

Peer-to-Peer Network Forum: Digital Thread in Manufacturing

Event Summary

Conexus Indiana held a Peer-to-Peer Network Forum on Tuesday, April 26, 2022, to explore the concept of digital thread in manufacturing. Organizations participating in the forum included Cummins Inc., Mursix Corporation, IntelAdvise, Praxair Surface Technologies, Antique Candle Company, ICTT System Sciences, IN-MaC – Purdue University, Purdue University Fort Wayne, and more.

The concept of digital thread is increasing in importance as complexity grows in product design, manufacturing, and life-cycle management. And the U.S. Department of Defense (DoD) is particularly interested to see digital thread concepts implemented across supply chain interactions. Standards and frameworks are still in development, often through collaborative experimentation and pilots, such as this recent [example in Indiana](#). The intent of the forum was to bring together subject matter experts (SMEs) and interested parties to use learnings from this pilot project and begin discussing future opportunities for Indiana's manufacturing and logistics economy.

The meeting began with a digital thread overview and defense context from Major General Clif Tooley, President of Defense Development at the Indiana Economic Development Corporation (IEDC). The IEDC and the DoD are interested in seeing more Indiana manufacturers adopt digital thread concepts. Recently, Indiana companies experienced a 35% loss in securing defense contracts, and more than 70% of the DoD supply chain (sub-tier 2) has been off shored. Digital thread and other advanced technology adoption could reverse this trend, especially as the U.S. DoD incorporates digital thread (or digital engineering) as an essential part of the contracting process. Indiana manufacturers must be prepared to meet these new demands.

General Tooley used an analogy of a Boeing 787 to highlight the potential impact of digital thread across supply chains. Hundreds of companies must collaborate to produce thousands of parts to build a complex system like an aircraft. It is this complexity that invites "a single source of truth throughout the supply chain." Digital thread is particularly useful for what is often referred to as product lifecycle management (i.e. from product design and manufacturing to testing). Having visibility and a single source of truth for a single part across suppliers makes product interactions, improved product quality, and innovation increasingly possible.

Finally, General Tooley alluded to the importance of involving the small-to-medium manufacturers (SMMs) early in the adoption phase. IEDC is seeking to help SMMs facilitate the necessary interactions for digital thread technology adoption (i.e. data infrastructure and cybersecurity). Innovation in an emerging space is often developed by the small and medium-sized manufacturers as (1) they make up most of the

manufacturing economy, and (2) they are the entities that will need to implement an enterprise-wide approach.

The second half of the forum included a presentation from Indiana's "Team Top Gun," comprising Mursix Corporation, Cummins, ICTT System Sciences and IntelAdvise. The IEDC, the Air Force Research Lab (AFRL) and the Indiana Defense Network funded the collaboration. The \$250,000 grant funding is being used to identify new ways to meet the demands discussed earlier by General Tooley.

Bill Schindel, President at ICTT System Sciences, provided an excellent overview of digital thread as well as the 'what, how and why' behind the work conducted by Team Top Gun (the PowerPoint slides are available [here](#)). The pilot project used a *real-world* part, described as an "O-Ring Seal," produced by Mursix for Cummins.



Bill also gave an overview of the various stakeholders and how they work together to achieve project objectives. Among the top objectives were collaboration between a SMM and OEM, shared learnings for workforce development and public sector partners as well as an improved framework for standardization digital thread standardization. Key stakeholders include:

- Small to Mid-size Manufacturer – Mursix
- Original Equipment Manufacturer – Cummins.
- Customer aka End User – AFRL
- Economic Development – Indiana Defense Network
- Workforce Development – Purdue Polytechnic
- Technical Assistance – IntelAdvise and ICTT System Sciences

Susan Carlock, VP of Business Development at Mursix, shared learnings from the perspective of an SMM. Mursix's goal was to improve competitiveness, transparency, and collaboration with the OEM. Part of achieving this goal meant sharing data on its manufacturing processes, purchasing, quality, and more. Achieving a connected data flow from SMM to OEM can be challenging because technologies, product specifications, and data formats are hard to define, agree upon, and share securely. But Mursix accomplished it by making big investments in time, effort, and education.

Finally, Steven Stahley, Director of Excellence Measurement at Cummins, shared learnings from the perspective of an OEM. The key objectives for Cummins were to strengthen its Industry 4.0 strategy, enhance workforce development relations with university partners, and bolster collaboration with the Indiana supplier ecosystem. Steve shared a significant insight: SMMs and OEMs need to develop a *digital roadmap* to integrate systems. To get started with digital thread, companies might ask themselves: "What systems do we use in our present state today? How well connected are they to each other?" From there, companies can pick one connection and work on how to improve it (i.e. strengthen a section of their digital thread one piece at a time).

An overarching theme from the presentations emerged: Technology adoption can strengthen the domestic manufacturing supply chain and help SMMs land new orders from customers.

To learn more about the project, read the final report from Team Top Gun here: [Digital Thread Pilot Project Presents Roadmap for Strengthening Domestic Supply Chain.](#)

Next Steps

Team Top Gun, the IEDC, and Conexus Indiana are incorporating feedback and perspective from the discussion, which may culminate in an ongoing working group for digital thread. Conexus will reconvene the group in Fall 2022 at a new host location to continue the conversation. Stay tuned.

Get Involved

Conexus Indiana's Peer-to-Peer Network is an invite-only forum for Indiana manufacturers and logistics companies to share knowledge and best practices about advanced technology they have utilized or are seriously considering. Ultimately, we hope these conversations will drive greater adoption of advanced technologies by allowing a variety of stakeholders to learn about technology among engaged and informed peers. Reach out to Conexus Indiana to get involved.