THE NEXT WORLD AFTER THIS: AEROSPACE AND DEFENSE ENTERS THE METAVERSE

AUDIO TRANSCRIPT

Michael Bruno: Hello, and welcome to Aviation Week's Check 6 Podcast with Accenture. I'm Michael Bruno, senior business editor at Aviation Week and your host for this edition of our regular podcast on major issues facing the global aerospace and defense sector. I'm joined by two Accenture aerospace and defense leaders, managing director, Chris Tridico and principal director, Jeff Wheless at Accenture Research. Chris, Jeff, it's great to have the band back together again. Thanks for joining me.

Chris Tridico: Hi, Michael. Good to be here.

Jeff Wheless: Hi, Michael. Great to be here as well.

Michael Bruno: So near Los Angeles Airport, there's a new company that is emerging that promises to be the next evolution in aerospace and defense manufacturing. Many startups make such assertions, but what distinguishes this company called Hadrian Automation is that the company is not selling a new aircraft or a spacecraft or a part that pushes the envelope of flight, but rather how the parts are made.

Using proprietary computer-aided programs and manufacturing execution system software to make components faster and cheaper, this venture capital backed company says it's on its way to proving a tenfold improvement in delivery time and a 40% cut in costs. Hadrian's claims may sound like pie in the sky to some A&D veterans. Many more outside industry dismiss such VC infused insertions as the next dot-com bubble. But Hadrian has good company in making technology changes in the business of flight.

Boeing just announced historic deals with each of the three leading cloud based computing giants, Amazon, Google, and Microsoft to move everything from its back office work to aircraft design all into the digital realm. Meanwhile, Honeywell International, a stall work tier one supplier of APUs, parts and engines has spun off one of the world's largest quantum computing companies. These developments go beyond industry 4.0 improvements for how to run an aerospace factory or a large defense prime.

Observers say aerospace, like almost every other sector, is bound on a one-way flight to the metaverse, a not so future state that mixes the digital world with the physical world. The paradigm shift could change the very nature of aerospace business itself, but it does present challenges and many, many unanswered questions. Chris, Jeff, you're here to talk about it with me and guide us through a lot of this. Chris, I'd start with you. What is the metaverse and specifically, how do you see A&D companies entering in it and being changed by it?

Chris Tridico: Thanks, Michael. That's a good question. Let me start off by saying that we're an industry that has always been synonymous with innovation. And, you know, while that's been studied throughout our history, aerospace and defense is currently experiencing a remarkable acceleration in that innovation. You point out revolutionary new approaches to manufacturing and infrastructure, but I think everyone will agree that these are just a few examples of the new technologies and approaches that come from both within our industry and from other industries.

The term metaverse that you asked about is often equated with immersive technology, VR and- and the like. But that's really just one aspect of it. Metaverse refers to an integrated mesh of technologies and their relationship to the physical world. Each of these technologies can provide tremendous value on its own and when linked together, their value actually multiplies. All of this points to a next generation of aerospace and defense, one in which the laws of physics still apply but our ability to understand and approach the limits of those laws is greatly enhanced.

Some of this we are already doing, whether it be augmented reality on the assembly floor or engine digital twins that span from design all the way through decades of service. To take full advantage of this, however, will require a fundamental rethink of how work gets done, how aerospace companies design, make and distribute products and services and how they interact with their customers and enable their workforce. The next several years are critical. Companies need to lay the foundation for this today, identifying new growth pathways and investments and incorporate this into their overall strategies.

Michael Bruno: So, Jeff, I want to ask you how real is this in the minds of aerospace executives? Because I know Accenture does a lot of polling and fans of Check 6 with Accenture know that you all regularly have survey results. So what are executives saying about this?

Jeff Wheless: Well, Michael they're saying it's very much real and aerospace and defense is one of those industries that thinks in decades. And when we interviewed industry executives for this year's report, they resoundingly told us that technology is front and center in their vision. 100% agreed that emerging technologies are enabling their organization to have a broader and more ambitious vision. And as Chris pointed out, the next couple of years will be an inflection point for them to lay that groundwork and figure out how they can harness what will soon be mainstream technologies, such as artificial intelligence, quantum computing, and virtual experiences. And, interestingly enough, of the 54% of executives who believe that the metaverse will have a breakthrough or transformational impact on their organization, a hundred percent of them believed it would be within the next four years. So time is of the essence in terms of setting up how you will be adapting and evolving these technologies.

Michael Bruno: So inflection points, paradigm shifts. But Chris, you know, it sounds like a lot of leaders see a turning point coming, but I thought we were using all these technologies already. I mean, artificial intelligence, AR, VR, these are not necessarily new terms. What is it about the middle of this decade that makes it such a critical point?

Chris Tridico: It's the convergence, Michael. It's the convergence of multiple technologies, things like a couple more that I'll add to your list are 5G, the fact that we're starting to embed microprocessors everywhere, augmented reality, smart materials, layering AI on top of that, all these things are coming together to reshape our physical world in increasingly sophisticated ways. And this is unlocking unprecedented abilities to control, automate and personalize. It will make new physical experiences and business models possible.

We're starting to see this as space that is being commercialized and new modes of air transport emerge. 93% of aerospace and defense executives believe this reshaping of the physical environment will emerge as a competitive differentiator for them. For example, aerospace and defense companies encounter this potential in a wide range of augmented reality use cases from enabling faster design cycles, redesigning the shop floor virtually before they actually move anything around on the floor, adoption by shop floor and assembly workers to improve their jobs and quality control and configuring hyper personalized interactive customer demos for new equipment. In fact, 84% of aerospace and defense executives agree that AR, augmented reality will disrupt our industry by mid-decade. This compares to a much lower 67% across other industries. Those are survey results, Michael. We have an opportunity to discuss this with industry leaders regularly, and they seem to be bullish on taking full advantage of this disruption. As I mentioned before, AR and VR are just part of the metaverse disruption, one of the many interface options, if you will.

The metaverse encompasses so many other things. For example, it even enables new materials that allow for integrated processing, ultralight component weights and amazing energy densities. These are all fueling new products and platforms and prompting us to rethink how we're commercializing the sky. All of these are interconnected back to the metaverse.

Michael Bruno: Well, you're making me feel a little bit better just as a parent. And I say that as I recently took my kids to the Smithsonian FUTURES Exhibit here in Downtown Washington, and we stood in a very long line to play with the virtual reality headsets. And while I questioned my sanity for standing in that long line, I did think, "Oh my gosh, my kids might actually use this technology one day." So Jeff, what is it about AR that makes it so appealing to business?

Jeff Wheless: Michael, that's a great observation. I was talking last week to a turbine component executive, and he told me that if he had a son or daughter under the age of 20, he'd be telling him to go for the type of job that integrates the virtual with the physical, and saw that as the future over the next 10 years. And I believe that we're going to see an explosion in the way that we can use the virtual world to envision, make things tangible before we build them or use them.

And we're already seeing this today, digital twins, flight simulators, over the shoulder, remote tech support. Those are all great examples of using technology to not only drive new ideas and skills but do so cost effectively and use less resources in the process of doing that. And safety and certification are hugely expensive and rightly so, in our industry. So exploring things in the virtual world lets us approach from different perspectives before we commit to building the first prototypes or putting them into production.

Michael Bruno: All right, I'd like to go deeper into many of those technologies and the challenges and the changes possible. But first before that, let's hear a word from our sponsor.

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Michael Bruno: Okay, we're back with Chris Tridico and Jeff Wheless from Accenture talking about the brave new metaverse world for aerospace and defense. Chris, I was looking over Accenture's Aerospace and Defense Technology Vision 2022 report, out later this month, and I was enticed by the new machines and the new business possibilities that were discussed in the report. We know Boeing has promised to digitally overhaul its designs and how it makes aircraft. Looking ahead to the end of the decade, how transformational could the metaverse be for the whole sector?

Chris Tridico: Well, it's for sure not just a virtual play. We're on the precipice of resetting the boundaries of aerospace as we know it and able to literally compute what was previously impossible. This outer limit of what is computationally possible is being disrupted by a new class of machines and processing architectures. Quantum biologically inspired architectures and high-performance computation are each allowing companies to tackle huge challenges, such as new materials modeling complex systems in real time, and even addressing the ongoing talent shortages.
For example, Honeywell, as you mentioned recently launched the largest quantum computing company in the world. A new venture with Cambridge Quantum called Quantinuum. Quantum computing could evolve into a full stack technology that would enable Honeywell, and while they're enabling their internal capabilities, provide new capabilities to their products and to their customers.

Michael Bruno: So Jeff, the Accenture poll further outlines how executives expect this to change more than what they sell. What are the survey results saying?

Jeff Wheless: Well, we're for sure in the strategy stage as executives wrap their minds around what high performance computing may mean, whether it's computational power, new computing methods or more powerful artificial intelligence engines. 79% of executives told us that they expect quantum computing to transform their organization and that virtually all of them, 99% said that this next generation of computing is critical for their long-term success. And like in other areas, our industry tends to be more bullish on these types of things. In other industries, it was only nine out of ten that took that long term view. So I think that really reflects our collective appetite for enabling new and novel advanced materials. We're seeking to deal with the inherent complexity that our industry presents, and that advanced computing may solve.

Michael Bruno: So I'm hearing a lot of promises, definitely some opportunities here, but gentlemen, there are definitely challenges as well. I mean, for one thing, the real world has a lot of trust issues with the digital world. We live in this era of deep fake videos and phishing scams, and there was already a growing concern about counterfeit parts long before we were talking about YouTube. So Chris, let's be honest, artificial intelligence freaks out a lot of people.

Chris Tridico: Michael you're keying on a really important point here. This is a real and looming issue in a lot of paradigms, aerospace and defense being just one of them. People are coming face to face with bad actors using some of this new technology from deep fakes to bots and more, and it's igniting a growing concern that may turn into the biggest hurdle for A&D companies looking to grow their use of AI.

Like it or not, they've been thrust into the forefront of a world questioning what's real, what isn't and if the line between the two really matters. There's a really interesting example that I'd put on the table here just for folks to consider, and that is Airbus did a partnership with synthetic data provider OneView. They conducted a pilot project where they tested the use of synthetic data for the machine learning analysis of satellite imagery.

That's when we take machine analysis, apply it to satellite images to see trends or potentially aberrations in the data, and identify potential issues. What they did in order to train this AI engine is worked with three different training data sets. One was just with real images. One was just with synthetically generated images, and one had a combination of the two and it was actually 95% synthetic and 5% real.

The results showed that the training was actually most effective with the mixed data set.

In fact, it performed 20% better than the data set comprised of just real images. Synthetic realness can push AI to new heights. But using these technologies forces companies to face questions about what's real, what's not and when the difference matters, especially considering that bad actors are using the same technology to create deep fakes and disinformation that undermines people's trust. The answers to these questions could be a strategic advantage or a company's worst nightmare in the terms of damage to their reputation.

Michael Bruno: And I will say that we know that trust is a key element of the aerospace sector in the aerospace industry, and it is very much proud of the amount of trust that it's built over the years, and it should be. But, you know, I think there's one more challenge we need to hit on, which is just the sheer daunting size of the change ahead. I've long talked with your colleague, Accenture Global A&D lead John Schmidt about how companies go about it. So how does a director at tier two supplier, think about all of this AR artificial intelligence, how to adapt it. What's the first step?

Chris Tridico: Michael, that's a great question. The thing is that we've already started this change. We're in the middle of it. So a lot of these first steps have been taken, but in some cases are being taken piecemeal. We work with a lot of companies every day on the challenges that are being faced when using this emerging metaverse continuum. In doing this, we recommend a three-point approach to benefit from the metaverse and related digital technologies.

The first thing is to set the strategy to identify how metaverse capabilities can enhance and create entirely new products and services unlocking both value and growth. This includes not just the end state vision, but defining a roadmap, partners and solutions required to get there safely and securely.

The second step is to shape a vision to drive metaverse strategies and operating models and learn from relevant use cases that are already out there.

And then the third step is to use 3D spaces and digital twins and the relationship to the real world to engage customers, employees, and organizations and develop new ways of designing, building, and supporting products and business operations. This is the heart of the metaverse. We do believe that this is one of those multifaceted mega trends that companies need to fully embrace, or they risk being regulated to the sidelines. Again, it's not just virtual reality, but how we innovate, operate and commercialize in both existing and emerging markets.

Michael Bruno: Well, I know we're going to be talking about this for a good long time, but unfortunately that's all the time we have today. Chris, Jeff, thank you very much for joining me. It's always educational.

Chris Tridico: Thank you very much, Michael. It was definitely a pleasure.

Jeff Wheless: Thank you, Michael. It's been great talking with you today.

Michael Bruno: Join us again next week for another episode of Aviation Week's Check 6 Podcast and be sure to look out for Accenture's Aerospace and Defense Technology Vision 2022 report this month. I'm Michael Bruno, goodbye for now. Stay safe and have a great rest of your day.