LEARNING MADE EASY

Ten Ways to Win with MBSE

for dummies®
A Wiley Brand

For many years, aerospace and defense (A&D) engineering has been on a hard-to-sustain path of ballooning development cycle times and skyrocketing costs. As with just about everything else in the world, there are pressures to deliver more innovation, deliver it faster, and deliver it at a lower cost.

The model-based systems engineering (MBSE) approach promises gains in all of those areas, as this book has outlined. Following are just some ways your organization can win by adopting MBSE, and some of the lessons to remember as you move forward in your digital journey.

Transform the Process

To be clear on what's needed — transform, transform, and transform again. Adopting the MBSE approach certainly requires bringing on the right product lifecycle management system that builds the digital thread and a wide array of integrated tools for modeling, product architecture, change management, and so forth.

But in the end, it's not just a matter of adopting new software. MBSE is not an app. It's a transformational mindset that must spread throughout the entire organization. You won't win if you don't transform.

Remain Welcoming

As stated previously, you need to think about the whole process, end-to-end,

and be open to transformation. At the same time, remain aware that many players in this program already have tools in place working for them. You need an MBSE environment that's transformative but also open and adaptable to processes that already exist or that key domains are hoping to put in place.

Redefine System Modeling

As you implement MBSE techniques and tools, a central part of the picture is system modeling. You'll use the system modeling way of thinking and as an architectural representation of your design, and that's a paradigm shift in the way you start building models. Take your architectural description and make it domain-specific — you can do that all over the design cycle.

Embrace Collaboration

Some processes take time. Just ask any maker of fine wine or whiskey — you can't just bring in more people to make faster work of fermentation. But working through an A&D program can move faster and more effectively when you have subprocesses running simultaneously in a collaborative way. The important thing is that you don't have separate engineers or supply chain partners in their silos, brewing up their own subprocesses without regard to the big picture.

Digitalized MBSE removes the silo boundaries so these collaborators can work more dynamically. They understand the various phases of development, as well as the impact of changes. And regarding the supply chain, MBSE aligns and integrates with supply chain partners, so all requirements are understood and defined, alleviating potential problems from happening in the first place. With real-time access from anywhere, MBSE users get best-in-class collaboration that is secure, scalable, and flexible.

Keeping an Eye Out

Your MBSE solution should provide continuous performance monitoring. Seeing key performance indicators (KPIs) — in real-time — is an essential component that helps everyone involved gain confidence in developing a product and ensures that all performance targets and program requirements are being met. This includes the level of maturity, the design itself, the relationships, the requirements, the verification of those requirements — just about everything that happens on both sides of the "V" diagram.

Tracing Your Way to Success

Traceability is essential, and it's one of the key benefits of your MBSE digital thread. You're using MBSE to organize the whole program — the data, activity, and all the interactions that happen along the way. Having a traceable process will pay significant dividends, and your tool choices can enable and automate traceability. For example, System Modeling Workbench (SMW) for Teamcenter, with its Arcadia method backbone, enables such traceability.

Make it Real

You can implement the best tools in the world, but you won't get anywhere if you don't have everyone on board. You need solid buy-in, but before you ever get to buy-in, you need people to understand what you're trying to do. Some have referred to MBSE as "CAD for systems engineering." It is, perhaps, an oversimplification, but it seems to resonate well and make sense.

On the other hand, many early adopters of SysML believe that SysML is MBSE. But the reality is that SysML is merely an enabler of the overarching MBSE approach. Once you begin to make these distinctions, you'll be well on your way.

Circle the Wagons

Much has been said about the "V" diagram that underscores the systems engineering process. But it's also worth thinking in terms of an "O"-shaped diagram. Not actually the letter "O," but a circle that illustrates the ongoing, back-and-forth connections among requirements engineering, system modeling, analyses, safety compliance, and managing technical content into interface, integration, and verification.

The MBSE paradigm is a continual path connecting these elements that all inform one another. That's true for systems engineering in the big picture and later in the process within the various domains, such as software, electrical, mechanical/physics, and electronics/hardware.

Tame Your Information

The biggest challenge for companies today is no longer within the engineering domain or level of modelers. The real challenge is the consolidation of all of the gigabytes of information coming in from all over into a single product architecture to view customer feedback, product requirements, and the latest from engineering, to name a few. The product architecture

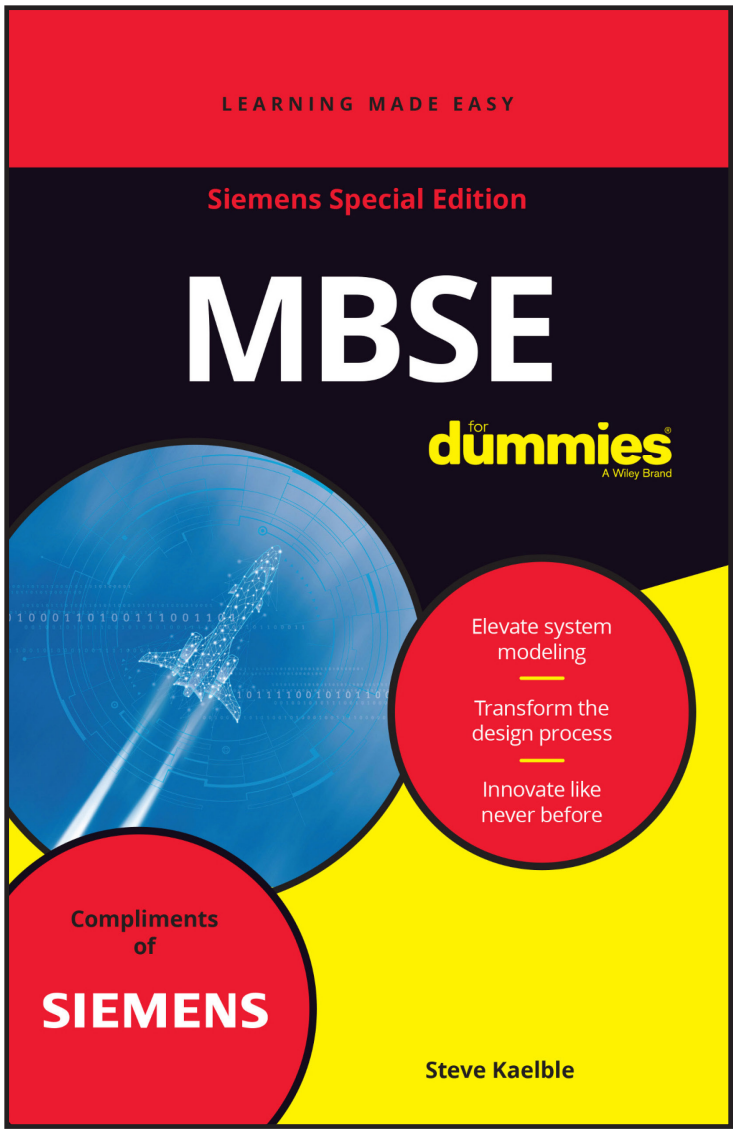
also includes areas in which companies have little means of managing the integration of electrical, electronic, and software with the functions to ensure the safety of the final product.

Get Physical

Models and simulations are remarkable things. MBSE allows you to benefit early in the process from insights that, in the past, would only have become evident much later. Those insights drive better requirements and make for a much more efficient journey.

It's sometimes easy to forget that you will have physical testing to do. That is simply a fact: The more you innovate, the more you will at some point need to test your innovations. But make no mistake, MBSE significantly reduces the need to do physical testing. Your MBSE program serves as that tight handshake between the virtual and physical worlds.

For further knowledge, download your free copy of *MBSE for Dummies* starting at www.siemens.com/mbse-for-dummies.



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