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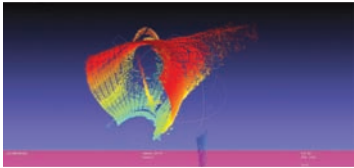
King of the ocean

Shell thinks big with its revolutionary FLNG vessel

Hibbard Inshore

ROV Inspection and Maintenance of Underwater Structures

Managing and maintaining the condition of critical structures and assets for functionality, lifespan assessment, and regulatory compliance are common challenges for dam owners. **HIBBARD INSHORE** helps address these challenges by giving quantifiable data on the underwater portions of structures allowing for planning and performance of necessary maintenance.



Tunnel bifurcation 3-D Scan



STRUCTURES INSPECTED

- Trash Racks
- Lower Outlets
- Face of Dam
- Intakes
- Head Gates and Seals
- Stoplogs
- Reservoir Bathymetry
- Toe of Dam
- Penstocks (Flooded & Dry)
- Turbines & Turbine Shut Off Valves
- Diversion Tunnels
- Long Conveyance Tunnels

INSPECTION EQUIPMENT

- Monochrome and Color Video
- Imaging Sonar
- 3D Sonar
- Ultrasonic Thickness Sensing
- Ground Penetrating Radar
- Navigation and Tracking Systems
- ROV penetrations to 20+ kilometers and 2,000 meters of pressure/depth
- Swimming, Floating, and Crawling Vehicles

ROV UNDERWATER CONSTRUCTION SERVICES

- Dredging in Front of Units
- Bulkheading
- Deep Water Trash Rack Removal & Replacement
- Underwater Cleaning
- Cutting
- Lifting

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Remotely interesting

A pioneer in the use of remotely operated vehicles for the inshore oil and gas industry, US company **Hibbard Inshore** has developed a hybrid vehicle that is uniquely suited to the inspection of long tunnels, as well as offshore pipelines and cables.

Since 1984, Hibbard Inshore has used remotely operated vehicles (ROVs), sensors and tooling for underwater inspection and construction applications for hydroelectric dams, water conveyance systems, sewer structures and industrial facilities. Much of this equipment was initially developed for the offshore oil and gas industry, modified, and reapplied to fit the specific needs of each of those industries, including ease of portability and the need for many sensors and tools in a small vehicle footprint.

Today, a similar migration is happening, but in reverse. Over time, these inshore industries have grown more accustomed to the use of ROVs and the vehicles themselves have become more advanced. Continual innovation has allowed smaller vehicles to perform larger tasks that previously would have required time-consuming and costly dewatering projects including major valve replacements, deep water and confined area debris removal, projects conducted in currents and projects conducted in extremely long tunnels with limited access.

“The hybrid vehicle can be run in either ROV mode with a tether or in AUV mode without, eliminating the need to deploy multiple vehicles for one project.”

Pushing the boundaries to meet these project goals led Hibbard Inshore to use vehicles, tooling and sensors that can now be reapplied to certain offshore projects for the oil, gas and power industries. These systems can be particularly advantageous in areas where it is difficult to mobilise a dedicated system or dynamic positioning (DP) vessel, and where using a vessel of opportunity would be beneficial. The systems also are particularly convenient to work with where there is shallow water or where both ROV and autonomous underwater vehicle (AUV) services would be needed in conjunction with one another.

In addition to employing its smaller Sub-Atlantic Navajo, Sub-Atlantic Mojave and Seabotix LBV-600 vehicles for spot inspections and small tasks offshore, Hibbard Inshore has outfitted its Sub-Atlantic Mohican vehicle to perform many pipe, cable-lay and tracking surveys in coastal circumstances while still maintaining the ability to air-ship the system quickly to any spot in the world. The system's high thrust-to-size ratio allows it to perform many of these surveys without heavy tether management (TMS) and launch and recovery



The hybrid AUV/ROV was developed in collaboration with Saab.

systems (LARS), and the vehicle can be set up in this configuration with many types of survey sensors, video cameras, and tracking and navigation systems in order to deliver quality surveys.

Hibbard Inshore hybrid AUV/ROV

In 2011, project requirements led Hibbard Inshore to work with Saab to design and outfit the first hybrid ROV/AUV uniquely suited to the inspection of long tunnels. This hybrid is a unique vehicle in that it was designed with the battery power to be deployed to linear distances in excess of 20km while carrying a suite of tunnel inspection sensors. During the outfitting and design of this vehicle, Hibbard Inshore and Saab also considered the needs of offshore applications.

The Hibbard Inshore hybrid AUV/ROV comes as standard with cameras, sonar, GPS, inertial navigation system and Doppler velocity log to accurately track position while surveying. Surveys can be performed in a grid format or following preset routes. Pipelines and cables can be followed and inspected while the hybrid AUV/ROV performs object avoidance, as in the case of manifolds. The vehicle is depth-rated to 1,200m, can be used in shallows; it is also particularly useful since it can stop, hover and closely examine a point of interest.

It can be run in either ROV mode with a tether or in AUV mode without, thereby eliminating the need to deploy multiple vehicles for one project, and it is air-shippable like the rest of the Hibbard Fleet, providing that same logistical advantage over dedicated systems. ■

Further information

Hibbard Inshore
www.hibbardinshore.com

