



DESIGNWORKS

# BlackBox VR: Helping to bring the future of fitness to here and now

CASE STUDY

## | SITUATION |

Black Box VR is working to redefine the way people exercise. Combining components of virtual reality, hardware, game design and exercise, the company's goal is to build a fully immersive gym experience that makes workouts fun and challenging while helping people reach their fitness goals.

When the company finally found a VR system (HTC VIVE) robust enough to deliver the experience they envisioned, it was time to begin developing a machine that would deliver physical resistance to the user during the workout. Black Box VR envisioned a machine with handles to grasp, similar to a cable-weight machine, that would be controlled by inputs from the VR system. This would create a truly immersive workout, with the VR game controlling the weight experienced by the user.

With no engineers on staff at the time, or the technical experience required for such an endeavor, Black Box VR turned to SGW Designworks to help turn their vision into a reality.

## | APPROACH |

We began by segmenting the project scope into six phases – beginning with Phase 0, which focuses on defining and testing the most important constraints. In our experience, research findings and product decisions that happen early in development have a significant impact on subsequent development work. Our approach was to scope each phase at the end of the prior phase with an overall development scope/budget in mind and engage in frequent, detailed communication with the client throughout the process. This ensured that development plans adapted to design decisions and findings throughout the process and stayed on track with the overall need and resource level.

With Black Box VR, defining development cost prior to Phase 0 would have been impossible, which is why decisions made in this first phase around the core technology drove the scope and cost of all subsequent development work. During Phase 0, we identified that the highest risk development item was the technology providing variable load resistance in the system, which would also need to receive control inputs from the VR system.



*Initial design of the load generating subsystem prototype*

Phase 1 efforts focused on quickly prototyping and testing the top two out of six identified technologies that could be suitable for the application and choosing one as the basis for the new system. Through testing, we discovered a specific type of servo that was well-suited for and allowed us to begin conceptual design on multiple configurations. From there on, we used rapid Build-Test-Learn cycles to uncover and overcome specific technical hurdles, leading us to a full-system prototype that was ready for user testing. Having users test the system through daily workouts helped us refine design and improve durability and arrive at a fully functional prototype that Black Box VR could share with the world.



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3131 W. State Street #230 | Boise, ID 83703 | (208) 391-4000 | [sgwdesignworks.com](http://sgwdesignworks.com)

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Next, fast cycles of “Build-Test-Learn” were used through multiple phases of development. Many subsystem prototypes were built and tested throughout the process, overcoming specific technical hurdles in a system that is truly the first of its kind. Full system prototypes were also built, and users started testing the system with daily workouts. This was instrumental in refining the design and improving durability.

### | RESULTS |

Twelve months and five phases after kicking off the project, Black Box VR took our prototype to the Consumer Electronics Show (CES) in Las Vegas, where they received the CES Innovation Award and were awarded “Best Startup of CES 2018” by engadget.com. Shortly after, the company began steady-state production of the system and are now working on rolling out Black Box VR gyms in the U.S.



The load resistance system is substantial, for high-load workouts



“SGW Designworks was instrumental in making our product a reality. We knew what we wanted our product to be, but we needed to take it from a concept to reality. SGW’s iterative and collaborative approach worked really well for development of the system hardware, which allowed our internal team to focus on the software side of the project and on the business. We’re looking forward to our next project with SGW Designworks.”

- Preston Lewis, Co-founder & CCO | BlackBox VR

### SGW EXPERTISE APPLIED

- Feasibility Analysis
- Specification Development
- Technology Assessment
- System Prototyping
- Detailed machine design
- Rapid Cycles: Build-Test-Learn
- Prototype Development
- Mechatronics Engineering
- Design Optimization
- Manufacturing Handoff