

Vortex Drives M113 Armored Personnel Carrier Simulator for Enhanced Training

With hundreds of drivers to train on the M113 armored personnel carrier, CONTEX Engineering's customer – a foreign military – had a real challenge. They had to get the new drivers up to speed quickly on multiple terrains and conditions, and yet the client lacked sufficient training grounds. As well as facing logistical problems, the customer wanted to avoid costly wear-and-tear on the personnel carriers typically caused by novice drivers. To overcome these issues, CONTEX was contracted to develop a fully featured M113 simulator.

Vortex Delivers the Ultimate Realistic Vehicle

To develop the vehicle dynamics, CONTEX initially considered using in-house resources. However, they soon realized there were many constraints to this approach. After a short evaluation period, they chose Vortex for a key reason, as Vice President Jerry Sun asserts: "We found that Vortex could handle the non-linear physics better than any other product. We were looking for extremely high fidelity in multiple on and off-road scenarios, and Vortex handled driving phenomena such as obstacles, drops in terrain, and collisions better than any other solution."

Producing authentic vehicle operation and response was essential for the project's success. The M113 behaviour had to faithfully reproduce how the real personnel carrier handled and reacted to obstructions and changes in topography. To help accomplish this, CONTEX collected actual M113 driving data, which was validated in the Vortex simulation to ensure the realistic dynamics that guarantee correct performance. "Vortex was an excellent choice for us because it is a theoretically sound physics model that allowed us to easily update and tune the actual vehicle dynamics," states Sun.

The Company

California-based CONTEX Engineering International provides simulators and engineering solutions to government and commercial customers worldwide.

The Situation

A foreign military required 30 simulation-based trainers to bolster its M113 armored personnel carrier training program. It needed to accelerate training, reduce equipment wear-and-tear, and expose trainees to a multitude of driving conditions.

The Solution

Vortex developed a customized vehicle dynamics model and simulation framework that combines accurate M113 behaviour and an interactive synthetic environment, all validated against actual vehicle performance data and behaviour.

The Results

By choosing Vortex, CONTEX ensured project success with the industry-leading COTS vehicle dynamics toolkit plus renowned Vortex expertise, which delivered a sophisticated yet easy-to-implement training solution for faster time-to-completion and reduced project risk.





The Vortex-powered M113 integrated perfectly into CONTEX's immersive simulators, which feature actual M113 gauges, controls and pedals.



The accurately simulated M113 drives across various terrains, through shallow water and ditches, and over low walls.

"Vortex is a major success factor for this project. The fidelity of the vehicle's driving is exceptional and maps exactly to the behaviour of the actual vehicle. CM Labs has been a valuable partner in the delivery of these simulators."

Dr. Jerry Sun, Vice President,
CONTEX Engineering International

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Vortex Provides Important Project and Training Benefits

The powerful combination of Vortex – a commercial off-the-shelf product – and the Vortex team's deep physics, vehicle dynamics, and computing expertise made all the difference in the success of this project. It accelerated simulator development, ensured smooth integration of multiple technologies, and reduced the risks of deploying a complex immersive training environment.

Due to Vortex's flexible and robust framework, it easily integrated into the full CONTEX training solution such as a 3D visual database, audio, and authentic M113 operator controls and gauges. CONTEX fleshed out its simulators with sophisticated training courses, and now just one instructor trains up to 30 students at a time – the ultimate in training efficiency.

A significant part of the project's success was the availability and commitment of the Vortex team, who assisted with on-site acceptance testing to put the finishing touches on the solution. "Having Vortex expertise available for all project phases, including on-site consultation and updates, made all the difference for us," says Sun. "Our client was very happy with the results. And we'll definitely be working with the Vortex team for our next major simulation project."

Now with the M113 training center fully operational, hundreds of drivers are experiencing real-world-based Vortex behaviour to prepare them for numerous driving challenges in different landscapes and conditions. This is another example of how Vortex physics and expertise accelerate training solutions, reduce implementation costs, and produce the most realistic synthetic environments attainable in the simulation industry.

About CM Labs Simulations Inc.

CM Labs provides dynamics-based behavior modeling solutions and services to organizations around the world. With a long history in the real-time visual-simulation and gaming industries, CM Labs produces feature-rich simulation capabilities that set the industry standard for interactive 3D dynamics and simulated mechanical equipment behavior.

Through Vortex, its flagship simulation software, CM Labs provides capabilities for training simulators, mission rehearsal, serious games, virtual prototyping, and testing.