

SUCCESS STORY

TOPIC NUMBER: N121-061

SBIR INVESTMENT: \$899,618

PHASE III FUNDING: \$20,700,000



PHYSICS BASED MULTI-TOUCH MOVEMENT INTERFACE CREATION FOR 3D MODELING AND SIMULATION

Jardon & Howard Technologies drew from its expertise in delivering training programs for the Department of Defense and created a modern and more realistic interface for Navy operators, reducing training gaps and costs.

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THE CHALLENGE

Current multi-touch pressure sensitive commercial off-the-shelf (COTS) hardware and software (e.g., Apple iPhones, Android phones, etc.) allow users to seamlessly interact with software applications using gestures, which are multi-touch pressure sensitive hand movements. This hardware and software limit potential by only employing a handful of human computer interactions (HCI) (e.g., panning and zooming). However, combining these gestures with real-time physics can result in more realistic and intuitive software applications. The Navy's goal was to research, define, and develop reusable real-time physics, navigation, and meta gestures application programming interface (API) software and standards for use in training, simulations, architectural design, and entertainment software applications on COTS multi-touch hardware.

THE TECHNOLOGY

Jardon & Howard Technologies (JHT) won Phase I and II SBIR awards and developed its Multi-purpose Reconfigurable Training System (MRTS). The MRTS technology is designed to instruct Sailors on submarine maintenance and operator tasks and reduces overall training costs and increases student throughput. The actual sub environment is emulated in a classroom using touch screens housed in large commercial racks. The simulation allows the user to manipulate 2D and 3D representations of knobs, switches and cables using common swipe, tap and pinch gestures. JHT also expanded the library of available gestures to trainees.

THE TRANSITION

In 2019, JHT was awarded a Phase III contract from NAVSEA worth \$7.2M to further evolve its MRTS technology for use on Navy subs. That same year, JHT was also awarded a \$6.9M sole source Phase III contract for its MRTS technology to support the Naval Air Warfare Center Training Systems Division (NAWCTSD) NATO Sea Sparrow Missile System (NSSMS) Operations and Maintenance Training System Simulator project.

JHT developed the latest iteration of its technology, the 3-Dimensional Multi-Purpose Reconfigurable Training System (MRTS 3D®), a game-based simulation system developed in tandem with the NAWCTSD in Orlando, Florida. JHT will be developing this training content as part of its latest \$6.6M Phase III contract. MRTS 3D is intended to replace the Navy's E-6B Mission Avionics Systems Trainer (MAST) while incorporating capability to train on new avionics block upgrades. The Navy E-6B Mercury is a communications relay and strategic airborne command post aircraft. Integrated into a Boeing 707 airframe, the E-6B provides reliable and enduring airborne command, control, and communications between the National Command Authority (NCA) and U.S. strategic and non-strategic forces.

THE NAVAL BENEFIT

This effort provided intuitive and reusable HCI for users, reducing training gaps and costs for expensive operator and maintenance equipment training, and expanding accessibility to these technologies for training and simulation software applications. The Navy also anticipates benefits beyond those realized by current gesture methods and expects this program will provide a path forward to create the next frontier of innovation in the HCI field. Simulation of equipment for training in various industries is becoming a necessity to provide a scalable solution reaching a larger audience at cost effective rates.

THE FUTURE

JHT's current Phase III contract with NAVAIR that is focused on the MRTS 3D technology is a 27-month development effort and is scheduled for completion in early 2024. It will result in delivery of a MRTS 3D simulation lab comprised of eight student stations controlled by an instructor operating station (IOS) at the E-6B training facility in Tinker, Oklahoma. Two squadrons are stationed at this facility, the "Ironmen" of VQ-3 and the "Shadows" of VQ-4, along with the schoolhouse responsible for training Navy pilots, aircrew, and maintenance personnel. Other industries that could benefit from JHT's training solutions technology include energy, education, industrial production, communications, and transport.