DDQA Workshop

Housekeeping Items

- All conversations must remain at Distribution A level (No classified, FOUO, CUI, etc.)
- Attendee microphones are muted and videos are turned off.
- If you have a question for the presenter or panel, please submit through the Q&A button. 

  - Questions will be answered at the end of the panel member talks
- If you dial in separately using your phone, link the phone connection with your assigned Zoom participant id
  - The participant id is 6 numbers seen by clicking on the  in the upper left of the zoom screen
  - On your phone press #, enter the participant id, #
- If you have any logistical or connection issues:
  - Connect with Zoom support:
    - Zoom Troubleshooting Guidance: https://support.zoom.us/hc/en-us/sections/200305593-Troubleshooting
    - Wireless Connection Issues: https://support.zoom.us/hc/en-us/articles/201362463-Wireless-WiFi-Connection-Issues
  - Connect with the ERI Team desk via the 6Connex platform

DDQA Agenda

Late Afternoon Break: 15:55pm-16:05pm	
1605-1615	***Introduction*** Brian Dupaix, Air Force Research Laboratory, Project Lead and Moderator
1615-1645	***Data Driven Quantifiable Assurance Panel*** Brian Dupaix, Air Force Research Laboratory, Design Assurance, Risk Assessment and Metrics G. Dave Via, Air Force Research Laboratory, Quantifiably Assured Manufacturing Glenn Berger, NSWC Crane, Verification and Validation Jeff Krieg, NSA, Field Programmable Gate Array Assurance
1645-1745	***Questions and Answers***

Trusted and Assured Microelectronics Program

Data Driven

Quantifiable Assurance

Aug 2020

https://www.CTO.mil *@DoDCTO*

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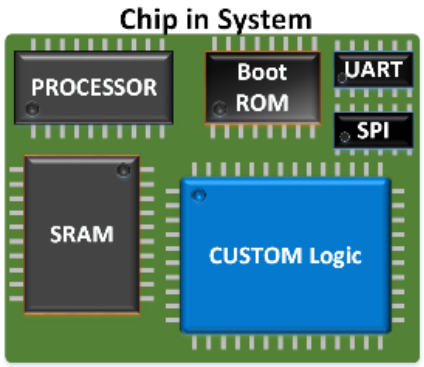
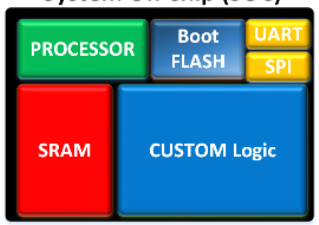
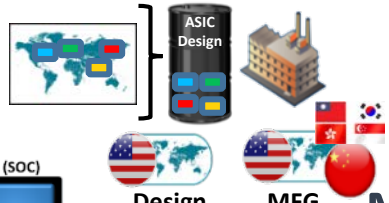
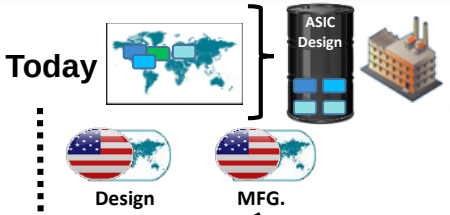
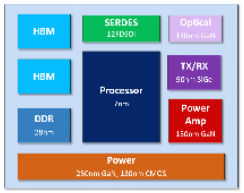
Assured Microelectronics Evolution

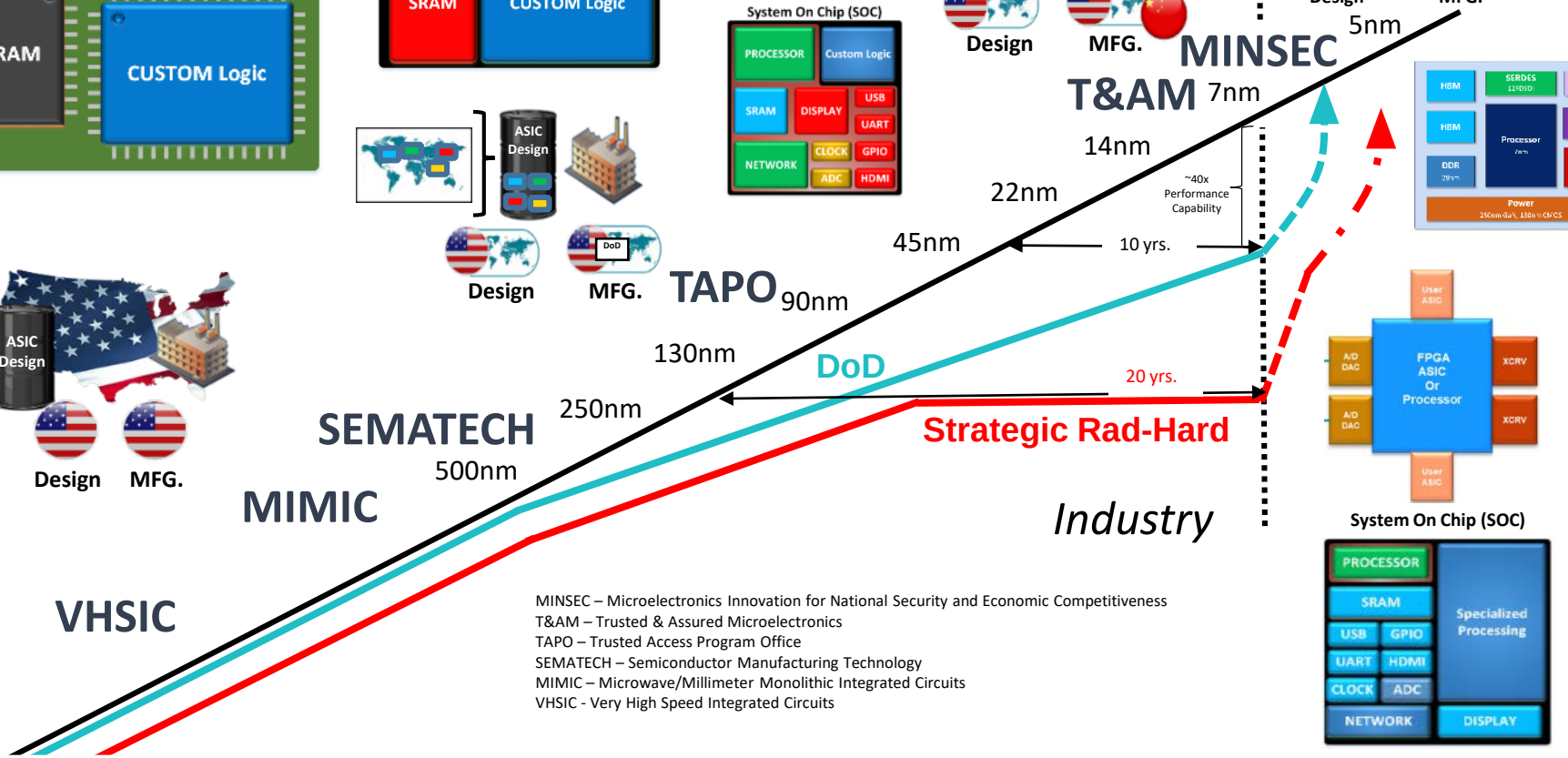












MINSEC – Microelectronics Innovation for National Security and Economic Competitiveness
T&AM – Trusted & Assured Microelectronics
TAPO – Trusted Access Program Office
SEMATECH – Semiconductor Manufacturing Technology
MIMIC – Microwave/Millimeter Monolithic Integrated Circuits
VHSIC - Very High Speed Integrated Circuits

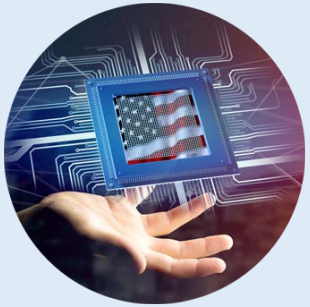
T&AM/MINSEC Program is developing the secure ecosystem to assure SOTA performance for Modernization

Trusted and Assured Microelectronics Strategic Approach

Microelectronics - DoD's Top Modernization Priority

We cannot expect success fighting tomorrow's conflicts with yesterday's weapons or equipment.

-National Defense Strategy

	 **Access to State of the Art Commercial Technology**	 **Data Driven Quantifiable Assurance**	 **Address DoD Unique Needs**	 **Create a Resilient and Robust Pipeline**
Gaps:	DoD lags commercial CMOS ecosystem/ infrastructure	Threats to design and manufacturing in global supply chain	Increased sources for national strategic defense	Domestic and Allied Ecosystem to rapidly and securely mature emerging advanced technology
Approach:	Establish best practices for secure design, assembly, packaging, and test capabilities to support DIB and co-development of dual use electronics	Secure full lifecycle confidentiality, Integrity, verification & validation, and supply chain for assured warfighters electronics	Develop sustainable sources of mission essential niche rad-hard electronics capabilities, and specialized radio frequency and electro-optic components	Invigorate secure pipeline for disruptive R&D transition, supply chain aware technology development, education and workforce.

Lifecycle Microelectronics Threats

Functional verification

Supply Chain Trust Assurance

Physical analysis

Processor/ IP

Formal Equivalence

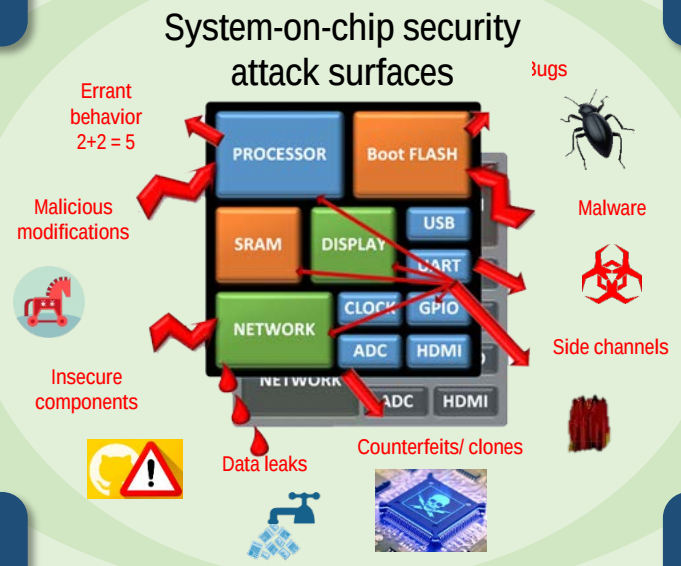
SW dev/debug

Formal Proof

Security design services

Design IP

Provenance tracking



"Data collection and analysis methods must be developed and applied along the entire lifecycle, in a manner that does not introduce significant throughput impact or prohibitive cost penalties, in order to effectively counter security threats that include malicious insertion, fraudulent products, theft of IP, and quality and reliability failures."

– Dr. Lisa Porter, DUSD R&E, ERI Summit 2019

Program* Development & Capabilities → PPP*/ CPI → Design → Verify → Mask → Fabrication → Pack. & test → Verify & validate → Config./ prog. SW → Integrate & test → Operation & maint.

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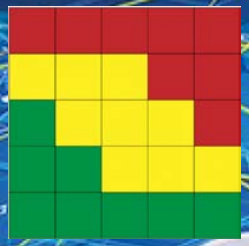
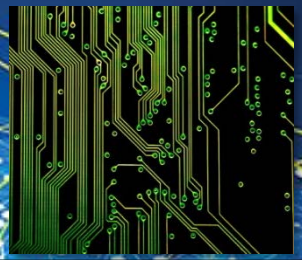
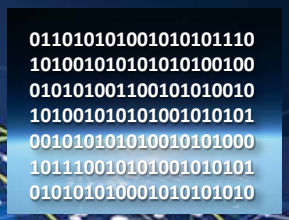
Data Driven Quantifiable Assurance

Lifecycle assurance tools & techniques quantified & qualified for military use to develop & demonstrate "Zero-trust" Architecture with Quantifiable Assurance and security standards!







Design Assurance

- *Design with Confidentiality and Integrity*
- *IP Protection and evaluation*
- *Quantified Assurance*

Risk Assessment and Metrics

- *Data Automation & Collection*
- *Mathematical Models*
- *Integration in Practice*

Quantifiably Assured Manufacturing

- *Fab Data Product capture*
- *Post Silicon Inspection and Verification*
- *IC Personalization*

Verification and Validation

- *Design Verification*
- *Physical Verification*
- *Functional Verification*

FPGA Assurance

- *FPGA Assurance Standards*
- *Detection and Prevention Capability*
- *Response/Analysis Capability*

JFAC*

- *Federated capability to support Programs in HW and SW assurance*
- *Core Laboratories and Service Providers*
- *PPP Guidance and Support*

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Data Driven Quantifiable Assurance

Lifecycle assurance tools & techniques quantified & qualified for military use & commercial standards

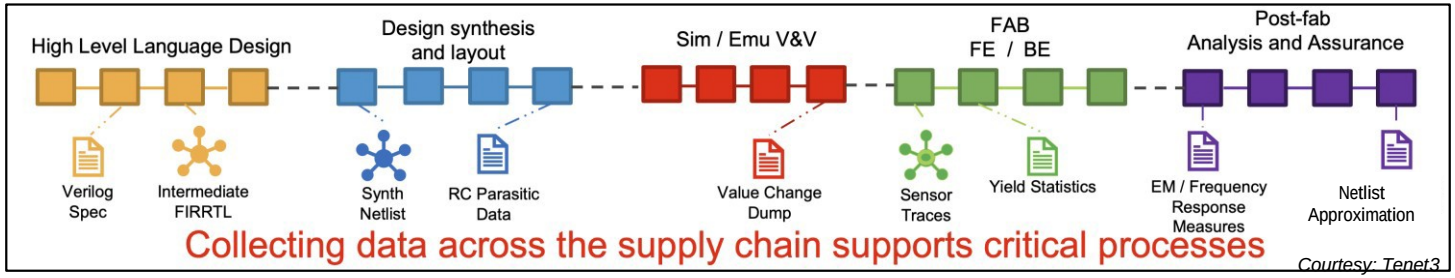
JFAC, Industry, Academia

Measurement, analysis, & Verification

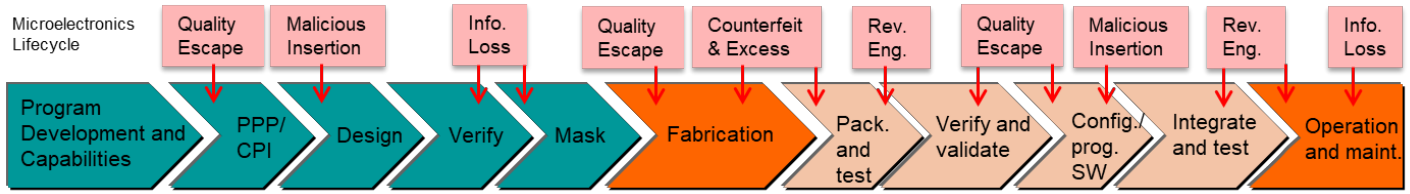
Taxonomy of threats & vulnerabilities

Quantitative methods for risk assessment

Design ***Functional*** ***Physical***

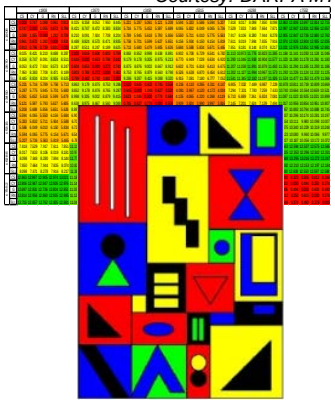


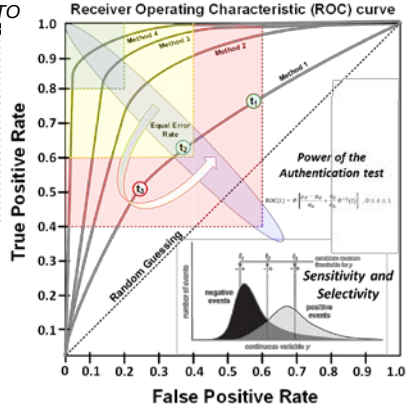
Courtesy: Tenet3

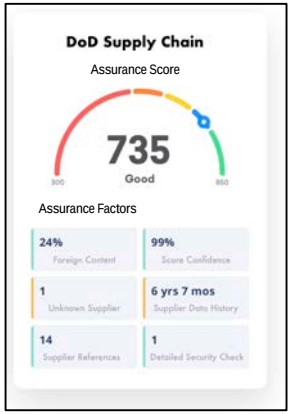


Courtesy: DARPA MTO

Courtesy: Nimbis







Develop and demonstrate a Zero-trust Architecture with Quantifiable Assurance and security standards!

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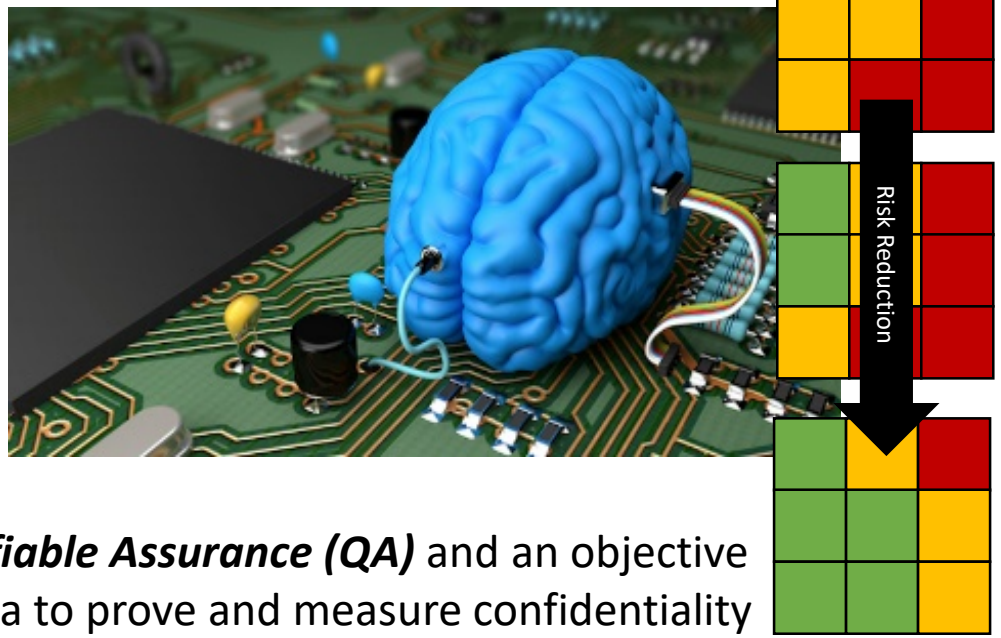
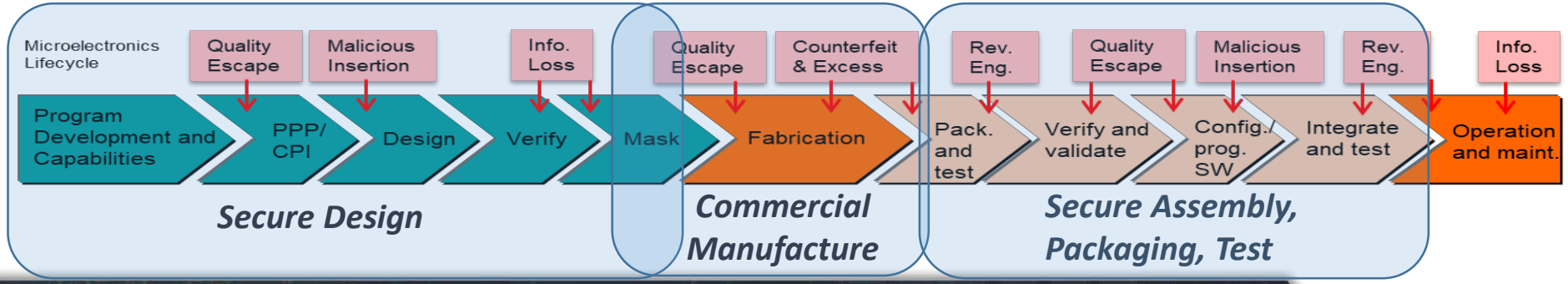
T&AM Data Driven Quantifiable Assurance

"Zero-trust" principles



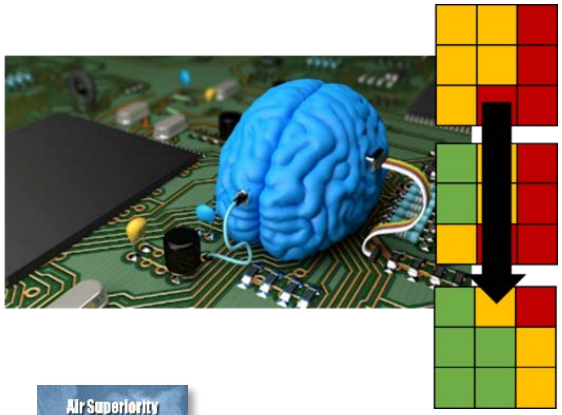
USD(R&E) efforts are establishing ***Quantifiable Assurance (QA)*** and an objective framework that identifies metrics and data to prove and measure confidentiality and integrity in the microelectronics lifecycle.



Summary & Keys to Modernization

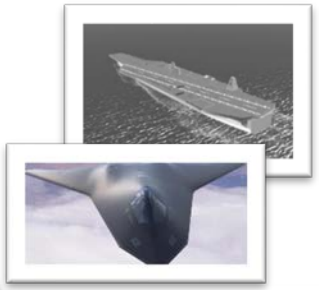
Keys to Modernization

- Address full microelectronics lifecycle "Zero-Trust" Architecture with data and metrics for Quantifiable Assurance
- Accelerate practice of protecting intellectual property through design
- Increase capability to verify and validate integrity of complex systems
- Enhance commercial partnerships to develop standards and promote assurance as a market differentiator
- Meet Programs where they are in the acquisition and sustainment cycle to increase lethality, improve readiness, and reduce vulnerabilities



Keys to T&AM Execution

- Microelectronics landscape continues to change….so does the world
- Service and Agency partnerships key to program success
- Build confidence in quantifiable assurance framework through successes and program aligned demonstrations
- Updating Policy and Guidance to enable modernization at the speed of relevance



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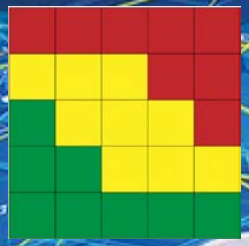

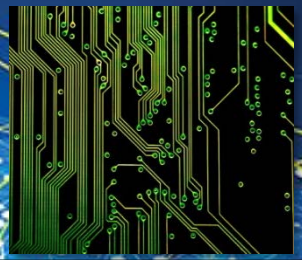

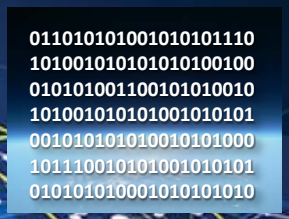

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