



ASK THE EXPERT:

Digital transformation in aerospace

Introduction

In today's fast-paced aerospace and defense (A&D) industry, digital transformation isn't just a concept or buzzword, it's a necessity. With rising demands for innovation and complex product development, companies are continuing to enhance efficiency, reduce costs and accelerate production timelines. Despite significant investments in digital tools, many aerospace companies struggle to fully realize the return on investment (ROI) they expect from their digital transformation initiatives.

So, what exactly is digital transformation and how can Siemens' solutions help A&D companies navigate this journey? Check out what Todd Tuthill, VP Aerospace, Defense, and Marine Industry at Siemens Digital Industries Software had to say about [digital transformation](#) hereafter.

Q: What is digital transformation in aerospace?

Todd: Digital transformation is the process of integrating digital technologies into all areas of a company, fundamentally changing how organizations operate and deliver value to customers. In the A&D industry, this often means moving beyond paper-based or document-driven workflows to embrace digital tools that allow for faster, more accurate and more collaborative ways of developing products and processes.

However, digital transformation in aerospace isn't just about adopting new technologies. It's about rethinking processes and culture to maximize the value that these technologies offer. It requires a shift in mindset to embrace change, continuous improvement and a willingness to explore new, digital ways of solving traditional challenges.

Q: What are Siemens' five stages of the digital transformation journey?

Todd: Siemens Digital Industries Software has developed a roadmap specifically for companies in the A&D industry to help them assess and advance their digital transformation efforts. Known as the **five levels of digital transformation maturity**, this



Todd Tuthill, VP Aerospace, Defense, and Marine Industry, Siemens Digital Industries Software.

Ask the expert: Digital transformation in aerospace

framework guides organizations from initial stages of adoption to full optimization. The five stages are:

1. **Configure:** This is where companies transition from traditional document-based workflows to model-based systems. In this stage, all product data is centrally managed, streamlining processes and improving data accuracy and reusability.
2. **Connect:** In this phase, companies integrate their data across multiple domains including design, testing, [manufacturing](#) and support to ensure a single source of truth for the entire product lifecycle. Many companies are currently stuck in this phase, struggling to optimize these digital connections.
3. **Automate:** Automation is the core of digital transformation. In this stage, you can automate mundane and complex tasks to free up time to focus on more creative and value-driven work. Siemens offers tools that automate tasks like generating wiring diagrams, which can save companies thousands of hours on each project.
4. **Generate:** At this stage, companies leverage generative design and other advanced technologies to explore multiple design and manufacturing alternatives quickly and efficiently. Generative tools help optimize production layouts, material flows and overall factory setups.
5. **Optimize:** The final stage involves leveraging the comprehensive digital twin and simulation tools to test, refine and perfect designs before physical production. This leads to fewer errors, reduced costs and faster time-to-market.

Q: How can your aerospace and defense company develop a clear vision for digital transformation maturity?

Todd: One of the biggest challenges A&D companies face is [developing a clear and unified vision for digital transformation](#). Many organizations dive into digital initiatives without an idea of what they want to achieve or how they will measure the success.

Creating a clear vision starts with leadership. Companies need to clearly define their goals, align all stakeholders and ensure that digital transformation efforts are part of a long-term strategy, not just a series of short-term fixes. Siemens encourages companies to regularly assess their digital maturity using the five levels of digital transformation to ensure they're on the right track.

Q: What kind of technology is used in aerospace engineering for digital transformation?

Todd: Siemens offers a comprehensive suite of solutions tailored to help A&D companies at every stage of their digital transformation journey. Some key offerings include:

- **Digital thread:** Siemens offers solutions that will help you [create a digital thread](#) that connects data across departments and processes, eliminating silos and creating seamless workflows. This enables real-time collaboration between teams like system architecture, design and manufacturing, making it easier to adapt to changes.

- **The comprehensive digital twin:** Siemens [digital twin technology](#) allows companies to create virtual replicas of their products and manufacturing processes to simulate performance, test different configurations and continuously optimize both the product and its production.
- **AI solutions:** [Artificial intelligence](#) is another critical piece of helping you mature your digital transformation. However, AI adoption in aerospace remains low, with only 8 percent of companies using AI in technical workflows, according to the [Siemens sponsored survey](#) across Aviation Week network. While many companies are still learning about adopting AI, Siemens is [working on solutions](#) that ensure [industrial-grade AI](#) is trusted and integrated effectively into engineering and manufacturing workflows.
- **Immersive engineering:** [Siemens' immersive engineering tools](#) enable engineers to collaborate in a 3D environment, designing and testing products in a virtual space before physical production begins. This enables engineers to design 3D objects in a fully immersive 3D environment, rather than relying on traditional 2D methods. This approach is not only physics-based but also highly collaborative, allowing teams to interact with the design in a virtual space as though they were physically inside it. By stepping into the 3D world of mechanical design, engineers can visualize, test and refine complex systems more effectively.

Ask the expert: Digital transformation in aerospace

Q: Why are many aerospace companies stuck in the "connect" phase?

Todd: According to a Siemens-sponsored survey across the Aviation Week network, many A&D companies are stuck in the "connect" phase of digital transformation. While they've made strides in connecting data across domains, they struggle to move beyond this stage to more advanced phases like automation or optimization.

One of the key reasons for this stagnation is the complexity of integrating legacy systems with new digital tools. Another significant challenge is the lack of a clear digital transformation strategy, which leaves companies focusing on short-term gains instead of long-term success.

Siemens' solutions, like digital threads and digital twins are designed to help companies move beyond the connect phase by automating processes and enabling more advanced capabilities like real-time simulations and [generative design](#).

Q: How can you and your aerospace company continue embracing digital transformation maturity?

Todd: The key to advancing on your path to digital transformation maturity (moving beyond the connect phase) is adopting more advanced digital tools and fostering a culture of continuous improvement. For A&D companies, this means embracing technologies like AI, immersive engineering, digital thread and the digital twin, which allow for real-time optimization and faster decision-making. However, no technology can succeed without the right people and processes in place. It's crucial to bring employees along on the digital transformation journey, providing them with the tools, training and support they need to embrace new ways of working.

Digital transformation is critical for aerospace companies looking to stay competitive in a rapidly evolving industry. Siemens' five-stage framework for digital transformation maturity offers a roadmap to help companies assess their progress and move forward with confidence. By embracing these technologies, aerospace companies can unlock the full potential of digital transformation and develop better products faster.

Siemens Digital Industries Software [siemens.com/software](https://www.siemens.com/software)

Americas
1 800 498 5351

Europe
00 800 70002222

Asia-Pacific
001 800 03061910

For additional numbers, click [here](#).

© 2024 Siemens. A list of relevant Siemens trademarks can be found [here](#). Other trademarks belong to their respective owners.

86342-D2 10/24 H