

Vortex Studio Powers Bluedrop's Rescue Hoist Simulators to Save Lives and Training Costs



Simulating rescues with no room for error

Precision is critical when a 21-tonne twin-blade helicopter is hovering over a ship in the open ocean. Gravity, ocean movement, wind, and cable torque all pose unique challenges, and chopper teams have no room for error when lowering a rescuer to recover people or cargo.

This was not lost on the team at Bluedrop Training & Simulations Inc. as they began development of a simulator designed to train the use of a helicopter hoist. Bluedrop has years of experience providing training services to clients worldwide, including all three branches of the Canadian military, and the Australian and Danish air forces. They knew that simulation is the key to training crews for situations that are too risky to rehearse in real life.

Bluedrop used virtual reality (VR) helmet mounted displays (HMDs) to provide rescue operation visuals, and an actual moving hoist cable as a control and haptic feedback system. However, the team also needed to simulate the actual environment, the helicopter motion, and the cables and lifting equipment required to truly represent the actual scenarios trainees might face.

"Realism is much more than just visuals," says Scott Kaiser, Director of Product and Development for the Halifax, Nova Scotia firm. "To offer a complete training experience, we needed our simulation to be as physically truthful as possible."

World-class simulation provided by Vortex Studio

In September 2015, Kaiser and his colleagues at Bluedrop started the search for a tool that could provide accurate cable simulations. "We turned to the market to find an off-the-shelf, high-fidelity cable system we could integrate into our end product," Kaiser says. "CM Labs and their Vortex Studio platform quickly stood out as the industry-leading solution in this space."

Vortex Studio is the industry standard for building and visualising simulations. With the platform simulating a wide range of mechanical devices, it has been used in the aviation sector to add landing gear, refueling capabilities, and cables to existing flight simulators. Additional capabilities provided by Vortex Studio for flight simulator applications extend to ground operations such as de-icing, towing, re-fueling, re-arming, and others.

Vortex Studio was developed to provide users who have a focus on engineering with a simple content creation platform that enables drag-and-drop workflows rather than software coding. It's this platform that allowed Bluedrop to recreate the helicopter cable and hoist, and use engineering properties and specifications to emulate the most true-to-life scenarios possible.

"A visual display provided by an image generator, displaying cables and hooks hanging down from a helicopter, is not sufficient," says Marc-Alexandre Vezina, product manager for Vortex Studio at CM Labs. "A lot of forces are acting on a cable — tension, torsion, gravity, and friction for example. The Vortex Studio platform is designed to simulate this."

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High-value training with lives in the balance

Bluedrop is now leveraging CM Labs' technology for two training simulators under development for military and aerospace clients. In one such partnership with The Boeing Company, Bluedrop used Vortex Studio to develop a training platform for the twin-rotor CH-47 Chinook helicopter. The 42-foot-long simulator applies VR technology to teach users how to operate the aircraft's three hooks.

In particular, the simulation allows Boeing customers to train for high-risk scenarios such as night-time and rough weather operations, mechanical issues such as cable breaks or damaged winches, and awkward loads, whether due to incorrectly attached loads, an uneven centre of gravity, or panicked rescuees.

Along with the safe, high-value training experience that the Bluedrop simulator offers to Boeing, it also reduces wear and tear on equipment, fuel consumption, and logistics and planning time. Training schedules no longer hinge on helicopter and crew availability, weather, or any of a host of other factors.

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Courtesy Bluedrop Training & Simulations Inc.

Bluedrop's Kaiser agrees with that assessment, but notes an even more significant benefit, "When a client needs to respond to an incident and lower a hoist, it's risky for everyone involved. Having flight crews who know how the basket will react to the rough elements they'll face during a rescue mission, that's the type of experience that will save lives."