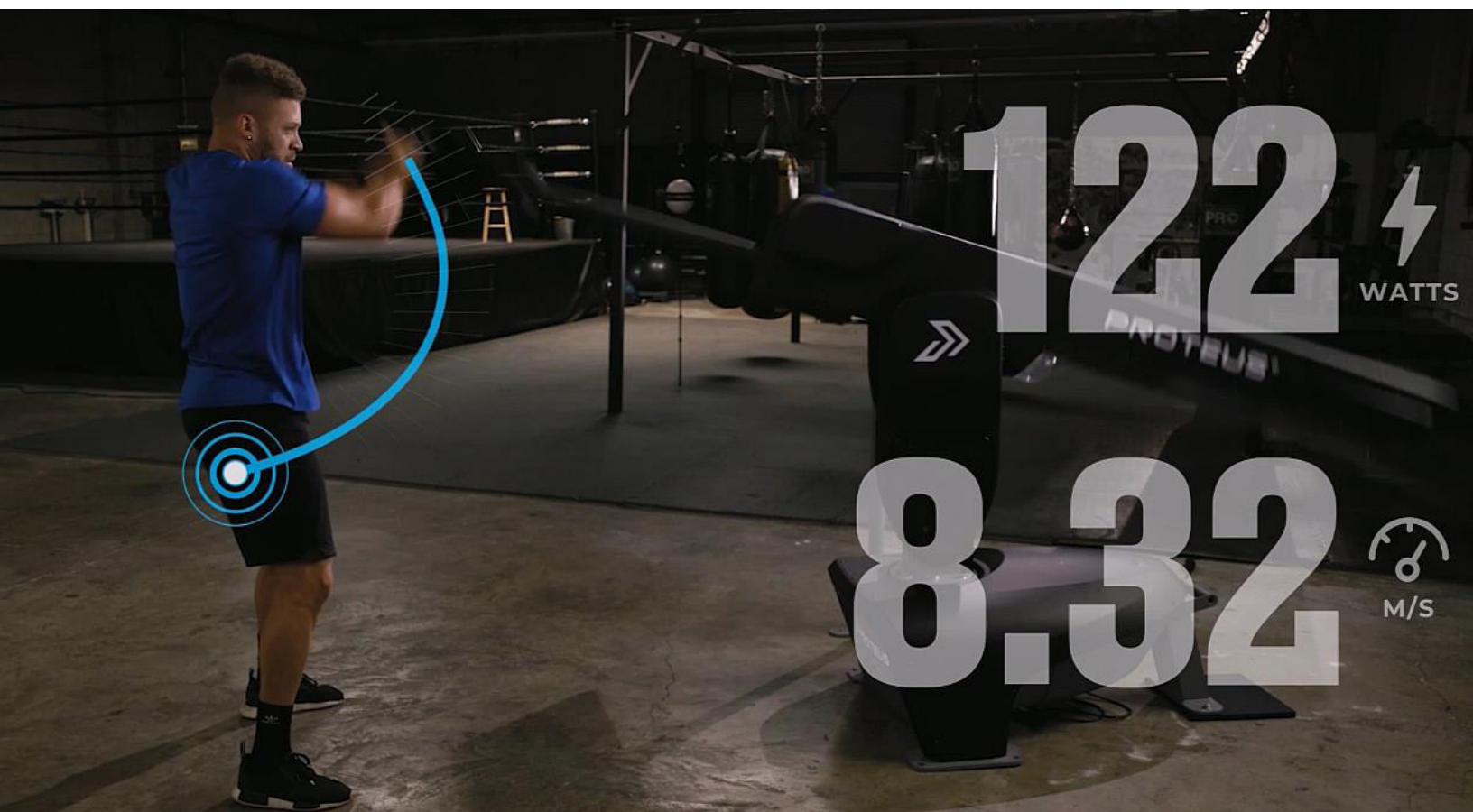


# PROTEUS MOTION

INNOVATING A COMPLETE PHYSICAL TRAINING AND STRENGTH-TESTING SYSTEM WITH 3DEXPERIENCE WORKS SOLUTIONS

## Case Study



Faced with design for manufacturability, design for assembly, and design for costs challenges during the height of the COVID-19 pandemic lockdowns, Proteus Motion turned to 3DEXPERIENCE Works modeling, design, data management, simulation, collaboration, and communication solutions to commercialize its advanced physical training and strength-testing system, which surpasses previous physical training and strength-testing products because it incorporates all human movements in 3D and has been adopted by some of the most renowned athletes, trainers, and institutions in the world.

### Challenge:

Quickly develop an innovative physical training and strength-testing system for training, exercise, and rehabilitation purposes, which incorporates all human movements in 3D, not just straight line movements, and takes the place of 20 pieces of exercise equipment, while avoiding repetitive and costly prototyping cycles.

### Solution:

Implement modeling, design, data management, simulation, collaboration, and communication solutions—including **3DEXPERIENCE** SOLIDWORKS Premium, **3DEXPERIENCE** SOLIDWORKS Professional, 3D Creator, 3D Sculptor, Collaborative Industry Innovator, and 3DSwymer roles—from the **3DEXPERIENCE** Works portfolio, which operate on the cloud-based **3DEXPERIENCE** platform.

### Results:

- Cut design cycles in half
- Saved \$20,000 in prototyping costs
- Reduced BOM costs by factor of four
- Shortened assembly time from two weeks to three hours

Proteus Motion founder Sam Miller drew inspiration for the advanced physical training and strength-testing system the company developed from his own childhood sports rehabilitation experiences and a mechanical prototype developed at MIT by his father, Larry, in the early 1990s. Today, Proteus Motion's hardware and software products form the centerpiece in many sports performance, physical therapy, and commercial gym settings, and have been adopted by some of the most renowned athletes, trainers, and institutions in the world, including Kansas City Chiefs Quarterback Patrick Mahomes. Customers include professional and college sports teams, commercial fitness and sports performance centers, and physical therapy and chiropractic facilities.

Winner of many innovation and design awards, and named one of the 10 Most Innovative Sports Tech Companies by Sports Business Journal, the Proteus Motion system surpasses previous physical training



"The **3DEXPERIENCE** platform gave us access to SOLIDWORKS CAD, SOLIDWORKS Simulation analysis, SOLIDWORKS Visualize rendering tools, and a cloud-managed PLM [product lifecycle management] system. Our team designed, prototyped, and ultimately built the Version 2 system thanks to all of the tools provided by the **3DEXPERIENCE** platform. I'm not sure if we'd have even been able to create and launch the Version 2 system with our existing design software, but if we could it would have taken at least twice as long as it did with the **3DEXPERIENCE** platform."

– Paul Vizzio, Director of Hardware Engineering

and strength-testing products because it incorporates all human movements in 3D, not just straight line movements, and can do in five minutes what it would take three hours and 20 pieces of equipment to achieve, according to Director of Hardware Engineering Paul Vizzio. "Our system is basically a complete sports science lab in a box," Vizzio says.

He adds that while the company used a free version of Fusion 360® CAD software for initial development of a proof of concept for the system, the four-person design team realized that it would need advanced solutions to take the system to market, especially when the COVID-19 epidemic shuttered the office. "Even though the idea and the concept was there, actually executing and designing for manufacturability, designing for assembly, and designing for costs were huge challenges," Vizzio recalls. "In setting out to commercialize this product, we realized that we needed something professional, something robust, and something strong to finalize development. When COVID hit and our office got shut down, we realized that our solution would also need to be cloud-based to support remote work and collaboration."

Proteus Motion found its product development solutions on the cloud-based **3DEXPERIENCE**® platform, implementing modeling, design, data management,

"We were initially interested in the desktop version of SOLIDWORKS but realized that the hardware architecture and PDM [product data management] server were too costly for us," Vizzio explains. "With **3DEXPERIENCE SOLIDWORKS Premium**, we gained the FEA [finite element analysis] and rendering capabilities that we needed to take the product to market, including the realistic animation of how our system works. With **3DEXPERIENCE SOLIDWORKS Professional**, other members of the team also contributed to the design. In short, we had the tools to commercialize the product while working remotely and without exorbitant hardware costs."

Using **3DEXPERIENCE** Works solutions, Proteus Motion redesigned its first version of the system to be more durable, mass-producible, affordable, accurate, and user-friendly, cutting its design cycle in half in the process. "The ROI [return on investment] that we've seen from **3DEXPERIENCE** Works solutions has been huge," Vizzio stresses. "The BOM [bill of materials] costs are drastically down by a factor of four. Assembly time is down—from two weeks to three hours—and productivity is way up. Everything has just been sped up."

The screenshot displays the SolidWorks CAD environment. On the left, the 'Feature Tree' lists the components of the assembly, including 'Proton V2 Housing', 'Linear Sliding Bearing', 'Hight Assembly V2', 'Base Assembly V2', 'Linear End Assembly', 'Proton Arm Roller Assembly', 'Quick Connect V2', 'Proton Arm V2', 'Linear Brake Mount', and 'Linear End Assembly V2'. The 'Proton V2 Housing' is highlighted. On the right, a 3D model of the assembly is shown, with a blue line indicating the 'Proton V2 Housing' component. The model is a complex mechanical assembly with various parts and joints.



## ENSURING SAFETY, REDUCING PROTOTYPING CYCLES

"We led with FEA simulations and had the results dictate the design of the system," Vizzio explains. "The materials, heat treatments, geometry, weld processes, and every design detail of the main

structure were simulated. By doing this virtually, it allowed us to quickly iterate and cycle through different design choices. Ultimately we combined this with our design for manufacturability approaches to settle on the optimal design for strength, cost, and build time of every component of the system. **3DEXPERIENCE SOLIDWORKS** Simulation also allowed us to cut down on the number of physical prototypes and testing that we needed to do. I would estimate that it saved us from two planned prototypes, each of which would have cost roughly \$10,000 to build."

## MANAGING DATA, ANIMATING HOW THE SYSTEM WORKS

In addition to cloud-based design and simulation, a primary reason that Proteus Motion chose **3DEXPERIENCE** Works solutions is its transparent data management. The company also leveraged the rendering capabilities of **3DEXPERIENCE SOLIDWORKS Visualize** to create video animations and photorealistic renderings of how the system works. "The data management/PLM baked into **3DEXPERIENCE** Works is one of the biggest drivers to what made us move forward with this platform," Vizzio points out. "Our previous data management was through filenames and unsearchable file hierarchies. We knew we needed a system with PLM, specifically revision management, baked into it, and the way that the **3DEXPERIENCE** platform uses it was the most seamless."

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"Rendering tools have helped us tremendously," Vizzio adds. "We developed our entire product video using **3DEXPERIENCE SOLIDWORKS Visualize** to [animate our machine](#) photorealistically. We use this video for sales, as an explainer for those who are just finding out about our product, social posts, and even recently for guiding customers through common service questions. The photorealistic images are used internally, and sometimes externally, to show overall design, directions as well as color, material, and finish choices."

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