

Vortex – The Leading Marine and Subsea Equipment Simulation Toolkit

From top-sea to the ocean floor, Vortex rules the marine and subsea visual-simulation sector. Put Vortex's high-fidelity physics-based motion and behaviour into virtual cranes, ROVs, cable systems and more for successful operator training, operations planning, and virtual prototyping/testing applications.

▶ Vortex Benefits

- Can save man-years of development and coding effort
- The multi-talented Vortex team will help you realize your goals with rapid technical support and implementation services
- Provides robust modeling capabilities – featuring engineering precision, physics-driven motion, and reusable models
- Renowned physics engine produces lifelike, repeatable behaviour for accurate real-time applications
- Easy integration with scenegraphs such as OSG and Vega Scene Graph, and game engines
- A mature commercial product, including upgrades, documentation, and support



Vortex-in-the-Loop for Superior Operator Training

Extensively used to improve operator skills and reduce training time, Vortex allows developers to quickly and easily add the mechanical and environmental behaviour necessary to effectively train operators who work with offshore heavy equipment and underwater vehicles such as ROVs. Simulations with Vortex-in-the-loop ensure mission-critical procedural skills and valuable feedback for advanced equipment use and intervention procedures.

Multiple Benefits for Operations Planning

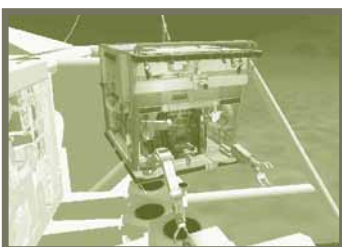
Add Vortex's real-time physics to your simulation project to accurately predict the outcome of engineering operations that involve ships, cranes, and cable systems operating in challenging environments. Vortex excels at accurately simulating – rather than just animating – complex operations, maximizing machine performance, and identifying problems long before expensive projects are deployed offshore or below the surface.

Reduces Physical Prototyping Costs and Improves Testing

Vortex is perfectly suited for virtual prototyping. Its robust and flexible simulation framework allows developers to integrate Vortex-powered mechanical systems with control-system applications developed in LabVIEW or Simulink. By using Vortex in prototyping multi-equipment processes and testing real control systems, it reduces costly physical prototyping and leads to safer operations.

Impressive Features for an Array of Applications

For marine and subsea projects, Vortex provides developers with a fully stocked toolkit and purpose-built modules to rapidly model highly realistic equipment and worksites featuring virtual port or offshore cranes, ship-to-ship operations, sonar sensor simulation, robotics, grasping, cables and tethers, environmental effects, floating hulls, flight dynamics for submersibles, cable systems and more.



Used by the world's top ROV suppliers, Vortex delivers high realism for real-time flight dynamics, grasping, tether management and subsea environmental conditions.



Vortex is ideally suited to marine equipment and crane applications since it accurately simulates the equipment and the complete virtual environment.



With both active single-beam sonar and sidescan sonar, Vortex equips operators with real-world navigation, object identification, and seabed-mapping skills.

Wide-Ranging Marine and Subsea Applications

Here are just some of the applications our customers have deployed:

- **Cranes:** Port, offshore, and shipboard cranes for simulation of crane dynamics, cable systems, load dynamics, lift operations, and ship/platform motion
- **Cables, lines and tethers:** Mooring lines, tethers and towing, ship-to-ship and ship-to-shore transfers via cable systems, subsea cables, catenaries, and risers
- **Replenishment operations:** Helicopter payload drops and receiving on deck
- **Dredging:** Heavy-duty dredging equipment simulations and dredging-operation planning
- **ROV pilot training:** Turnkey simulators within ROV control systems, ROV propulsion and flight dynamics, tether management, and robotic manipulator behaviour
- **Sensors:** Simulating virtual ROV cameras, laser scanners, depth cameras, visual cameras, pressure, force, contact, and position sensors
- **Sonar:** Sidescan sonar, which captures wide areas of the seafloor through a cascading waterfall display; and active single-beam scanning sonar with rotating transducer array, displayed on a Plan Position Indicator (PPI)
- **Underwater mission planning and virtual testing:** Operations of autonomous underwater vehicles (AUVs), ROVs, seabed trenchers and other specialized subsea equipment
- **Robotics and manipulators:** Simulating accurate manipulator arm movements and object collisions/responses, grasping of tools and equipment, specialized tools for cable cutting, cleaning and intervention operations
- **Subsea environment modeling and visualization:** Seabed visualization, hydrodynamic effects of ocean currents and buoyancy, floating detritus, visibility effects of stirring up sediments and mud, low visibility, and lighting

Marine/Subsea Customers

Here is a partial list of Vortex marine and subsea customers:

- ▶ **Industry:**
Acergy, GRI, Northrop Grumman, Oceaneering, Perry Slingsby, and Trimble



behaviour in motion

