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Accelerate your digital transformation

Why digital transformation can help streamline proof of compliance by rethinking the product development process for complex products
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For aerospace manufacturers, certification is everything, time is money, and product development challenges continue to escalate.

A product can't pass certification until you test and verify that it meets regulatory and safety requirements.

However, in addition to already strict regulations, today you face additional demands for advancements, including but not limited to aggressive sustainability targets and autonomous aircraft options – which require more integrated systems driven by software and electronics.

It's no wonder that 75% of your product development cost is spent on certification.

To address market demands for future products, aerospace companies are increasingly replacing mechanical systems with electrical systems. They are also building in solutions that help companies monitor product performance. In addition to other product advancements, these demands increase the number of intersections of systems and the amount of data in new products.

Certification is everything

• Traditional methods for documenting every system and every part of an aircraft are inefficient, create risks, and increase potential for inaccuracies or errors.

• Increased product complexity means that you can no longer simply rely on physical testing in a linear process to mitigate design flaws.

• Using a traditional product development process is unsustainable.

• You need your workforce to focus on designing and engineering, not tracking documents.

It's cost-prohibitive to continue to solely rely on producing physical parts for testing. Plus, reconciling a single change can be tedious because of the level of complexity, and the data related to that change is not in context for certification. When you multiply one change across millions of parts and hundreds of suppliers, it is clear that traditional methods are no longer viable.

The challenges of A&D manufacturers today require a new approach

While many regulatory agencies, for example, the FAA, still rely on paper documentation, the airworthiness team needs to track requirement verification to demonstrate compliance. But they waste time sifting through numerous documents as they struggle to track product and design change data. These are just a few of the industry challenges that are driving you to commit more resources to your verification and certification plans. Others include:

Tracking product data in linear, document-driven systems

Product changes and tracking changes through the entire product lifecycle

Lack of visibility

Limited collaboration

Costly physical testing for quality
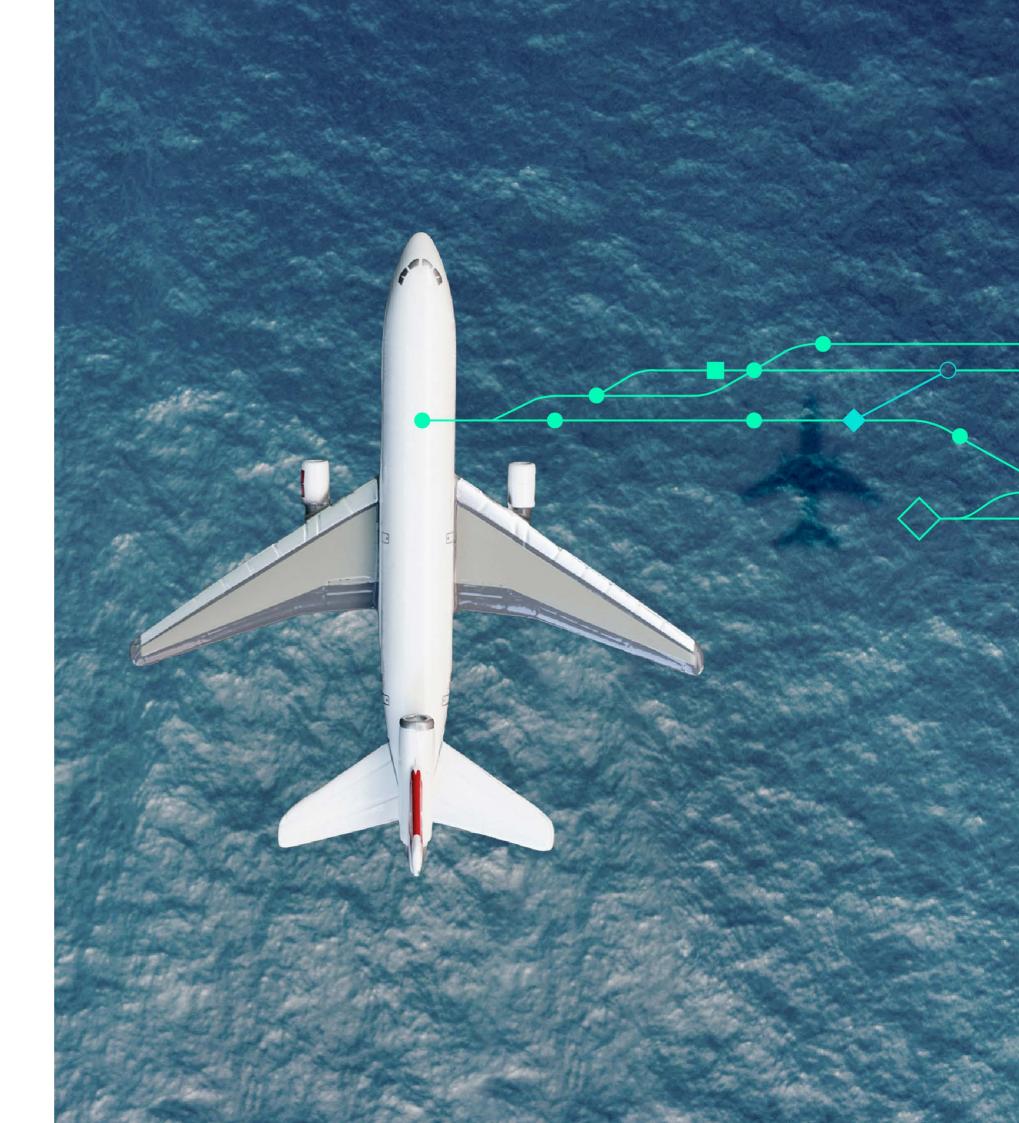
Shrinking workforce

And when proving airworthiness is solely the responsibility of very few, other teams can't see how their changes impact requirements up or downstream. This lack of visibility and collaboration can allow compliance issues to be missed, which may require significant time and effort to correct.

Without a new approach, it is inevitable that program plans will suffer delays, costs will increase, and you will run the risk of meeting your delivery targets.

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Being able to translate data from one system to the next without doing a lot of manual processes allows companies to move faster. They're freeing up their teams to be more innovative, as they are able to focus on solving problems instead of managing administrative tasks around their design and making sure that everything's in sync.

Dale Tutt – VP Industry Strategy, Siemens Digital Industries Software

Create an auditable, traceable chain of data, from concept through production

Leverage virtual and physical testing for proof of compliance

Enable concurrent virtual verification and validation

Streamline proof of compliance with solutions from Siemens

To meet certification faster, you need more efficient ways to track this level of product-, testing-, and design-change data. You need to digitally transform your approach. You can streamline your proof of compliance process when you take steps to digitally transform your product development process. Consider verification management as a key part of your digital transformation, beginning at the requirements stage.
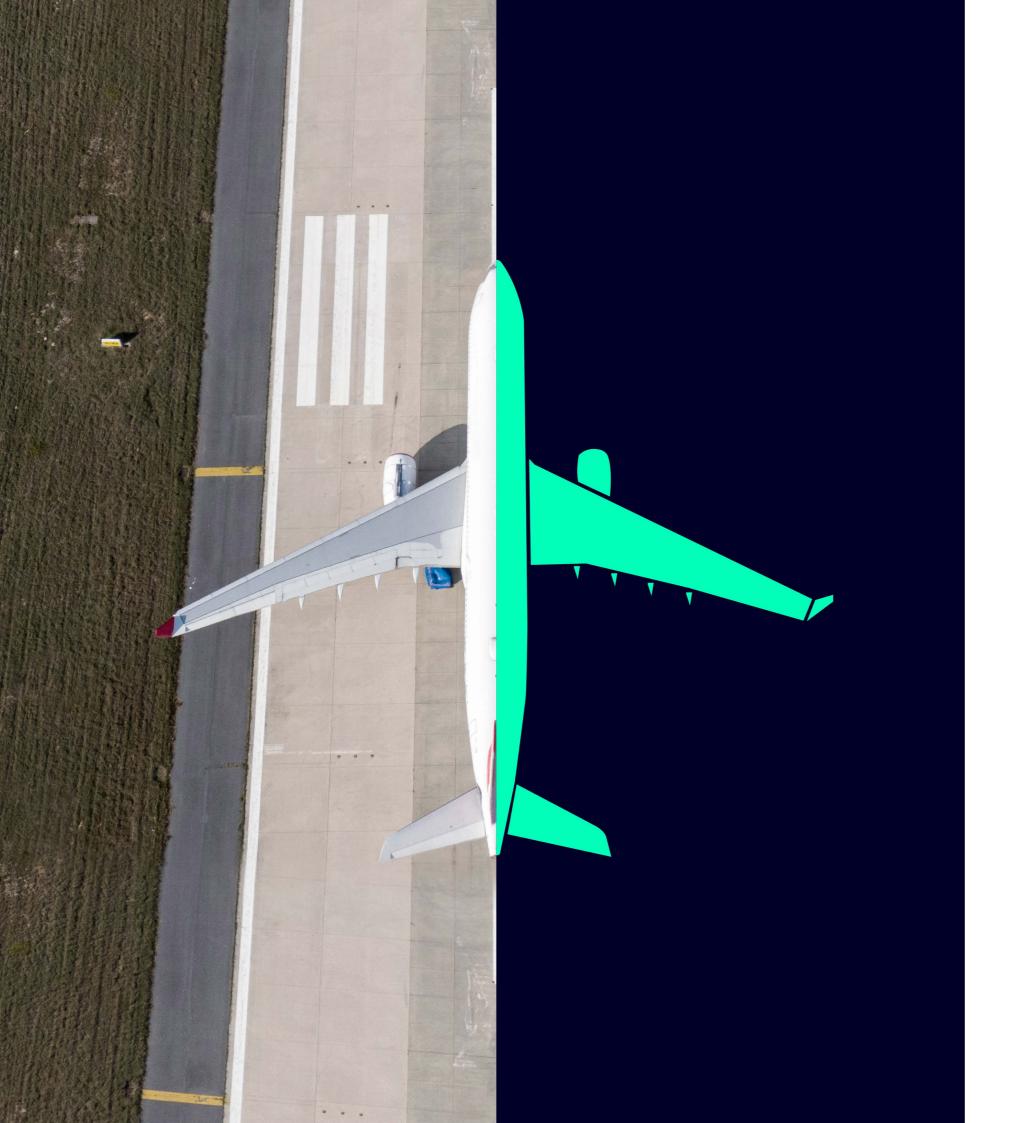
To build new, very complex products more efficiently and cost-effectively, you need to shift from a traditional, linear, document-driven process to a digital, model-based and closed-loop approach.

Start with verification management. When you begin your digital transformation journey with the digital twin and a new approach to verification management, you can begin to build verification, certification, and traceability considerations into the overall program plan.

This allows you to both plan and work on your certification documentation as you design the aircraft and its systems. You can also link the virtual product (digital twin) to the physical to help reduce reliance on physical parts for testing to prove design and reduce risk.

Streamline costs and save time while meeting performance, safety and reliability targets to certify faster.

The verification management digital thread enables you to have accurate documentation through end-to-end traceability, and a link between virtual and physical testing for proof of compliance.

How do you get there?

To adopt a fully digital, closed-loop approach, you can start by tying regulatory requirements to a digital model, a digital twin — starting at the earliest stage — to build verification and certification deliverables into daily design, analysis, and testing workflows.

Give all stakeholders access to accurate data

The digital twin gives your development teams the ability to integrate the virtual with the real. The digital twin carries the product data across the entire product lifecycle. So, you reduce risks and shorten cycle times because all stakeholders are using the right data.

Link virtual and physical testing

For proof of compliance, you can draw a link between virtual and physical testing. By keeping all elements for the proof of compliance in the context of the digital twin, you can reduce the time and costs needed to produce the engineering data for verification testing. This is true whether these elements are based on comparison or similarities with the previous programs: virtual test-based or physical test-based.

Enable virtual verification and validation

The model-based, closed-loop approach automatically enables traceability because compliance artifacts are collected in real time, instead of manually gathering and collecting data after verification and testing activities. By integrating verification testing and certification into the overall program plan, you reduce the time and costs of physical testing. At the same time, you ensure product safety and regulatory compliance.

Make certification an integral part of the overall design, production & quality processes

What you gain with solutions from Siemens

You gain a digital, model-based, closed-loop approach. You can discover integration problems early and avoid unnecessary re-testing and reduce risks. This accelerates the certification process and saves costly rework. You can reduce reliance on physical parts, gain a set of fully traceable data, create confidence that you can easily show compliance, and build trust with regulatory authorities.

Solutions from Siemens enable you have accurate documentation, thorough end-to-end traceability, and a link between virtual and physical testing for proof of compliance.

With Siemens Xcelerator as a Service, powered by AWS, you have the power of creating the world's most comprehensive digital twin – now in a more accessible, scalable and flexible form.

For more information on solutions that help deliver proof of compliance faster, visit siemens.com/plm/vm or follow us on LinkedIn and Twitter.

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