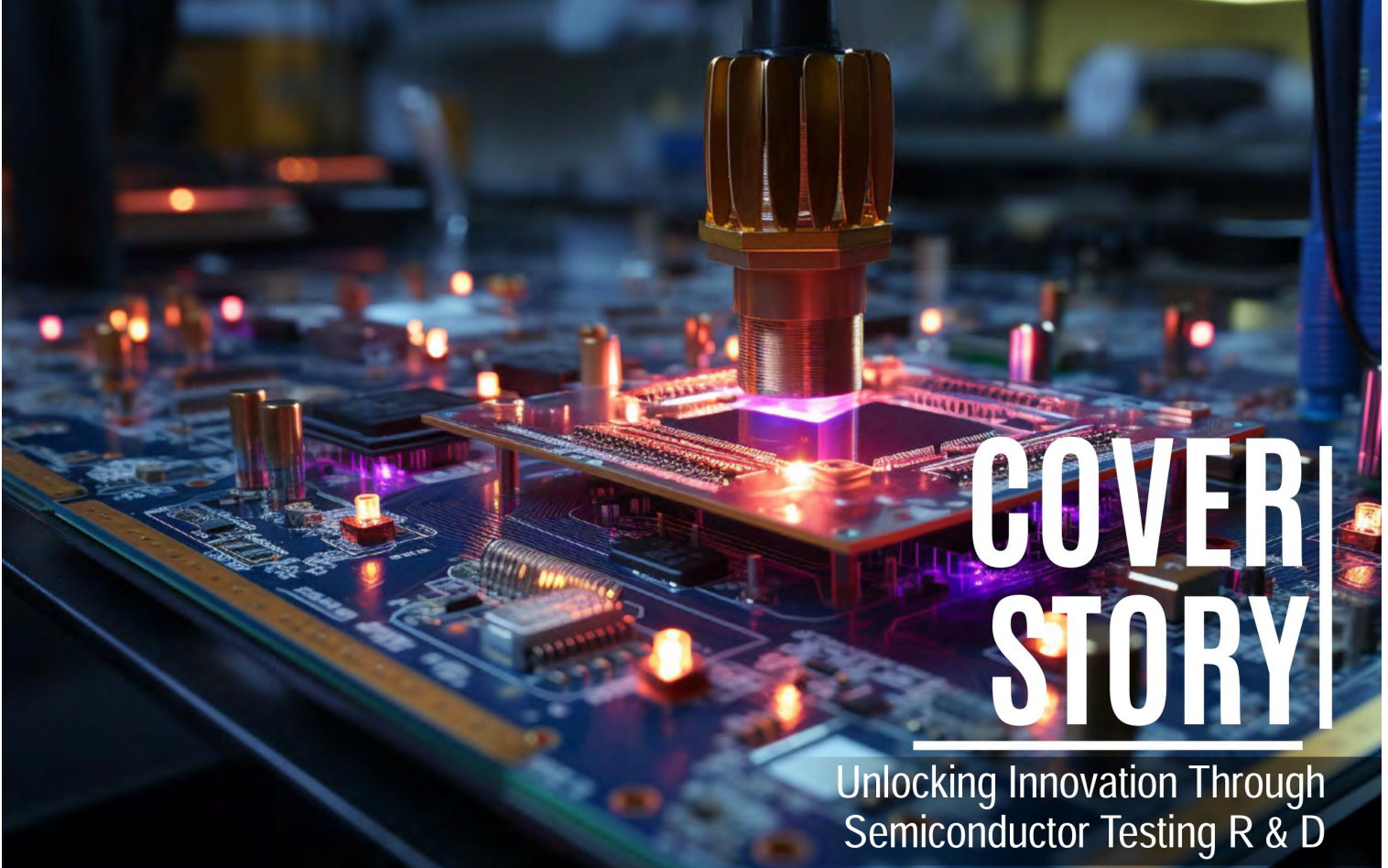


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## COVER STORY

Unlocking Innovation Through  
Semiconductor Testing R & D

### INSIDE

A Powerful Partnership for  
a Brighter Future

Elevating Security & Reliability  
in Embedded Applications

SEMICONDUCTOR • AUTO • POWER • HYDROGEN • IT • IOT • T&M • TELECOM • CONVERGING TECH

### ATTRACTION



**Ross Berntson**  
President & COO  
Indium Corporation



**Radha Krishnan**  
President & Founder  
Detroit Engineered Products  
(DEP)

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Unlocking Innovation Through  
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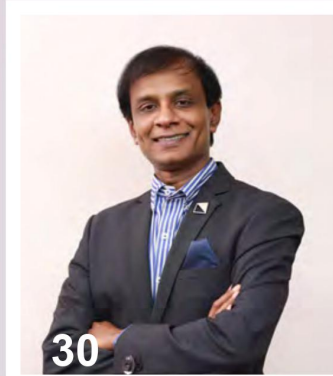
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## DEP MeshWorks, A Game-Changing CAE Platform for Automotive Industry

**D**etroit Engineered Products (DEP) is an Engineering Solutions and Product Development company. (DEP is into Computer-Aided Engineering (CAE) software on businesses. CAE software has emerged as a vital tool, revolutionizing product design, innovation, and optimization. During an interaction with **Vidushi, Radha Krishnan, President and Founder, Detroit Engineered Products (DEP)** discussed about how CAE plays an important role in aircraft design safety and how well it works in optimizing drone performance.

### **How does Design Enablers in CAE design contribute to product development, particularly in enhancing innovation and efficiency?**

In CAE, a design engineer must spend a significant amount of time manually creating geometry, mesh, or connections. DEP MeshWorks includes a powerful Design Enablers module that allows users to automatically generate typical design solutions to improve structural and CFD performance while reducing weight. These Design Enablers can be implemented as a complete solution that includes properties, materials, connectors, and other components. They are simple to create and do not require the user to manually create geometry, mesh, or connections capable of providing high-level inputs, as a design engineer does. All typical Design Enablers are available as automated ready-to-use CAE solutions, and since they can also be executed as a batch process for future product lines, this is an innovative solution that can really help speed up the time taken for the product development process.

### **In what ways does Design Enablers in CAE design play a pivotal role in ensuring the safety and precision of aircraft design, especially in the context of virtual validation?**

Safety is unquestionably the top priority for aircraft designers in the aerospace industry. Companies can use virtual validation to test designs before investing in prototypes, ensuring that products are safe and reliable



**Radha Krishnan**  
President & Founder  
Detroit Engineered Products (DEP)

from the start. Virtual validation essentially provides a simulated environment in which engineers can run multiple tests to ensure the validity and security of their products prior to physically building them. The virtual validation process gives engineers and product designers a detailed 3D visualization of a part or product in CAD and CAE. By eliminating the need to build prototypes for testing, engineers can run endless tests to check safety measures, ensure strength and endurance, and operate software using CAE, all while reducing production time and costs.

**Can you elaborate on how Simulation Technology improves quality in the manufacturing industry and how Design Enablers in CAE design facilitate this improvement?**

Simulation technology is critical, design simulation has historically been a critical point in the manufacturing industry. We are pleased that CAE, through our technologies and others, facilitates digital manufacturing assessments. For example, if you're using an injection molded process, you could enter the gate location, material, and temperature, and then run the simulation. If you notice a flaw in your actual part, you can improve it early on by performing a CAE assessment. That is the immediate advantage of using a simulation. Otherwise, you must create the tools, which will cost millions of dollars. All these parameters can be optimized in the gate location, along with other structural parameters. This process

not only optimizes your component for manufacturing, but at the same time considers the product's performance and weight as well.

**How does Digital Twin Technology, facilitated by Design Enablers in CAE design, enable the exchange of data and interaction through IoT, particularly in enhancing product performance and reliability?**

Instead of creating a physical prototype and an actual part, you use a digital twin to validate your manufacturing process or performance virtually. A digital twin, also known as a virtual twin or simulated twin, is the virtual representation of a real-world asset or process. They are designed to last the product's lifetime and contribute to the optimization of the actual physical asset.

The Internet of Things (IoT) and Digital Twin are two intertwined concepts. With the advancement of the Internet of Things, the digital twin process can now enable testing, analysis, and predictions based on real-world scenarios rather than assumptions, resulting in accurate test results that save time and money. The volume of data generated by digital twin methodology is enormous, and IoT must keep up with the data and analysis required. On the other hand, the Digital twin is critical to the development of IoT because IoT must evolve to meet the rapidly growing standard of the Digital twin in terms of accuracy, data capacity, and sensing capabilities.

This can be analyzed, and real-time feedback on performance, emission, and any other parameters you want to monitor can be provided. It is especially useful when the physical asset is in difficult-to-access locations or is part of an unmanned program.

**With the increasing use of drones across various industries, how does Design Enablers in CAE design contribute to preventing harm to aerial territory assets and optimizing drone performance?**

Drones are becoming more important players in the various industry than they were previously, primarily for military or hobbyist applications. DEP provides many aftermarket products and services, including drones. I see drones as flying robots; the work they do on the ground today can be done in the air tomorrow. At DEP, we worked on an interesting project in which we added many control systems to a drone to help deter birds and assess safety during takeoffs and landings. For example, to deter birds, the drone simply goes into the air and makes some high-frequency noise, scattering the birds. So, the bird will be out of the way of the plane. This way, you can easily provide solutions without having to do so manually. Drone technology can be used for a variety of applications, not just manufacturing. All of these depend on our ability to envision real-world solutions. We would love to create more of these variants because we have all the necessary technology on our side.

**“At DEP, we worked on an interesting project in which we added many control systems to a drone to help deter birds and assess safety during takeoffs and landings.”**



### **What inspired the establishment of DEP? Was it driven by identifying a market gap or recognizing a significant opportunity in the CAE industry?**

Our company began its journey 25 years ago with the goal of redefining industry standards and leaving a lasting impact on the global community. Established in 1998, we began as a small team with big dreams, motivated by innovation and a desire for perfection.

In the early years, we concentrated on developing cutting-edge technologies to meet emerging market demands. Our commitment to CAE research and development resulted in the development of DEP MeshWorks, a game-changing CAE platform that quickly gained popularity in the automotive industry.

As we grew, we expanded our portfolio to meet the changing needs of our diverse customer base. We expanded beyond automotive into industries such as aerospace, defence, biomedical, energy, electronics, oil and gas, consumer products, and heavy equipment. Our dedication to quality, customer satisfaction, and ethical business practices became the foundation for our success. This ethos not only strengthened our client relationships, but it also promoted a positive company culture. We have expanded our portfolio through product development and have begun collaborating with companies to create new age innovative products. Collaboration has been a key component of our journey. We formed strategic partnerships with industry leaders, establishing a network of expertise that aided our growth. This collaborative approach not only accelerated our development but also allowed us to contribute meaningfully to the industries we serve.

Looking back, our journey has been characterised by milestones, challenges, and ongoing learning. Today, as we celebrate 25 years of success, we remain committed to our founding principles while looking forward to the opportunities and challenges that the future brings.

### **Looking ahead, what is the future of CAE, and how does DEP align with that vision in terms of driving innovation and advancements?**

MeshWorks' latest version in 2023 is exciting because it demonstrates the integration of advanced algorithms, methodologies, and powerful AI and ML technologies in the backend, resulting in an intuitive, user-friendly front-end interface. This enhanced

version transforms product development cycles by introducing Next Generation CAE/ CAD Morphing, Concept Modelling, and CAE Parametrization, resulting in significant time savings and optimised products. The addition of innovative modules such as Reduced Order Modelling, Groundbreaking Concept Modelling, and the electrification module (eMoD) enables users to continuously innovate and quickly create new and optimised products. MeshWorks 2023's cutting-edge features open up new possibilities and accelerate the innovation process for engineers and designers, and the entire team is thrilled with it.

### **What are some of the key challenges faced in the CAE industry, and how is DEP addressing these challenges to improve efficiency and effectiveness?**

Like any growing startup company, we have also faced numerous challenges in scaling our business. Initially, acquiring skilled engineers proved difficult due to intense competition. However, we devised an attractive compensation package and offered flexible work arrangements, attracting top talent. As the company expanded, managing complex projects and meeting tight deadlines became overwhelming, and we implemented project management software, enhancing communication and task allocation. Another obstacle was data security concerns from clients with sensitive information. We have invested in robust encryption measures, bolstered server security, and conducted regular security audits to build trust with clients.

The turning point came when a major client demanded customization beyond our software capabilities. We collaborated with the client, invested in research and development, and delivered a tailored solution, strengthening DEP's reputation.

Through perseverance, innovation, and customer-centric focus, we have so far successfully navigated these challenges, positioning DEP as a trusted leader in the industry.

### **Which industries stand to benefit the most from the solutions provided by DEP in the realm of CAE design and optimization?**

CAE solutions are widely used in a variety of industries, particularly aerospace, automotive, manufacturing, and civil engineering. CAE software is used extensively in the aerospace industry to optimize aircraft design, structural analysis, and aerodynamic simulations. CAE is used by automotive companies to test vehicles,

analyses emissions, and design engines. CAE is used in the manufacturing industry to optimize processes like injection molding simulations and CNC machining. Civil engineering uses CAE for structural integrity assessments, urban planning, and environmental impact studies. DEP MeshWorks has developed specialized modules and toolkits to meet the unique needs of each sector, and we stay up to date on the latest technologies. For example, we have developed a module specifically for Electric Vehicles in MeshWorks, called eMOD, which simply put is a collection of specialized tools for modeling all components of an electric vehicle, which may be used for everything from system analysis to component analysis for EVs. This sector-specific customization ensures that CAE solutions align with the precise requirements and challenges of each industry, optimizing their overall performance and usability.

### **Could you highlight any emerging trends or developments in the CAE industry that you find particularly exciting or noteworthy, and how DEP is adapting to capitalize on these trends?**

Our CAE and engineering company remains at the forefront of technological advancements by fostering a culture of continuous learning, research, and innovation. We invest significantly in staying abreast of the latest developments in computational engineering, simulation technologies, and related fields. Our dedicated R&D teams actively collaborate with academic institutions, industry experts, and research organizations to anticipate emerging trends and incorporate cutting-edge advancements into our solutions. Additionally, we prioritize ongoing training and skill development for our teams to ensure they are well-versed in the latest technologies and methodologies. Looking ahead, our company's plans for continued innovation in CAE software involve further enhancements in simulation accuracy, speed, and scalability. We aim to leverage artificial intelligence and machine learning to optimize simulation processes, enabling more complex analyses and real-time decision-making. Moreover, we are committed to addressing sustainability challenges within the engineering domain by integrating eco-friendly practices and supporting green initiatives. By staying agile and adaptive, our company is poised to lead the way in the evolution of CAE software, ensuring that our solutions consistently meet and exceed the evolving needs of the industry.