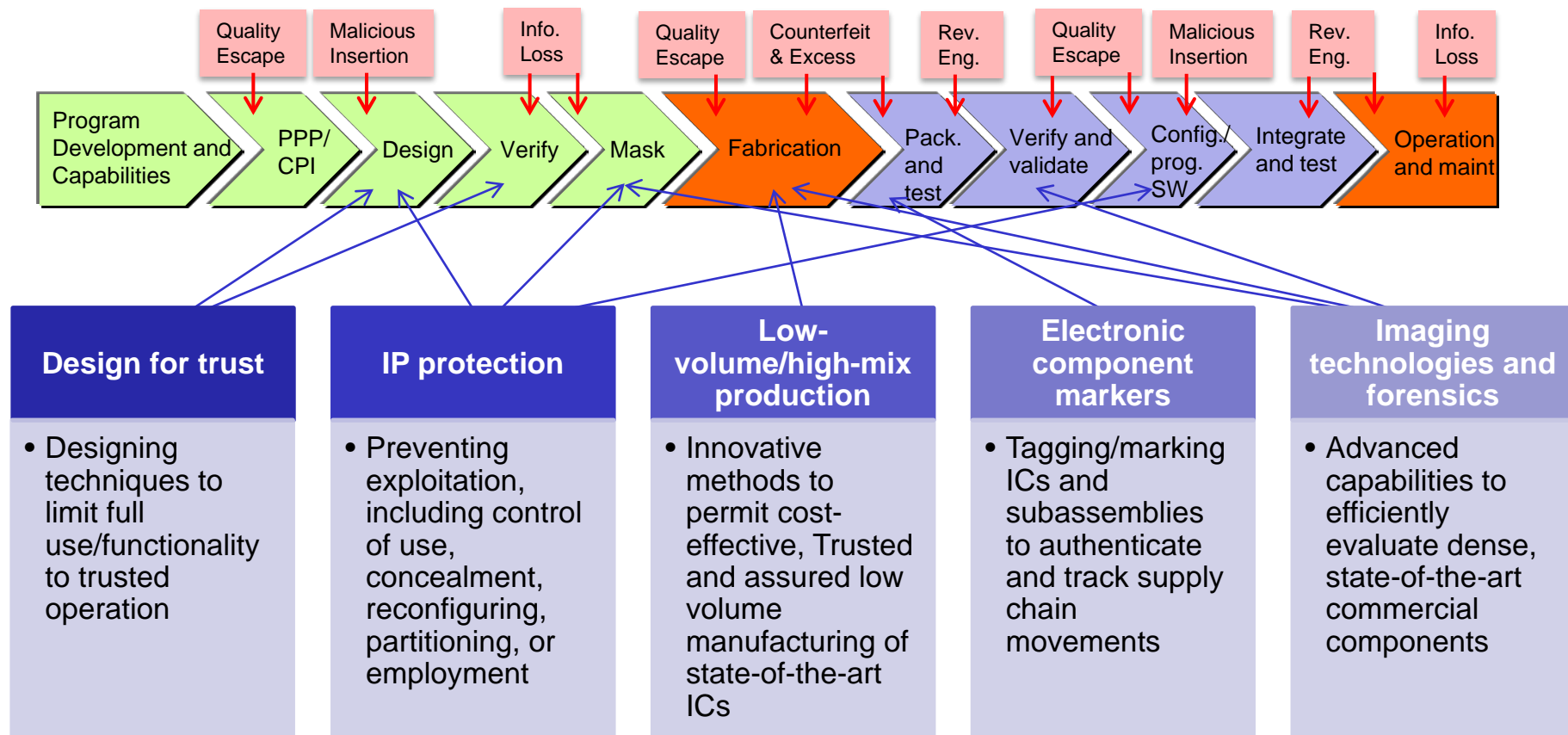
### Advanced Technology and Alternative Techniques for Microelectronics Hardware Trust



2015      2016      2017      2018      2019      2020      2021      2022      2023      2024



# T&AM New Trust and Assurance Approaches



**Implement and demonstrate assurance capability with transition partners**



# T&AM Focus Areas

## Verification & Validation

- Improves microelectronics test and verification methodologies in support of verifying the trust and assurance of parts

## Design Assurance

- Assured and immediate access to domestic production of advanced microelectronics and disruptive research and development investments to surpass the impending limitations of Moore's Law on silicon microelectronics

## FPGA\* Assurance

- Demonstrate innovative design, manufacturing, imaging, tagging, control and assessment approaches for protecting DoD's microelectronics supply chain and intellectual property

## Enhanced Manufacturing

- Development of advanced node microelectronics fabrication and packaging capabilities at existing SOTP\* foundries with a focus on high-mix, low-volume alternatives

## Radiation Hardened Microelectronics

- Demonstrate innovative design, manufacturing, and assessment approaches for trusted, strategic radiation-hardened electronics in advanced technology nodes for next-generation strategic systems

## Outreach & Standards

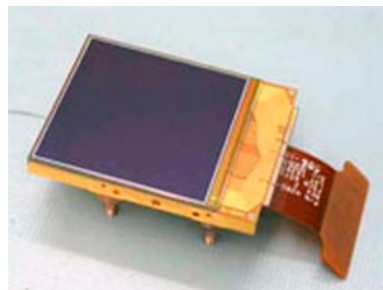
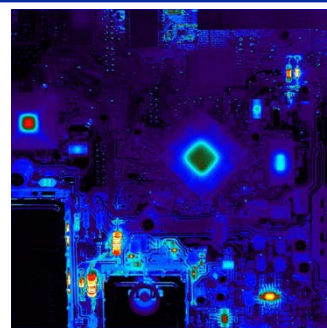
- Develop standards and practices to foster commercial development of secure, trusted and assured parts.
- Document and promulgate security-enhancing design practices across government, industry, and academia

\* Field Programmable Gate Array (FPGA), State of the Practice (SOTP)





# Advanced Electronics Community of Interest (AE COI) Portfolio Overview



**Capabilities:**  
C4 ISR Cyber EW  
Weapons



**EO/IR Components**

**Cross Cutting Technologies**

**RF Components**

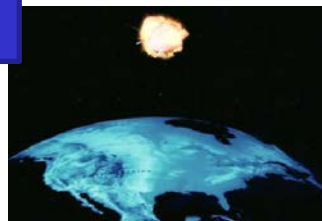
**Power Electronics**

**Digital, Analog & Mixed-Signal ICs**

**Quantum Based Comp. & Tech.**

**Electronic Materials**

**Fundamental Research**



**Radiation Hardness**



**Trust and Supply Chain Security**



**Industry**



# U.S. Microelectronics Leadership and Dominance



## Strategic National Security Applications



Secure IoT



Financial &  
Data Analytics



Autonomous  
Systems + AI



Robust + Agile  
Communicators



Commercial Space



Biomedical

## Strategic National Economic Competitiveness Applications

### Proactive Awareness & Security

- Supply Chain track
- Proactive Authorities
- Intelligence & CI
- Standards

### Access & Assurance

- Secure Design
- IP, EDA, experts
- Foundry assured Access
- Prototype Demonstrations



### Enhanced Manufacturing

- SOTP Back-end parity with SOTA
- SOTA on 200mm tools at SOTP
- High-mix low vol. fabrication

### Incentives & Market Growth

- Acquisition reform and incentives
- Tax, policy, regulation reform
- R&D and domestic fab incentives

### Strategic Alliances

- Cooperative R&D
- Trade and Foreign Military Sales (FMS)
- Americas
- Europe
- Asia partners

## Disruptive Research & Development

Materials, Devices, Circuits

Architectures

Design Tools for Complexity

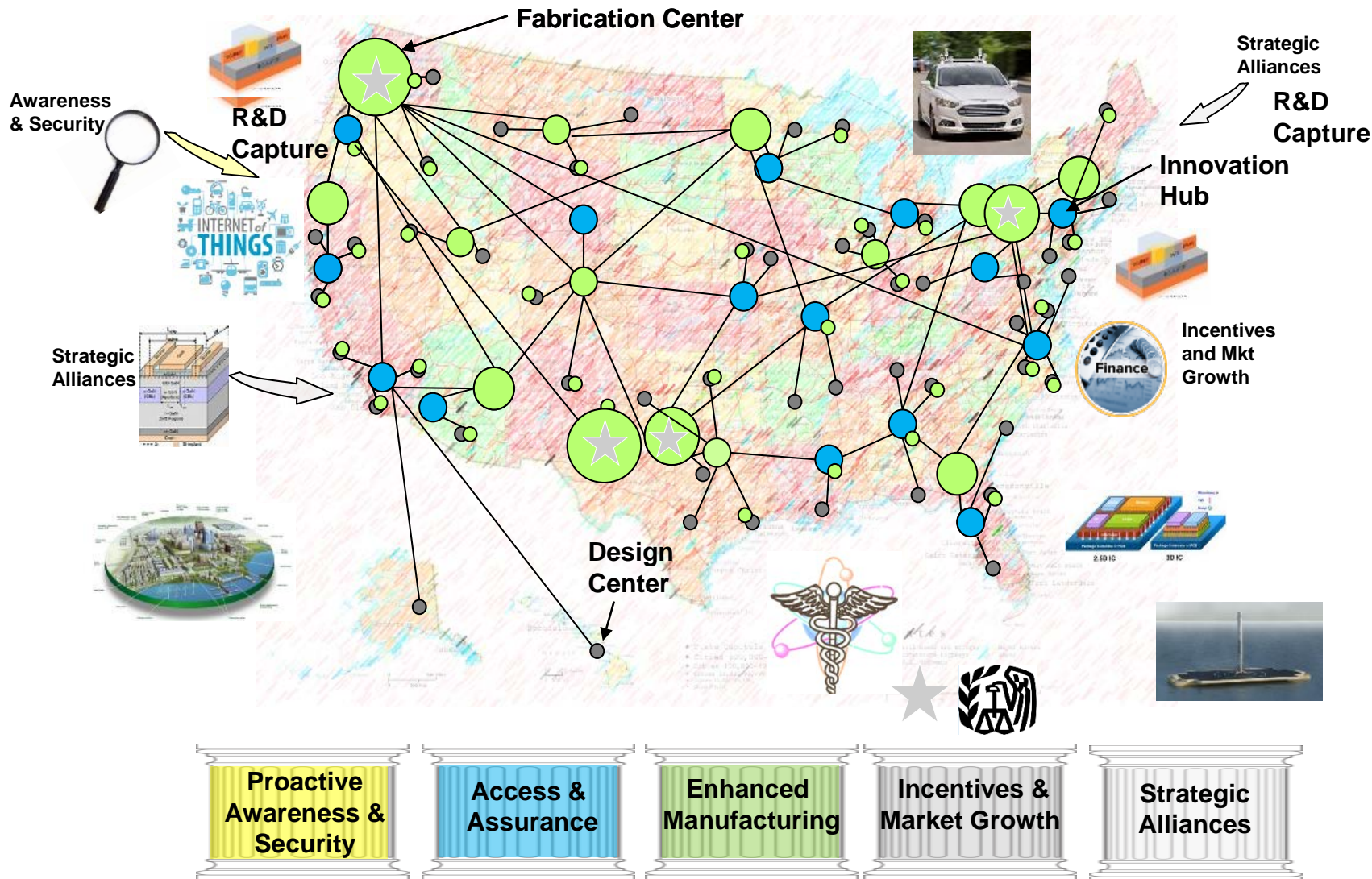
Experts, Infrastructure, Venture Capital

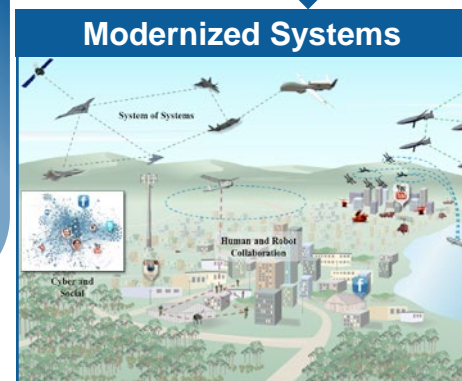
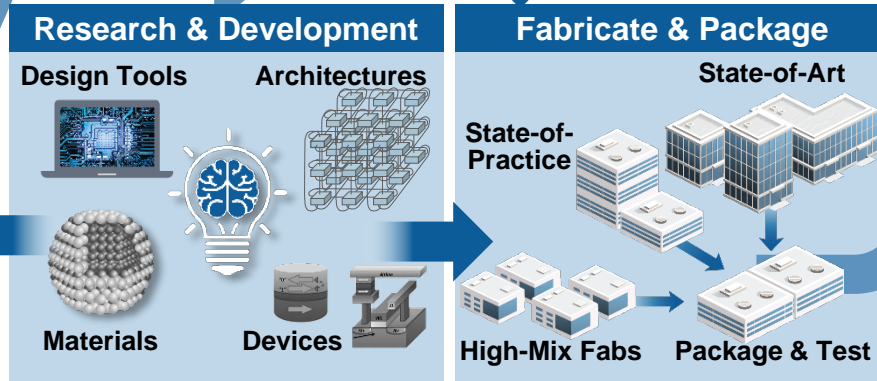
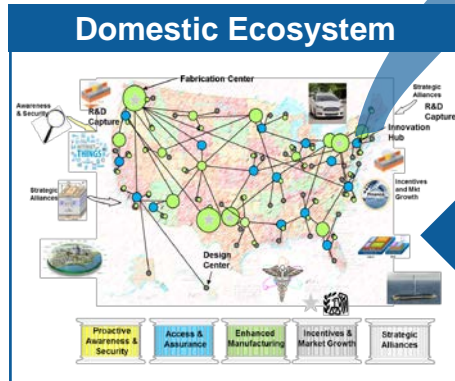
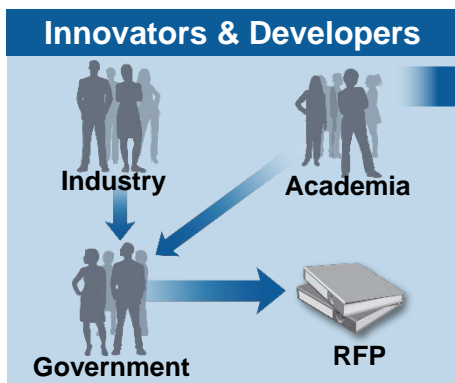
Innovation, Science & Technology, R&D





# Create Microelectronics Innovation Throughout the United States







# Teaming and Partnerships Are Key to Success



- **Many stakeholders are involved in the success of the long-term strategy:**
  - Leadership from OSD, Services, and Agencies
  - Performers including Services, DMEA, DARPA, IARPA and other S&T organizations and laboratories
  - Integration and support of functions of:
    - DoD Trusted Foundry Program
    - DMEA Trusted Supplier Accreditation Program
    - Joint Federated Assurance Center
    - Microelectronics Assurance S&T and transition activities
  - Building and leveraging partnerships with Defense and commercial industry and academia for National Security and Economic Competitiveness
  - Coordination with other U.S. Government agency partners
- **Overall Bottom Line – structuring activities to meet acquisition program needs for trust and access to state of the art microelectronics**





# Systems Engineering: Critical to Defense Acquisition



***Defense Innovation Marketplace***  
<http://www.defenseinnovationmarketplace.mil>

***DASD, Systems Engineering***  
<http://www.acq.osd.mil/se>