

## Aviation Week Check 6 with Accenture on June 18, 2021 The Dollars and Sense of 1s and 0s in A&D Manufacturing

### Speaker 1:

You're listening to the Check 6 Podcast, brought to you by editors across the Aviation Week Network. Listeners now have access to special subscription offers, including a preferential rate for Aviation Week and Space Technology. Go to [podcast.aviationweek.com](http://podcast.aviationweek.com) to learn more.

**Michael Bruno:** Hello, and welcome to Aviation Week's Check 6 Podcast with Accenture. I'm Michael Bruno, senior business editor. There's a lot of talk in the industry these days about designing new aircraft, new spacecraft, and new weapons systems, from a new bomber and a new jet trainer for the US Air Force, to new electrically powered vertical takeoff and landing urban air taxis, to maybe someday a new clean sheet airliner out of Airbus and Boeing.

Underlying all of this is a growing sentiment that everyone wants everyone to go faster and get these products out sooner. The reasons are obvious, of course, starting with profit, affordability, and performance. But they come against a backdrop of development timelines getting worse since the heights of the Cold War. The fact is that from commercial aerospace to the defense industrial base, the factor, the sector is haunted by long development cycles with rollouts of new aircraft being measured in decades.

Now, however, new design tools and strategies are emerging to combat the trend of prolonged development. Digital twins, model based systems engineering, and other advances are really starting to make their way into A&D programs.

Early results seem promising, but there are challenges and risks, including money and cybersecurity. Here to talk with me about it all are Craig Gottlieb, strategy and consulting lead in Accenture's aerospace and defense practice, and Joyce Kline, Accenture's digital lead in the North American A&D practice. Craig, Joyce, welcome.

**Joyce Kline:** Hello, Michael.

**Craig Gottlieb:** Hi, Michael.

**Michael Bruno:** It's great to be back with both of you again. Thanks for joining. I was at an Aviation Week Conference recently with lots of suppliers and OEMs, and digitization was a hot topic, believe it or not. Lots of talk about digital twin and MBSE and about how it's being used today and promises for tomorrow. Can we start with a baseline for our audience here? Can one of you talk about what these technologies are and what they mean?

**Joyce Kline:** Absolutely, Michael. I think grounding the audience in the definitions is an important first step, and happy to define all three.

Let's start off with the digital thread. It's a digital foundation, and it links together product data with an end to end digital process, and it spans from design to manufacturing all the way to product support. And if we take a digital thread first approach, what we're doing is providing for greater collaboration across the enterprise and with external parties such as suppliers and customers.

Now let's move on to the definition of a digital twin. It's a real time virtual representation of a potential or physical product, platform, or ecosystem that's used to model, visualize, predict, and provide feedback on properties and performance.

And then lastly, MBSE. Model based system engineering involves the movement from a waterfall based, document centric approach, to an iterative approach that enables model based agile ways of working. MBSE also links models such as ALM and PLM, and it establishes a closed loop, more collaborative engineering change process.

Now, one of the key things to consider here in A&D is that we're taking a thread first, data centric approach, versus the creation of a digital representation of the physical product, which is actually the digital thread twin methodology that's being used in other industries. But we're really taking a thread first approach here in A&D.

**Michael Bruno:** All right. So I got to ask the reporter's favorite question about, so what? So, you know, we hear all the time that we've been working with digital tools for quite a long time, computer aided design, things like that. Why are these new technologies so important? What do they mean for industry?

**Joyce Kline:** It's a great question, Michael. You know, they're important for really a number of reasons, and they span all the way at the start of the development or approval process for a new platform, all the way through to product design, and then also within operations.

So if we start with that development process, digital thread, twin, and MBSE really enable greater insight and speed from concept to program approval, which is also bid win, using simulation to reduce the engineering cycle time, increase alignment to requirements, and also increase win probability on those new programs.

If we take a look at the product side, what we're seeing are benefits from design, to manufacturing assembly, to operations, and then all the way back to design, that include improvements in areas such as quality, the ability to extend the useful life, reduce the cost of operations and, and the list goes on.

If we look at the operations side, what we're seeing are solutions that enable things like the connected factory, and with the supply chain, the ability to provide opportunities to analyze and find improvement areas, identify weak links, and also enable simulation. And again, the list goes on there as well.

One of the key things that we're thinking about in terms of the collective benefits in terms of your question, we're seeing between 20% and 40% improvement in the time to deploy and solve critical digital twin business challenges.

**Michael Bruno:** I'm impressed with that statistic, 20% to 40% improvement.

That leads me into the next question. It seems to some of us at Av Week that we see the military world really leading in some of the immediate, most tangible adoption of some of these technologies when it comes to new aircraft. I'm thinking of the Boeing T-7 Trainer and the Northrup Grumman B-21 Raider.

Obviously, a lot isn't known publicly about those programs, but the officials will tell us that they're using some of these new technologies to try to get these programs out quicker and get through the design process and learn a lot more quicker. So why is it the defense world is really leading the way here?

**Craig Gottlieb:** Thanks, Michael. And you're right that many of you at Aviation Week are thinking this, because I've got my addition right here, and I saw it when I opened it first thing this weekend, when I was flipping through, is that this seems to be a matter of interest across the team over there.

But you're absolutely right. You're spot on. Defense OEMs are early adopters, largely because of changes in DOD's acquisition and digital engineering strategy. Those have resulted in MBSE and digital twin and thread being written into program requirements. And nothing helps a business case like a customer requirement.

But that said, if you look at what DOD's objectives are in a world of near peer military competition, they're focused on speed of delivery of the war fighter, the ability to quickly respond to changing threats, and reduced operational costs. As Joyce just mentioned with that statistic, MBSE and digital twin and thread approaches support those objectives very well.

But putting those requirements aside, benefits are being realized within the businesses, too. You just mentioned the T-7. What's interesting there is it's a training system that's an example of the power of these new digital tools. The program has resulted in deploying digital thread-based engineering approach. That has cut the effort for the assembly process by the physical aircraft by 80%. But I think what's even more interesting is that by taking these digital design practices, engineers were also enabled to significantly improve first time quality while reducing software development time and verification time.

And these approaches of MBSE and digital thread also support, in the case of this, the system based approach where you not only have the physical aircraft and the improvements there, but this digital training system and services that go alongside to improve the overall business case for the program. It's a really interesting set of things that we have going on here.

**Michael Bruno:** All right. Well, let's pull on that thread for a little bit, because we've actually been talking about digital thread and, twin designing and MBSE for a few years now, but there does seem to be this kind of second-generation evolution going on. And it's spreading far beyond from just the product design offices, so what is Accenture hearing about where executives think it can be further applied?

**Joyce Kline:** Michael, in our recently published A&D tech vision, we actually had the opportunity to survey a number of executives on these very questions. And what we found were the following results, which I think are really interesting.

We found that 68% of the executives we surveyed expect their investments in intelligent digital twins to increase over the next three years. And 85% agree that digital twins are becoming essential to their organization's ability to collaborate in strategic eco- ecosystem partnerships.

But it's this last statistic that I really enjoy. And from an industry perspective, we found that 31% of A&D companies are scaling digital twins, and this is compared with 18% from other industries. It just helps to further emphasize the leadership position that the A&D industry is taking in the use of digital twins, digital threads, et cetera. I think it's pretty powerful.

The other thing that's interesting, too, is all you have to do is just listen to the earnings reports from the major A&D players, and you hear the CEOs making outward statements about digital thread, twin, and model based engineering. It's pretty impactful.

And then what we're seeing on the ground is that companies are educating their employees, and this is across the organization, all levels, actually all functions as well, in developing digital thread, digital twin, model based engineering strategies, and building their muscle in these areas. And I think that's also something, the corroborating, if you will, what's happening from a C suite perspective and then on the ground as well.

**Michael Bruno:** I hear those comments, too, from the OEMs on the earnings reports and at the conferences. You increasingly hear them very openly talk about how important it is and the investments they're making on it. So very exciting comments we're hearing from the top, the OEMs and the tier ones. But what about in the supply chain? They've got to get involved in this, right, because two thirds of the spend of any given aircraft program is in the supply chain. So what's in it for the suppliers?

**Craig Gottlieb:** You hit on the exact question there. I think every supplier that's looking at this is saying, "Well, what's in it for me?" Right? And I think the important thing here is that we need to start thinking about, and I think more importantly, the OEMs need to start thinking about, how does a supplier's data create value for the OEMs as well as the overall supply chain? And then what's it going to take for these suppliers to plug into the extended digital thread and, and data foundation?

I think what's really interesting here is that fundamentally, this notion of a digital thread and sharing data across the thread forces everybody to think about value more in terms of an ecosystem, and how do I create value across all of the players in that ecosystem, versus just the value for each player in isolation. It's really this ability to think about value differently is going to be super important to extend the thread out into the supply base.

Now more fundamentally getting down to brass tacks, yes, there are cost savings through lower cost of development, things like engineering cycle time, the time that it takes to chase down quality issues in manufacturing, the cost of track and trace throughout the supply chain and, and many other examples as well.

And also, there's potentially a revenue element here as well. Right? We've seen improvements potentially in time to cash through faster cycle time as well as potentially improved payment terms from OEMs and customers as, as things progress.

But getting back to this notion of where's the value and what's in it for me, and articulating it well, is going to be critical in order to get the adoption that we need for digital twin and thread.

**Michael Bruno:** And I have to imagine suppliers also, it's just going to be important to get on the programs in the future. Right? You're going to need to have these technologies to show your OEM customer that you're playing the game along with them.

A lot of great technologies here. Adoption is growing. We're seeing them spread out across the life cycle and, and the product cycle. And that's all exciting, but there are a lot of challenges. There are some risks here, too. We're going to go to that next. But first, let's hear a word from our sponsor.

#### **Sponsor break:**

With more than 30 years of experience in the aerospace and defense industry, Accenture helps companies harness digital technologies to improve operational performance, enable competitive differentiation, and drive profitable growth. To learn more, visit [accenture.com/aero](https://www.accenture.com/aero).

**Michael Bruno:** We're back with Craig Gottlieb and Joyce Kline of Accenture, talking about digital twinning, MBSE, and the digital thread. We've heard about the promise and the benefits. Now, how about some challenges and risks?

One thing I'm hearing more about is the need to have good data, good, clean data. I recently came across a pitch from a company that says it'll help you clean your data, and I thought, "Wow. It's that big of an issue that somebody's got a business pitch out there for it." So Joyce, Craig, good, clean data, why so important?

**Joyce Kline:** Michael, it's so interesting. We've talked in the past about many data related topics, and data cleansing and data quality are certainly top of mind for many organizations.

The real challenge here is how do you approach this, because it's really not about cleaning all of the data. I think that would just be a Herculean task and one that I'm not sure would actually provide all the value.

In fact, what we recommend is defining and investing in the 10% to 20% of the data elements that are critical. We call these the critical data elements, and in fact, these CDEs drive about 90% of the business value. And once these critical data elements have been identified, it's important to maintain them from an ongoing perspective so that you have that ongoing data quality.

The other thing that needs to be part of the discussion here is the standing up, if you will, of what we'll call a data quality factory, because that's one way to actually build in a process for continuous monitoring of those critical data elements and maintaining that criticality of that important piece of data.

**Michael Bruno:** All right. One of the underlying enabling technologies that we haven't really touched on yet, but we talk about all this data and all this data flying all over the place, that's, that implements the cloud, right? I mean, the cloud is becoming so much more important in everything we do. Cloud and cyber security are also becoming important in everything we do.

Even breaches of commercial companies are getting identified as national security threats, and we already know that adversary nations have stolen IP across the Western A&D landscape, commercial and defense. Should companies expect to have to raise their standard of cyber security in a digital twin world?

**Craig Gottlieb:** Michael, I think the, the short answer is yes, but not just because of digital twin and thread. As you mentioned, the threat is growing across the board, and so companies should absolutely be looking to raise their cyber security standards.

I think what's interesting is as Joyce was talking about in her previous comments, it really does start with an understanding of the data. Right? Organizations that have a clear handle on data classification and where their critical data lie can make more informed decisions around the risks associated with greater data sharing and also shape their data governance, data security, policies, and procedures accordingly.

Now where it starts to get interesting with things like cloud and digital thread and digital twin is that these new technologies may actually provide a unique opportunity to increase the security of how we collaborate through the use of more modern coding practices, called zero trust security approaches, and the integration of more security technology be it encryption, be it block chains, be it what have you, into how they store and share their data.

But ultimately, as we look forward we're going to need to take a really careful, strategic, and stratified view to building digital threads in a secure way. If you look out at the DOD, where they're going with things like joint all-domain, command and control, other initiatives like that that are predicated upon data sharing, we're going to need to figure this out in a way that helps us both achieve the outcomes that we're looking for but be secure at the same time.

**Michael Bruno:** Okay. But there's a four-letter word here that we haven't really talked much about yet, and that's cost. Somebody's got to pay for this. Right?

I was at a recent conference. A lower tier supplier gets up. He says, "Hey, I'm with you on trying to increase cyber security standards, but I'm just a little guy and I don't make the margins that your big tier ones and OEMs do. I need some help paying for this."

This all costs money for this new cyber security standard. Who's going to pay? How does the whole supply chain get help in implementing what's required?

**Craig Gottlieb:** Yeah. Absolutely. You can pick many four-letter words. I think cost is probably the easiest one that can be allowed to be said on a podcast. But there's absolutely an investment required. No doubt about it.

When it comes to paying for that investment, there are three potential scenarios. First, if the way procurement and contracting are done today continue, you'll probably start to see some of that compliance find its way into pricing, which could be interesting for OEMs as they start to negotiate new contracts.

Second, there's obviously the opportunity, particularly as you look at things like infrastructure funding, et cetera, of government providing some sort of sliding scale of compliance by tier or funding that through various different types of initiatives that they have out there.

And then lastly, what's interesting and perhaps most intriguing but, I think needs to be further developed is building on this notion of ecosystem value, is the emergence of self-regulated and potentially self-funding ecosystems in which tier ones, OEMs, provide incentives like better payment terms or even direct cash to suppliers, who go along and, and invest in these kinds of new technologies and new policies and procedures. But to be sure, there's work to be done.

**Michael Bruno:** All right. Well, we're getting to the end of the podcast, but, I always want to come back and hit one of the favorite topics that we talk about here in Check 6 with Accenture and that's workforce, right, because all of this sort of depends on workforce and the humans behind the technology.

We've talked for years about the changing nature of an aerospace employee. Companies increasingly needed digitally literate employees and workers, all the way onto the factory floor, long before people were really talking about digital thread and twin models and MBSE.

So recently, Accenture's tech vision report outlines what I think is a mind-blowing vision of in a post pandemic world, you don't just have this need for digital literacy. You've got employees who could be working from anywhere, on any system. And basically, if you thought that it was tough to have literate, digitally literate employees before, there's an even bigger risk now, it seems to me, of a digital divide. What do you two think about that?

**Joyce Kline:** Yeah, Michael. It's so interesting. One of the most important elements that we're seeing is this need to break down silos within the organization and create a situation where all employees, regardless of where they are, are enabled with the right data and tools to do their job.

And really, what this all starts with is this solid data foundation, and it's enabled by the things that Craig was talking about, cloud-based solutions with the appropriate amount of security that allow for ease of access and citizen development.

And we're talking about here is a scaled approach where we're moving away from each and every business unit creating their own solutions, to really the intentional methodology with the enterprise fully in mind, um, so that we can scale that enterprise.

You mentioned the tech vision. One of the things that the tech vision survey found is that 87% of executives agree their organization must train their people to think like technologists, to use and customize technology solutions at the individual level, but without highly technical skills. And I think this transformation is really going to hopefully open up and really enable employees at all levels of the organization. Really looking forward to seeing some of the changes that'll be enabled as a result.

**Michael Bruno:** A lot to chew on there, and we could have a whole other podcast to talk about it, and maybe we will sometime. But for now, that's a wrap for this edition of Check 6 with Accenture. Craig, Joyce, thank you for joining me.

**Joyce Kline:** Thank you, Michael.

**Craig Gottlieb:** Thanks for having us.

**Michael Bruno:** Join us at Aviation Week again soon for another edition of Check 6 which is available for download on iTunes, Google Play, Spotify, and Stitcher. Have a great rest of your day.

Copyright © 2021 Accenture All rights reserved.  
Accenture, its logo, and High Performance Delivered are trademarks of Accenture