MICROELECTRONICS SUPPLY CHAIN & OPERATIONAL SECURITY

ORGANIZATIONAL SPECIFICS

Standards Organizations:	Various
Technical Committees:	Various
Other Partnering Organizations:	Various
Government Organizations:	DOD
Industry Sector(s) / Technology:	Microelectronics
Program / Activity Website URL(s):	https://www.ansi.org/standards-coordination/workshops-and-other-coordination-activities#micro

STANDARDS DRIVEN PUBLIC-PRIVATE PARTNERSHIP (PPP) OBJECTIVES

PPP Drivers:

Microelectronics (ME) support all industry sectors including information technology, telecommunications, critical infrastructure, utility management, national defense, and more. The ME supply chain is inherently global and the U.S. is very reliant on overseas suppliers. The ME lifecycle, including phases such as design, fabrication, packaging, and testing, is decentralized, resulting in challenges to accessing trusted and assured ME. These challenges increase with the procurement of commercial-off-the-shelf (COTS) products. Against this backdrop, *Section 224 of the Fiscal Year 2020 (FY20) National Defense Authorization Act (NDAA)* directed the U.S. Department of Defense (DoD) to establish trusted supply chain and operational security standards for the purchase of ME products and services.

The law specifies that the standards shall not be military standards or specifications and shall systematize best practices relevant to manufacturing location, company ownership, workforce composition, access to manufacturing data, reliability of the supply chain, and related matters. It also specifies that the established standards shall be, to the greatest extent practicable, generally applicable to the trusted supply chain and operational security needs and use cases of the United States Government (USG) and commercial industry, such that the standards could be widely adopted by government agencies, commercial industry, and allies and partners of the United States as the basis for procuring microelectronics products and services.

Recognizing the importance of ME to the U.S. economy, DoD has a goal of substantially increasing the percentage of ME produced in the United States. The Department wants to aggregate information across government agencies, programs, and policies to help DoD in its planning, discovery, and innovation efforts. Accordingly, the workshop continued the information exchange begun in July to look at acceptable levels of assurance (LoA) for COTS ME across four supply chain practice areas: procurement management, information and IP protection, secure design, and supply chain traceability (SCT).

PPP Goals:

Given Section 224's mandate requiring broad consultation among industry and government stakeholders, DoD invited the American National Standards Institute (ANSI), as the national coordinator for the U.S. private-sector system of voluntary standardization, to convene two workshops. The scope of the workshops was limited to commercial off-the-shelf (COTS) devices, not custom devices.

The efforts were focused on gathering and assessing information regarding relevant standardization activities to fulfill its mandate under Section 224 of the NDAA (FY20) requiring that DoD microelectronics products and services meet trusted supply chain and operational security standards. Stakeholders identified for targeted outreach include DoD, the Departments of Homeland Security, State, and Commerce (especially the National Institute of Standards and Technology (NIST), along with suppliers of microelectronics products and services, representatives of major industry sectors that rely on a trusted supply chain and the operational security of microelectronics products and services, and the insurance

industry. Ultimately, DoD sought to foster an ecosystem where trusted supply chain and operational security standards for procuring microelectronics products and services are widely adopted by U.S. government agencies, allies, partners, and commercial industry.

Public Sector Role & Participation:

Supported by DoD funding, ANSI led the planning, facilitation, promotion, and reporting of the events. To support planning and event discussions, ANSI issued an request for information about published industry consensus standards, standards activities underway, or other relevant guidance documents. ANSI compiled a ME standards landscape spreadsheet which lists over 200 standards and guidance documents from 27 organizations. ANSI and DoD both worked to engage a balance of stakeholders from the public and private sector.

To support the workshop agenda development and discussions, DoD provided technical guidance about the various supply chain practice areas that attendees would explore. At both events, DoD briefed sets of assumptions (detailed more below) that established parameters to scope the discussions and questions to target industry feedback.

- ***1st workshop:*** DoD presented its strategy for protection against risks, vulnerabilities, threats, and for determining mitigations – referred to as the CIA Triad – based on three core components: confidentiality, integrity, and availability. Nonrepudiation was also called out by the standards community as an important consideration, due to the distributed nature of the ME lifecycle. These four components became a common thread throughout the workshop discussions.
- ***2nd workshop:*** DoD provided definitions of four notional LoAs, baseline assumptions, and relevant supporting documents. To prepare for the breakout discussions, DoD went through a group exercise where attendees identified candidate considerations and criteria against the four LoAs for SCT, with a focus on non-repudiation.

Implementation Methods:

The workshops were held on July 27-29, 2022 and October 26-28, 2022.

- **July Workshop**: Approximately 140 subject matter experts representing academia, industry, various branches of the USG, standards development organizations (SDOs), and trade associations participated in the workshop, with a hybrid of both in-person and remote participation. Following several presentations and panels to level set the discussions, workshop attendees were separated into three breakout groups to discuss existing standards being leveraged by the commercial sector, and to make recommendations for candidate standards that the DoD should consider when developing their requirements for COTS ME products and services. The breakouts focused on three supply chain practice areas: procurement management, information and IP protection, and secure design. After the breakouts concluded, the group came back together for breakout session reports and closing discussions.
- **October Workshop**: Following the same format as the July workshop, approximately 108 subject matter experts participated in the second workshop, with a hybrid of both in-person and remote participation. Accordingly, the workshop continued the information exchange begun in July to look at acceptable levels of assurance (LoA) for COTS ME across four supply chain practice areas: procurement management, information and IP protection, secure design, and supply chain traceability (SCT). The event breakout sessions corresponding to these practice areas addressed three objectives:
    - Identify the appropriate set of candidate considerations for each supply chain practice area
    - Develop baseline candidate criteria for secure microelectronics that can be used in DoD systems and national critical infrastructure
    - Identify appropriate references (standards, guidance, regulations, policy, etc.) that apply

To facilitate the workshop discussions, ANSI hosted two virtual standards briefing webinars on September 30 and October 6, 2022, highlighting various technical standards and related guidance which could support ME.

Reports of both events were developed and distributed to DoD and the workshop attendees. They were not made available to the public.

Measurement of Success:

At the conclusion of the project, there was an increased understanding about the existing and future standards needs. Additionally, attendees from both the public and private sector felt more informed about DoDs needs (standards and continued general feedback from industry) which would support Section 224 requirements development. Feedback from attendees was positive with regards to the format of the workshops as well as the level of information sharing.

The initiative was scoped to support two workshops so the project was complete after the events. Continued work was set to be supported directly by the DoD.

Key Takeaways:

- The topic area was very complex and two workshops helped get the discussions started but more time was needed to develop actionable outcomes.
- There are several standards development activities that were supporting ME technology and ME sector standards. It is beneficial to provide that information in advance to the events so attendees can review.
- Hybrid engagement at the workshops was very helpful; however, it can be challenging to solicit their engagement in the live discussion (instead of just chat). Online interactive poll and Q&A tools would help augment their contributions.

Advice for Others:

Critical and emerging technology areas like microelectronics have very broad technology and sector impacts. It is challenging to gather all the perspectives in a short time period. Using a combination of information collecting practices (RFIs, webinars, workshops, direct outreach) helps accelerate those efforts. Hosting informational webinars prior to events is a good alternative to trying to include them in the face-to-face discussions. Especially with standards briefings, which are inherently technical, the webinars allow attendees to digest portions of information, have longer Q&A with the presenters, and do additional research so they may come to the face-to-face events and make informed decisions.

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