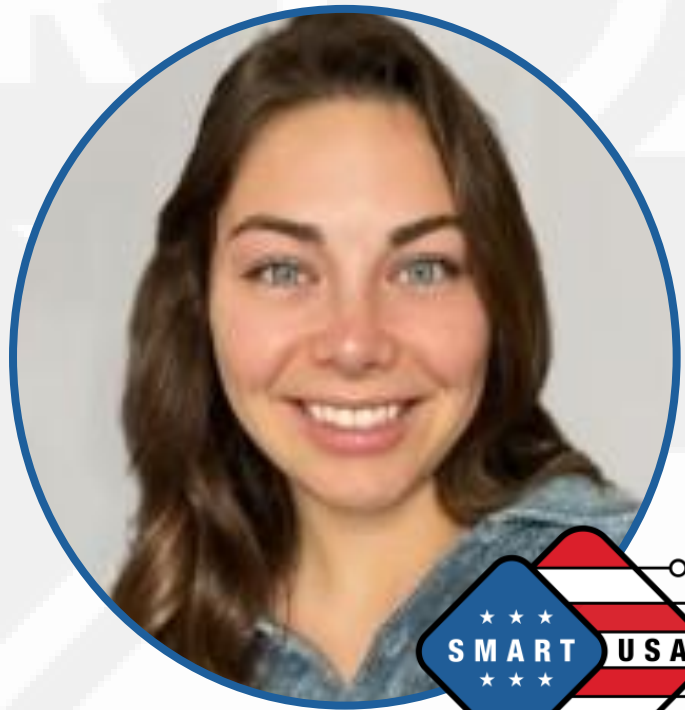


Semiconductor Manufacturing and Advanced Research with Twins Manufacturing USA Institute

SMART USA



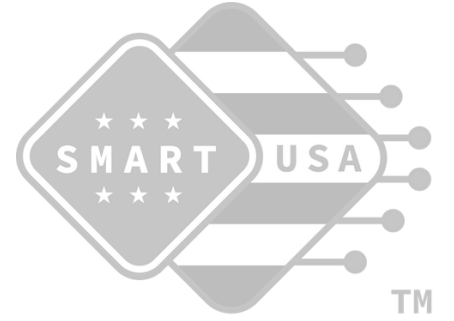
Emily Dean
Operation Manager

SMART USA Institute

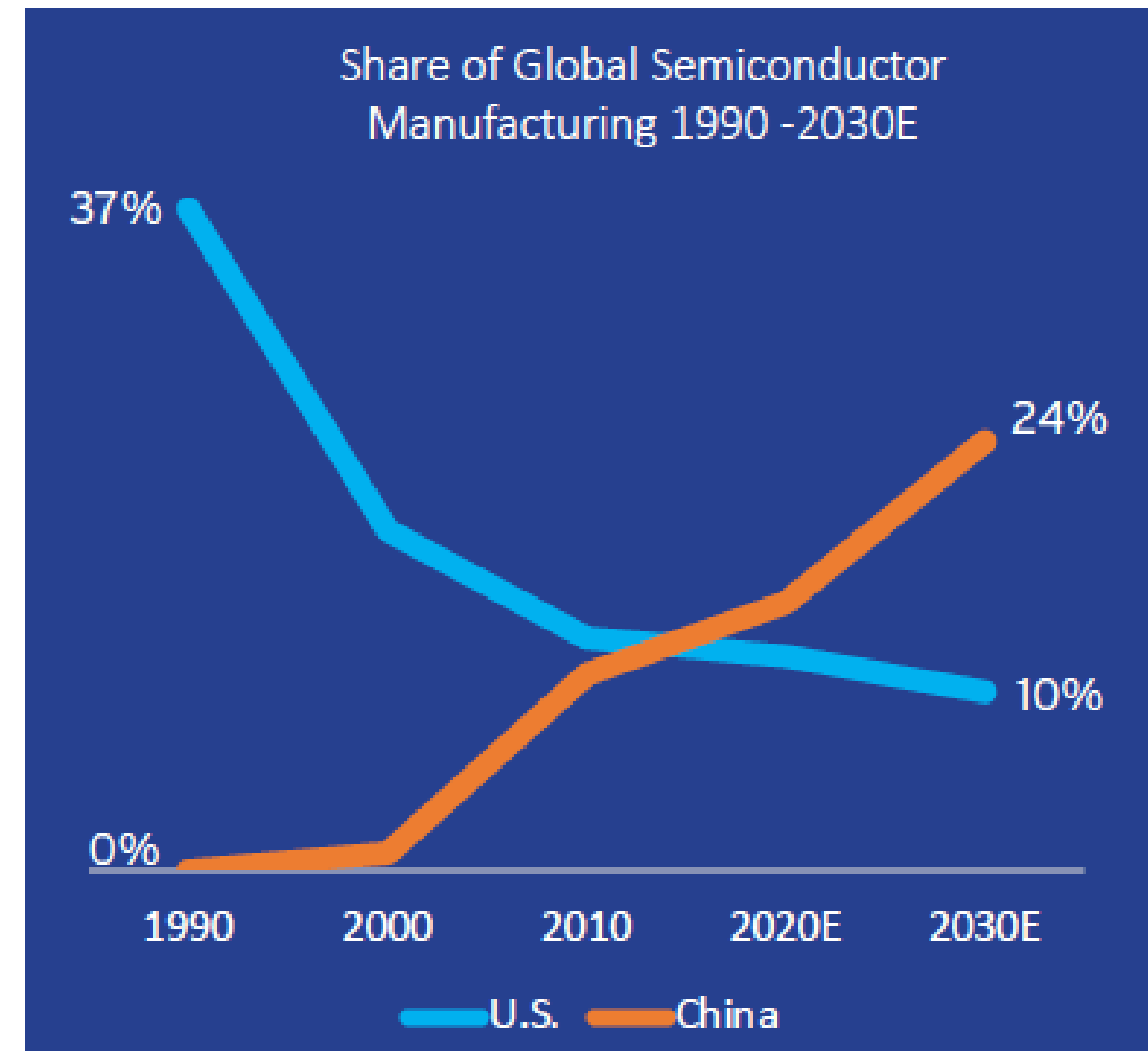
10/22/2025



Why is the CHIPS Act needed?

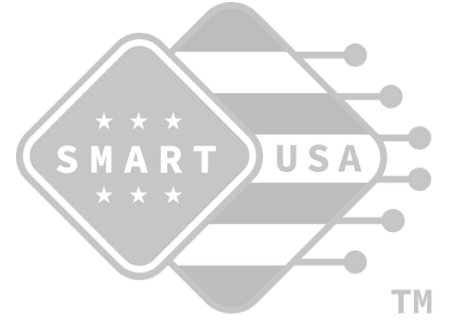


- Supply Chain Resilience
- Economic Security
- National Security

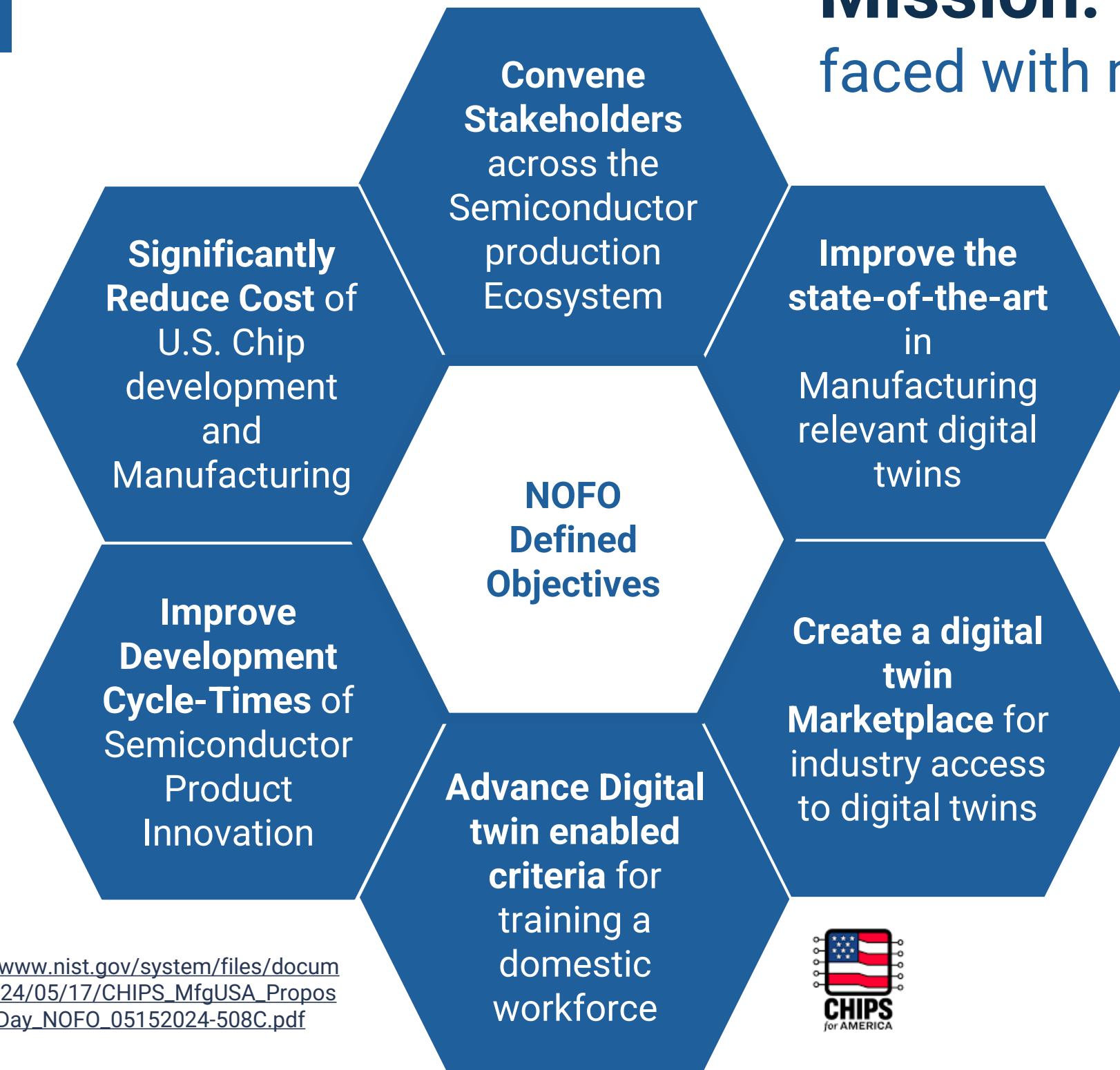


<https://www.semiconductors.org/turning-the-tide-for-semiconductor-manufacturing-in-the-u-s/>

CHIPS Manufacturing USA



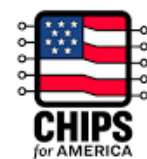
Mission: Collaboratively address challenges faced with manufacturing focused digital twins



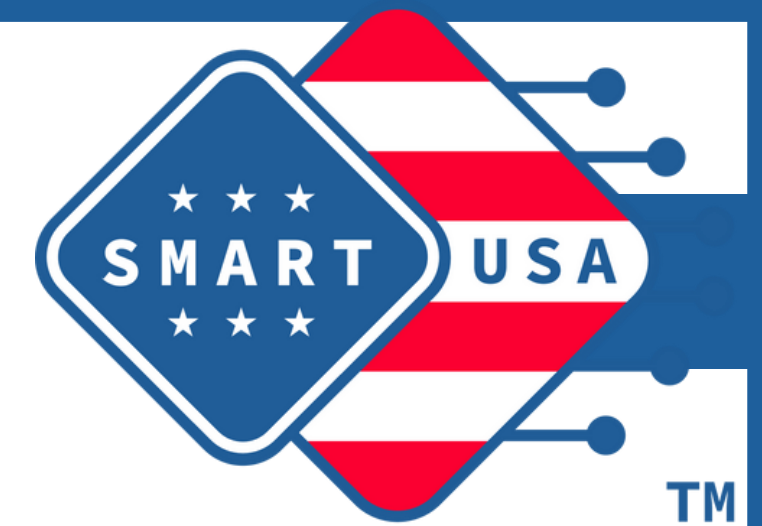
SMART USA's four defined objectives to be achieved in a five-year period.

1. 40% reduction in development and manufacturing costs
2. 35% reduction in process development cycle time
3. 40% increase in yield
4. Train and educate $\geq 110K$ workers for the industry

https://www.nist.gov/system/files/documents/2024/05/17/CHIPS_MfgUSA_Proposers%20Day_NOFO_05152024-508C.pdf



Operational Areas



- Projects will all fall within one of the following Operational Areas, (OA).
- Project focal topics change every solicitation, but all aim to move the marker closer to achieving our institute level targets.

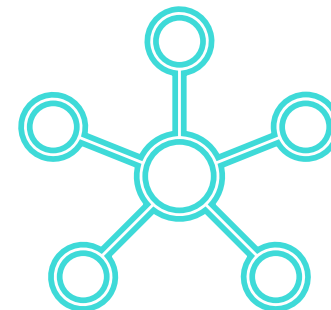
OA1



Institute Operations

- Build the Ecosystem
- Build Governance and Management plans
- Institute sustainability

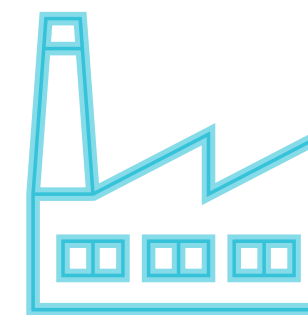
OA2



Shared Physical and Computational Capabilities

- SMART Backbone
- Digital SMART Marketplace

OA3



Industry-Led Solutions

- Improve Digital twin diversification
- Establish quantification method for evaluating digital solutions

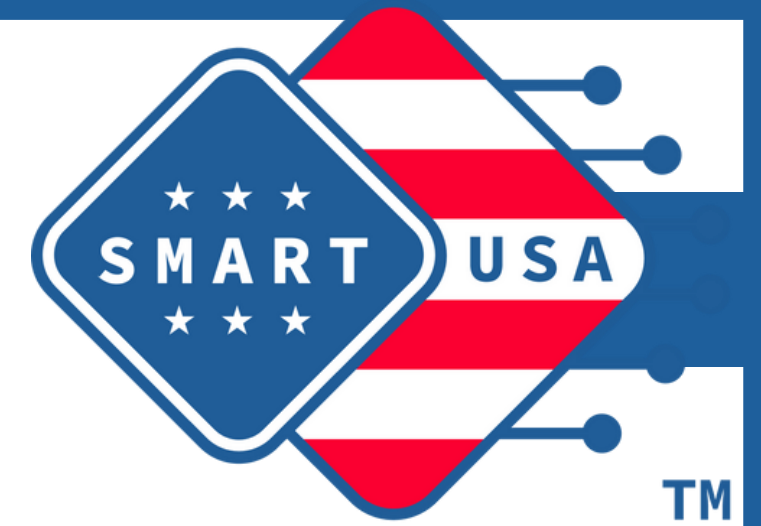
OA4



Education & Workforce Development

- Digital Innovation Semiconductor Centers (DISCs)
- Digitally Trained Workforce platform

Digital Twins Approach



What are they? | Why do they matter?

A virtual representation or model serving as a real-time digital counterpart of a physical object or process

- Innovate faster and at less expense
- Shorten process design and validation times
- Improve manufacturing performance
- Enhance training

Challenges



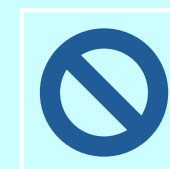
Fragmentation

Inability to access data needed to validate digital twins and power machine learning and AI tools



Lack of Trust

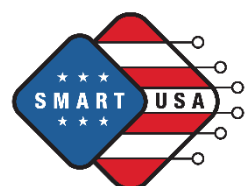
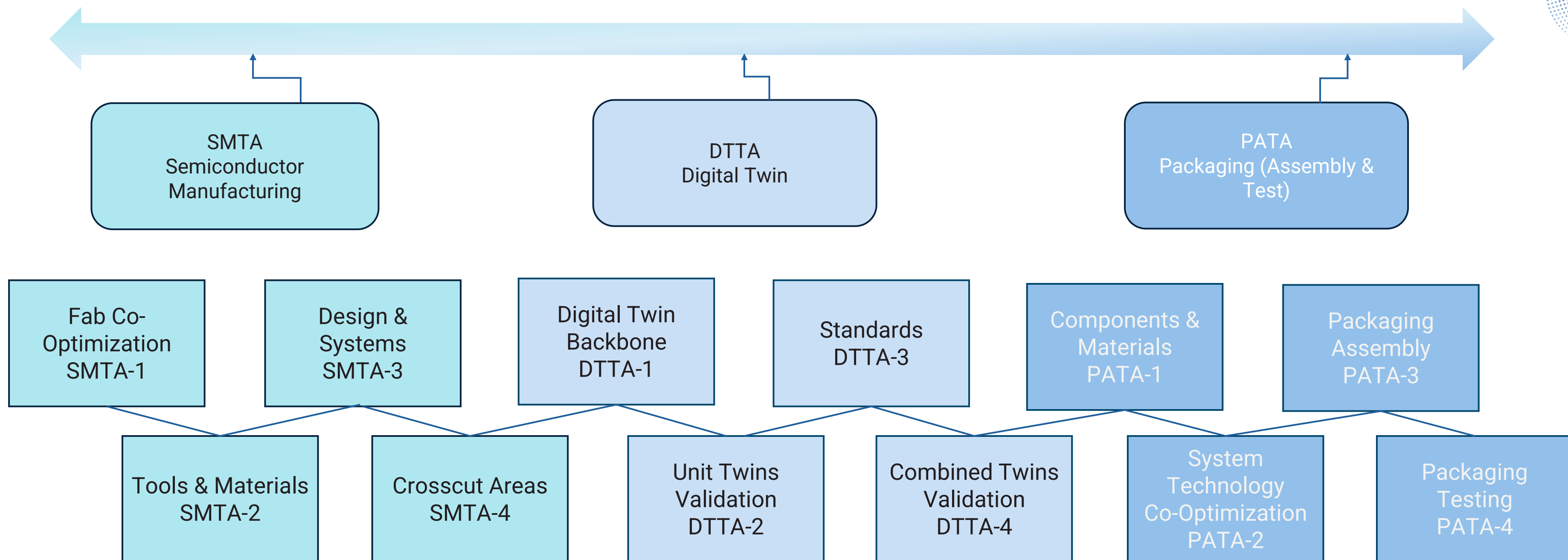
Unwilling to take risk to work across organization boundaries



High Barriers to Entry

Significant investment to participate, which is out of reach for SME manufacturers

Technical Thrust Areas (TA)



WORKFORCE DEVELOPMENT



SMART USA Infrastructure

The U.S. is facing a tremendous semiconductor workforce shortage of 67,000 semiconductor workers by 2030.

SMART USA aims to use digital twins to help fill gap at speed and at scale.

Our programs will target:

- Digital twin engineers
- U.S. semiconductor workers

Key partnerships will bring digital twins to classrooms and virtual learning environments across the country, making careers in semiconductors accessible like never before.



DISC Network



SMART USA Infrastructure

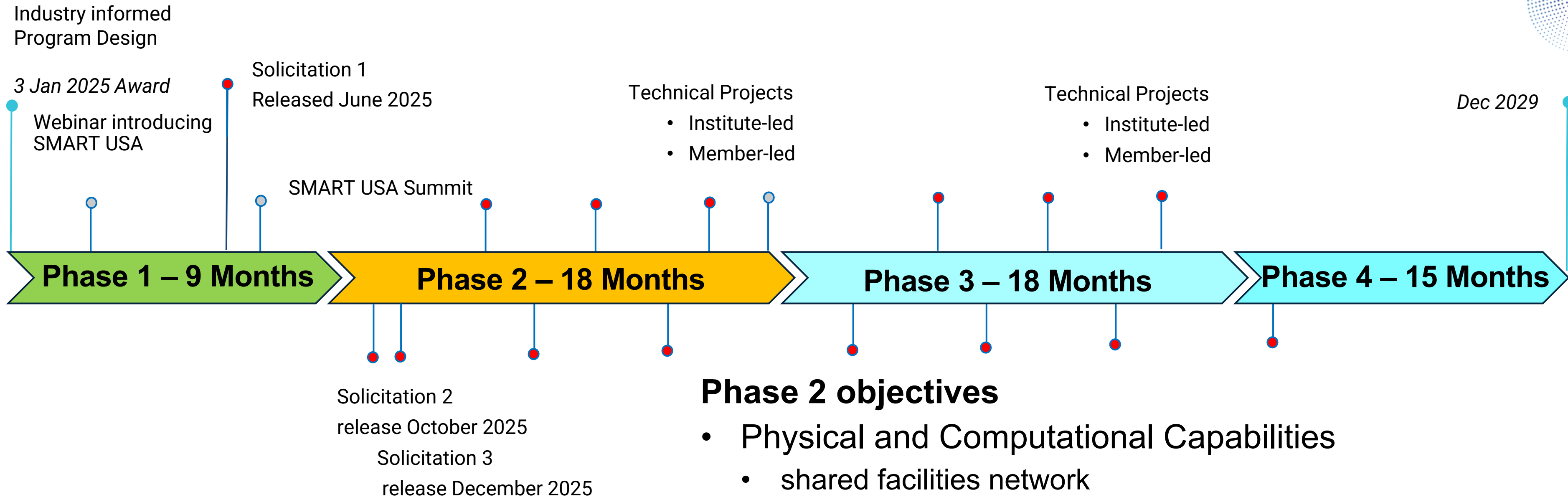
Digital Innovation
Semiconductor Centers,
DISCs, bring SMART USA to
communities across the
country.

Achievement looks like:

- Training Programs
- Accessibility
- Connection

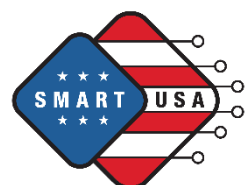


SMART USA – Plans, Accomplishments



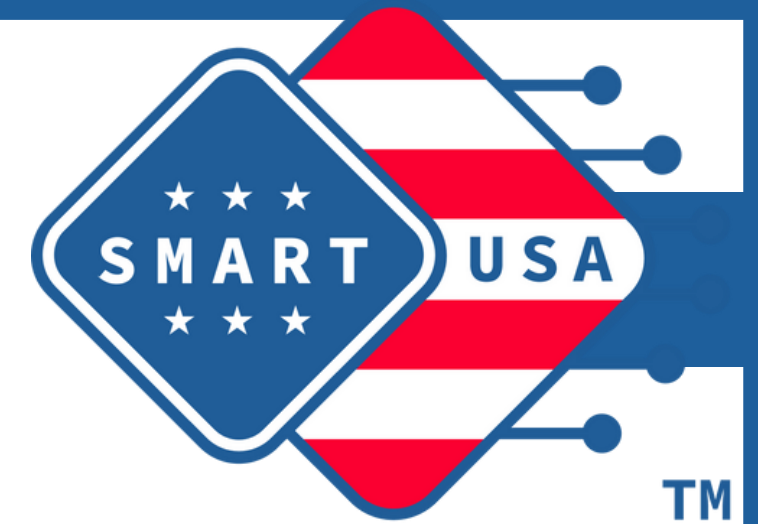
Phase 2 objectives

- Physical and Computational Capabilities
 - shared facilities network
 - digital twin backbone.
- Digital Twin Standards
- Digital Marketplace Launched and Validated
- Workforce Platform Launched and Validated

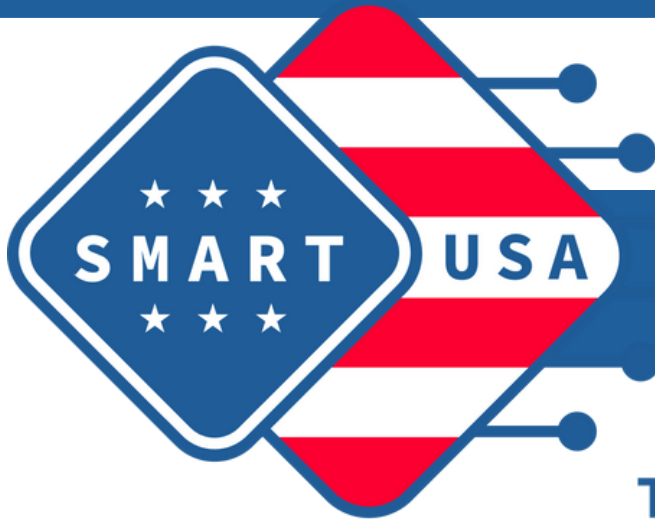


**SMART USA
INSTITUTE**

Project Types



- **Institute-Led – Collaborative** – Projects Carried out by institute staff or sub-contractors, intended to accelerate objectives of the institute, or provide greater access and advancements to the membership ecosystem.
- **Member-led – Collaborative** – Often led by university teams and required to maintain collaboration with a minimum of three different industry partners. These projects are expected to yield innovations and IP owned by the project performing members, this technology is anticipated to have commercial impact and help the industry progress to meet institute objectives.
- **Member-Led – Proprietary** – Led by either industry or academia with surplus membership funds, not spent on collaborative proposals. These projects are executed via a team, and may be a novel topic, or a continuation of a previous project. IP rights are dictated at the time of proposal submission.



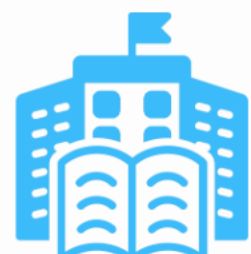
MEMBERSHIP OPTIONS



Industry

SMART USA welcomes businesses of all sizes to participate. Opportunities include rights to IP, access to funding calls, and collaboration.

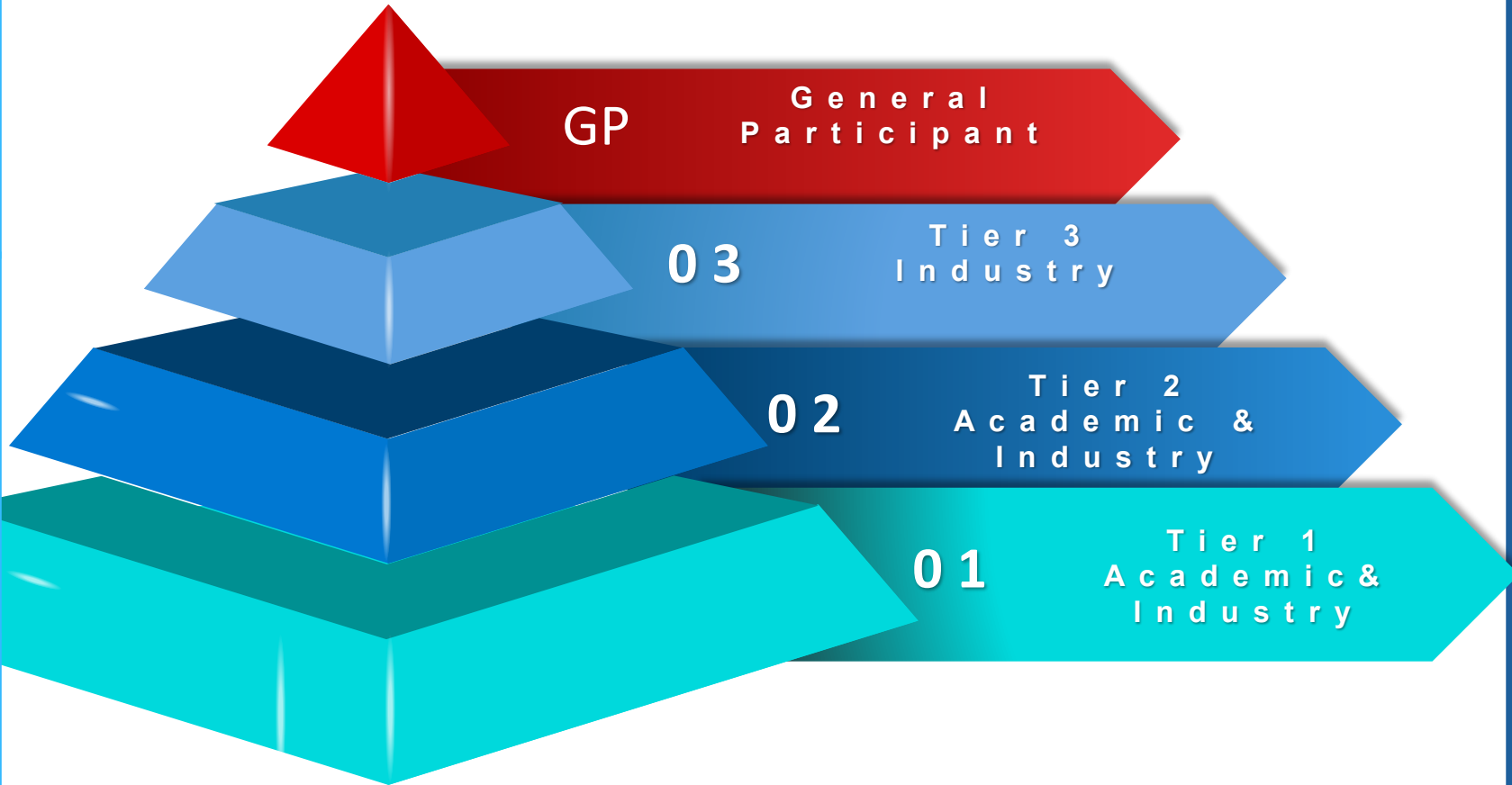
1.5x Return



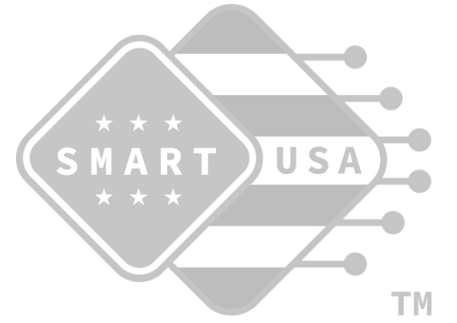
Academia

SMART USA seeks engagement from research and academic institutions with opportunities to participate in funding calls and collaboration.

1.5x Return

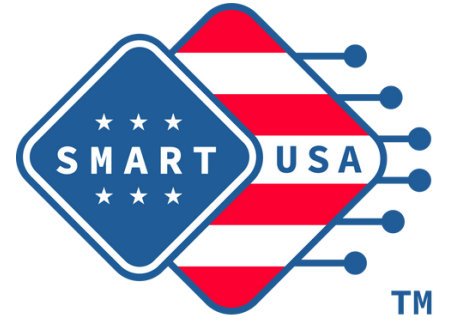


Learn about becoming a member



Reach out to
us regarding
Membership!

<https://www.smartusatwins.org/membership/join/>



MAPT Road Map

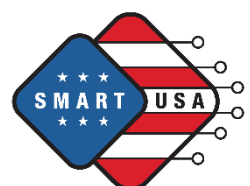
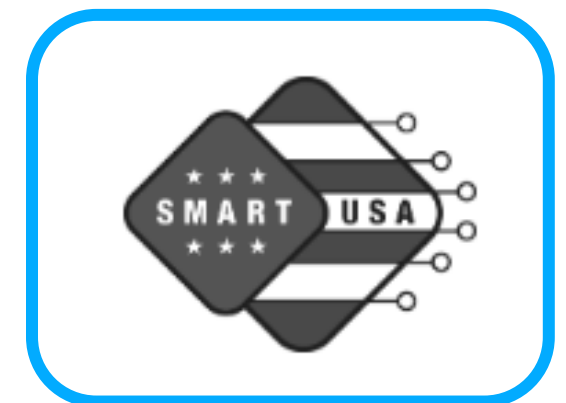
Version 2

The industry's first 3D semiconductor roadmap

- Now contains Chapter 12 on Digital Twins
- 370 Experts across 132 organizations helped author.
- Translates the 2030 decadal plan
 - Seismic shifts into actionable strategies for Chipmaking.

MAPT Roadmap

Proud Member of Manufacturing USA



**SMART USA
INSTITUTE**

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