



MEMORANDUM

To: GuidePost Clients
From: GuidePost Strategies
RE: NDIA Electronics Summer Division Meeting: DoD's Microelectronics Strategy
Date: August 30, 2022

OVERVIEW

On Tuesday, August 30, the National Defense Industrial Association (NDIA) held its Summer Division Meeting. The meeting featured keynote speaker **Dr. Christine Michienzi**, Chief Technology Officer of the **Office of the Under Secretary of Defense (OUSD) for Acquisition and Sustainment** and **Dr. Dev Shenoy**, Principal Director for Microelectronics of the **OUSD for Research and Engineering**. The senior Department of Defense (DoD or Department) officials offered insight into DoD's microelectronics roadmaps. *This memo primarily outlines Dr. Michienzi's remarks and the OUSD's microelectronics acquisition priorities.*

High-Level Takeaways

Acquisition and Sustainment. The OUSD for Acquisition and Sustainment (A&S) is:

- Focused on sustaining the Department's existing systems using **"state of the practice"** and **legacy semiconductor technologies**.
- Seeking to leverage DoD investment authorities to resolve critical microelectronics sustainment issues, including **access to more modern radiation-hardened semiconductor technologies** and access to **technologies with little commercial viability**.
- Closely collaborating with the OUSD for Research and Engineering (R&E) and the **Defense Microelectronics Cross-Functional Team**, which was established by the Deputy Secretary in January 2020 and is charged with developing DoD's microelectronics strategy.
- Also closely collaborating with other agencies on the **CHIPS and Science Act of 2022** and in particular is collaborating with the Department of Commerce and the National Security Council.

Research and Engineering. Dr. Dev Shenoy, who leads the DoD's Microelectronics Cross-Functional Team, outlined the DoD's vision for microelectronics. The vision consists of:

- **Guaranteed, long-term access** to measurably secure microelectronics;
- Enabling **overmatch performance**; and
- **Increasing military and operational availability and warfighter combat readiness.**

To address the challenges it is facing with respect to microelectronics:

- DoD's OUSD for R&E is focused on **aggregating microelectronics demand across critical sectors** to provide an opportunity for DoD and its partners to meet the challenge of access to secure microelectronics.
- The Department has developed **roadmaps for secure access to critical technologies** including "state of the art" microelectronics and advanced packaging and testing. DoD has also developed roadmaps for the Joint Federated Assurance Center as well as for education and workforce development.
- DoD is currently, in collaboration with other agencies, **planning for CHIPS funding-related investments**.

ACQUISITION AND SUSTAINMENT

Microelectronics Acquisition Challenges

- In her presentation, Dr. Michienzi acknowledged that given DoD is a "low-volume, high-mix customer" for microelectronics, the Department has a **"very limited market presence"** in the microelectronics sector, which means that it also has **"limited availability to drive change."**
- Dr. Michienzi also discussed how DoD is **"out-of-phase and multiple generations behind"** commercially viable microelectronics technologies.
- What's more, **DoD-specific microelectronics applications are not "commercially sustainable"** - Department needs include strategic radiation hardened microelectronics for space and nuclear purposes; ultra-high voltage (>25kV) power electronics; and classified designs.

DoD Microelectronics Requirements

- While DoD requires **assured, secure microelectronics**, most commercial microelectronics components lack provenance and are manufactured in unsecure environments. Note also that the majority of these components are manufactured outside the U.S.
- Microelectronics acquired by DoD **must be able to operate in harsh environments** (e.g., in high temperatures). Commercial off-the-shelf (COTS) microelectronics are typically designed to operate in constrained temperature ranges, but DoD applications often require parts to operate in environments with **extended temperature ranges** or in **irradiated environments**.
- DoD-acquired microelectronics must also have **quantified reliability**. Many Department applications are mission and safety-critical, but commercial microelectronics reliability data and quantification methods are in many instances completely unknown (or incomplete).

Strategies to Increase Use of Commercial Microelectronics

- Developing assurance methodologies independent of the locations of manufacturers is critical because almost all state-of-the-art COTS components are manufactured overseas. Dr. Michienzi made clear that there is **no "one-size-fits-all" solution** to addressing these challenges.

- **DoD-critical applications of COTS microelectronics require the development of a reliability quantification strategy.** Dr. Michienzi emphasized that DoD intends to collaborate with industry to develop standards for commercial microelectronics products that DoD uses for its specific applications.
- DoD needs to **better utilize tools like digital engineering and modular open systems architecture** to allow for technology refreshes and for programs to maintain parity with commercial sector technology.

The CHIPS and Science Act of 2022

- Dr. Michienzi highlighted that while the initial language of CHIPS called for “state-of-the-art semiconductors,” she “worked very hard” to take that language out of the bill because “some component of CHIPS needed to be dedicated to legacy or state-of-the-practice chips.”
- Figuring out how to *sustain* domestic manufacturing capability is crucial in order to make the domestic semiconductor manufacturing industry cost competitive. Sustaining domestic manufacturing capability may include tax incentives, collaboration with state and local governments to develop incentives, and workforce training credits.
- **DoD is working very closely with the Department of Commerce, and Commerce has agreed to provide some of its funding for national security purposes.** DoD is also working closely with the National Security Council and other agencies that “have equity in microelectronics” (e.g., the Department of Energy and the Department of Health and Human Services). Note also that DoD is looking to private equity firms for capital and setting up public-private partnerships.