Trusted Microelectronics Joint Working Group

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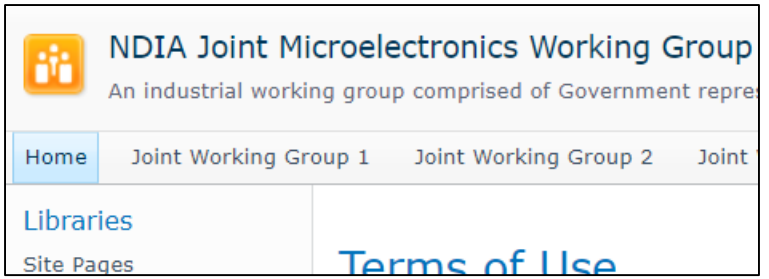
NVIDIA Tesla V100 data center GPU, courtesy nvidianews.nvidia.com

Trusted Microelectronics Background

- **First Workshop Held on June 28, 2013**
- **Ten Workshops have since been held**
  - Hundreds have participated from government, industry and academia
  - A great deal of focus on **Trust** but also on **Access, Industrial Base, National Competitiveness, Cost** and **Collaboration/Cooperation**
  - Participant interest in ongoing activity led to:
    - A call for a working group to be formed during the February 2016 workshop the group was subsequently formed from volunteers (many more than expected)

Trusted Microelectronics Joint Working Group

- Obtaining Trusted and assured microelectronics is critical to maintaining the U.S. military's technological advantage
  - As consolidation and the migration offshore of integrated circuit design and manufacturing capabilities continue, the defense industry faces increasing challenges to obtain those critical components from Trusted Suppliers



TM JWG Members Collaborated on private Sharepoint Site

- An NDIA Trusted Microelectronics Joint Working Group (TM JWG) was formed to collaboratively develop mitigation strategies for the decreasing access to assured microelectronics for defense and national security systems
  - Over the 14-month study period, the NDIA TM JWG membership reached 80 participants from nine government offices, 28 separate defense companies, and nine non-profit and FFRDC organizations

TM JWG Organization

- The TM JWG formed four teams to address critical challenges impacting defense microelectronics supply
  - Future Needs & System Impact of Microelectronics Technologies: Team Leader: Charley Adams, Northrop Grumman
  - Trustable Access to Leading Edge Technology: Team Leader: Ezra Hall, GLOBALFOUNDRIES
  - Trustable Microelectronics Standard Products: Team Leader: Ken Lebo, Jacobs Engineering Group
  - New Methods to Instill Trust in Commercial Semiconductor Fabrication: Team Leader: Pat Hays, Boeing

TM JWG Members

As of February 15th, 2017

Charles Adams Northrop Grumman	**Dean Brenner** Honeywell International Inc.	**Gerry Etzold** Etzold Technology Consulting	**Adam Hauch** DSS	**Scott Jordan** Jazz Semiconductor Trusted Foundry, Inc.	**Grant Meyer** SRI International	**Paul Quintana** Microsemi	**Nicolas Sramek** The Aerospace Corporation
John Adams The Aerospace Corporation	**Edward Chatters** Contract Support to ODASD(SE)	**Saverio Fazzari** Booz Allen Hamilton	**Pat Hays** Boeing	**Taffy Kingscott** IBM	**Eric Miller** Boeing	**Dan Radack** Institute for Defense Analyses	**Paul Syers** Potomac Institute for Policy Studies
Scott Anderson Lockheed Martin	**James Chew** Cadence	**Brad Ferguson** Cypress Semiconductor	**Kenneth Heffner** Honeywell International Inc.	**Elizabeth Klein-Lebbink** The Aerospace Corporation	**John Monk** Northrop Grumman	**Kirk Reynolds** Rockwell Collins	**Major Manny Trejo** DoD
Brett Attaway AIM Photonics Institute	**Rob Ciccariello** Contractor to MIBP	**Michael Fritze** Potomac Institute for Policy Studies	**Kelly Hennig** Northrop Grumman	**Ken Lebo** Jacobs	**Jeremy Muldavin** DASD(SE)	**Christine Rink** The Aerospace Corporation	**Roger Van Art** Vantagepoint Advisors
Anita Balachandra TechVision21	**Brian Cohen** Institute for Defense Analyses	**Aman Gahoonia** Defense Microelectronics Activity	**Craig Herndon** NSWC Crane	**Tim Lee** Boeing	**Mike Newman** Aeroflex (Cobham)	**Tyler Schmidt** Intel Federal	**John Verwey** Department of Commerce
Todd Bauer Sandia National Laboratories	**Mark Crawford** Department of Commerce	**Aaron Gilbert** DoD	**Dan Holladay** University Of Central Florida	**Neal Levine** Defense Microelectronics Activity	**Ken O'Neill** Microsemi	**Neil Schumacher** IBM GBS	**David Weaver** SRI International
Gerry Borsuk Naval Research Laboratory	**Greg Creech** GLC Consulting, LLC	**Jim Gobes** Intrinsix Corp	**Mike Holmes** Sandia National Laboratories	**Daniel Marrujo** Defense Microelectronics Activity	**Greg Orne** Honeywell International Inc.	**Tim Scott** Novati Technologies	**John Weaver** Techtonic Labs
Brad Botwin Department of Commerce	**Eric Dauler** MIT Lincoln Laboratory	**David Gottfried** Alfred University	**Robert Irie** OSD Manufacturing and Industrial Base Policy	**Erika Maynard** Department of Commerce	**Catherine Ortiz** Defined Business Solutions	**Ray Shanahan** DASD(SE)	**Ken Wetzel** SMI Inc.
Bryan Brady Avnet	**Dave Davis** USAF SMC	**Ezra Hall** GLOBALFOUNDRIES	**Michael James** IBM GBS	**Steve McNeil** Xilinx	**Doug Palmer** Booz Allen Hamilton	**Vashisht Sharma** Institute for Defense Analyses	**Pete Wheatley** DoD
Gordy Braun Honeywell International Inc.	**Antonio de la Serna** DRAPER	**John Hallman** MacAulay-Brown, Inc.	**Sean Johnson** DoD	**David Meshel** The Aerospace Corporation	**David Pentrack** Defense Microelectronics Activity	**Chris Sims** NSWC Crane	**Ed Yarbrough** Honeywell International Inc.

# of Organizations / # of Participants

Industry: 28/40 | **FFRDCs: 3/10** | **Academia/Non-Profits: 6/8** | **Government: 9/22** | **Total: 46/80**

TM JWG Members

As of February 15th, 2017

Government

DASD (SE)
Defense Microelectronics Activity
DSS
Department of Commerce
Department of Defense (NSA)
Naval Research Laboratory
NSWC Crane
OSD Manufacturing & Industrial Base Policy
USAF SMC

Industry

Aeroflex (Cobham)	DRAPER	Intrinsix Corp	Novati Technologies
Avnet	Etzold Technology Consulting	Jacobs	Rockwell Collins
Boeing	GLC Consulting, LLC	Jazz Semiconductor Trusted Foundry, Inc.	SMI Inc.
Booz Allen Hamilton	GLOBALFOUNDRIES	Lockheed Martin Corporation	Techtonic Labs
Cadence	Honeywell International Inc.	MacAulay-Brown, Inc.	TechVision21
Cypress Semiconductor	IBM/IBM GBS	Microsemi	Vantagepoint Advisors
Defined Business Solutions	Intel Federal	Northrop Grumman	Xilinx

	#Org.	#Participants
Government	9	22
Companies	28	40
Academia/Non-Profits	6	8
FFDRCs	3	10
Total:	**46**	**80**

FFRDCs

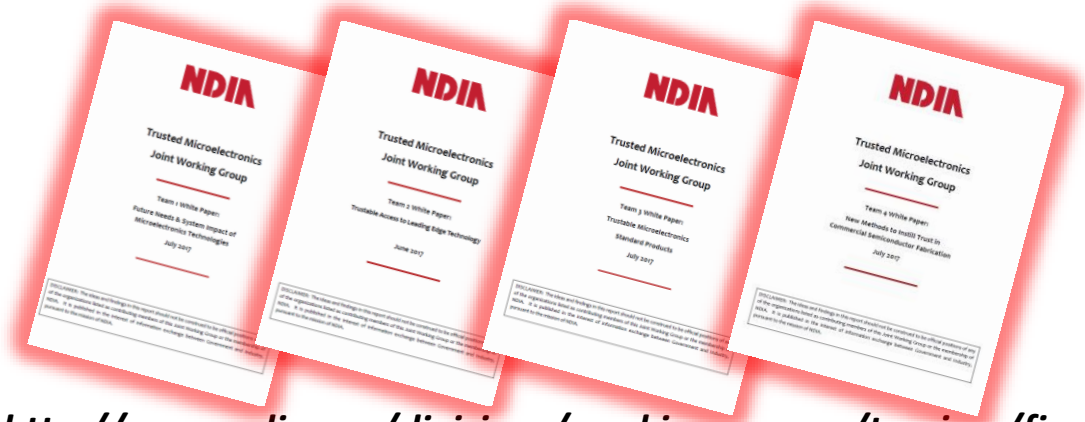
The Aerospace Corporation
Institute for Defense Analyses
Sandia National Laboratories

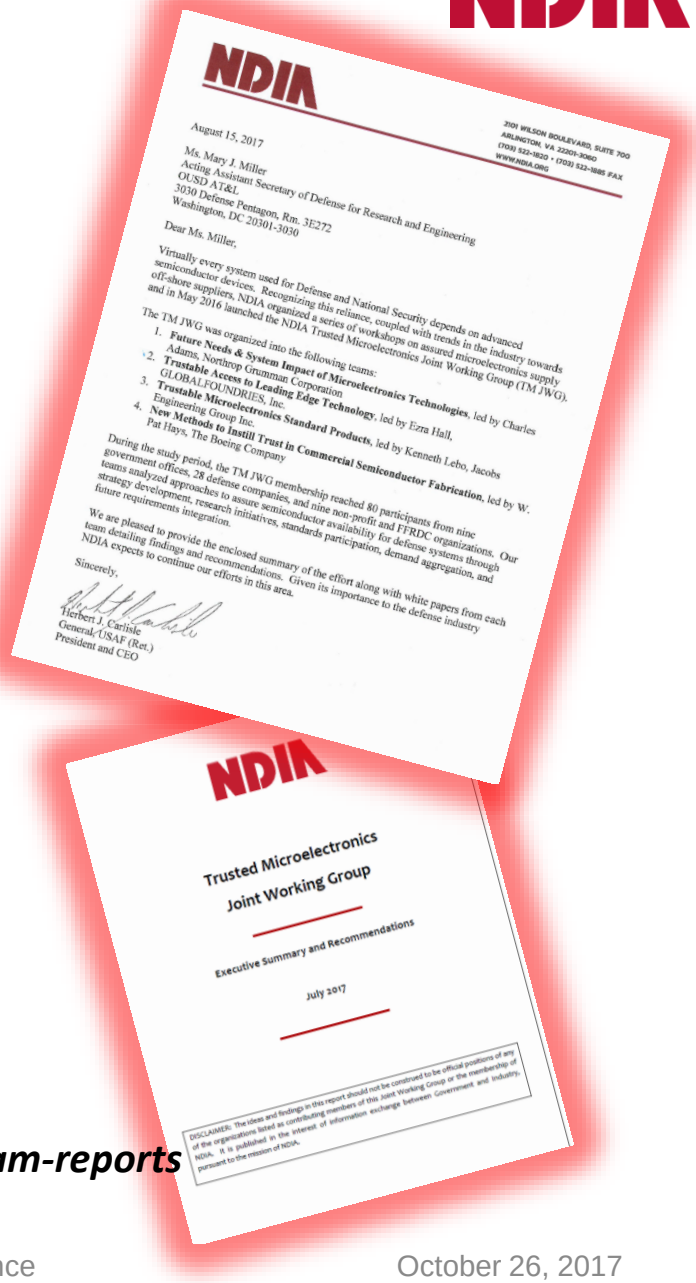
Academia/Non-Profits

Alfred University	Ohio State University
AIM Photonics Institute	SRI International
MIT Lincoln Laboratory	University of Central Florida
Potomac Institute for Policy Studies	

The Results from the TM WG

- **TMW WG Findings Transmitted to ASD(R&E) on August 29, 2017**
- **Findings Publicly Posted on the NDIA site**
- **Includes Reports from All 4 Teams**





http://www.ndia.org/divisions/working-groups/tmejwg/final-team-reports

Key Recommendations

- Create a U.S. National Semiconductor Strategy
- Adapt DoD Acquisition Practices to Align with Commercial Market
- Increase DoD Market Influence
- Adopt New Trust and Assurance Models
- Launch R&D to Achieve Trust and Security in Un-trusted Fabs

Key Recommendations

Create a U.S. National Semiconductor Strategy

- Viewed by the TM JWG as single most impactful action to assure access to technologies
- Recommends a Government-Industry-Academia consortia or coalition to develop plan, including and beyond DoD's requirements
- Would prioritize essential technologies for loss contingency protections and create a technology roadmap to identify investments

Key Recommendations

Adapt DoD Acquisition Practices to Align with Commercial Market

- Recommends defense programs be provided new methods to purchase technology on commercial terms after trustworthiness evaluation
- Develop approaches to adopt commercial solutions and intellectual property with well-defined risk mitigations
- Develop a process to plan sustainment needs during initial product purchases

Key Recommendations

Increase DoD Market Influence

- Increase market influence by exchanging research investment for access to commercial products
- Aggregate demand across DoD programs, other USG offices, and non-USG industries that have similar component and system integrity concerns.

Key Recommendations

Adopt New Trust and Assurance Models

- Develop program-specific Trust Plans and Technical Implementation Guides to identify security measures for each step in the product flow from design through test
  - The Guides would factor technology-enabled mitigations and countermeasures into security requirements
  - The Plans could expand today's Trust offerings by defining the boundaries for assurance spectrums or "tiers of trust" levels, and would cover component categories beyond ASICs.

Key Recommendations

Launch R&D to Achieve Trust and Security in Un-trusted Fabs

- Launch near-term research and development to address the security concerns of existing commercial technology capabilities
  - Separate from, but coordinated with, the national semiconductor strategic plan
- Establish a government focus to track future technology trends and impacts is recommended to continuously identify technology renewal opportunities and capabilities gaps.

Outcome and Impact

- **The NDIA Trusted Microelectronics Joint Working Group demonstrated the value of government-industry collaboration when addressing critical issues facing the Department of Defense and the Defense Industrial Base**
  - There was immense participation throughout government, industry and academia
- **This work coincided with accelerated concern over the issues**
  - DoD establishment of the JFAC and T&AM program
  - Studies – PCAST, DSB Cyber Supply Chain Task Force . . .
  - Presidential EO on Industrial Base (Includes semiconductors)
- **Given the importance of this work to National Security Community NDIA plans to leverage the Joint Working Group into a standing NDIA Division so that it may continue under an officially recognized charter**
  - This division is tentatively being called the NDIA Electronics Division
- **Further information on the Workshops and TM JWG reports can be found at www.ndia.org/divisions/working-groups/tmejwg**

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