



**Feedback on DoD Commons Section of CHIPS Act**

**Submitted by the**

**NDIA Electronics Division Policy Sub-Committee**

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The objective of this document is to recommend refinements to the execution of the Microelectronics (ME) Commons portion of the CHIPS and Science Act for long term success of DoD objectives and achievement of congressionally mandated goals. Recommendations were aggregated from NDIA Electronics Division members, led by the Defense Industrial Base Policy Subcommittee.

The bi-partisan Chips and Science Act legislation, passed by Congress and signed into law by President Biden, is an historic and monumental endeavor intended to address both economic and national security risks resulting from off-shoring of ME manufacturing capabilities. The recent pandemic and geopolitical developments, such as the Covid pandemic's related supply chain disruptions, the war in Ukraine reducing critical materials supply, and risks to an independent Taiwan (where the majority of the world's supply of ME supply is produced), has exacerbated supply chain vulnerabilities and heightened awareness to potential losses of critical ME capabilities of pervasive importance to U.S. National interests. China's historically large and unprecedented investments in domestic semiconductor capabilities has also motivated the U.S. CHIPS investments to help the U.S. compete for increased global share of supply through an expanded domestic manufacturing footprint. While the Department of Commerce (DOC) will manage awards for the lion's share of CHIPS funding (\$50B), the DoD has been allocated \$2B with execution authority to address development of new materials, devices, architectures, and prototypes to address defense ME needs, including bridging new capabilities to production at scale with industry suppliers.

Nation States and Regional Coalitions, including adversaries, are intensely competing in this economic sphere in what many call a Chip War where the victor will reap the benefits including market dominance, control, and technological superiority on the battlefield. Decades of hands-off U.S. Government policy has resulted in non-free market forces and incentives in other regions of the world attracting ME manufacturing suppliers, causing a great off-shoring with the U.S. now contributing less than 12% and 2% of the semiconductor fabrication and packaging/test supply capacity respectively. The Chips and Science Act legislation attempts to reverse this trend by incentivizing domestic supply with subsidies, guaranteed loans, and tax relief on capital expenditure, which are vital to U.S. national economic and national security interests while taking advantage of our current dominant industry position with nearly 50% overall device design ME market share.

The National Defense Industrial Association, Electronics Division, requested and compiled feedback from Industry members regarding the Chips and Science Act and more particularly to DoD Microelectronic Commons implementation. These are monumental repatriation efforts which will require expansive, consistent and strategic collaboration between the USG and Industry stakeholders to deeply understand motivations, behaviors, and critical factors for success. The below summarized observations and suggestions from the NDIA ME constituency are intended in the spirit of providing constructive input to help the DoD direct activities over the five-year time frame of execution.

## **Feedback and recommendations, respectfully provided for consideration and further dialogue**

1. *Clearly differentiate and define scope of DoD ME Commons in relation to similar efforts being run by DOC, DARPA, DMEA and others.*
  - a. Clearly identify DoD MEC principal responsibilities and primary ownership vs. other efforts.
  - b. Establish aligned infrastructure (EDA, design, fabrication, test, packaging, etc.) strategy and access for DoD MEC Programs at the new DOC Centers (NSTC, NAPMP, Manuf USA, etc).
  - c. Expand from Technology readiness (TRL) to also include a metric based on readiness of technologies to address Defense specific requirements.
2. *Clearly distinguish the roles of Hubs and establish Core infrastructure approach for cost effective guaranteed access*
  - a. The present model of Core for service access is not cost effective as each Hub will separately negotiate Core access with no scale or buying power. This will result in limited Core access and for access obtained, the addition of Hub management fees for flowing funding to Cores.
  - b. Provide explanation and path for Core Fab infrastructure funding. Note, it would be unreasonable to expect awarded Hubs to collaborate and pool funding to establish a Core infrastructure approach.
  - c. Clarify expectations or plans for Core infrastructure approach, will this follow post Hub awards?
3. *Ensure Hubs do not otherwise create boundaries and silos impeding the overall vision to create an ecosystem with on-shore capabilities and advanced technologies.*
  - a. Provide Commons-wide, Government-furnished, equitable infrastructure, guidance and clear expectations to Hubs and Cores across the ecosystem that will adequately support all focus areas.
  - b. Provide clear expectations on sharing of Government-funded foreground IP development from projects within and across Hubs in the ME Commons ecosystem.
  - c. Enable access to new and enhanced background Intellectual Property.
  - d. This may require a separately funded effort that is a fast-follower (2024+), clarified and funded in 2023.
4. *Analyze and determine whether Hub technical areas are being addressed adequately in order to achieve desired result.*
  - a. For example, Quantum and Artificial Intelligence may not have adequate level of support or engagement compared to others.
5. *What is the ultimate goal of Commons? Prototyping? Early MRL? Later MRL? Clarify goals for ME Commons. Considerable confusion remains in Industry, from small business to USG Prime organizations.*
  - a. Serious Prototyping, in a lab to fab approach, requires industrial capabilities (in at scale foundries/Cores) and discipline compared to a more flexible university mindset targeting fundamental research only.
  - b. Funding for credible prototyping, in a real production type environment, will be considerable and is required for success, and could be most cost effectively addressed through infrastructure access agreements with Cores. Advanced research targeting dual-use production requires integration capabilities only available at scale foundries (Cores), with targeted research and paths to development for production.
  - c. The full life cycle of technology maturation, through to bridging over the valley of death, needs to be addressed. Later TRL/MRL levels should be funded in order to successfully mature defense specific technologies. This will not be done by industry as they are profit driven.

6. *Hub partners intentions may not align with intent of ME Commons and CHIPS Goals*
  - a. Ensure open, unencumbered access.
  - b. Closed or restricted access for defense platforms is challenging. Can the security requirements as a function of TRL be clarified?
  - c. Clarify role of universities and their researchers especially with respect to security requirements.
  
7. *Establish a viable business model and infrastructure to ensure lab to fab transition success.*
  - a. Address the valley of death with a pro-active approach to align future Cores; partner with industry (EDA, Cores, IP providers, etc.) to align research in DoD technology areas with nearest evolving technologies that industry will produce in volume for non-defense markets, and in so doing, align both “Technology Push” and “Requirements Pull” with maximal overlap between defense and non-defense markets.
  - b. Define sustainability plans and strategy for out-years, beyond 5-year funded horizon.
  - c. Create infrastructure that is sustainable.
  - d. University-led Hubs will focus on early-stage development. Define how the structure will transition from lab to fab and provide prototypes and how research is targeted to non-defense markets that complement defense demands for viable technologies from a business perspective.
  - e. Clarify the process by which Cores are funded. Will the USG or HUBS determine the Core funding profiles?
  - f. Business model should differentiate from DARPA type engagements by focusing on transition to production.
  - g. Phase implementation efforts to include a funded stabilization period.
  - h. Recommend funded oversight across Hubs, Cores and regional efforts to identify best and institutionalize standard practices to improve efficiency and execution.
  
8. *Create infrastructure to enable IP sharing and controls in the spirit of an open ecosystem.*
  - a. Develop a clear IP policy that will apply across all the Hubs.
  - b. Protect IP solutions. Mitigate risks associated with IP exposure or re-use without proper consideration.
  
9. *FFRDC participation is limited and not allowed for direct engagements.*
  - a. DOE Labs and other USG affiliated organizations have considerable National Security missions with requirements directly applicable to Defense and other systems.
  - b. FFRDC’s cannot legally be subcontractors on a Hub proposal. They need to be separately funded.
  
10. Integrate workforce development into Hub projects and scale it with project demand.
  - a. This would be driven by actual project needs for the Hub focus area, boding well for career placement.
  - b. This model for workforce development would sustain after the ME Commons period of performance.

The DoD ME Commons represents a historic USG investment in defense electronics needs. It is critical that it is well planned and executed to achieve its goals of adding to defense capabilities. Fundamental to this effort is ensuring that technologies developed are effectively transitioned through serious prototypes and into production for the benefit of the warfighter. The recommendations presented here represent a collection of constructive feedback ideas collected from the NDIA defense industry stakeholders. We all want this unique program opportunity to succeed and thus present our execution concerns and recommendations above and invite the department to participate in a joint government – industry discussion, hosted by NDIA, to further develop perspectives and understandings, and further ideation.