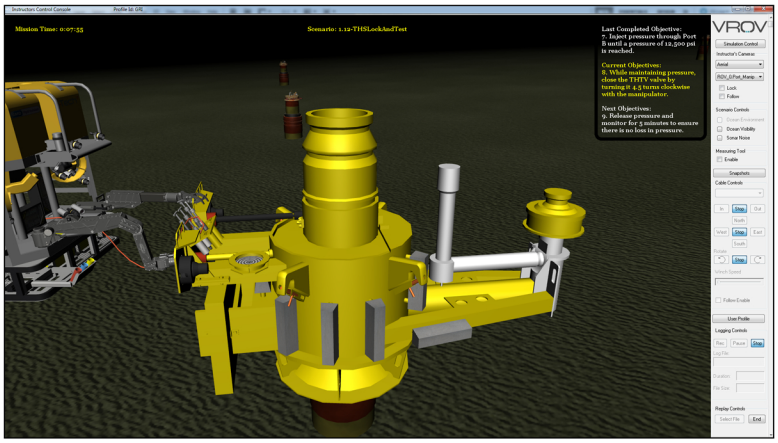
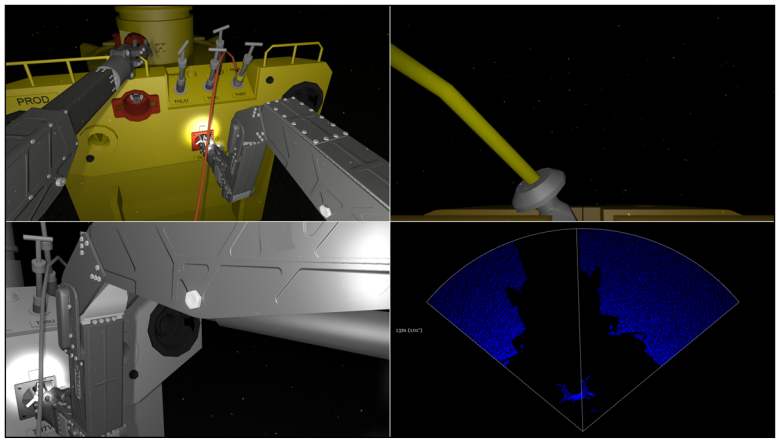
VROV Simulator





VROV Simulator output from single computer. Left: Instructor's view. Right: Split-screen custom display depicting 3 cameras and 1 sonar.

VROV

Virtual Remotely Operated Vehicle

VROV is a 3D interactive real-time simulation system which supports the complete range of AUVs, Inspection and Work Class ROVs, and the full spectrum of sensor and intervention subsystems. Since 1999, VROV has set the standard in interactive, real-time subsea simulation, featuring fully interactive tether dynamics, manipulator functionality and high-fidelity sonar and graphics simulation.

The goal of the system continues to be the enhancement of the safety and productivity of marine assets and operations:

As an instructional tool, VROV provides a cost-efficient opportunity for a trainee to gain valuable stick-time and operational familiarity while minimizing risk to personnel and ROV equipment.

As a design and engineering tool, it consistently demonstrates its value in testing the form and function of subsea assets, including vehicles, tools and structures control software, and in facilitating training in operation and installation of assets.

Applications

DE-SIT
(Dynamic Electronic System Integration Testing)

Oil and Gas Field Intervention

Mission Planning and Rehearsal

Hardware and Control System Design Support

Search and Recovery

Features

Meets standards for IMCA Class A ROV Simulator and DNV GL certification

Maintains high-fidelity dynamic interactions while using complex systems and multiple ROVs

Sonar simulation based on signal simulation with multi-beam compatibility

Fully integrated with GRi's IDEA Field Development Kit products

Includes VROV Objective Overlay software to ensure the completion of training objectives

Provides support for a wide range of ROV tooling, including skids, torque tools, hot stabs, and various cutting tools for training in tooling operation

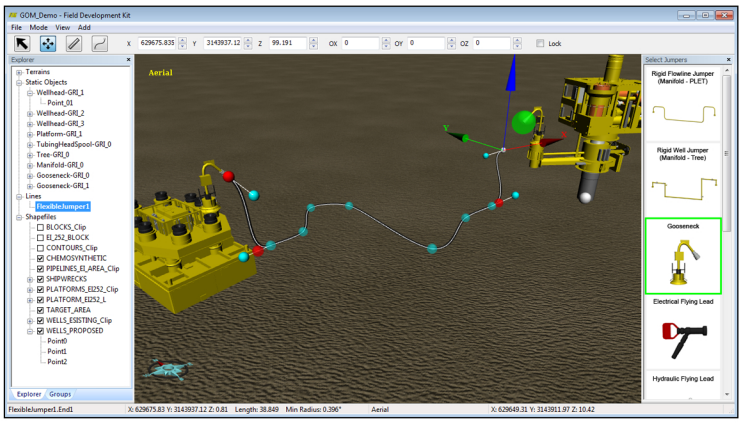
Simulates complex operations using a small computing hardware footprint (often a single CPU)

User-defined fault initiation to develop a pilot's crisis handling abilities

IDEA-FDK

Interactive Design, Engineering & Analysis Field Development Kit

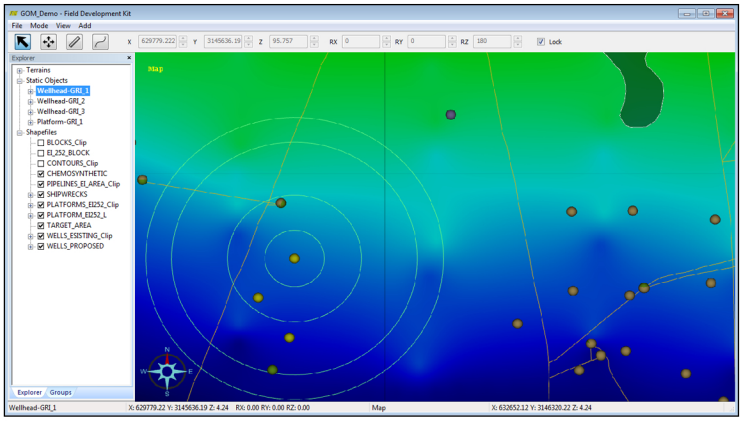
The IDEA-FDK is an advanced 3D design and visualization tool for offshore oil and gas projects. It equips users with a powerful set of tools tailored to provide solutions for the design and visualization needs of offshore oil and gas developments and their associated operations, thus increasing overall project awareness and enhancing operational safety and productivity.



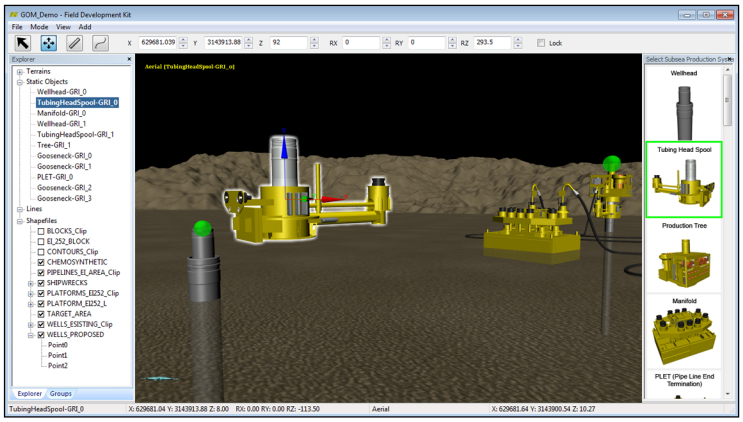
Custom flexible jumper creation

Applications

- Flowline and Cable (Flying Lead) Routing
- Field Expansion Planning
- Integrated Data Visualization (GIS, Seismic, Bathymetry, etc.)
- ROV Accessibility Testing / Clash Detection
- Simple Desktop Jumper Metrology
- Mission Planning and Rehearsal



Map view displaying imported GIS shapefile data



Field assembly using predefined equipment snap points

Features

Import bathymetric data generated from real-world surveys to create a 3D terrain and geo-reference the scene accordingly

Plan and visualize equipment layouts, including pipe and cable routing, by adding and positioning 3D equipment models and creating 3D jumpers, flying leads, flow lines, and umbilicals to interconnect the equipment

Import GIS (Geographic Information System) shapefiles to enhance the scene with real world mapping data for pipelines, equipment positions, geo-hazards, exclusion zones, etc.

Export GIS shapefiles containing mapping and equipment positioning information based on the bathymetry, 3D equipment positions and orientations, and line layouts designed in the FDK. These shapefiles can then be used in other GIS applications

Capture screenshots, videos and simulation log files which can be used for review, collaboration and marketing purposes

Add a dynamic ROV model to the scene and switch to simulation mode, allowing the user to “fly” the ROV through the 3D environment and interact with equipment models for the purposes of accessibility testing and mission planning

Integrated engineering analysis tools

iDEA Field Development Kit

Inspection Class ROV Simulation Training

Inspection Class ROVs demand a training simulator with capabilities equal to the importance of the tasks they perform. They are used to facilitate the safe and efficient undertaking of activities where the use of work class ROVs or divers is inadvisable or impossible. These ROVs have applications in sectors as diverse as the oil and gas industry, law enforcement, research and exploration, and the military.



Royal Canadian Navy Fleet Diving Unit members training with VROV Seabotix military spec simulators.

Military, Law Enforcement, and Homeland Security

- Body and evidence recovery
- Ship hull, waterways, port infrastructure, and incident inspection
- Mine and contraband detection and countermeasures
- Black box search and recovery

Civil Infrastructure Integrity Support

- Inspection and maintenance of nuclear facilities
- Water pipes and tanks
- Bridges and dams



Features

- Fully interactive realism, challenging environments, and realistic tasks
- Wide range of training content with competency assurance
- Full array of sensory and ancillary intervention equipment, including cleaning and cutting tools, as well as tracked vehicles
- Embedded into new ROV system deliveries or as an after-market addition to existing systems
- Base system easily upgraded with a range of sonar (FLS or multi-beam) and manipulator options



TELEDYNE SEABOTIX

Oil and Gas

- Asset integrity inspection of pipelines and structures
- Gauge and connector inspection and cleaning
- Work class ROV intervention assistance
- Well capping and containment operations
- Debris identification and clearance assistance

VROV

Virtual Remotely Operated Vehicle

Download Now!

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VROV Simulator for Teledyne SeaBotix Vehicles: ROV Pilot Training, Competency Assurance, and Mission Planning and Rehearsal

TELEDYNE SEABOTIX

System Modelling



Working closely with Teledyne SeaBotix engineers, GRi Simulations has developed high fidelity models for the following vehicles:

vLBV300

vLBV950 (camouflage and regular texturing)

vLBC - Vectored Little Benthic Crawler

Systems, Subsystems, and Configurations

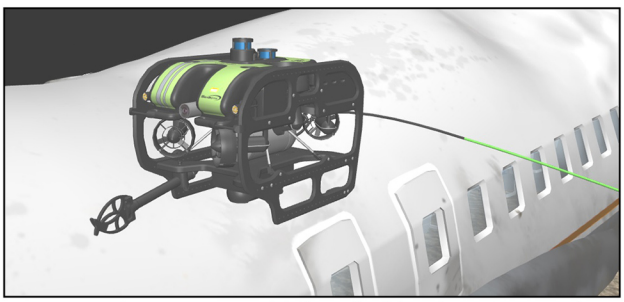
ROVs may be equipped with any applicable combination of manipulators or sonar to allow the user to engage with a variety of simulated environments.

Vehicles may be tracked or non-tracked.

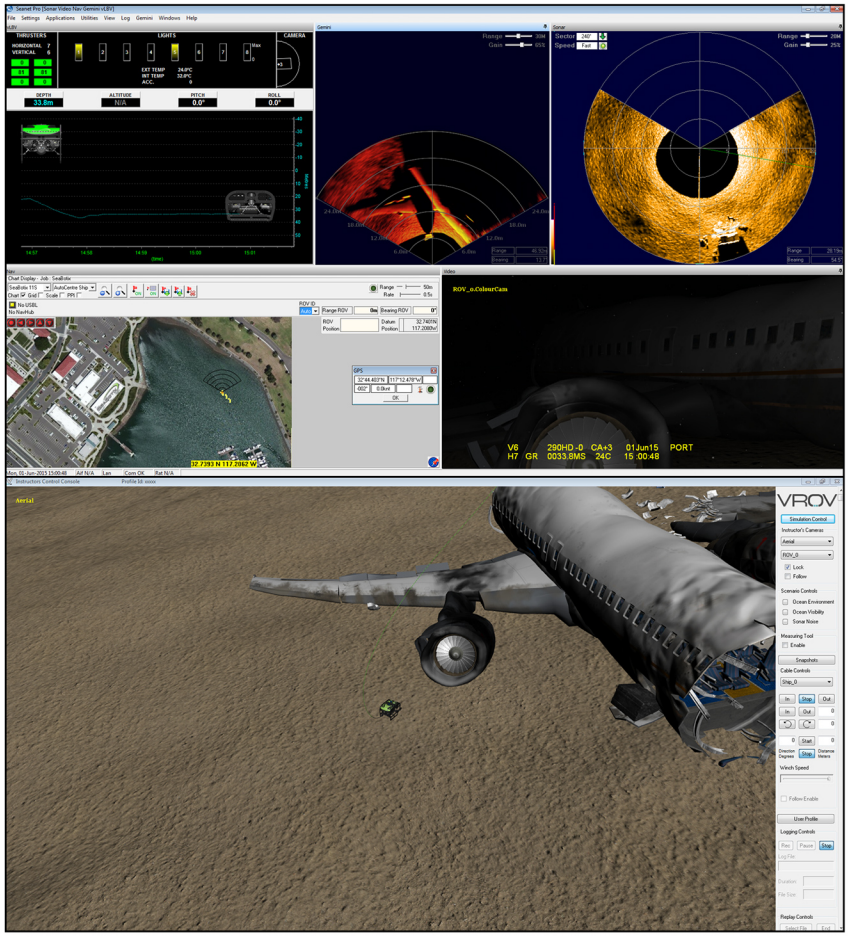
Two ROVs may be introduced to the scenario for team training opportunities.

GRi's generic sonar can be upgraded to a number of Forward Looking Sonar and Multi-Beam sonar options. GRi currently simulates the following sonar configurations for Teledyne SeaBotix operations:

- BlueView
- Super SeaKing/SeaPrince
- Micron DST
- Gemini



SeaBotix vLBV950 with interlocking jaw, operated with the SeaBotix Operator Control Unit (OCU).



Objective Overlay and Summary Report

Objective Overlay is a tool that helps guide and evaluate independent learning, providing scrolling task objectives and completion status.

Missions are logged, and summary reports generate details of task success and efficiency to support performance evaluation and competency assurance programs.

Applications

SeaBotix simulation enables training and competency assurance for a range of industries and applications:

- Maritime Defense
- Oil and Gas
- Homeland Security
- Search and Rescue/Recovery
- Forensic Evidence Recovery
- Ship Hull Inspection
- Infrastructure Inspection
- Mine Countermeasures



Royal Canadian Navy Fleet Diving Unit members training with VROV Seabotix military spec simulators.

Mission Development Module

Generic mission content allows the trainee to engage in a variety of simulated settings, from inland to Arctic environments. The Mission Development Module enables the user to import and populate mission components to fly various ROV system configurations. Object Randomization and Snapshot Capability promote demanding training missions and create virtually unlimited custom scenario content.

Scenario Randomization: Relevant objects such as search targets are randomized upon scenario start-up to allow dynamic training missions.

Snapshot: At any time in the course of simulation, a snapshot can create a sub-mission with different locations. This is also useful in targeting specific objectives.

Minimum Hardware Requirements



GRi recommends a laptop with the following minimum requirements:

System Element	Minimum Requirements
Processor	i5
RAM	4 GB
Graphics Card	NVIDIA 570 GTX

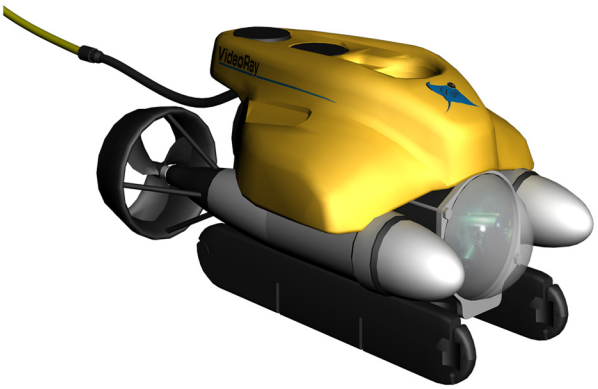
VROV
Virtual Remotely Operated Vehicle

Coming Soon!

store.grisim.com

VROV Simulator for VideoRay: ROV Pilot Training, Competency Assurance, and Mission Planning and Rehearsal

System Modelling



Working closely with VideoRay engineers, GRi Simulations has developed a high fidelity simulation model for the **VideoRay Pro4** ROV, which may be equipped with the following attachments:

Hull Crawler

Manipulator with various jaw attachments, including:
- Parallel Jaw
- Cutter
- VJaw

Sonars, including:
- Tritech Micron
- Teledyne BlueView

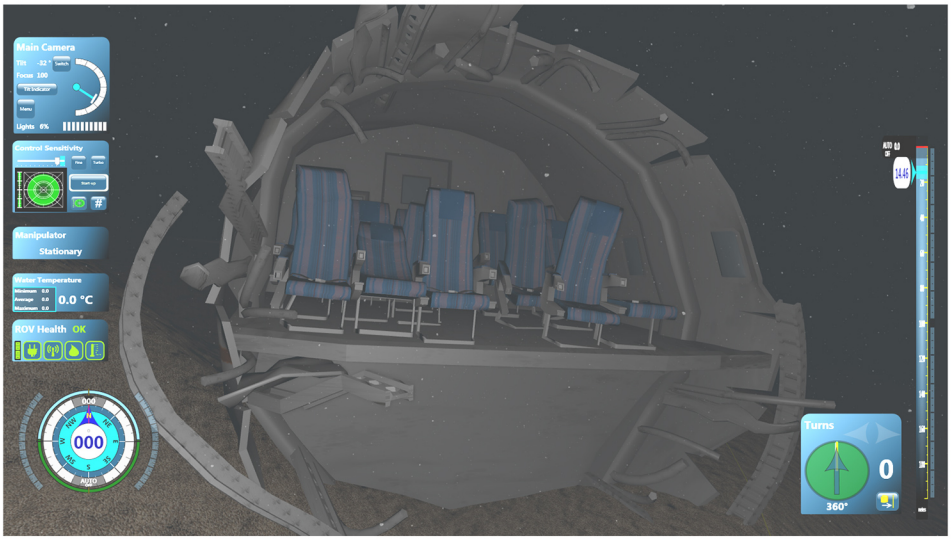
Features

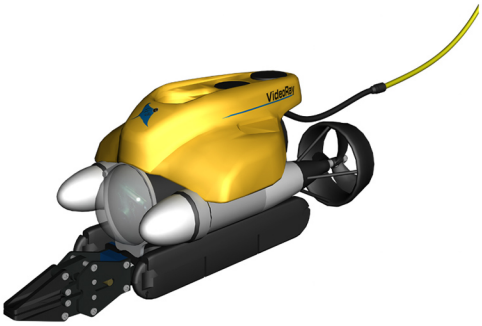
Generic mission content allows the trainee to engage in a variety of simulated settings, from inland to Arctic environments. Object Randomization and Snapshot Capability promote demanding training missions and create virtually unlimited custom scenario content.

Scenario Randomization: Relevant objects such as search targets are randomized upon scenario start-up to allow dynamic training missions.

Snapshot: At any time in the course of the simulation, a snapshot can create a sub-mission with different locations. This is also useful in targeting specific objectives.

Fully Integrated Interface





Objective Overlay and Summary Report

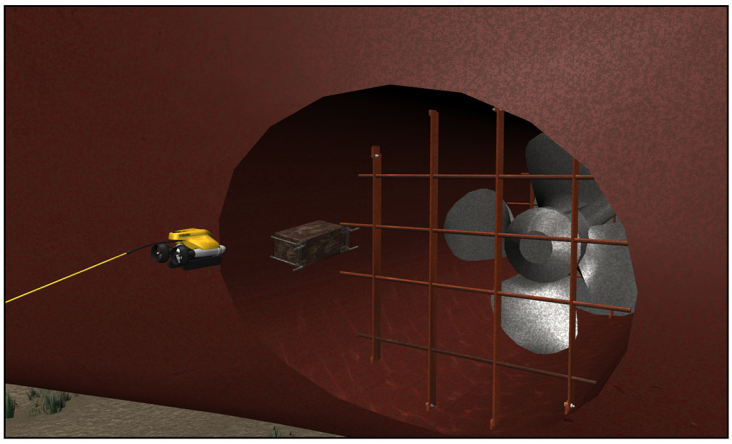
Objective Overlay is a tool that helps guide and evaluate independent learning, providing scrolling task objectives and completion status.

Missions are logged, and summary reports generate details of task success and efficiency to support performance evaluation and competency assurance programs.

Applications

VideoRay simulation enables training and competency assurance for a range of industries and applications:

- Pipeline and Route Surveys
- Offshore Oil and Gas Support
- Port Security
- Search and Recovery
- Forensic Evidence Gathering
- Ship Hull Inspection
- Infrastructure Inspection
- Mine Countermeasures



VideoRay Pro4 locating contraband during a ship inspection



VideoRay Pro4 investigating a shipwreck

Minimum Hardware Requirements

GRi recommends a laptop with the following minimum requirements:

System Element	Minimum Requirements
Processor	i5
RAM	4 GB
Graphics Card	NVIDIA 570 GTX

VROV
Virtual Remotely Operated Vehicle

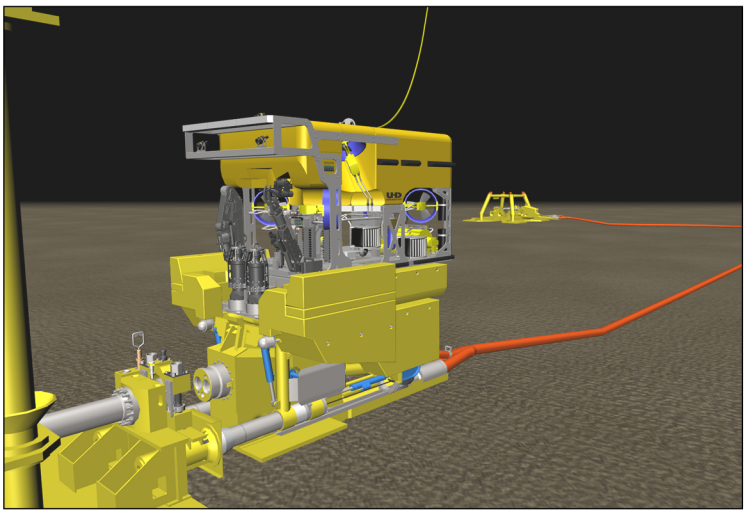
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GRi SIMULATIONS

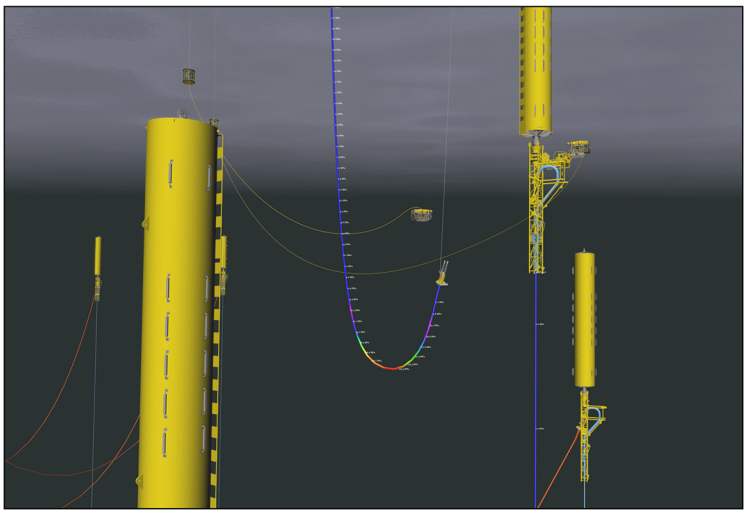
GRI SIMULATIONS

DE-SIT
Dynamic Electronic System Integration Testing

Dynamic Electronic SIT uses high-fidelity, dynamic interactions with complex 3D models and mechanized systems to recreate realistic offshore environmental conditions. DE-SIT's improved capabilities facilitate verification of access and operability, improving efficiency and safety of physical testing and offshore operations. In addition, DE-SIT scenarios provide high-quality pilot and team operations training. It offers additional testing as a compliment to as-built models and scenarios.



DE-SIT of flexible flowline jumper procedures, including pullhead connection and removal, as well as hub face cleaning and seal plate change out.



Flexible riser pull-in operation with integrated real-time FEA.

DE-SIT is not intended as a replacement for SIT, but to be used in conjunction with SIT. This combination offers a variety of benefits for project planning and rehearsal.

Benefits of using DE-SIT

Physics:

- For a sub-sea scenario, SIT does not allow for vital components such as buoyancy, drag, currents, and sea state. DE-SIT maintains complete physics modelling for equipment movement and interaction.

Tether Hazards:

- Vertically suspended, taut SIT crane wires are not representative of tether movements and their impact on operations. Potential entanglement between ROVs and structures are not properly evaluated through SIT training. DE-SIT tethers maintain realism in interactivity and movement.

Environmental Effects:

- The realism of SIT testing is limited in its visibility conditions. SIT is completed fully lit with external views. No provision is made for the effects of sea conditions. DE-SIT operations are completed through pilot views and sonar, with views that are representative of real-life conditions such as current and sea-state.

SIT Enhancement:

- Reduced scope and duration of SIT.
- Reduced replica fabrication and rework requirements.
- Improved safety and efficiency of SIT and real-world operations.

VROV
Virtual Remotely Operated Vehicle

Hardware Interfaces

VROV communicates directly with the user's preferred control console and interface to provide a user-oriented training experience. The system exchanges information in the same format as real-world ROVs, delivering realistic training and analysis. VROV integrates on a component level for the ultimate in system testing.

VROV is also used extensively for AUV system development. AUV control systems testing in VROV greatly reduces offshore testing times, leading to shorter development cycles.

GRi prides itself on rapid development of custom software interfaces for any ROV control system, AUV control system, ROV/AUV instrumentation pack, manipulator controller, or any other HMI system. If your system is not currently available, it can be added to VROV upon request.



ROV Pilot Chair Console

VROV

Virtual Remotely Operated Vehicle

Integrated Inspection Class ROV controllers allow users to practice with real ROV control interfaces. VROV currently interfaces with an extensive range of controllers.

VROV offers an immersive training experience in very intricate ROV manipulator operations. Many leading ROV manipulator controllers are offered in the VROV Simulator, including the full line of FMC Schilling Robotics Manipulators.



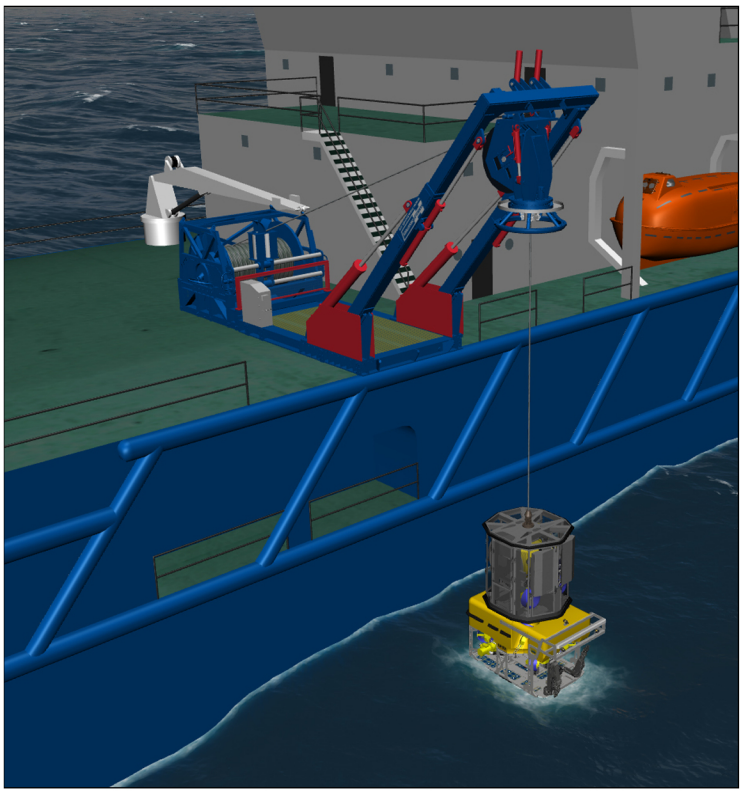
SAAB Seaeye Tiger ROV Controller



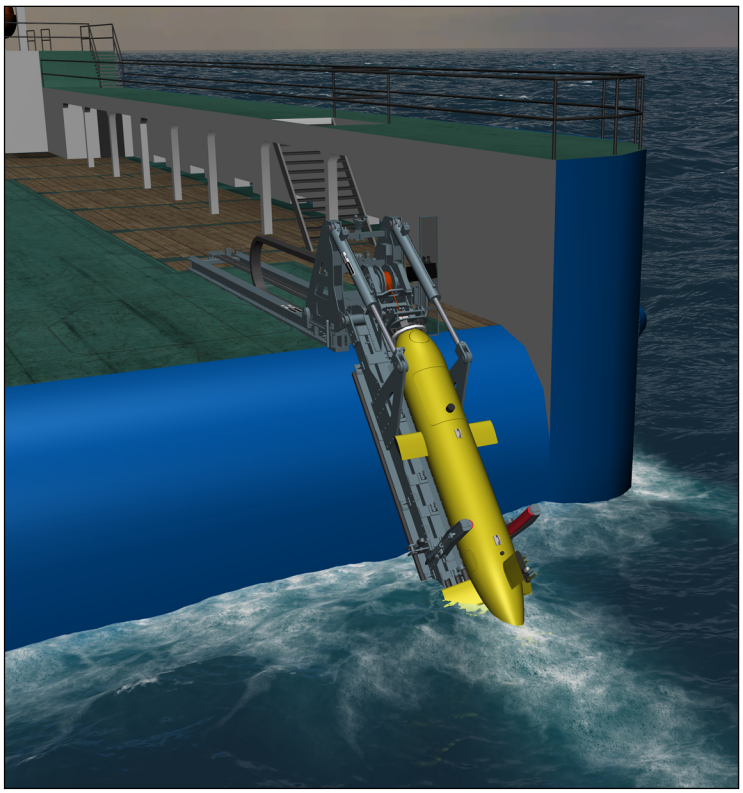
FMC Schilling Robotics Master Controller
(Positional Manipulator Controller)

Launch and Recovery System Simulation Training

VROV supports Launch and Recovery System (LARS) operator training. The LARS is mounted on a vessel where RAO information, along with user modifiable environmental parameters, may be entered to provide a realistic platform for training.



Hawboldt Industries ROV Launch and Recovery System with the Schilling UHD ROV



Hawboldt Industries AUV Launch and Recovery System with the ISE Explorer AUV

A full mock-up of the operator controls is offered, enabling simulation training on the same controls used in the field.



Mock-up of Hawboldt Industries ROV LARS controls



Mock-up of Hawboldt Industries AUV LARS controls

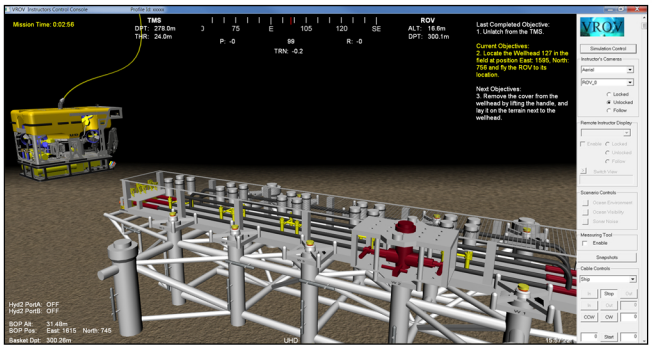
VROV
Virtual Remotely Operated Vehicle

Sonar Simulation Training

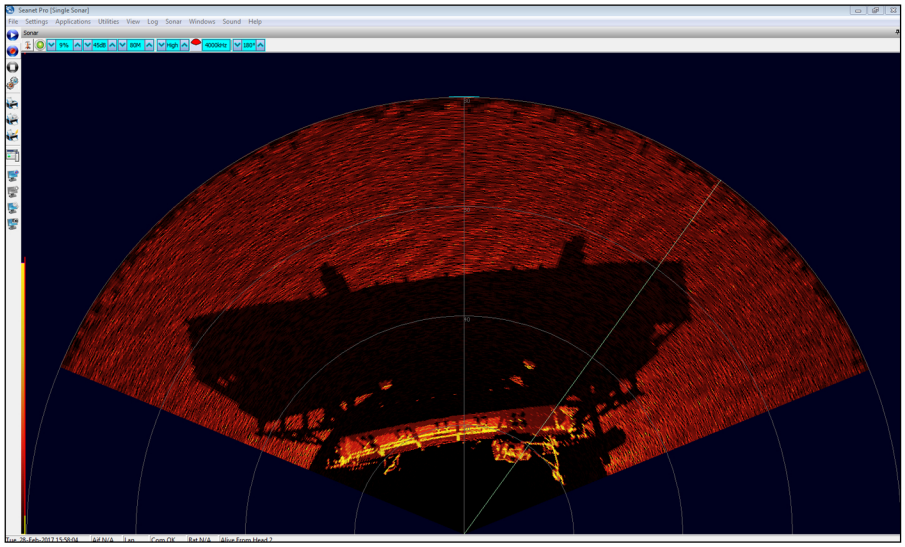
VROV creates simulated sonar data that can be processed, controlled, and displayed on the VSonar module or OEM topsides. VROV's virtual sonar has shown its value in pilot training exercises, as well as in AUV control system development.

VROV has integrated into several different single beam (avoidance) sonars for ROVs and AUVs including:

- Tritech Super SeaPrince
- Tritech Super SeaKing
- Kongsberg MS1000



Inspection of template before BOP Installation

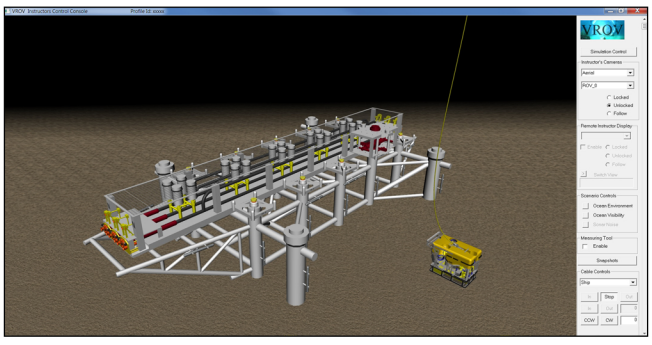


Tritech Super SeaKing single beam sonar

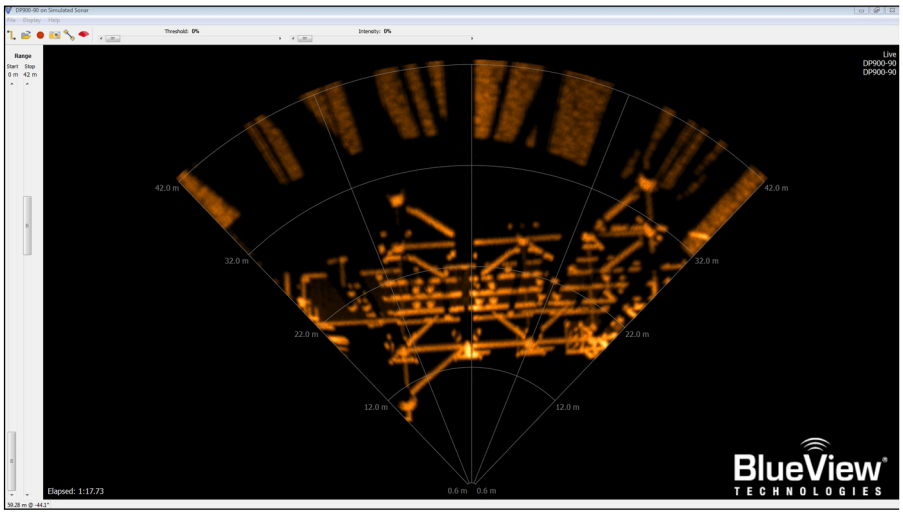
VROV
Virtual Remotely Operated Vehicle

In addition to single beam sonars, VROV also offers some multibeam (imaging) sonar options including:

- Tritech Gemini
- BlueView



Performing a routine inspection of oil field equipment



BlueView multibeam sonar