

Newsletter

WHEN INNOVATION MATTERS



Model-Based Systems Engineering

Creating a competitive edge for businesses in a global economy

Shifting Focus to Model-Based Systems Engineering Methods

Recently, the Department of Defense (DoD) has shifted to requiring Model-Based Systems Engineering (MBSE) for research & development and sustainment programs. Today, the DoD is using the MBSE environment as the solicitation medium rather than a flat specification and reference document. Although some small and medium businesses may have Systems Engineering teams that can develop these MBSE models, strategic partnerships will also be necessary to successfully bid and win government opportunities to build compliant systems.

The Innovative Impact of Model-Based Systems Engineering in Businesses

An MBSE model in summary contains detailed context diagrams, presenting inputs/outputs, functionality, constraints (e.g., size, weight, power, cooling), performance, and interface details. As context will be required at the subsystem or configuration item level, small and medium-sized businesses will be able to effectively bid at the subsystem level in partnership with a prime integrator. Larger companies and integration primes will also be able to address technology gaps filled by niche expertise (from innovative small and medium-sized businesses) with multiple options that ultimately offer them improved supplier resiliency. Overall, the government's new shift to MBSE methods provides an amazing opportunity for U.S. companies to stay competitive in a global economy.

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SE Notes Coming Up

Supply Chain Risk Management

Topics Include:

System Modeling to Enable Supply Chain Resiliency

Assessing Supply Chain Risks With Future System Requirements

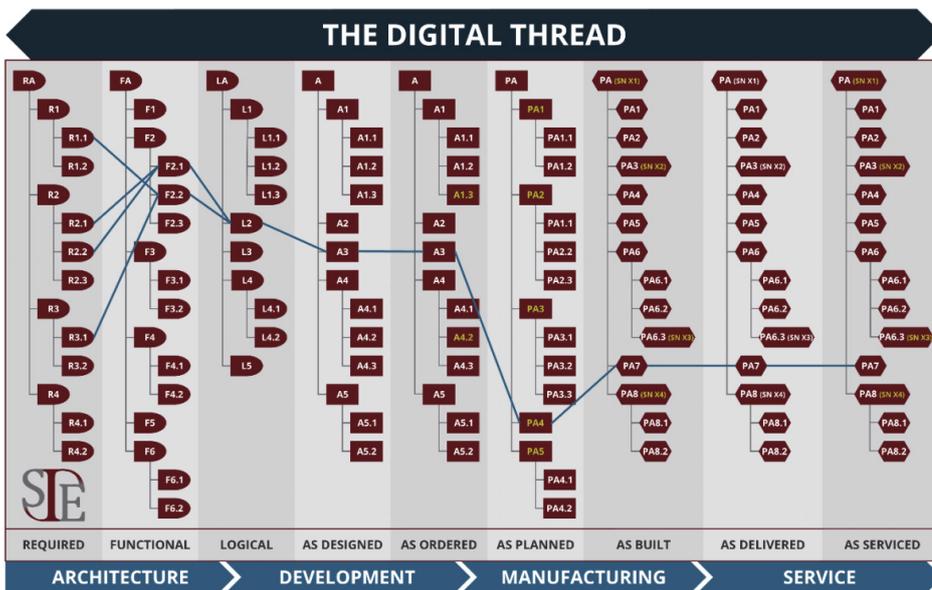
Assessing Supply Chain Risks in the Electronics Market

The Digital Thread and MBSE

A need for better control in manufacturing

Instilling concepts of the digital thread, in combination with MBSE, can enable better control in manufacturing with efficiency and associated cost savings. The need to characterize and control the materials that are used in the manufacturing of electronic products is critical. In the world of Internet of Things (IoT), materials control is one of the forgotten areas because of the complexity of measuring and controlling material systems in a factory setting. Some material systems of interest include soldering materials (e.g., solder paste, fluxes), coating systems and masks, residues from a no-clean process, and laminate and insulating systems. As we tighten processes, move to more agile automation, and integrate smart decision making from big data and machine learning methods, the ability to measure the consistency of materials in manufacturing will be critical.

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“The need to more effectively characterize and control the materials that are used in the manufacturing of electronic products is critical.”

For information on the latest technology in controlling materials in an electronics manufacturing environment, visit insituware.com or contact info@insituware.com

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VISION MARK-1



Assuring Supplier Resiliency

To create a more resilient industrial base

In July 2017, Executive Order 13806 entitled “Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States”¹ was released. This order essentially states the need for a resilient base of resources required to protect the National Security of the United States due to challenges in the industrial base. Some of these challenges include sequestration and uncertainty of government spending; the decline of critical markets and suppliers; unintended consequences of U.S. Government acquisition behavior; aggressive industrial policies of competitor nations; and the loss of vital skills in the domestic workforce.

Fortunately, the Engineering and Manufacturing community can provide value to improve U.S. domestic competitiveness through the architecture of defense systems that enable competition within the existing defense supply as well as the expansion of suppliers from adjacent industries.

System modeling also provides architectures that allow supplier competition while creating direct digital links between system design and manufacturing, which reduces production setup costs. These reduced costs along with a more competitive supply chain can assist in the implementation of a more agile manufacturing processes to lower production costs of low volume, high part mix defense products, thus creating a more resilient and strengthened industrial base.

¹President. Executive Order 13806. Presidential Executive Order on Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States. July 21, 2017.

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Creating a More Resilient Supply Chain

Using mission engineering tools

How can Mission Engineering (ME) tools be used to enable a more robust and resilient supply chain for the DoD?

1. **Assessment of the “kill chain”**

Through the assessment of the “kill chain,” the needed capabilities associated with planned missions can be defined, modeled, and sanitized for engagement with industry. If these are shared with potential suppliers (in the current Defense Industrial Base (DIB) and in adjacent industries), it will enable innovative tier 1, 2, or 3 companies to better align with these capabilities, and in some cases make internal investments in response to what would be perceived as future defense needs.

2. **MBSE tools in an ME Process**

If MBSE tools are effectively adopted into the ME process, an efficient extraction of capability definitions that are understood by different supply tiers (e.g., 1-3) and disciplines can be performed. These disciplines include design and development, logistics, supply management, and manufacturing.

3. **Incorporating with the Digital Thread**

A digital thread that ties design, manufacturing, and logistics data to the mission model and aligns these processes to achieve the desired capabilities could allow the platform's specific acquisition objectives to be realized more effectively. The MBSE tools environment becomes the “glue” that bridges capability needs to optimal industrial investments through the model.

In summary, Mission Engineering tools can be used to enable a more robust and resilient supply chain for the DoD through current and potential multi- tier DoD suppliers that are enabled to invest in future defense capability needs, which will ultimately build a more robust and resilient industrial base.

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