



THE A&D EXECUTIVE'S GUIDE TO
REALIZING DIGITAL TRANSFORMATION

Component 5: Value chain collaboration and intelligence

Gain intelligent insights for predictability and resiliency,
improved collaboration and better sourcing decisions

[siemens.com/aerospace-supply-chain](https://www.siemens.com/aerospace-supply-chain)



Executive Summary

With today's major aircraft and defense systems requiring millions of parts from thousands of suppliers, it's easy to imagine what keeps aerospace and defense (A&D) executives up at night: the risk of unexpected supply chain disruptions. Executives at space systems companies face equally daunting concerns about their supply chain, in this case because parts are so customized that supply sourcing can be a high-risk endeavor. At any time, a supply chain disruption may cause a chain reaction of delays, cost overruns and missed delivery windows.

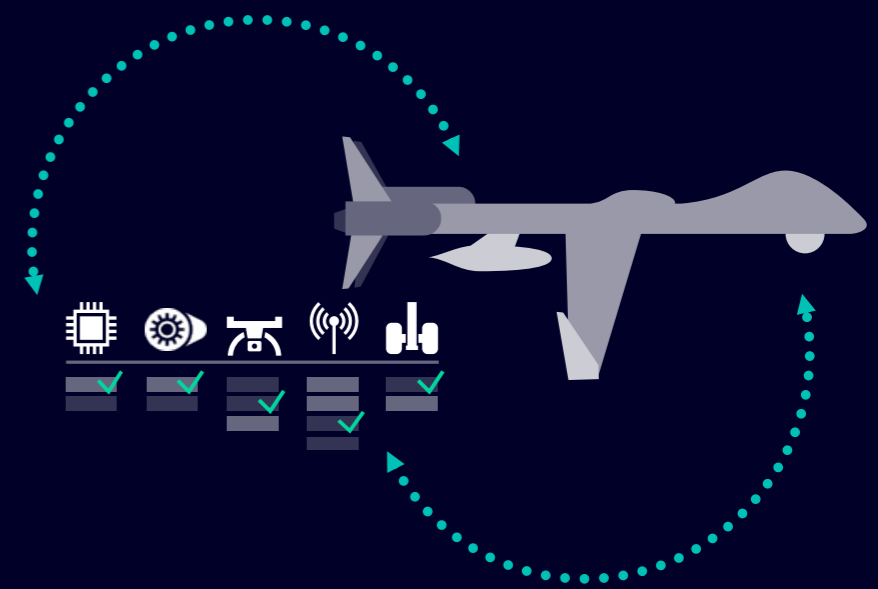
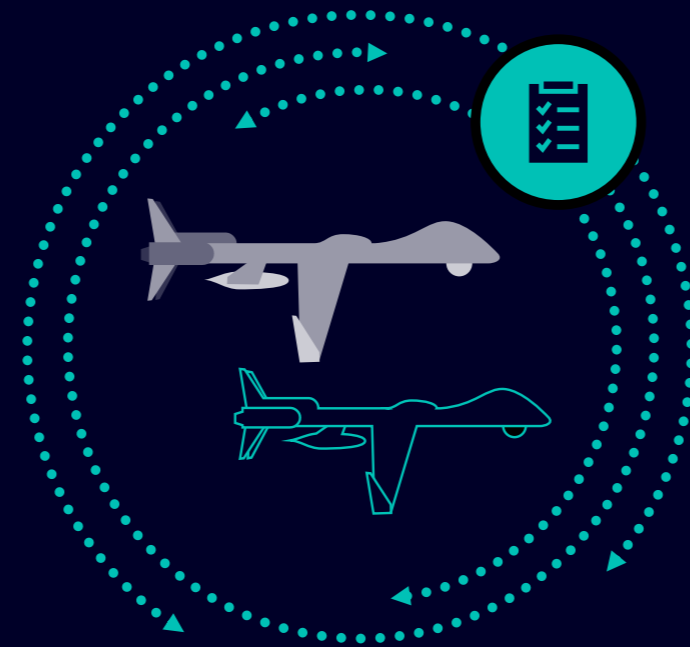
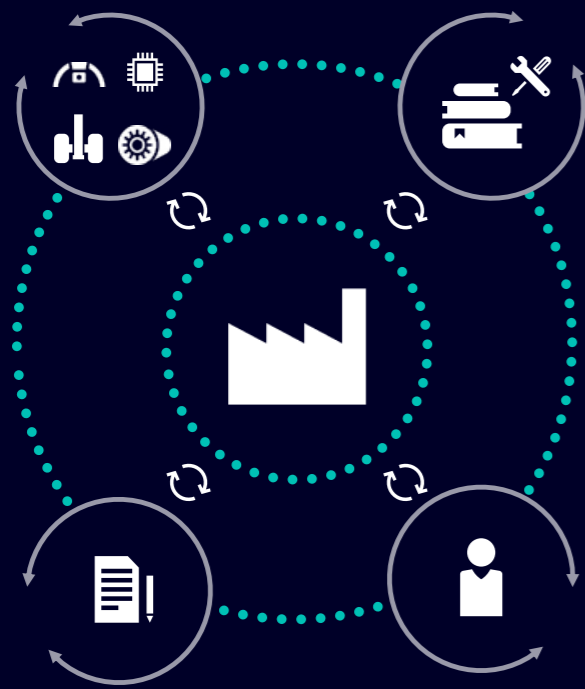
As your company makes sourcing decisions for the components, systems and assemblies going into each of your programs or missions, how can you achieve value chain predictability and resiliency?

Legacy software solutions simply can't keep up with today's value chain challenges. And it's a losing proposition to buffer inventories, because the accelerated pace of engineering changes and growing number of configurations could easily make stockpiled materials and parts unusable.

What A&D companies need is the power to proactively predict and avoid supply chain disruptions – a solution that ensures data accuracy and offers integrated, collaborative functionality up and down the value chain. Siemens Digital Industries Solutions offers just these capabilities, covering the entire value chain with a holistic, collaborative and intelligent digital solution.

Value Chain Collaboration & Intelligence

Gain intelligent insights for predictability and resiliency



Visibility across value chain

Improved collaboration.



Open access to connected, in-context, accurate data

Better decisions.



Intelligent part selection/sourcing

Quality. Predictability. Resiliency.

Build a resilient supply chain through digital transformation

How critical is A&D value chain management today? We think the answer to this question is succinctly (and alarmingly!) conveyed in one statistic from a recent Deloitte survey:

90 percent of surveyed executives say they continue to experience unexpected supply chain disruptions.

Indeed, supply chain disruptions represent one of the major contributors to the delayed launch of some 45 percent of A&D products, according to Gartner. Something has to change.

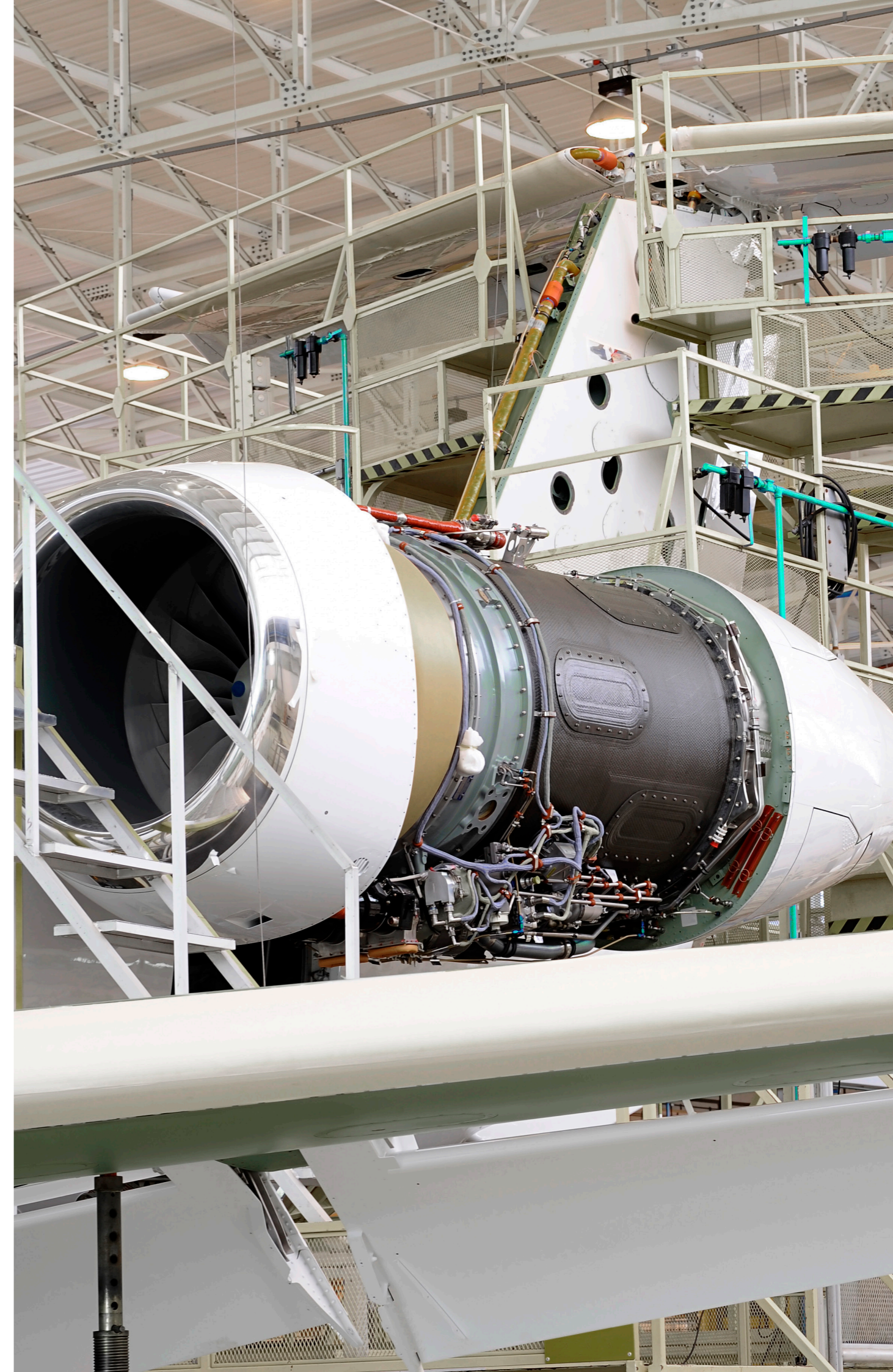
Of course, most A&D companies have already been improving their value chain management. The global health crisis and geopolitical unrest of the early 2020s challenged the industry with difficult yet valuable lessons, which led to system upgrades and streamlined value chain protocols. Yet supply chain volatility is likely to continue and expand, creating new challenges. Substantial new demands are placed on the industry, for example, by countless governmental and corporate commitments to 2030 net-zero and carbon-neutrality.

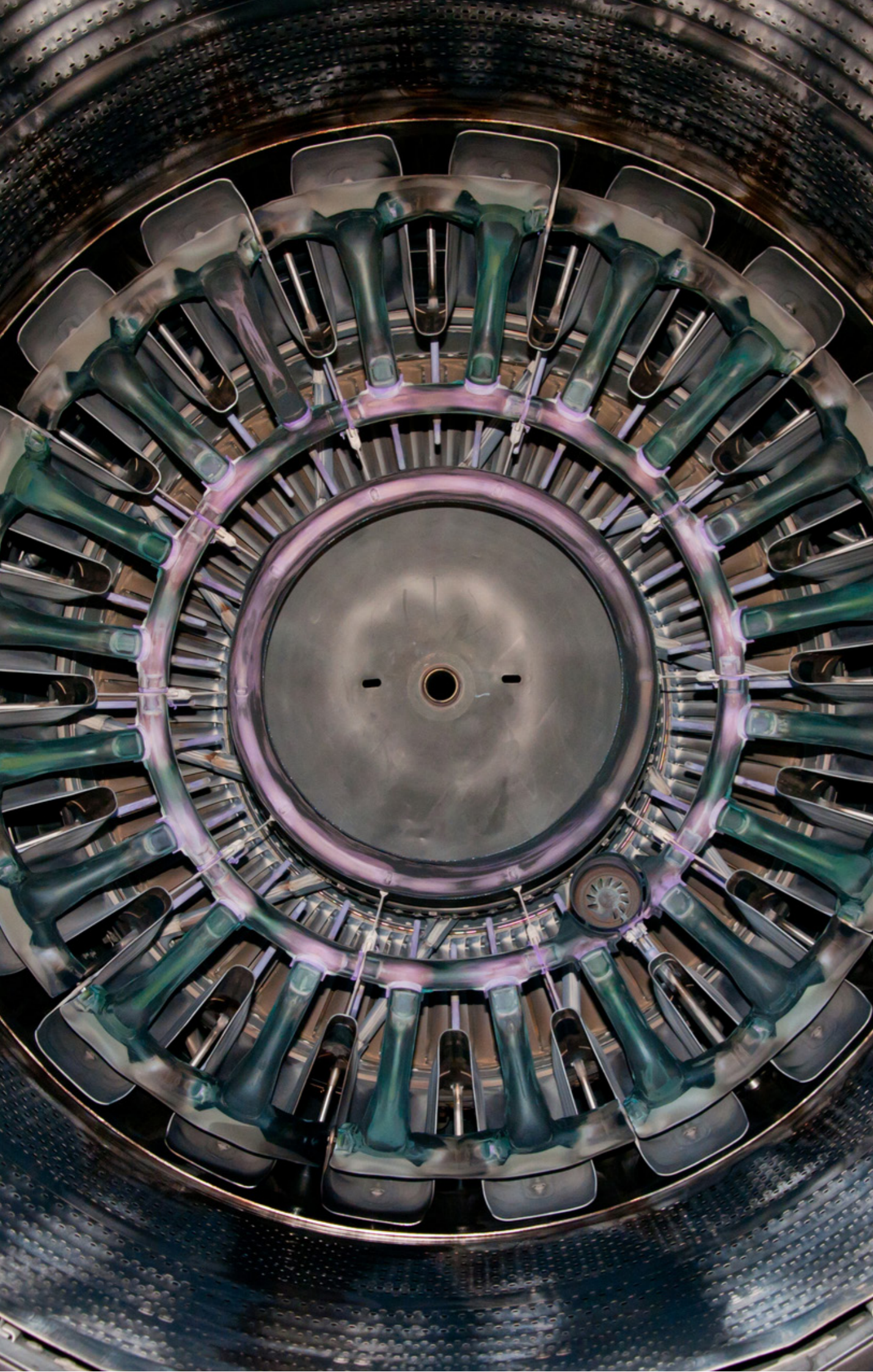
The potential impact of supply chain disruptions is intensified by exploding product complexity and constantly evolving regulations. Value chain management therefore must address challenges that commence with the earliest product design and development phase and continue through manufacturing to sustainment for the entire service life of the product.

Under these conditions, the industry is anxious for some good news about value chain management. Siemens is pleased to provide it. Advances in value chain management software make it possible for your A&D company to achieve its manufacturing goals and meet customer cost and schedule requirements.

The robust digital continuity provided by this solution delivers visibility between manufacturers and their suppliers across all facets of the value chain. Early and ongoing transparency continues throughout the product lifecycle. Today's value chain management solution enables you to proactively adjust and make changes early to minimize risk, reduce the cost of late changes or delays and drive reliability and resiliency across the value chain.

The key to gaining this reliability and resiliency is to implement value chain collaboration and intelligence through a practical and implementable digital transformation strategy.





How to manage a supplier network in the current A&D climate

As Siemens has listened to executives like you across the A&D industry and around the world, we have discovered a common goal among you. Simply put, executives seek to make financial, strategic and/or business decisions that ensure **on-time delivery of products at the best possible bottom-line cost.**

Excellence in value chain management is vital to achieving this goal. All it takes to delay delivery of a major A&D product is one small issue with one part. Therefore, your cost and schedule outcomes strongly depend on empowering your team to proactively predict and overcome supply chain disruptions. To make deliveries on time and at cost, your team needs a powerful digital value chain management solution to manage the sourcing and acquisition of highly specialized and/or vast numbers of parts from thousands of suppliers.

The traditional approach to value chain management has supported the A&D industry for a long time, but it is no longer sufficient. While it provides insights into materials, parts and component availability, limited data sharing capabilities may leave some stakeholders with a lack of access to relevant data. These users may end up working from information that is out of date or from an incomplete data set. Limited visibility across the value chain results in uncertainties regarding part availability as well as the performance characteristics of parts, materials and processes, such as quality and conformity to current standards. Limited visibility, outdated information and incomplete data sets may also impede certification or qualification processes.

Finally, the sheer quantity of metadata for two to three million parts is problematic for legacy value chain management systems. You need more intelligent insights at the right time to make informed part and material decisions.

To determine the best steps for your company toward value chain digital transformation, you must carefully consider the risks and rewards of software and partnership decisions. Which solution will you choose? What will it take to implement it?

A new or updated solution must offer value chain collaboration and intelligence capabilities that allow the entire supply chain to become more collaborative as it leverages real-time market insights. Adopting these value chain collaboration and intelligence capabilities will help your team fully understand changing supply chain dynamics, such as part and material availability, on a continuous basis.

How to meet the success requirements of reliable, resilient value chain management

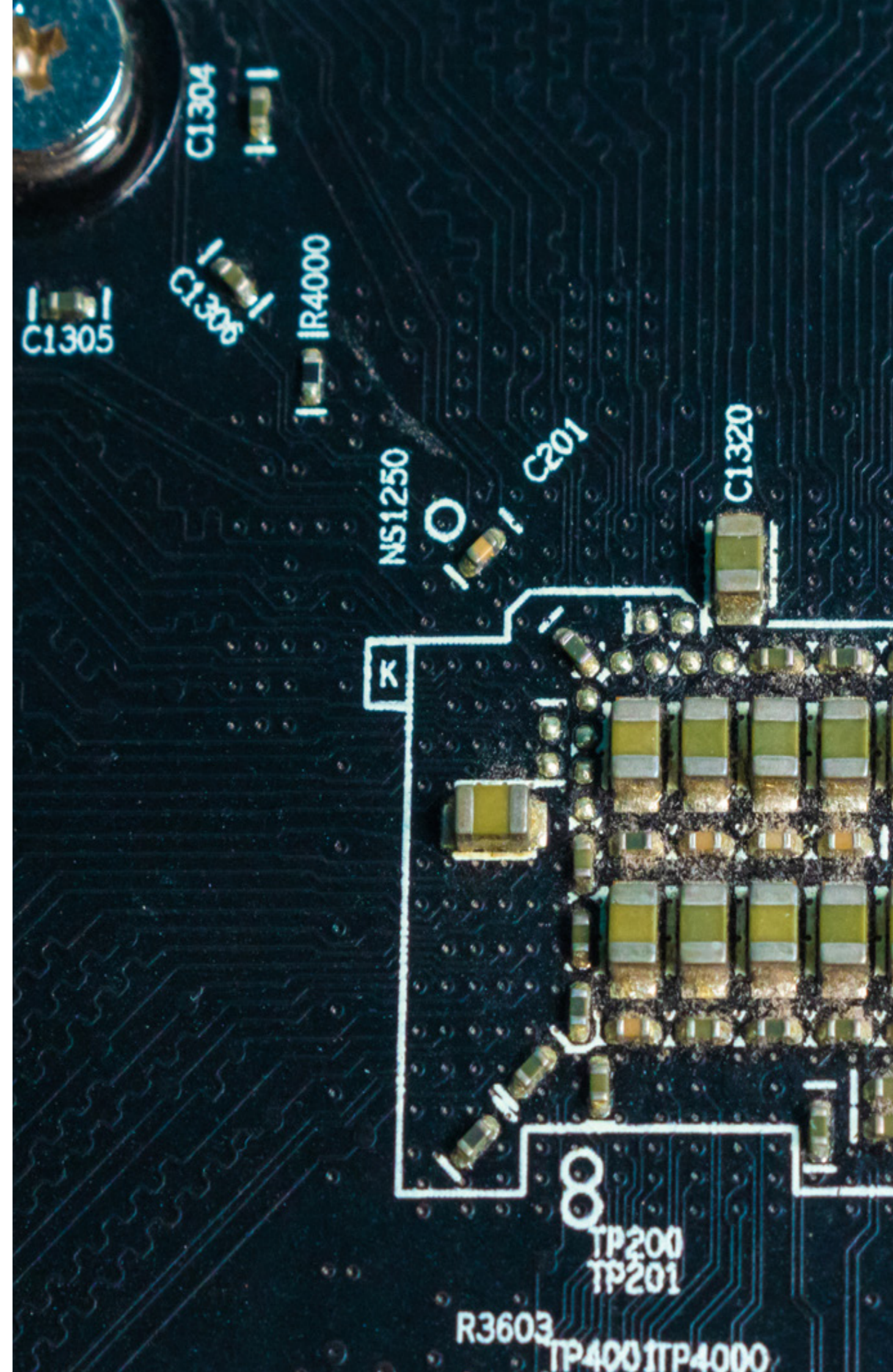
If value chain predictability and resiliency are the manufacturer's remedy to our world's ongoing supply chain volatility, what are the essentials that will lay the groundwork for attaining these desired outcomes? Having devoted themselves to answering this question, value chain experts at Siemens have determined three requirements to achieve this success.

Expand your view of the supply chain and its vulnerabilities. Historically, there has been a tendency to focus on commodity items, but today you must look at all the elements within your value chain that involve suppliers. Considering everything from raw materials to mechanical components and subassemblies, identify all the various ways the supply chain can break. This may include issues related to data accuracy, stakeholder disconnect, and access to parts, raw materials and commodities.

Use gathered intelligence to make value chain decisions early in product development. From the beginning of the design stage, consider supplier needs and options. Aggregate market intelligence and use it. Then make decisions about sourcing as early in the product development process as possible.

Create visibility, knowledge and connections to enable better collaboration. With access to connected, current, accurate data that is provided in context, your team will gain visibility and knowledge across the entire value chain. They'll be able to proactively predict disruptions that will affect suppliers' ability to produce parts/products on time and at cost. With an understanding of intelligent part selection and sourcing, you can also make informed make-versus-buy decisions.

These success requirements represent the cultural shift necessary to gain the advantages of a holistic approach to value chain management. Now we turn to the technological shift: how to digitally transform your value chain management and achieve reliability and resiliency.





Digitally transform A&D value chain management

To successfully transform to a holistic value chain management solution, companies must implement collaboration and intelligence functionality. At Siemens, we support this functionality through the power of the comprehensive digital twin and the unique, scalable, flexible and open Siemens Xcelerator business platform.

The Siemens Xcelerator portfolio elevates value chain management to provide a comprehensive view of your whole product for all stakeholders across its entire lifecycle. It offers integrated digital tools to facilitate well-informed decisions about every aspect of your supply chain – from decisions made early in product development through real-time decisions throughout the life of your product.

To support these informed decisions, the collaboration and intelligence capabilities of a holistic value chain management solution drive an integrated model-based approach for greater decision making flexibility and agility. Greater visibility between A&D manufacturers and their suppliers across all facets of the value chain enables proactive, early changes and adjustments. As a result, you can minimize risk, reduce the cost of late changes or delays and drive reliability and resiliency across the value chain.

Value chain collaboration and intelligence are built on the Siemens Xcelerator platform's single source of truth – a **comprehensive digital twin** that enables ongoing teamwork across processes and logistics networks. The digital twin keeps all stakeholders up-to-date with data that is curated and secured. It gives each user access to information about each aspect of every component related to their sphere of responsibility – and only that information.

Three features of holistic value chain management anchor your digital transformation to full value chain collaboration and intelligence:

- **Visibility across the value chain** improves collaboration
- **Open access to connected, in-context accurate data** drives better decisions
- **Intelligent part selection and sourcing** improves quality, predictability and resiliency

Let's look at each of these key features in detail.

KEY #1

Improve collaboration with visibility across the value chain

An integrated, model-driven approach to value chain management entails transparency and immediacy of the data that informs each stakeholder's value chain responsibilities. The comprehensive digital twin applies the integrated model-driven approach and carries with it all data related to design, requirements and supply/materials needed to build the product. It connects requirements to source selection and all deliverables throughout the value chain.

Secure data exchange ensures accurate data is available up and down the supply chain to all stakeholders. It enables consideration of supplier needs at the earliest stage of product development to influence evaluations and responses to a request for information or request for proposal (RFI/RFP).



USE CASE

Duqueine Group

The Duqueine Group specializes in composite aerospace components, ranging from airplane cabin interiors and first-class seat structures to collecting cold flux tunnels for the turbo reactors of the Airbus A380 aircraft. The company must manage designing and manufacturing composite aerostructures made from upwards of 1,500 parts. At the same time, Duqueine engineers and operators must keep up with each customer's specific configurations and requirements – which often change.

Handling these part variations and frequent changes is a high-stakes challenge for the company – one that it meets efficiently through holistic value chain management. “We know there aren't any mistakes in the data and that data in the PLM system can also be present in the ERP system,” explains Xavier Danger, Duqueine Head of Engineering. “Moreover, the system enables us to always work with the latest version of the data.”

The value chain management solution provides Duqueine with a single repository to ensure data consistency. It also enables product and manufacturing engineers to reuse existing models, which greatly accelerates their product and process development work. The holistic approach lets the Duqueine team smoothly integrate product lifecycle management (PLM) with computer-aided design (CAD) to create standards that simplify daily work.

Duqueine's digital transformation efforts so far have resulted in increased knowledge sharing and collaboration, greater design data consistency and increased productivity and efficiency with up-to-date information across operations. Importantly, the company has **reduced time-to-market by more than 50 percent.**

For more information read the [case study](#).



USE CASE

BAE Systems

The Military Air & Information (MAI) business of BAE Systems delivers and supports advanced defense and aerospace systems, focusing on combat aircraft, jet trainers, reconnaissance aircraft and unmanned aerial vehicles. In addition to design and delivery of aircraft such as the Hawk trainer, the Tornado and the Typhoon, MAI must provide configuration-driven, through-life upgrade, maintenance, repair and overhaul (MRO) services.

The business unit's "availability service" business model entails fleet availability and performance-based logistics contracts for the life of the aircraft – often spanning 50 years, and also requiring the company to constantly meet customer demands for faster response and shorter cycle times. "We needed a solution that would enable us to track everything that happens to an aircraft once it is in active service," says Dave Wood, MAI's PLM Program Technical Manager Combat Air.

As MAI implemented a holistic value chain management solution, tasks included migration from its legacy system of over one million documents and information on one million parts. Partnering with Siemens and CSC, MAI successfully transitioned not only to full implementation of the value chain management solution but also to self-sufficient support and maintenance of the new software.

Among key results from the implementation, MAI now has a **single source of product and process knowledge for its aftermarket enterprise**, managing data from many different applications. Wood notes, "It is critical that the product configuration is correct, and everything fits together. All the information relating to a single product is held in one place, including configuration management and engineering change orders."

The value chain management solution, Wood concludes, gives MAI "the ability to maintain the life history of each and every part and the ongoing relationship of BAE with the customer."

For more information read the [case study](#).

KEY #2

Drive better decisions with open access to connected, in-context accurate data

The single source of truth provided by a holistic value chain management solution links requirements to source selection and securely connects data using a flexible and open ecosystem. These capabilities enable you to exchange accurate digital data with the supply chain, including configuration management, revision history, program management, systems engineering, design, manufacturing and support data.

Connected, in-context accurate data drives continuous collaboration. When all stakeholders have access to current, accurate configuration data, they can quickly adjust to changing dynamics of the supply chain and make better decisions faster.

KEY #3

Improve quality, predictability and resiliency with intelligent part selection and sourcing

A critical objective of holistic value chain management is to enable manufacturing customers to determine the “just right” (goldilocks) decisions around design, parts and materials, including make-versus-buy decisions. A view of the supply chain as it exists enables stakeholders to achieve this objective. They can assess requirements, cost and availability early in the process.

With the holistic solution, you can establish a process to use the data by any manufacturer working with a supplier. This process helps to mitigate risk and create predictability, reliability and resiliency in part selection and sourcing.



USE CASE

Parpas Group

The Parpas Group manufactures milling and boring centers for the production of molds and dies, as well as mechanical components and large parts for the aerospace industry. Production is on a build-to-order basis in which engineers select from a portfolio of standard parts and components, which are then built to each customer’s specifications.

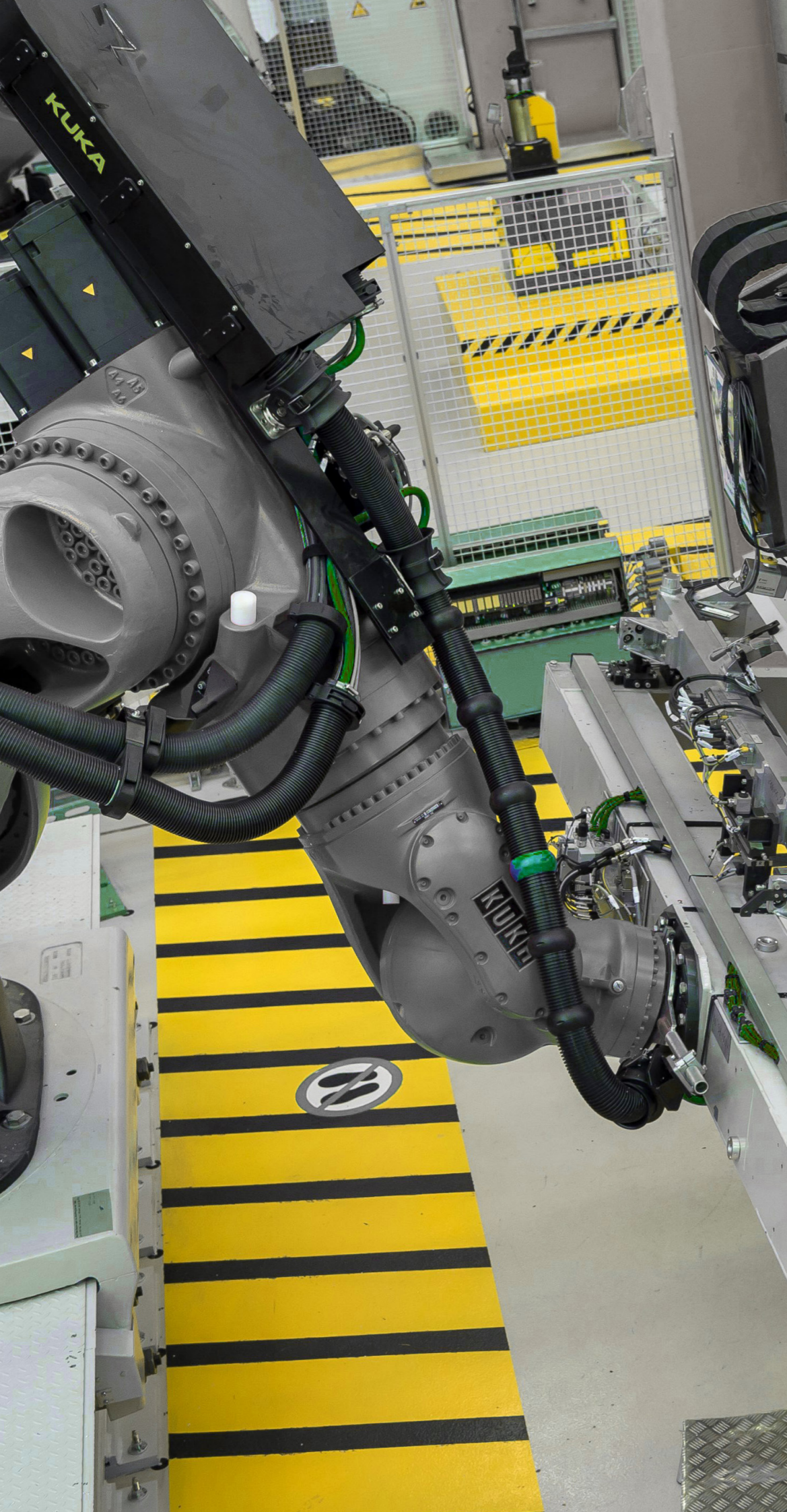
Over time, Parpas has outsourced a growing number of parts to external suppliers. Today, 70 percent of these parts come from outside sources. A holistic value chain management solution has enabled Parpas to efficiently manage its supply chain.

The solution streamlines file management for all types of documents and integrates PLM and ERP information. “We have high part and component reuse rates,” reports Michele Bacco, Parpas engineering department manager. “We can apply advanced search functions not only to single details and parts, but also to entire operating modules, which can be reused across different machines and orders.” With the holistic value chain management approach, Parpas has **significantly improved turnaround** by avoiding redesign.

Parpas employs the solution to manage preferred suppliers and give them access to the PLM. Designers at these suppliers can log in on the web and download drawings and specifications. Holistic value chain management also allows supplier personnel in purchasing, production, inventory or quality control to view files and documents.

“The solution supports sharing of information among all the actors in our product development process,” Bacco says. “Everyone appreciates the opportunity to view the information they need quickly to help them makes decisions or find answers.”

For more information read the [case study](#).



Advance digital transformation maturity through value chain collaboration and intelligence

As a vital part of A&D industry digitalization, value chain collaboration and intelligence play a critical role in advancing your company's efforts toward digital transformation maturity. Using our longstanding and deep-seated experience with digital transformation, Siemens has identified five levels of digital transformation maturity. These provide a framework on which you can assess your value chain management approach and develop a roadmap to the future.

The traditional approach to value chain management typically embodies the first level of digital transformation maturity, **configuration control** or product data management (PDM). Each supplier's information is digitally stored, with changes tracked and with ongoing access and search capabilities provided. Data sharing between suppliers at the configuration level is available but limited. Performance of cross-database functions is primarily a manual undertaking.

A holistic approach to value chain management offers data **connection** across the value chain, enabling data communication among suppliers and supporting the capabilities described in this eBook to accelerate early decisions, drive continuous collaboration and proactively mitigate risk. Requirements for human intervention begin to decrease at this level, with the work of finding, collecting, tagging and moving data still being manual activities.

The Siemens approach to value chain collaboration and intelligence is beginning to automate these manual tasks, advancing digital transformation maturity into the **automation** level. It enables continuous optimization of the value chain and early mitigation of technical risk across the supply chain, and across the entire product lifecycle from concept to service management.

The holistic approach to value chain management enables you to advance within the automation level and eventually into the final two levels of digital transformation maturity, called **generative design** and **closed-loop optimization**. These final levels will become fully available as new artificial intelligence (AI) capabilities reach commercialization.

By continuing to advance toward digital transformation maturity through a step-by-step implementation of value chain management, your company will reap key benefits: minimized risk, fewer late changes or delays and an increasingly reliable and resilient value chain. As you advance your organization's ability to adapt to changing industry dynamics by leveraging value chain collaboration and intelligence, you also lay the foundation to adopt future AI capabilities for even greater optimization.

About Siemens Digital Industries Software

Siemens Digital Industries Software helps organizations of all sizes digitally transform using software, hardware and services from the Siemens Xcelerator business platform. Siemens' software and the comprehensive digital twin enable companies to optimize their design, engineering and manufacturing processes to turn today's ideas into the sustainable products of the future. From chips to entire systems, from product to process, across all industries, Siemens Digital Industries Software – Accelerating transformation.

For more information on Siemens Digital Industries Software for A&D, visit our [website](#) or follow us on [LinkedIn](#) and [Twitter](#).

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