

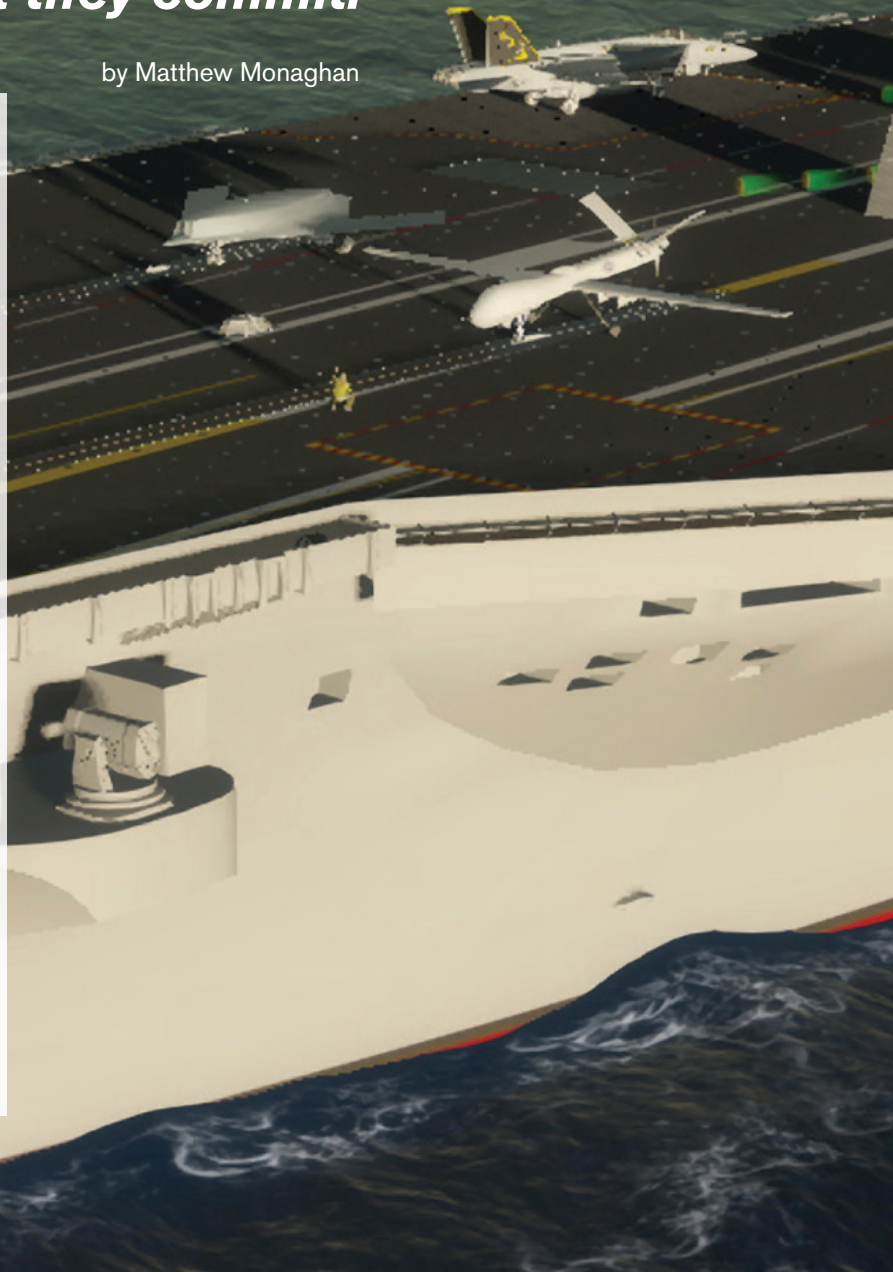
Ensuring on-time delivery

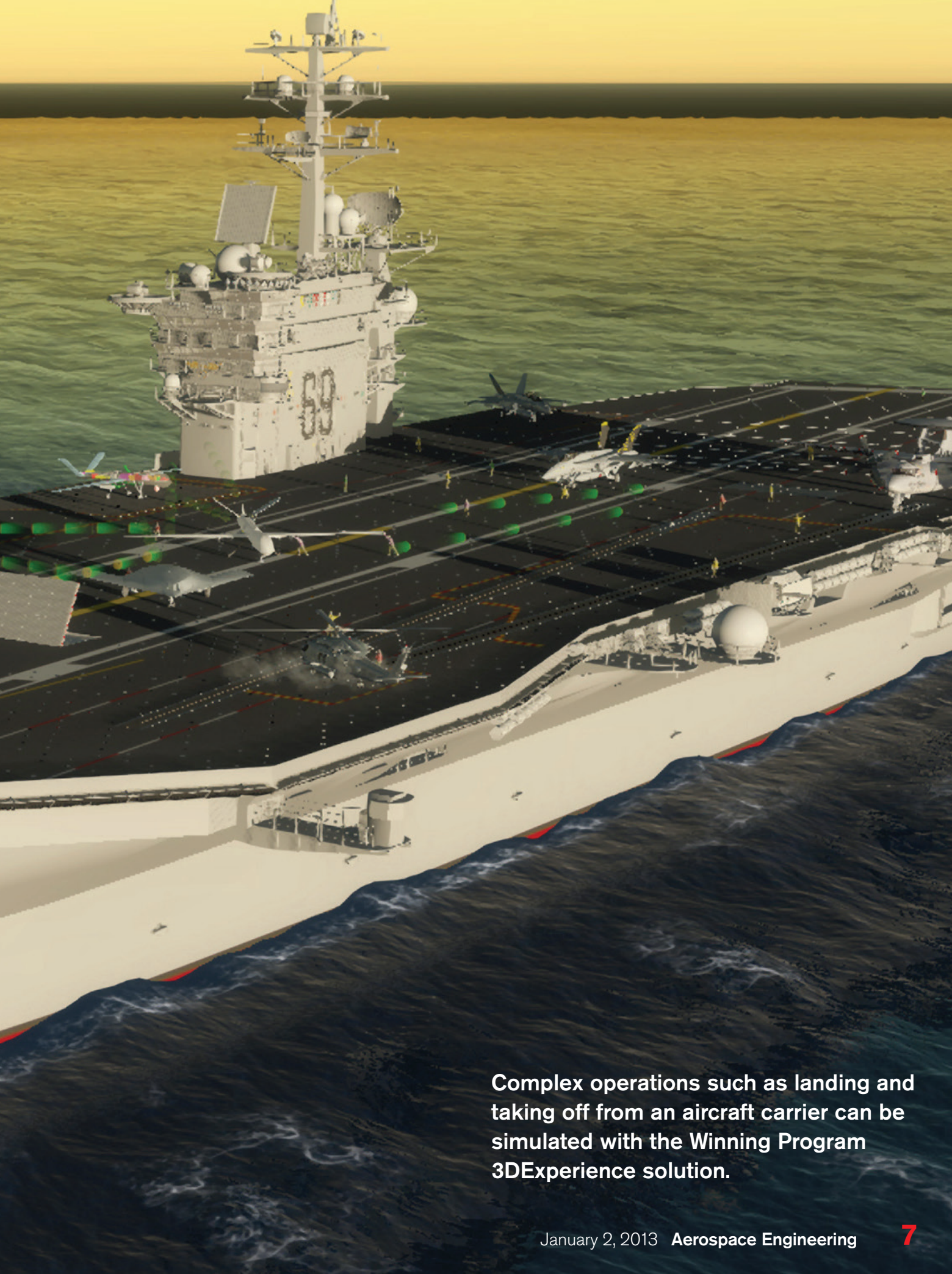
Any delay in terms of schedule or not meeting the specifications or budget can have a huge impact on the viability of a program as well as the companies involved. New software demonstrates companies can actually deliver on what they commit.

by Matthew Monaghan

The aerospace industry is facing numerous challenges moving forward, most notably increasingly complex and competitive programs with competitors from different regions of the world, and the growing shortfall in terms of the number of skilled professionals working in the industry, with as much as 40% of the workforce becoming eligible for retirement within the next three years.

“We looked at these and said, how can we impact positively these challenges?” said Michel Tellier, Vice





Complex operations such as landing and taking off from an aircraft carrier can be simulated with the Winning Program 3DExperience solution.

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Michel Tellier (left), Vice President, Industry Solutions, Aerospace and Defense, Dassault Systèmes, and Brian Christensen, Solution Experience Leader for Winning Program, at the 3DExperience Forum on Nov. 6 in Orlando, FL. (Matthew Monaghan)

President, Industry Solutions, Aerospace and Defense, **Dassault Systèmes** (DS), at the company's recent 3DExperience Forum in Orlando, FL. "The area where we have the greatest opportunity to impact these was actually in the early stages of the program—conceptual

design, advanced design, preliminary design—where you make the promise, decide on the technologies, decide on your partners, where fundamentally you stipulate what you're going to do. This is an area that's been historically underserved."

According to a 2011 **Roland Berger** study, 70% of cost decisions made during a program's concept and preliminary design phase impact 80% of the total life cycle cost. Many of these decisions have historically fallen on the shoulders of a select group of experts within an organization who relied on their knowledge and years of experience. While effective overall, this approach was not institutionalized and suffered in terms of collaboration among various departments.

"Fundamentally, the shift that's happening demographically within the industry is important because now is the time to urgently capture that knowledge and experience and furthermore boost the ability of these teams to collaborate," Tellier said in an interview with *Aerospace Engineering*.

"We have the technology in the V6 Experience platform to do systems-based design," Tellier said. "We have the technology through our nonlinear solvers and our optimizers to generate and produce massive amounts of iterations automatically. We have the technology to be able to take a functionally architected product and run it through use cases or flight scenarios or flight envelopes and understand what its behavior is going to be. We have the capability so that as you're planning your program, you're not just writing it down on a sheet of paper, you're

implementing it into the same system so that every decision you make you can see what impact that decision is going to have on your schedule, cost, resources, and skills downstream.”

This capability has been dubbed “Winning Program,” the first DS “industry solution experience,” which enables aerospace and defense companies to configure the right concept for their customers and recognize from the earliest stages of the program that it can be delivered on budget and on time.

“We’re providing a platform that allows you to permit your architects to design the concept in an interrelated collaborative platform that brings those concepts together, so that the person working one system and the person working another system are all defining in the same space—an expert platform for these experts,” Tellier said. “That platform can then be exercised in terms of all the different flight scenarios, use cases, operational conditions, and circumstances



The governance and collaboration proposal development feature of Winning Program ensures efficient and repeatable processes across dispersed teams and full visibility of the offer or proposal.

that you can do in the virtual world that you can’t do in the real world. So you know whether or not your design decisions are good. You can execute massive amounts of trade studies, massive amounts of iterations, and optimize your design.”

Know your role

In today’s competitive aerospace market, companies must have efficient processes to develop proposed system configurations that can be delivered on time, responsive to the

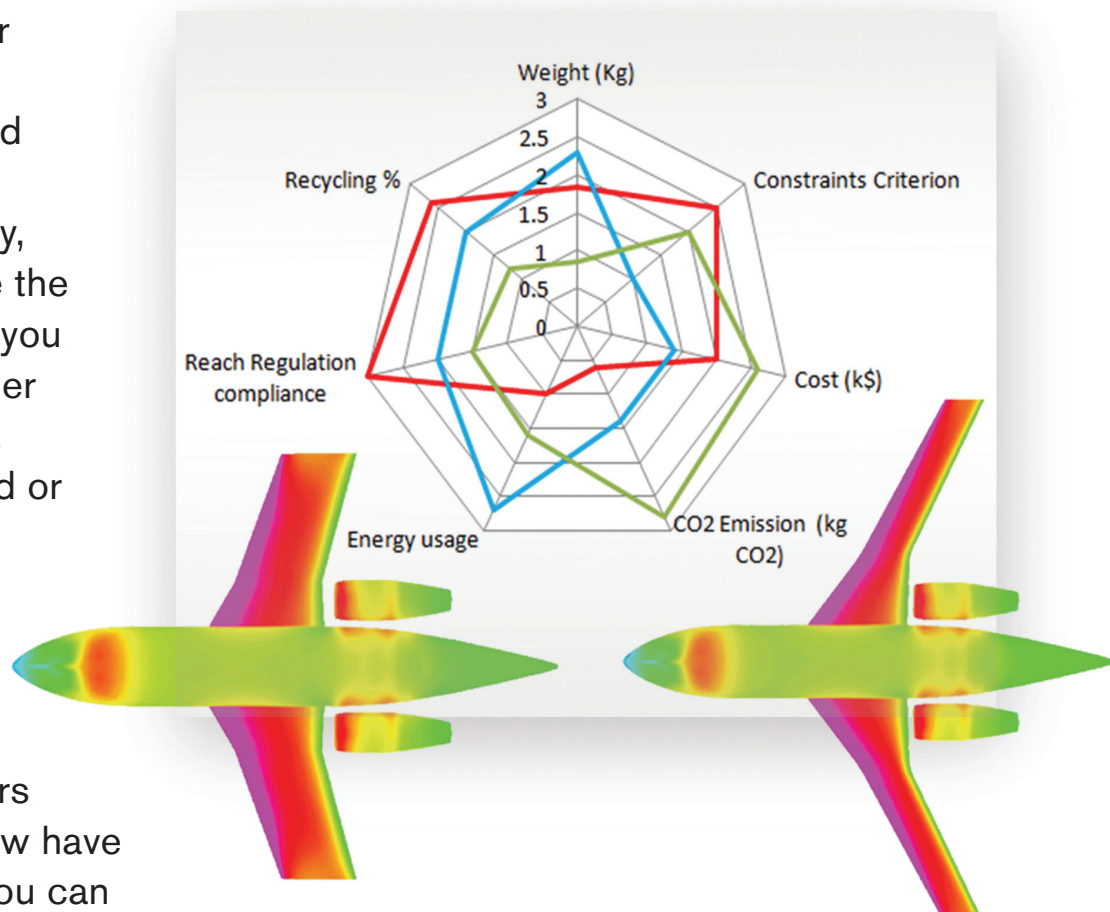
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requirements of the business or request for proposal (RFP), technically feasible, and competitively priced.

“At the end of the day, this is where you make the promise; this is where you either win or lose,” Tellier said. “For any supplier, they get down selected or not. Their lifeblood is winning these programs. Winning today is about providing a promise or proposal that delivers the most value. You now have to provide proof that you can actually deliver on what you commit.”

With the Winning Program 3DExperience solution, users have access to full-program data, enhanced trade studies management, and the ability to define and manage proposed system configurations. Full analysis history can also be reused for future studies, and all program and proposal data can later be accessed.

Winning Program's component management



The System Trade Studies solution provides the ability to view trade-offs of various designs to decide on an optimal systems architecture that includes proposed technologies.

platform manages the bidding process, organizes all requirements and constraints internally and externally, coordinates all of the work, and provides a communication platform with the customer.

“What we’re looking to do is create an environment where everyone knows what they

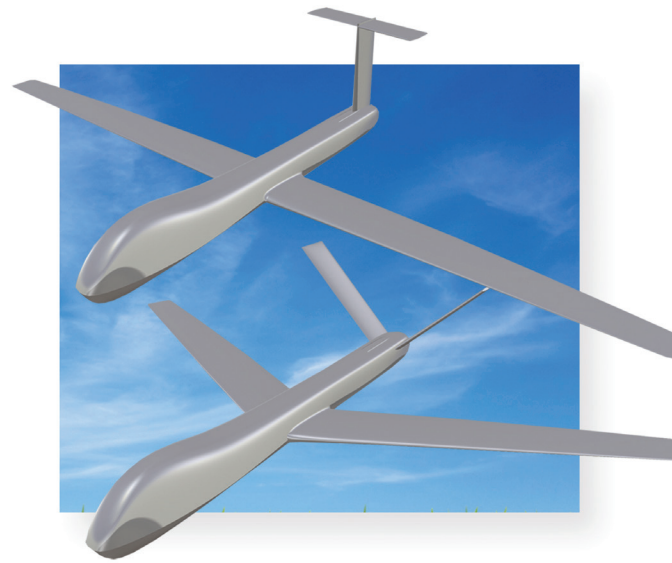
need to do, when they need to do it, and what are their dependencies and what are the deliveries that they need to create,” said Brian Christensen, Solution Experience Leader for Winning Program. “We use a task-management system where we assign the tasks for everyone to do, therefore they know what they’re expected to do. This has a very valuable input into this process because many of these people are moving in and out of jobs, retiring, so it’s very important to have a controlled environment to know what needs to be done, when it needs to be done.”

As a result of this approach, problems can be pinpointed at any point in the development cycle and the root cause can be identified.

Carrier complexity

For any team, it is important for everyone to understand what is being done and the decisions being made. With that in mind, Winning Program provides the ability to model the entire systems infrastructure, including the requirements and functional, logical, and physical architectures.

“It’s no longer the state of the art to have a digital mockup of what you’re developing, but it’s really to have a functional digital mockup,” Tellier said. “We add behavior. It’s the ability to understand how all the different systems work together, how they behave together. With this capability, what we’re doing is throwing the entire flight envelope and operational envelope



Within the Configuration Definition phase, Winning Program manages the generation of the best concept architecture to meet customer and business requirements.

in terms of test scenarios at this behavioral mockup, and that allows us to drive a massive amount of maturity into the design very early on.”

This ability to simulate multiple aspects provides the ability to simulate complex operations. For example, a virtual/physical model of an advanced design can be run against all of the flight conditions for landing and taking off from an aircraft carrier.

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All of the program shifts for the personnel on an aircraft carrier can be implemented into the model.

“What we were looking at was an integrated or competing set of requirements,” Christensen said. “We used a system model and simulated what it would be like to take off from an aircraft carrier. That generated our load models or the forces that we would have to experience. We then directly fed that into our analysis model, our FEA model, to see what stresses are to be experienced on the landing gear in those conditions. Typically, you would do some manual iterations to try to find the best one. Unfortunately, in today’s world you need thousands of iterations, so we use

our iSight capability to connect directly those two simulations and iterate through thousands of options resulting in an optimal design for the landing gear.”

This can be used to illustrate not just what a vehicle can do in the context of its own design state but also in the customer’s design state, incorporating personnel shifts as well as electronics, communication, control, and command forces.

“Fundamentally, this is the ability to not just demonstrate to your customer that you’ve understood their operating environment and you’ve validated your

design in their environment; it's also the opportunity to use this as a design link to drive the optimization of design for operations as well," Tellier said.

This capability also provides significant benefits in the space and defense industries.

"In space, you don't really design for mass-producibility, you design for the thing to survive in the environments it's subjected to, and you can't simulate those environments on Earth," Tellier said. "All these systems have to be validated interconnectedly because that's where the issues occur. [Winning Program] allows them to conceptually do all this integration and then validate it, which they need to do.

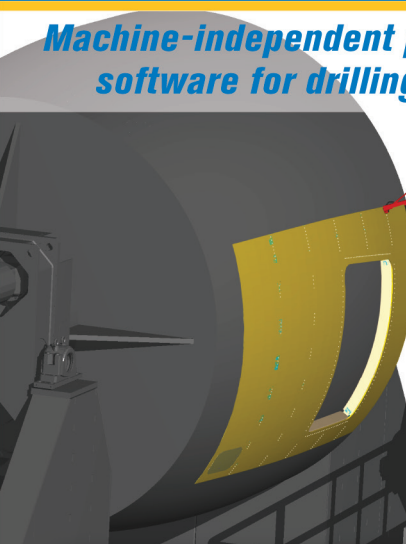
"The defense world is getting much more competitive, so being able to demonstrate that you have a viable program is the most important thing. It's not so much about the product that you're proposing to do on its own, it's how well it integrates

into their infrastructure and that you can prove that you can get it done. Being able to efficiently conceptualize a design and then move it downstream is a huge value." **A**

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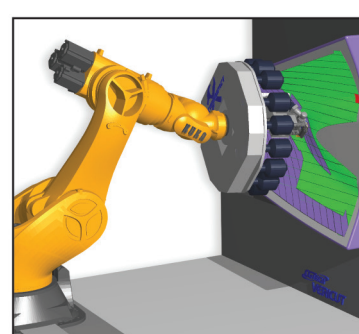
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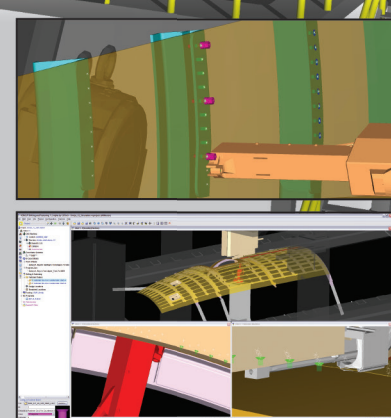


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