

Digital Engineering

Transform projects through advanced engineering simulation



Digital Engineering

Navigating Digital Complexity

Element brings unparalleled engineering expertise to today's rapidly evolving digital landscape, with deep understanding of the rigorous demands in safety-critical markets like Aerospace, Defence, and Energy. Our specialized teams guide industries through the challenges of implementing cutting-edge digital solutions, from initial concept and simulation to prototype development, testing, integration, and operational support. We ensure efficiency, innovation, and compliance at every stage — to engineer digital excellence across your most complex projects.

Tailored Digital Approaches

Specifically for digital engineering, Element draws on key methodologies including Computational Fluid Dynamics (CFD), Finite Element Analysis (FEA), Discrete Element Method (DEM), and Machine Learning. Our state-of-the-art digital hubs handle complex simulations and monitor factors like safety, performance, and compliance. This holistic approach produces insights you can trust to inform critical engineering decisions.

Our capabilities include comprehensive modeling and simulation, digital twin development, software development for engineering applications, system and process safety solutions, advanced data science, and full lifecycle support. We combine computational expertise with hands-on engineering knowledge to deliver results that matter.

Integrated Technology & Physical Testing

What sets Element's digital engineering apart is our unique integration of advanced computational methods with physical testing capabilities. While many providers offer either digital or testing services, Element combines both, allowing validation of digital models against real-world data. This integration creates a powerful feedback loop that enhances accuracy and reliability. Our engineers work across both domains, ensuring that digital simulations reflect physical realities and that testing programs are optimized through computational insights. This comprehensive approach delivers superior results while reducing overall project timelines and costs.

Data-Driven Insights & Security

At Element, we transform complex data into actionable intelligence through advanced analytics and machine learning. Our digital solutions leverage both historical and real-time data to enable predictive maintenance, optimize performance, and identify opportunities for improvement. We understand the critical nature of your proprietary information and implement robust security protocols throughout our digital engineering processes. Our secure data handling practices ensure your intellectual property remains protected while still enabling the collaborative innovation needed to solve your most challenging problems.

Multi-Disciplinary Expertise

Element's digital engineering teams combine diverse technical backgrounds across materials science, structural engineering, fluid dynamics, computer science, and safety engineering. This multi-disciplinary approach allows us to address complex challenges from multiple perspectives, creating more comprehensive and effective solutions. Our experts regularly collaborate across specialties, ensuring that digital models accurately represent the interplay between different physical phenomena and system components. This integrated expertise enables us to tackle projects of any complexity, from specialized component analysis to full system optimization across mechanical, electrical, and software domains.

Real Results

Our dedicated digital engineering hubs feature advanced computational capabilities across Europe and North America, with bespoke modeling environments and specialized teams equipped for multiple simulation types and ample testing capacity. Using cutting-edge technologies, we assess structural integrity, fluid dynamics, operational safety, and system performance, delivering reliable insights to help you design and operate with confidence in challenging environments.

Key Benefits

- **Enhanced Performance**
We optimize your systems to deliver peak efficiency and reliability.
- **Reduced Development Costs**
Virtual testing minimizes expensive physical prototyping and iterations.
- **Regulatory Confidence**
Our work aligns with evolving standards, ensuring compliance throughout your project lifecycle.
- **Flexible, Scalable Solutions**
We customize each approach to fit your material, environment, and timeline.
- **Supporting Innovation & Adoption**
Our digital solutions facilitate rapid development cycles, allowing you to bring products to market faster while maintaining quality.

Industry Partnerships & Collaborations

Element collaborates with leading technology partners, industry associations, and research institutions to stay at the forefront of digital engineering innovation. Our teams actively participate in cross-industry working groups, technology forums, and standards development initiatives. These partnerships enhance our capabilities, allowing us to apply best practices and emerging techniques across multiple sectors while adapting solutions to industry-specific challenges. By leveraging this collaborative network, we deliver more robust, future-proof digital engineering solutions tailored to the unique requirements of aerospace, defence, and energy applications.

Our Purpose

We're committed to advancing engineering excellence through rigorous digital analysis and proactive solutions. Our goal is to help you develop safer, more efficient systems that shape a sustainable future. Supporting our wider work to Engineer Digital Excellence across our client's life cycles and throughout the value chain, we apply advanced simulation and modeling to solve your most complex challenges while meeting evolving regulatory requirements.

Connect With Us

Ready to strengthen your digital engineering capabilities? Get in touch today:

P: +1 833 366 1612

W: element.com/digital-engineering

