QUARTERSIM US

Letter from the President

Hi all,

A new year is officially underway, and if the pace of the past few weeks is any indication, 2026 is already moving fast. We wrapped up 2025 on a strong note at TotalSim, with exciting projects, growing partnerships, and plenty of reasons to be optimistic about what's ahead. That momentum has made the transition into the new year feel both energizing and — in the best way — a little busy.

Here in Ohio, the winter weather has fully settled in. While it may be cold outside, there's something refreshing about this time of year — a chance to reset, reflect, and focus on what's next. For us, that means continuing to invest in our people, our technical capabilities, and the relationships that allow us to solve meaningful engineering challenges every day.

With the 2026 Olympic Games on the horizon, we've been revisiting some of our past work in Olympic sport. It's been a fun reminder of the role simulation plays at the highest levels of competition, and it will definitely add a little extra excitement when the Games begin.

As we look ahead, our plans for 2026 are clear: build on the progress we've made, stay curious, and keep pushing what's possible with simulation. We're excited for the year ahead and grateful to everyone who continues to be part of the TotalSim journey.

Here's to a strong start to 2026!

TotalSim Bulletin

We attended the Siemens Americas Partner Conference 2026 and are proud to share that we were recognized for the highest achievement percentage of target in North America. This milestone reflects the strength of our partnership with Siemens and our focused commitment to delivering high-impact simulation solutions powered by Siemens STAR-CCM+.

At the end of last year, we also officially achieved Expert Gold status exclusively through STAR-CCM+, underscoring both our deep technical expertise and our belief in the platform as a best-in-class solution for CFD-driven engineering and innovation. By working closely with Siemens, we continue to help customers tackle complex challenges with greater confidence, speed, and accuracy — while raising the bar for simulation-led design.

This recognition also speaks to the broader momentum of innovation happening here in Ohio. As the state continues to invest in advanced manufacturing, aerospace, mobility, and digital engineering, partnerships like ours with Siemens play a vital role in keeping Ohio at the forefront of technology-driven growth.
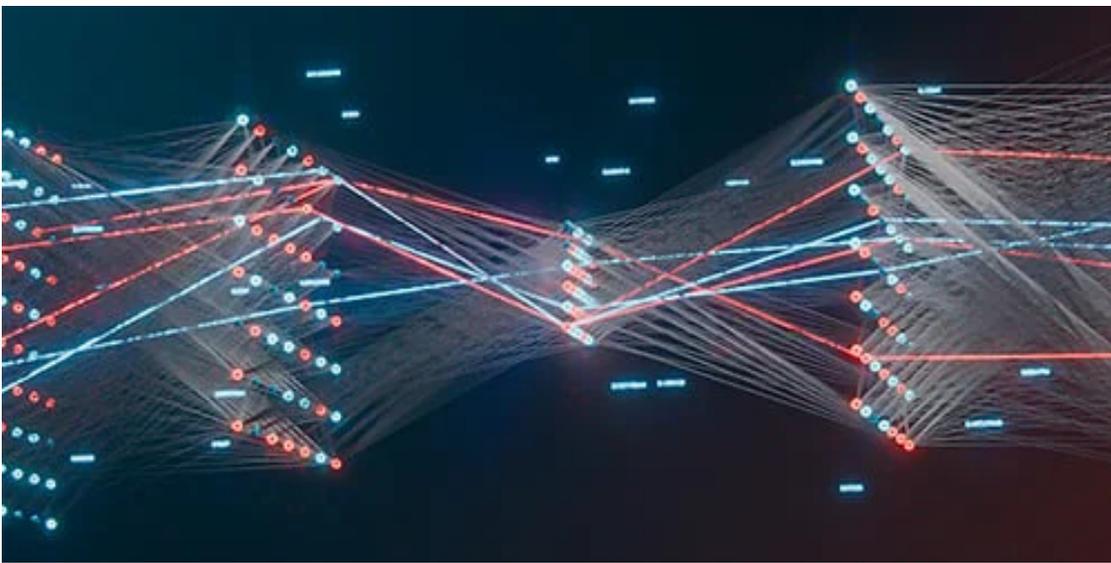
The Transformative Impact of Artificial Intelligence
on Computer-Aided Engineering (CAE)

Computer-Aided Engineering (CAE) has long been a cornerstone of modern product development, allowing engineers to simulate and analyze designs virtually before physical prototypes are built. From finite element analysis (FEA) for structural integrity to computational fluid dynamics (CFD) for aerodynamics, CAE tools help industries like automotive, aerospace, and manufacturing reduce costs, accelerate innovation, and mitigate risks.

However, traditional CAE workflows are often limited by high computational demands—complex simulations can take hours or days to run on high-performance clusters. This bottleneck restricts the number of design iterations and slows down decision-making. Enter artificial intelligence (AI) and machine learning (ML), which are reshaping CAE into a faster, smarter, and more creative discipline. AI is not replacing engineers but augmenting their capabilities, enabling unprecedented speed, exploration, and optimization.

Key Ways AI is Revolutionizing CAE

Ultra-Fast Simulation Predictions: AI-powered surrogate models learn from previous high-fidelity simulations to predict outcomes in seconds instead of hours. Generative AI tools can forecast 3D physics performance 10–100x faster, agnostic

to the original solver. This allows engineers to run thousands of what-if scenarios in real time. Supercharge Simulation Predictions With a Robust AI SaaS Platform Physics-informed neural networks (PINNs) and deep learning frameworks (e.g., DeepFEA) embed physical laws directly into models, improving accuracy for transient analyses while reducing compute needs.

Generative Design and Optimization: AI explores vast design spaces by generating hundreds or thousands of optimized alternatives based on constraints like weight, strength, material usage, and manufacturing methods. Siemens's generative design tools and Altair's AI Powered workflows produce organic, lightweight structures that outperform human intuition in many cases. These tools integrate seamlessly with additive manufacturing, enabling previously impossible geometries that reduce material waste and improve performance.

Automation and Intelligent Decision Support: AI automates repetitive tasks— meshing refinement, boundary condition setup, and result interpretation—freeing engineers for higher-value work. Machine learning also detects anomalies, predicts failure modes, and recommends improvements early in the design cycle.

Siemens and Altair are leading the charge: Siemens is embedding AI across its Xcelerator platforms for design automation and simulation acceleration. While Altair and others are advancing physics-AI hybrids for industrial and engineering applications.

Benefits for Industries and Engineers

- **Speed and Cost Savings:** Design cycles shrink dramatically, enabling more iterations and faster time-to-market.
- **Innovation Boost:** Engineers explore radical concepts that traditional methods might overlook.
- **Sustainability**: Optimized designs use less material and energy.
- **Accessibility:** Cloud-based AI tools democratize advanced simulation for smaller teams.

The global CAE market is projected to grow significantly, driven partly by AI integration, with forecasts showing strong expansion through 2035.

Challenges and the Road Ahead.

Despite the promise, hurdles remain:

- **Data quality and quantity are critical—garbage in, garbage out:** Interpretability of black-box models can raise trust issues in safety-critical applications.

- **Integration with legacy workflows requires careful change management.** Looking forward, expect deeper fusion of AI with digital twins, real-time simulation during design reviews, and autonomous agents handling end-to-end optimization.

Conclusion

 AI is not just enhancing CAE—it is redefining what is possible in engineering simulation. By making analysis faster, smarter, and more creative, AI empowers engineers to tackle complex challenges and deliver better products. The future of CAE is AI-augmented, and those who embrace it will lead the next wave of innovation.

Quarter in Review: Events

In December, the team returned to the PRI Show in downtown Indianapolis, joining the motorsports industry once again at its largest annual gathering. The PRI Show brought together thousands of racing professionals, buyers, and media from across the globe, with more than 1,000 manufacturers and service providers represented under one roof.

As a trade-only event, the PRI Show continues to serve as the ultimate marketplace for motorsports innovation, uniting manufacturers, builders, race teams, and track operators from all forms of racing. Attendees from all 50 states and more than 35 countries came to discover new technologies, explore emerging trends, and connect with a highly motivated, prequalified racing market.

During the show, Naethan presented a [Race Car Aerodynamics Discussion](#) and Q&A, providing an overview of the role aerodynamics plays in race car performance across multiple disciplines. The session covered how different race series—from grassroots and dirt racing to NASCAR, IndyCar, and Formula 1—leverage aerodynamic shapes and devices to improve downforce, reduce drag, and achieve faster lap times. The presentation concluded with an engaging Q&A, prompting thoughtful discussion and real-world questions from attendees throughout the industry.

Overall, it was a great experience to be back at PRI, reconnecting with industry peers and building new relationships.

From the Field

Gaining Speed Where It Counts — Bobsled Aerodynamics Case Study

BOB-RUN001.1: Baseline
Velocity 80 mph Altitude 556 m Temperature -5 C
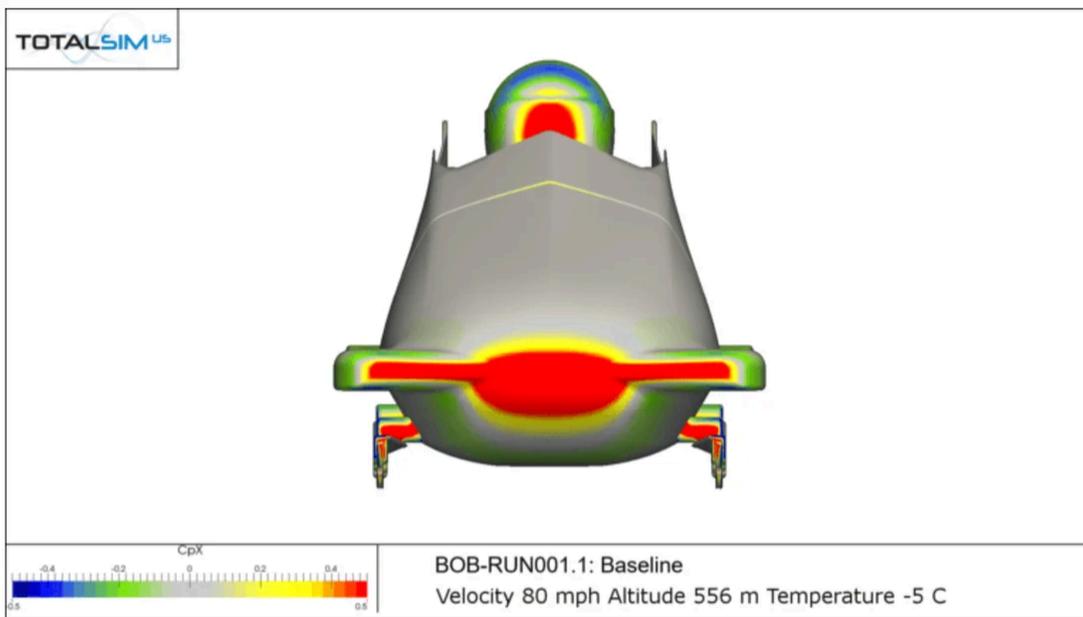
In the Winter Olympics, bobsled racing is often decided by hundredths of a second, making aerodynamics a critical factor in performance. TotalSim US worked with an independent bobsled designer to help unlock additional speed through aerodynamic optimization — without violating the sport's strict design regulations.

Using CFD, the team evaluated a clean-sheet bobsled design alongside historical baselines, studying how subtle changes to components such as the nose, bumpers, and cowling gap affected overall drag. Unlike traditional testing approaches, CFD allowed multiple design variations to be analyzed efficiently and safely, including simulations on both straight and curved track sections to better represent real racing conditions.

Through a structured test plan and advanced adjoint optimization methods, each component was refined individually before being combined into a final configuration. The result: a 4.4% drag reduction on curved sections and an 8.2% reduction on straight sections compared to the baseline design — gains that can translate directly into meaningful time advantages on the track.

Read the full case study to see how CFD helped transform small design changes into race-winning performance.

UpcomingEvents

We're looking forward to joining leaders from industry, government, and academia at the upcoming [Ohio Air Mobility Symposium](#) to discuss the evolving advanced air mobility landscape, from cargo to passenger applications. The event explores how Ohio can play a leading role in UAM research, testing, manufacturing, and policy— building on its legacy as the Birthplace of Aviation.

As a team based here in Ohio, we're excited to be part of the conversations shaping how air mobility can be integrated into our communities safely and equitably. If you'll be attending, reach out — we'd love to connect and chat.

Blast from the Past

With the 2026 Olympic Games kicking off this February, we're feeling the momentum that builds anytime the world's fastest, strongest, and most precise athletes take center stage. While winter sports are up next, we're taking a quick look back at one of our favorite Olympic events to watch during the Summer Games: cycling — a sport where aerodynamics can make or break a podium finish.

From time trials and track racing to road races and peloton dynamics, Olympic cycling is a constant battle against aerodynamic drag. Rider position, bike frames, wheels, helmets, and skin suits are all carefully engineered to shave off precious fractions of a second. It's the same performance-first mindset that connects athletes across both Winter and Summer Olympics— optimize the flow, reduce losses, and maximize results.

TotalSim has played a role in this world through our cycling aerodynamics work with national and professional teams, combining CFD, wind tunnel testing, and real-world data to push performance further.
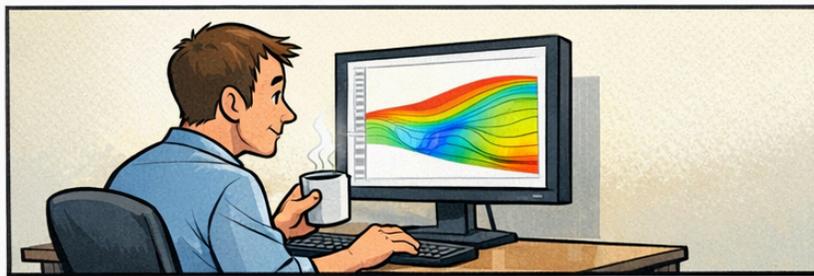
Read the full [deep dive](#) on how aerodynamics shapes Olympic cycling — and why every detail matters.
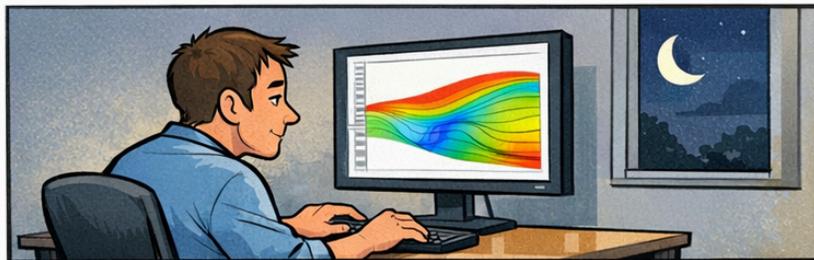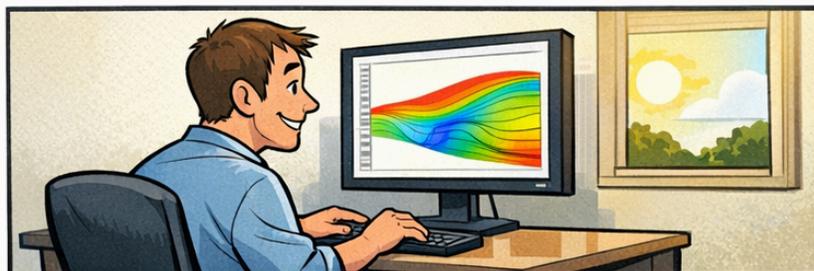
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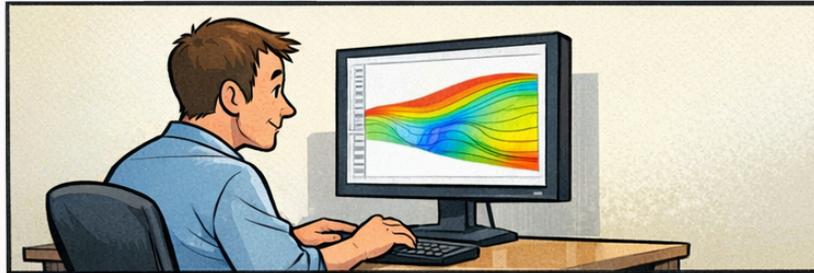
Industries Where We Excel

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