

## Training in motion



## Simulation-based heavy equipment training solutions

Vortex simulators provide an immersive environment that leads to essential skills development, increased safety, and reduced training costs. Developed with operators, trainers and simulation experts, Vortex simulators deliver an integral training solution to better prepare heavy equipment operators for the challenges ahead.

# Vortex value.

With Vortex simulators, organizations have an ultra-realistic and cost-effective solution for operator training and skill refinement that perfectly complements equipment seat-time.



## Scalable solutions.

Vortex provides scalable solutions to meet every training need and budget. From the entry-level VxTrainer to the ultra-realistic VxMaster and full team-based learning installations – Vortex fits your requirements now and can grow with your organization.

## Adaptable systems.

Vortex simulators can be configured for multiple training requirements. Equipment types, controls and training exercises can be swapped quickly to use your investment for different machines. Even if you train operators in multiple industries – from high-rise construction to offshore drill rigs – Vortex can handle your needs.

## Classroom portability.

Vortex simulators are designed to fit into existing classroom installations. They are compact and portable, yet they still offer all the training value of older fixed installations at significantly less cost. They do not require special infrastructure or maintenance. And since Vortex simulators are built with off-the-shelf components, they can be easily administered by your existing IT staff.

## Customer care.

Vortex simulators are bundled with complete customer care packages that protect your investment. These packages offer on-site installation, training, hardware maintenance and ongoing software upgrades.



# Vortex advantage.

Vortex simulators enable organizations to optimize their capital assets and maximize the availability and capability of their equipment and operators.

## Safety first.

Simulation-based training allows operators to train for both everyday and extraordinary situations. It is not practical to train operators how to react to a shifting load, unstable ground, or high winds using real equipment. With simulation-based training, operators can practise difficult tasks and learn instinctively how to react to the unexpected.

## Cost reduction.

Training skilled operators is a major investment. Simulators can train apprentices in the basic skills and provide experienced operators with new skills at a fraction of the expense of using actual equipment. Simulators won't replace seat-time in real equipment, but can dramatically reduce the demands on training and production machines. They are also an effective student screening tool.

## Experience.

It is difficult to give apprentices the seat-time they need to understand the equipment. Simulation-based training easily allows students to log extra hours with less supervision and very little cost. It also allows operators to experience new work challenges. Simulators widen the range of operator experience and instil confidence.

## Worksite efficiency.

Simulators not only help reduce training time, they also produce more efficient operators. Through repeated manoeuvres, new operators acquire crucial skills quickly. Learning on a Vortex simulator means they make fewer mistakes and are more efficient on the job.

## Reduce maintenance.

Maintaining a fleet of heavy equipment is costly. Even with the best training, students make mistakes and cause wear and tear. Simulators reduce maintenance costs and reduce the demand on equipment resources. Through the use of simulators, students understand the controls before they operate the equipment for the first time.





# The exercise is simulated. The skills are real.

Vortex crane and heavy-equipment simulators lead the way in operator experience. This ensures that the training translates into real on-the-job skills. Instructors can load multiple work-sites and provide novice through advanced students with a wide range of work conditions and tests.



## Construction Equipment

From crowded city sites to the open highway, Vortex provides a wide range of machines and training exercises for construction operations.

- Mobile cranes (truck and crawler)
- Tower crane
- Concrete pump
- Earth mover and excavator
- Concrete placement, fly-forming, erection
- Pile-driving, clamming, drag-lining



## Offshore Cranes

Offshore heavy-lift operations on drill rigs, back-loading supply vessels and performing subsea lifts on intervention ships are all part of the training.

- Pedestal boom crane
- Knuckle boom crane
- Knuckle boom pipe-handling system
- Box boom crane
- Gantry crane



## Port Cranes

Efficient port operations are an essential part of the training process. Exercises teach operators to increase moves per hour, understand terminal processing and traffic flow.

- Ship-to-shore / quayside crane
- Rubber-tired gantry crane
- Straddle carrier
- Mobile harbour crane
- Reach-stacker
- Dock and ship pedestal cranes
- Bulk material handling

# Scalable and portable solutions for every need.

All Vortex simulators provide stunning realism through four components: lifelike 3D visuals; high-fidelity equipment dynamics and environmental effects; authentic machine sounds; and real machine controls.

## VxTrainer Series

The VxTrainer is a cost-effective entry-level training platform. It will fit any training budget and deliver significant results. While easy on the budget, the VxTrainer still delivers significant value – particularly for novice skills training, equipment familiarization and for student recruiting. It is also a perfect supplement to a VxMaster since it is affordable enough for multi-seat installations. Training organizations can easily provide practice time with larger class sizes. With simplified controls and on-screen LMI/SLI, students are quickly up to speed with equipment operations.



## VxAdvantage Series

The VxAdvantage is available in both single and dual large-screen HD display configurations. It packs many of the same features as the VxMaster, but in a smaller and highly portable footprint. With the dual configurable display option, it can provide the visual sightlines needed for both boom and gantry or tower operations. It uses the same controls, operator chair and LMI/SLI as the VxMaster. Computers and display mounts are all assembled in a single unit – making setup very easy. VxAdvantage is the perfect solution where portability and off-site instruction is required.



## VxMaster Series

The VxMaster provides a fully immersive and cost-effective solution for training centers to implement rigorous, standards-based heavy equipment training. It leads the industry with real crane controls, cab-like enclosure, surround visual-system, lifelike worksites, an instructor's station and more, providing the ideal high-fidelity environment for building real operator skills. VxMaster features a high-resolution graphics processor, multiple large HD displays and a sophisticated head-tracking system for precise point of view.



# You work as a team, so train as a team.



Unique *team-player* simulation technology from Vortex allows you to train the entire operations team in rigorous real-life exercises. All operations team members must work together – for crane operations this means the operator, slinger and banksman (signaller) – to complete the training, and if one fails, the team fails. Vortex classroom-based learning provides multiple stations for all team members to learn proper procedures, best practices and teamwork – just like on the real job, while working to avoid operational mistakes and safety violations. From job planning to after-action review, Vortex collaborative learning builds effective teams.



## Operator Training

The operator works in the simulated crane cabin, but is responsible for the entire crew's performance. He leads the team and receives signals from the banksman on-screen. From the cab, the operator sees the worksite and load, and can rely on the banksman in a blind lift. The operator can observe the banksman and slinger avatars working on the virtual site.

## Banksman Training

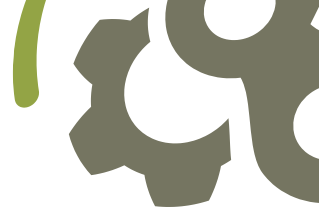
The banksman or signaller is linked to the team-based training exercise in two ways. First, he can walk his avatar throughout the site, erect barriers and observe the working conditions while in constant radio contact with the operator. Second, his signals are displayed (picture-in-picture) to the operator in the cab.

## Slinger Training

The slinger is an essential member of the team. He must direct his avatar to walk through the simulated worksite, erect barriers and perform a safety inspection of lifting gear and loads. If there is something wrong, the slinger must record the incident. The slinger also slings the load for the operator to perform the lift and can even pull on taglines to help land the load.

## Team Review

Training is not complete without job planning as well as after-action review. The Vortex simulator environment provides the tools to review the job with the team. The instructor can replay operations as well as quickly highlight performance faults by any team member. During playback, the exercise can be observed from any vantage point. Faults such as load pendulums, impacts, safety incidents and failure to protect others on the worksite are all logged.



## Serious simulation for a serious job.

Vortex is the leader in simulating the fundamental physical behaviour of machinery and interactive environments for training applications. Sit in the cab of a Vortex simulator and experience the difference.

If the simulation isn't right, the training won't be right either. Imagine having to *unlearn* bad procedures and incorrect responses because the training did not properly represent the machine, load dynamics, controls or the visual environment. Imagine the safety risk of poor training.

Vortex technology has been used for many years by the world's leading military training simulation companies. It has been used as the core technology to simulate battle tanks, convoy driving and even robots for IED search and destroy. It is used to train soldiers worldwide to operate heavy equipment in the toughest conditions.

Vortex engineers work closely with training professionals to ensure the simulated environments are ultra-realistic. Our specialists in vehicle dynamics, physics and 3D software build the industry's most compelling training environments. Vortex engineers not only operate the equipment to understand the real machine, we work closely with operators to test the virtual machine until they are completely satisfied with its accuracy and behaviour.



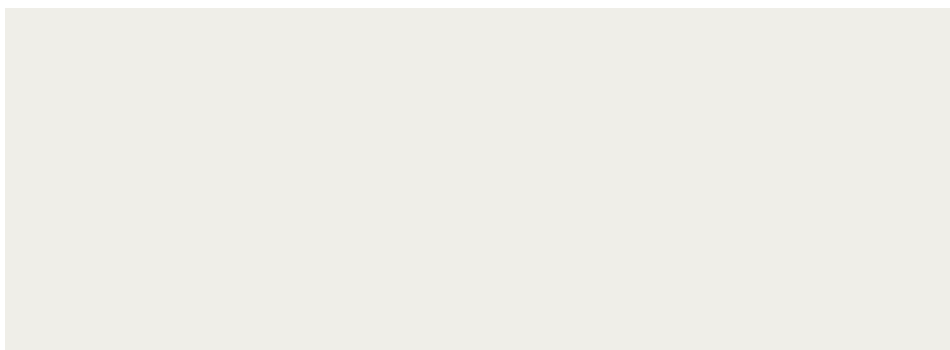
## Your worksite, your training.

Vortex provides off-the-shelf training solutions that easily integrate into your training program. We can also customize our solutions to meet your exacting requirements. We've built simulations for every conceivable machine – from locomotive-mounted pile-driving to six-legged walking forestry harvesters. We have modelled simulated environments from the surface of Mars to the deep sea. If you require specific equipment, real worksites or unique training exercises – we can quickly deploy them in the Vortex simulator framework and deliver a complete training solution. We also provide customized hardware and display solutions – from a single desktop display to large multi-projector dome installations.



## About Vortex

The Vortex team provides simulation-based training solutions to companies and training facilities in the defence, construction, mining, oil and gas, port operations and marine sectors. With a long history in simulation-based heavy-equipment training, the Vortex team produces feature-rich immersive environments that set the standard for interactive team-based skills development. Vortex expertise and technology bring intelligent training, operations planning, and virtual prototyping to life around the world. Vortex customers include Honda, John Deere, L-3, Lockheed Martin, NASA, Carnegie Mellon University, and over 100 other leading companies and educational institutions.



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