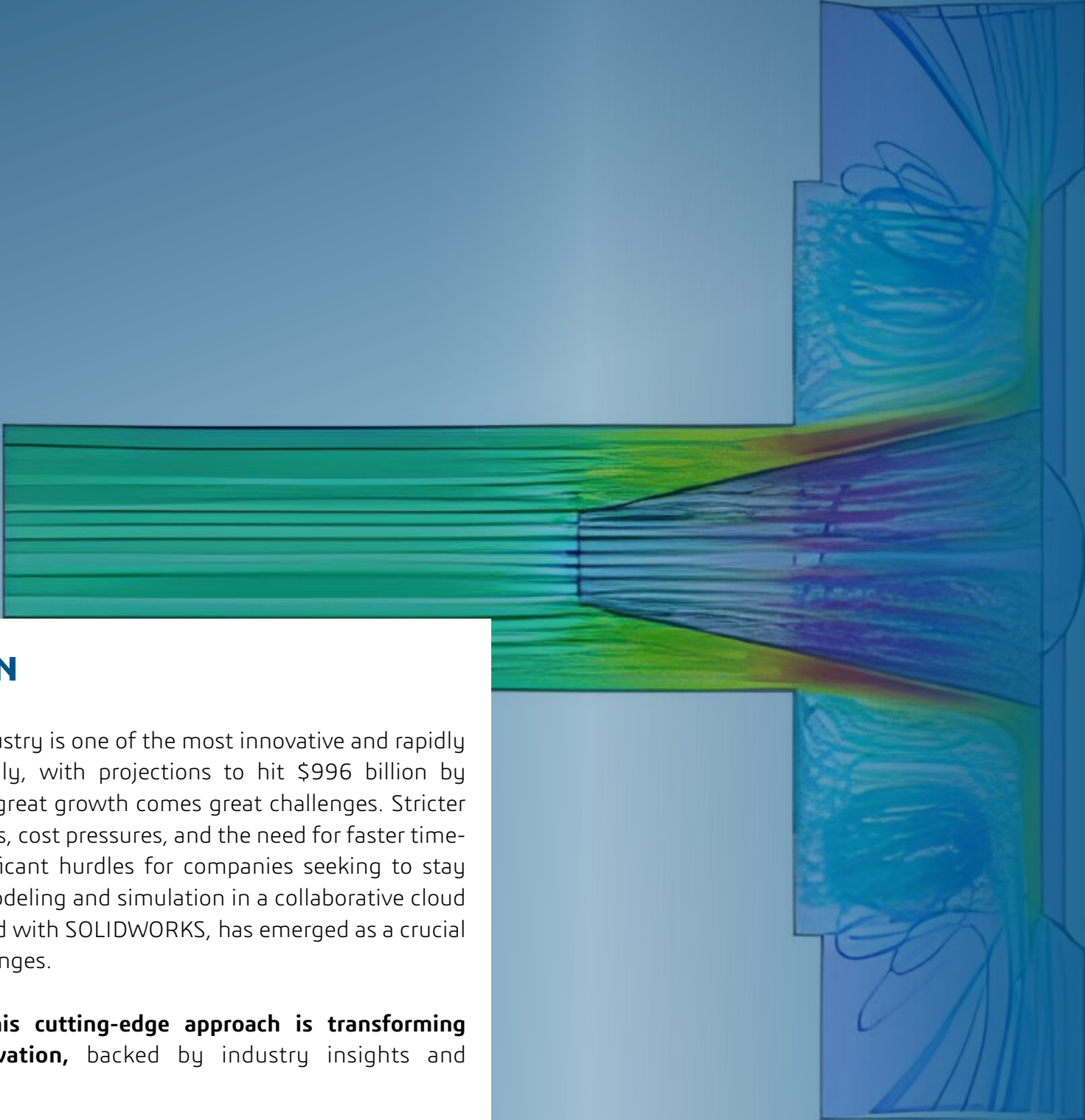


A blurred background image showing a person in a white lab coat and blue face mask pushing a large, light blue medical device (likely a portable X-ray or ultrasound) through a hospital corridor. The motion blur suggests a fast-paced environment.

10 WAYS UNIFIED MODELING AND SIMULATION DRIVES MEDICAL DEVICE INNOVATION



INTRODUCTION

The medical device industry is one of the most innovative and rapidly evolving sectors globally, with projections to hit \$996 billion by 2032¹. However, with great growth comes great challenges. Stricter regulatory requirements, cost pressures, and the need for faster time-to-market create significant hurdles for companies seeking to stay competitive. Unified modeling and simulation in a collaborative cloud environment, integrated with SOLIDWORKS, has emerged as a crucial solution to these challenges.

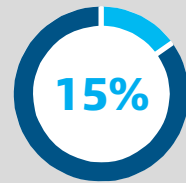
Here are **10 ways this cutting-edge approach is transforming medical device innovation**, backed by industry insights and real-world applications.

1. REDUCES DEVELOPMENT COSTS

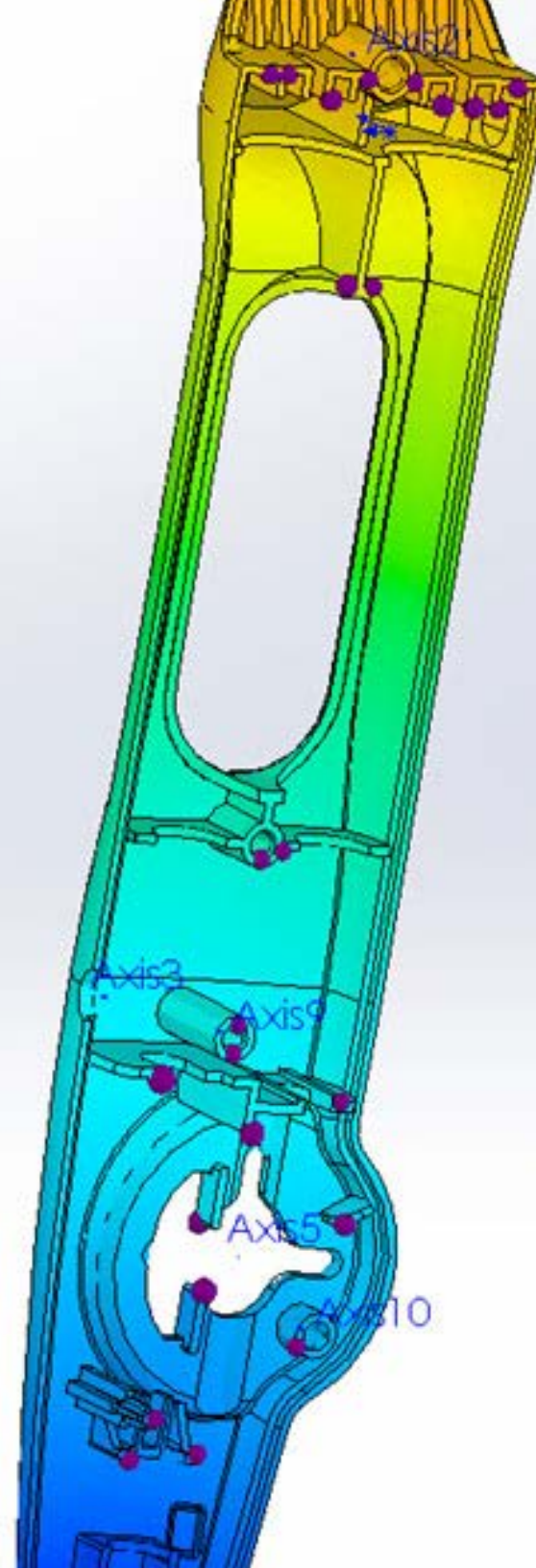
Physical prototypes can cost tens of thousands of dollars per iteration, yet 75% of medical device startups fail, due in part to failure to meet initial usability or compliance standards². Simulation allows teams to identify and resolve errors virtually, cutting down costs associated with rework and materials.

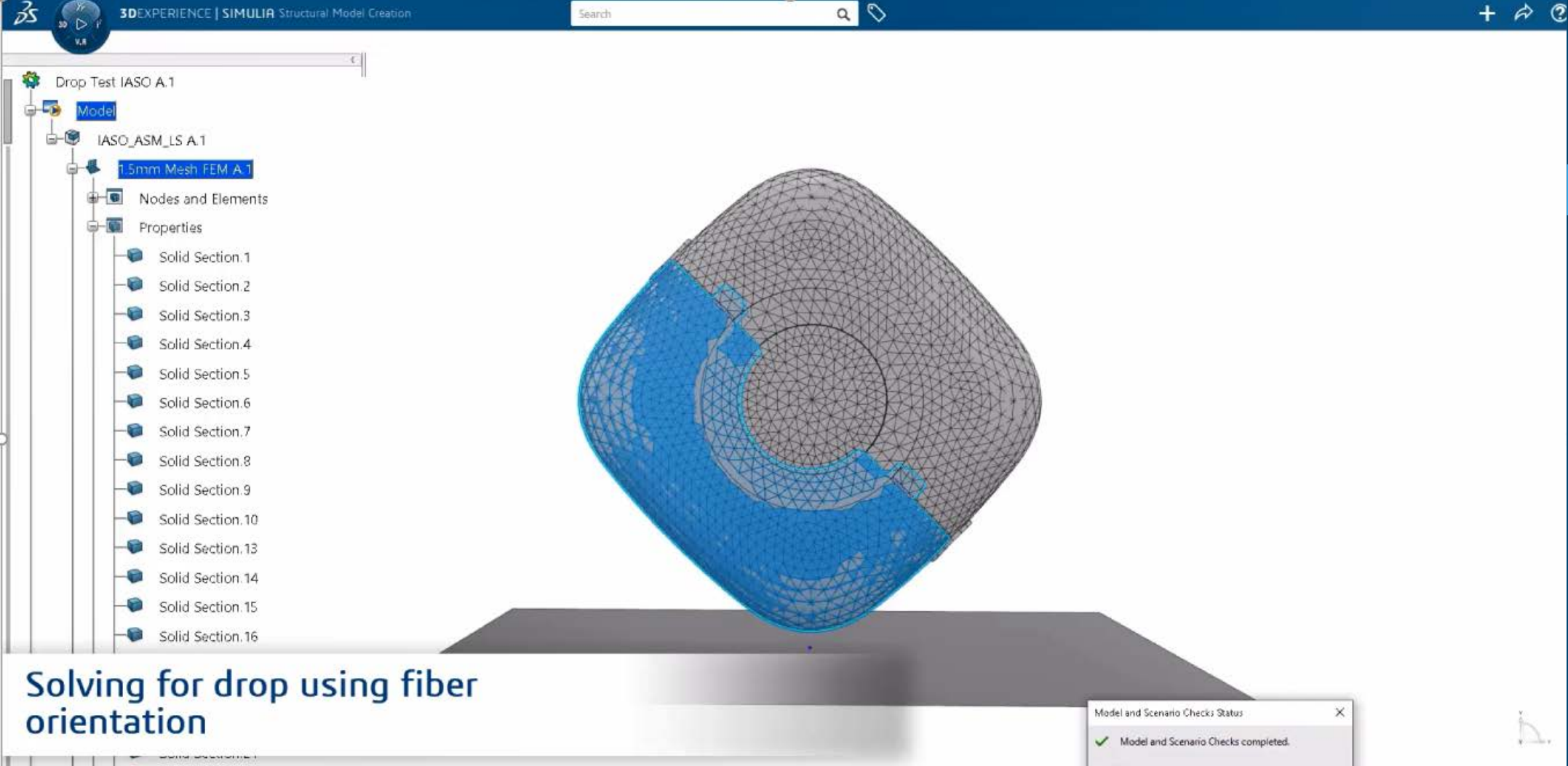
Key Statistic:

Companies using integrated simulation tools reported a **15%** reduction in prototyping costs³.



Reduction in prototyping costs





Solving for drop using fiber orientation

2. IMPROVES PRODUCT QUALITY

Due to their life-critical applications, medical devices must adhere to strict regulatory requirements. By conducting comprehensive simulations, such as human exposure compliance readiness or drop tests, teams can test for real-world scenarios before manufacturing, ensuring robust and reliable designs.

Key Statistic:

Device failures have emerged as the leading cause of medical device recalls, accounting for **43 events** and affecting **64.71 million units** in Q3 2024⁴.



43
EVENTS



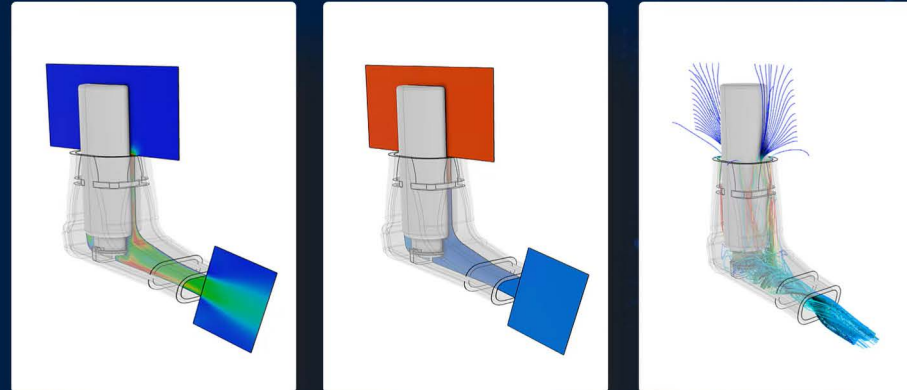
64.71
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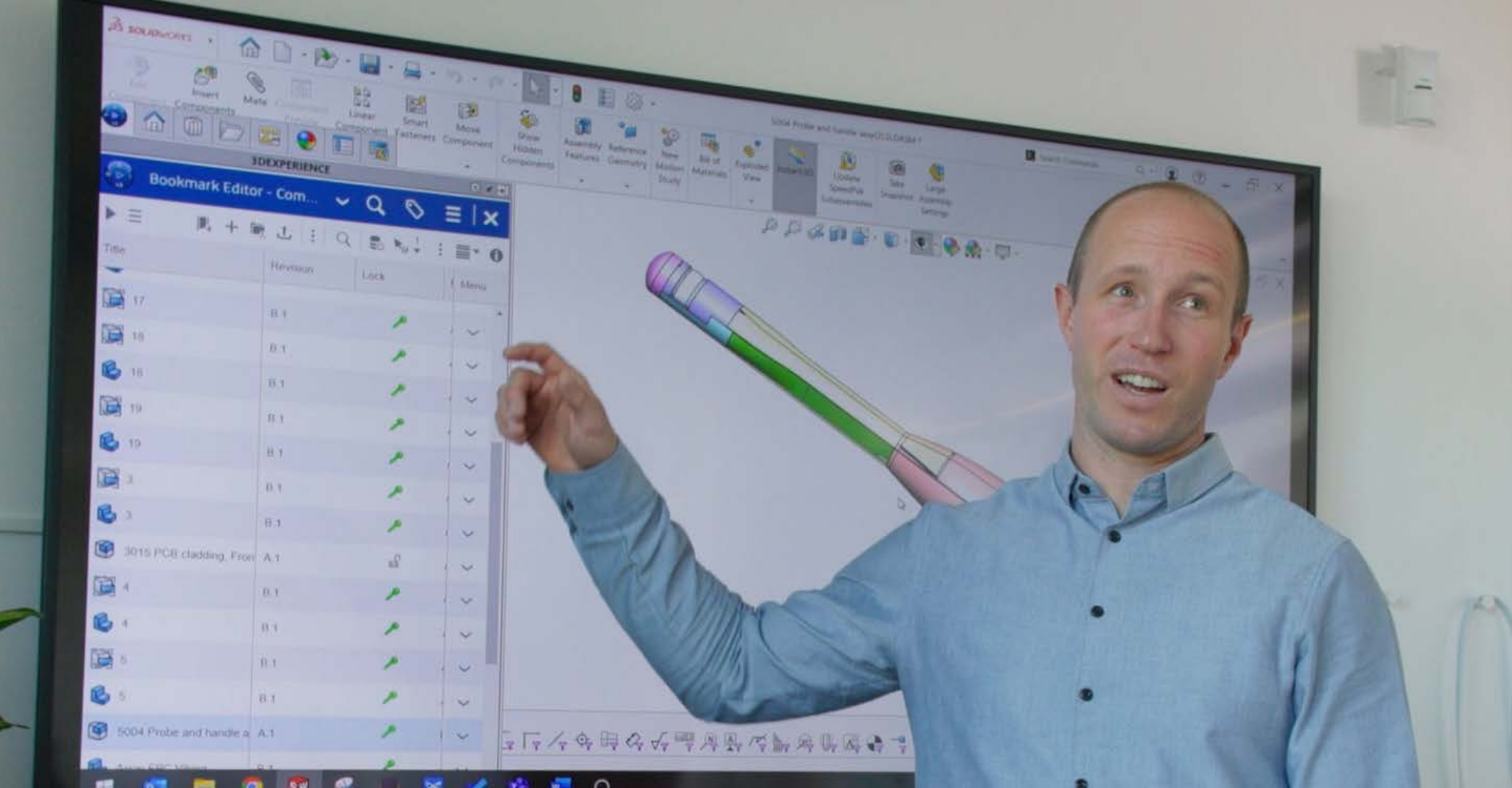
3. ENABLES MULTI-DISCIPLINARY TESTING

Medical devices often involve complex engineering, requiring input from mechanical, electrical, and material science disciplines. The **3DEXPERIENCE** Simulation tools integrated with **SOLIDWORKS** are multi-disciplinary, supporting various analysis types like stress, thermal, and plastic injection molding.

Example:

- A company designing inhalers can evaluate durability and fluid flow within the same simulation environment.





4. ELIMINATES HARDWARE BARRIERS

Traditional on-premise simulation software requires costly high-performance computing resources. Cloud-based solutions eliminate these barriers by allowing users to access cutting-edge computation power without investing in expensive hardware.

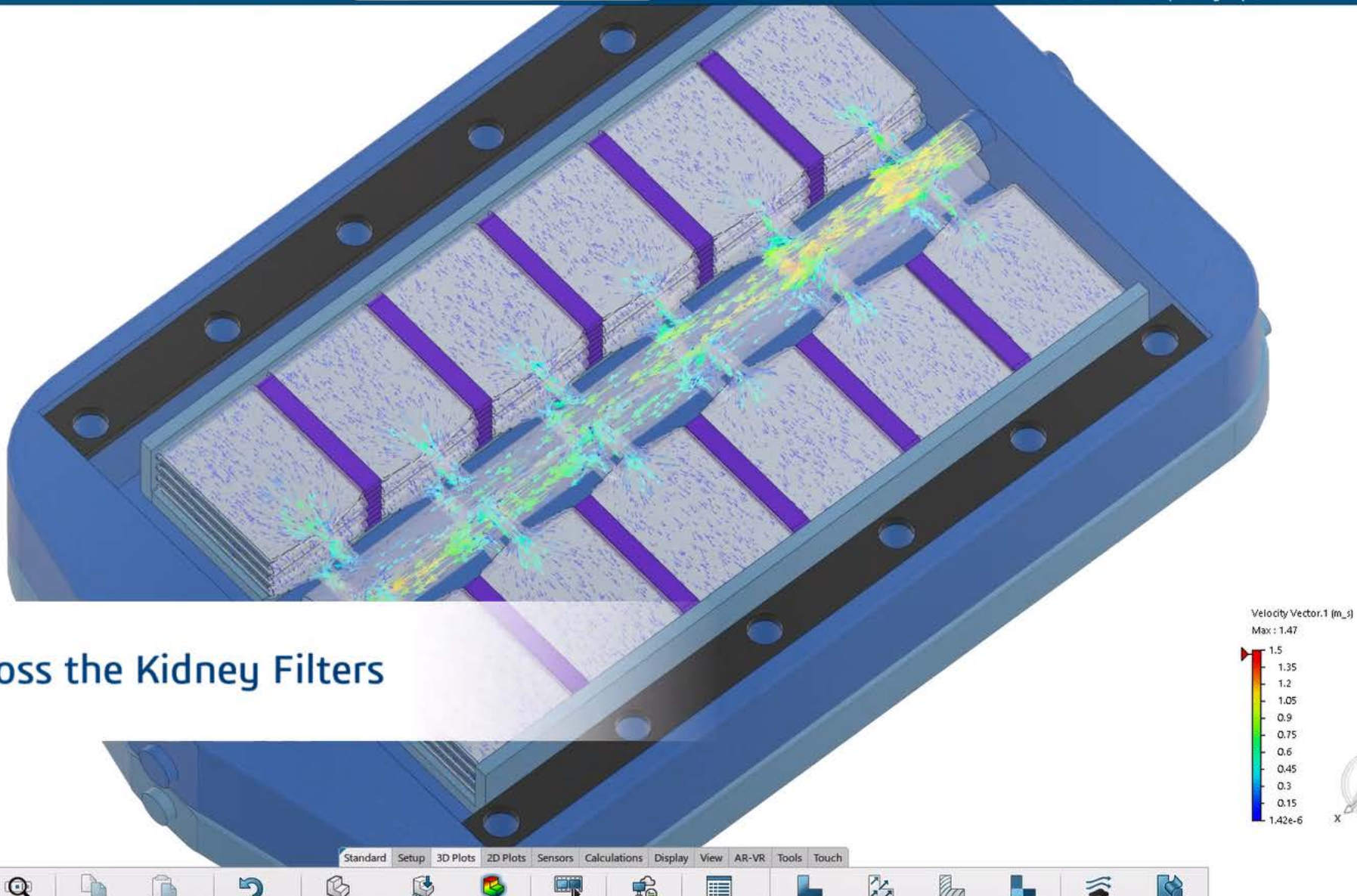
Industry Insight:

Cloud-based simulation tools reduce **IT infrastructure** costs by up to **35%**, making them more accessible for small- to medium-sized medtech companies⁵.



Cloud-based
simulation tools
reduce costs

UP TO
35%



Flow field across the Kidney Filters

5. ADDRESSES COMPLIANCE CHALLENGES

Compliance with FDA and ISO regulations is one of the medical device industry's most significant pain points. Simulation tools can help teams test their products against specific compliance criteria, reducing the risk of non-compliance penalties.

Key Statistic:

- More companies are turning to Simulation tools to better prepare to meet regulatory demands.⁶

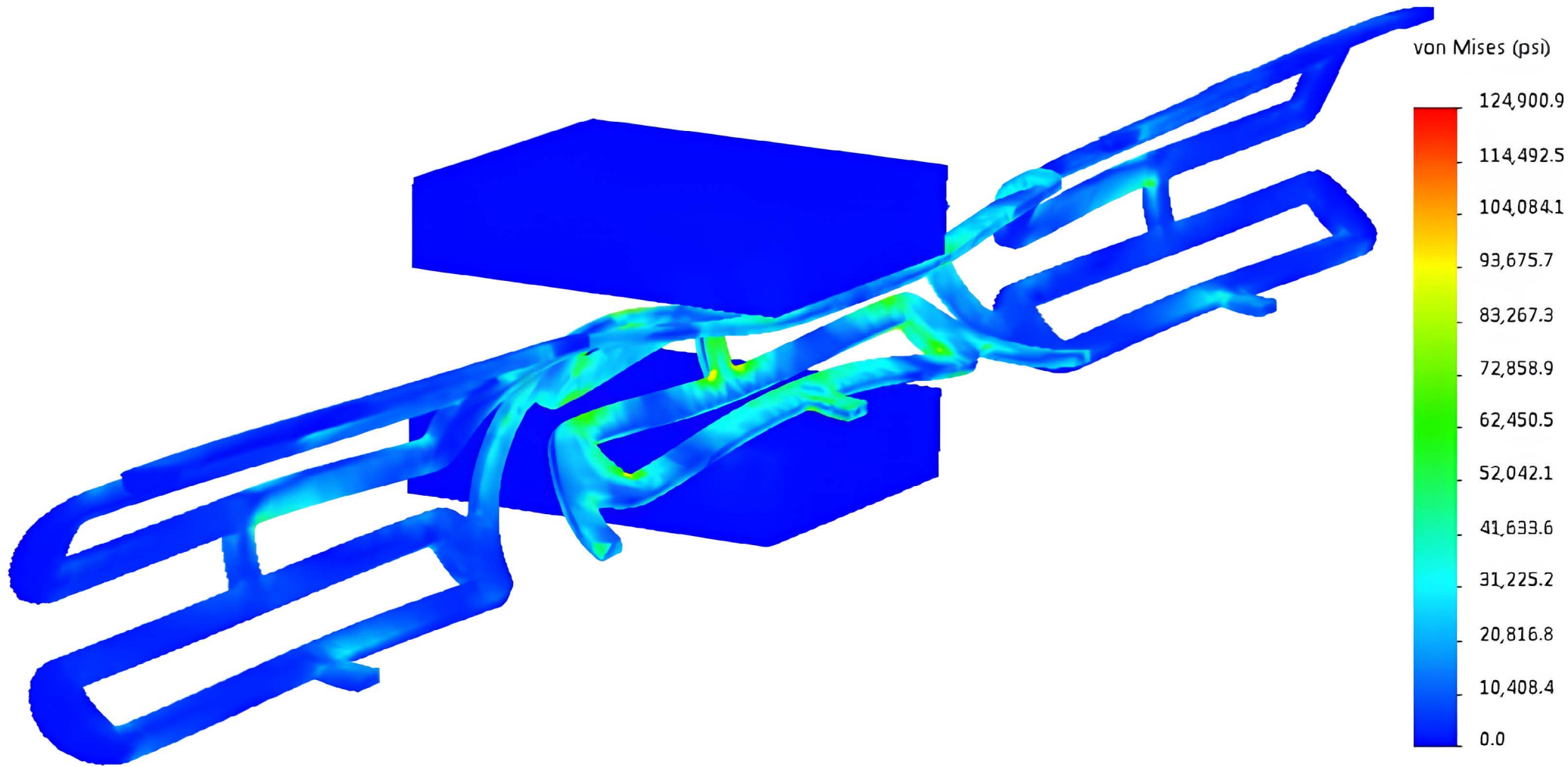


6. SUPPORTS SCALABLE SOLUTIONS

The versatility of simulation tools ensures scalability across device sizes—from tiny implants to large imaging machines. The ability to simulate performance across a variety of use cases ensures adaptability throughout product portfolios.

Example:

- A drug delivery device manufacturer can scale its simulation tests to modify designs for pediatric versus adult patients within the same platform.

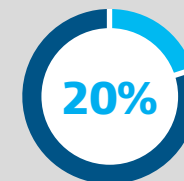


7. STRENGTHENS RISK MANAGEMENT

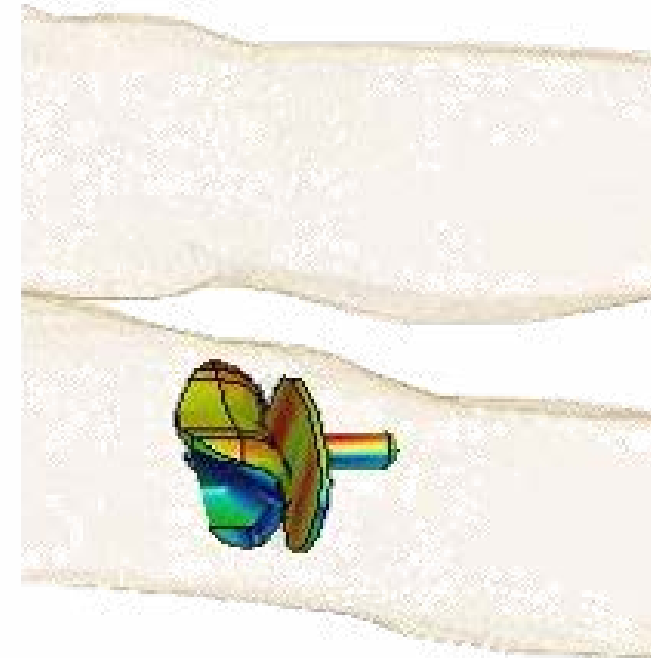
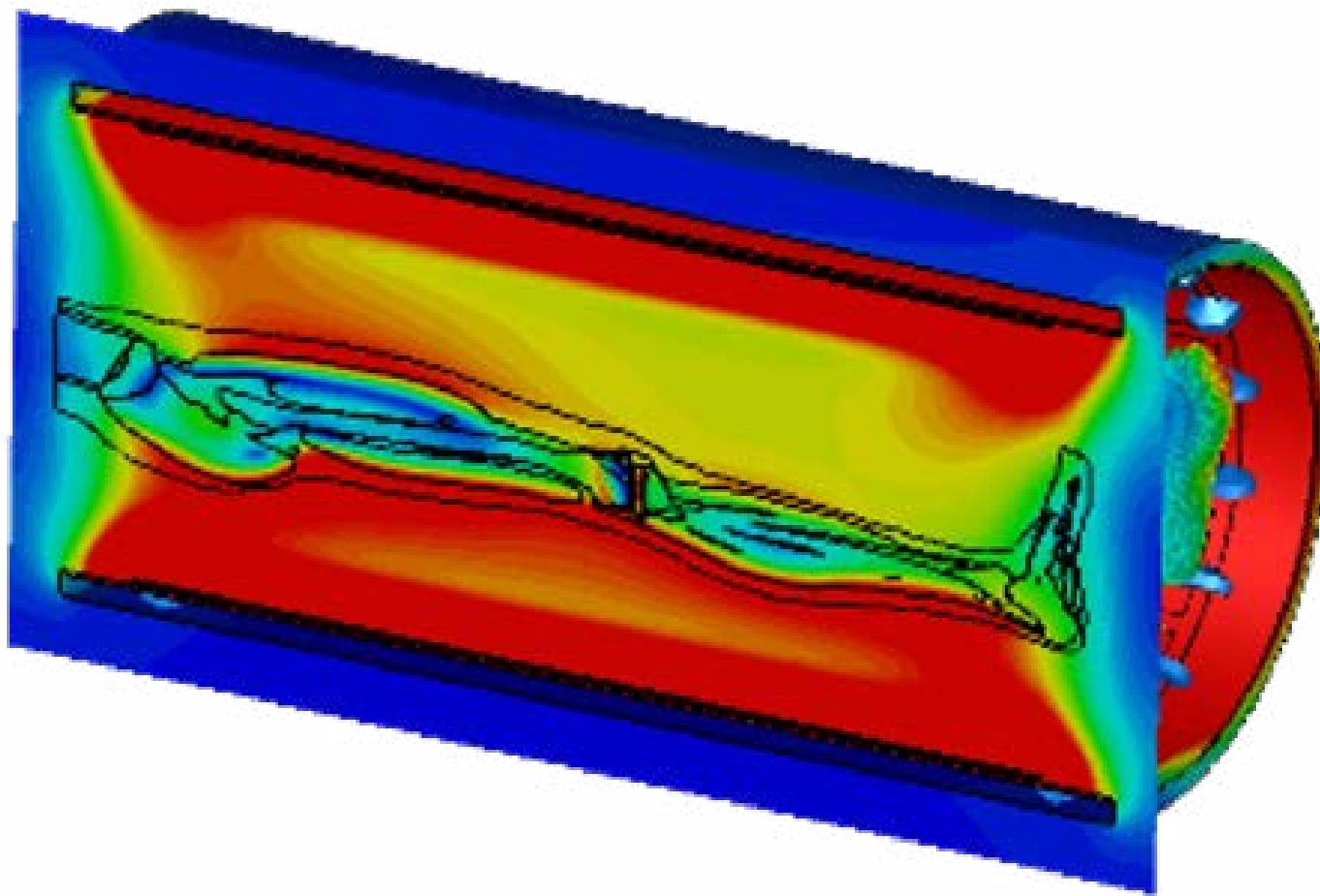
Medical device companies must mitigate risks at every stage of product development. Virtual simulations allow for extensive testing, including stress, durability, and environmental exposure, without relying solely on physical tests. This minimizes risks before products go to market.

Key Statistic:

Companies using simulation-driven design reduced product development cycles by **20%** on average⁷.



Reduced product development cycles

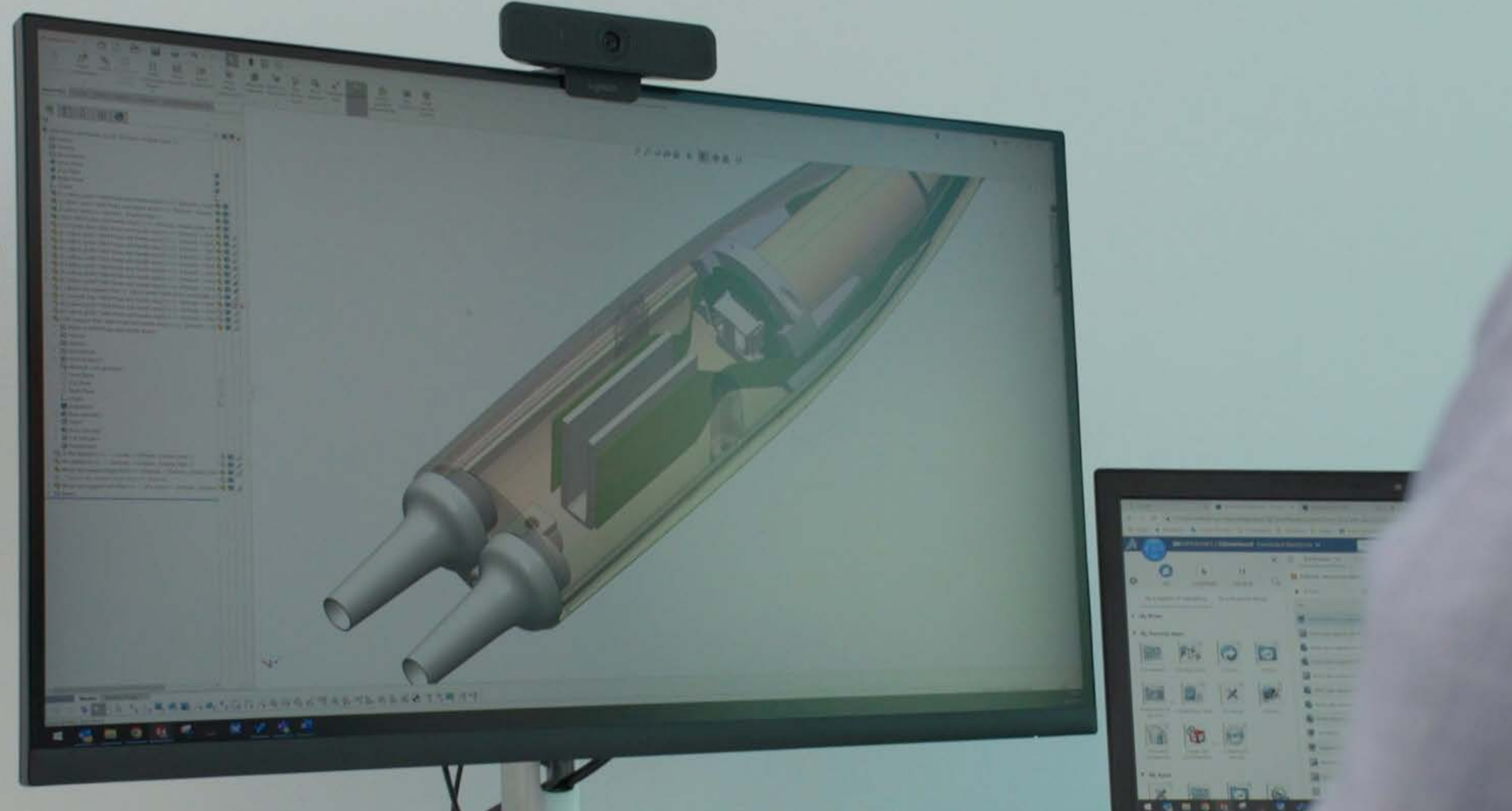


8. ENHANCES COLLABORATION ACROSS TEAMS

Collaborative design is no longer optional, especially given the global nature of medical device manufacturing. A cloud-based platform enables real-time collaboration between designers, engineers, and manufacturers regardless of their location. This approach breaks silos, ensuring faster feedback loops and a more unified development process.

Example:

- A multinational team working on antenna designs for medical imaging equipment can communicate within the cloud environment, significantly reducing delays caused by miscommunication.

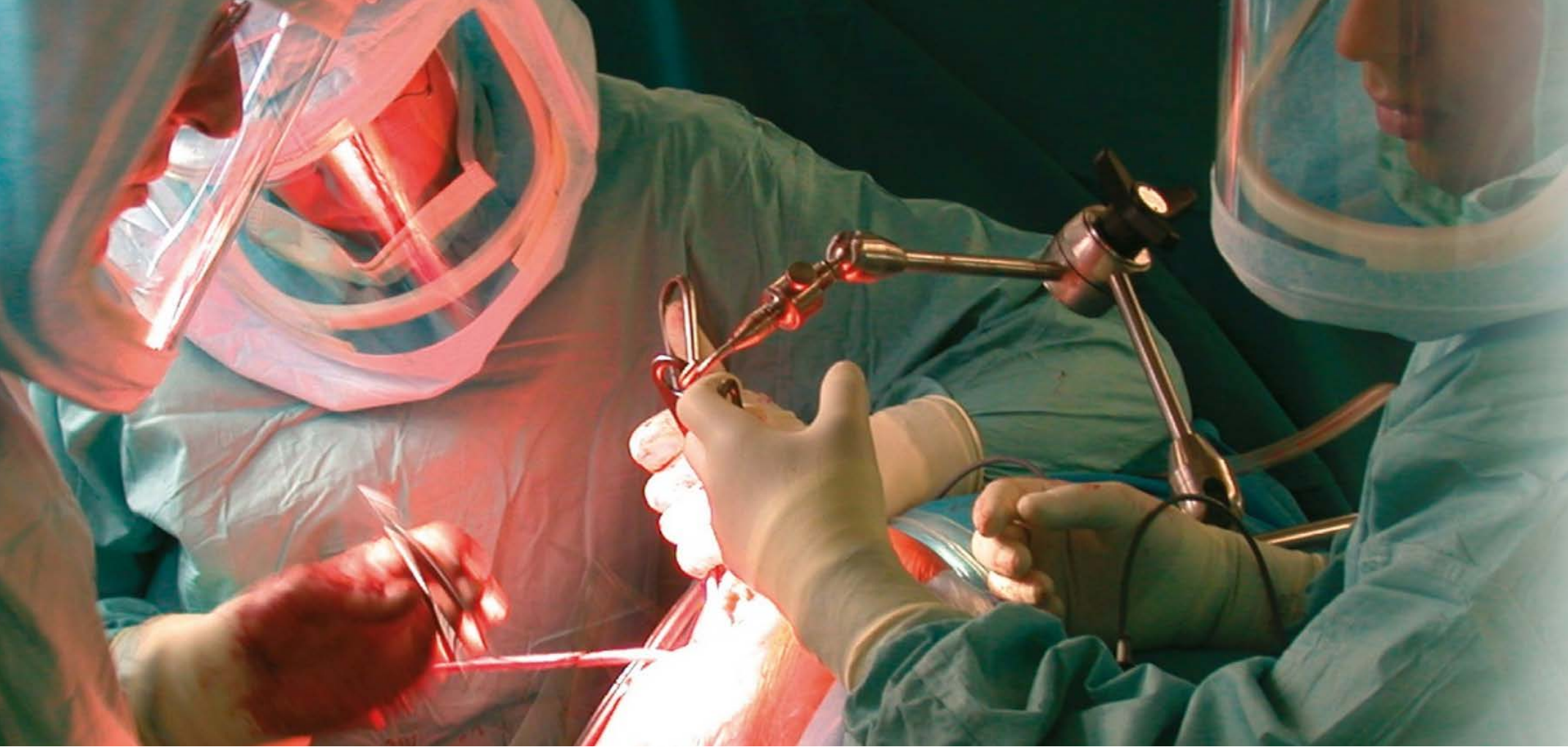


9. CULTIVATES INNOVATION

By reducing the time spent on repetitive and time-consuming testing and development tasks, unified modeling and simulation frees up resources for more creative and innovative thinking. Companies can dedicate more time to exploring cutting-edge designs, staying ahead in a competitive market⁸.

Industry Example:

- A company developing cancer screening technology used simulation to prototype entirely new designs in weeks rather than months, gaining first-mover advantage.



10. ACCELERATES TIME-TO-MARKET

Because time is of the essence in the medical device industry, many medical device companies utilize simulation to virtually test their products early in the product development cycle. However, they often rely on simulation specialists outside their organization which slows the process. A platform-based approach that tightly integrates modeling and simulation empowers engineering teams to harness the value of simulation to accelerate time to results, leading to faster innovation and greater efficiency.

Key Statistic:

- Time is of the essence in the medical device industry, especially with over 6,500 medtech companies in the U.S. alone⁹.

CONCLUSION

For medical device companies to thrive in a market expected to nearly double in value by 2032, integrating unified modeling and simulation with powerful tools like **3DEXPERIENCE** Simulation and SOLIDWORKS are no longer a luxury; it’s essential. Beyond streamlining workflows, reducing costs, and enhancing product quality, these tools are enabling the medtech industry to meet

compliance requirements, innovate faster, and create life-saving devices with unparalleled precision.

Explore how SOLIDWORKS plus **3DEXPERIENCE** Simulation tools can bring efficiency and innovation to your medical device designs.

¹<https://www.globenewswire.com/news-release/2023/12/04/2790172/0/en/Medical-Devices-Market-Size-Estimated-to-Reach-USD-996-93-Billion-By-2032.html>
²<https://wjarr.com/sites/default/files/WJARR-2024-1740.pdf>
³https://www.solidworks.com/sw/docs/Aberdeen_Sim_FINAL_virtual-prototyping.pdf
⁴https://www.solidworks.com/sw/docs/Aberdeen_Sim_FINAL_virtual-prototyping.pdf
⁵<https://www.3ds.com/industries/life-sciences-healthcare/medical-devices>
⁶https://mdic.org/wp-content/uploads/2023/01/CMS_Landscape_Report.pdf
⁷<https://www.einpresswire.com/article/721769981/virtual-prototype-market-report-2024-market-insights-and-future-outlook>
⁸<https://www.mpo-mag.com/exclusives/5-ways-simulation-in-medical-device-design-accelerates-innovation/>
⁹<https://www.fortunebusinessinsights.com/industry-reports/medical-devices-market-100085>

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