

Small but Mighty: VideoRay ROV is Versatile Member of the Environmental Lab Crew

By Jim Devereaux, Environmental Laboratory Environmental Services Unit



This remotely operated video camera goes where divers or other equipment cannot go, used for projects ranging from eelgrass surveys, wastewater facility inspections, lost equipment recovery to searches for submerged human bodies.

The Lab's Environmental Services unit purchased a VideoRay Pro 3 XE GTO Remotely Operated Vehicle (ROV) in 2007 as a result of interest from Lab customers in obtaining underwater video. Since then, the ROV has been deployed dozens of times for projects ranging from eelgrass surveys and lost equipment recovery to searching for submerged bodies. The ROV has proven to be extremely capable and has provided results that have met and often exceeded project managers' expectations.

The VideoRay ROV is one of the smallest ROVs available on the market, making it extremely versatile and capable of going places that larger units can't access. Considering its small size, the ROV is very capable, with two cameras, lights, sonar, two high-powered thrusters and a manipulator.

Because the ROV is often deployed in limited visibility waters, the BlueView 900 KHz sonar is vital to the success of most missions. The sonar has a range of about 180 feet and is critical when attempting to locate items or navigate in murky waters.

The Environmental Services Unit has assembled a four-person team that operates and maintains the ROV. Specific roles are assigned to each team member for each project. Depending on the project, anywhere from two to all four members may be needed. Roles include the ROV operator, tether handler, video and sonar operator, and project oversight and communications point person.

Thanks to the small size of the system, deployment can be from many different platforms. The ROV has been deployed from three different boats: the 43-foot-long *Liberty*, the 24-foot-long *Chinook* and the 17-foot-long *Wooldridge Chuck*. The ROV can also be operated from a van when deployed in a manhole or other on-land structure.

The Lab's ROV has been used in dozens of projects since it was purchased. The most consistent work has been for King County's Wastewater Treatment Division (WTD) facility inspections. Some of the inspections have included the outfall pipes for Hanford, Murray, 53rd, 63rd, Barton, Sweyolocken, Dexter, Densmore, Montlake, South Mercer and University pump stations as well as the South Treatment Plant emergency bypass outfall (EBO).

Of the facility inspections the Lab has conducted, 53rd Avenue and Renton EBO were particularly interesting, according to Jeff Bowman, WTD Facilities Inspection.

"I guess I like the ROV's ability to 'go where no man or machine has gone before,' giving us a valuable perspective of not only pipe condition but more importantly of sediment depth and blockages," he said.

"Previously with contract divers, we were only able to visually inspect the outfall openings or exposed pipe with very limited access. Now we can swim as far as the tether can take us inside the pipe."

Bowman said the crew was surprised to discover that the 53rd Avenue Outfall was completely blocked in at least two areas with sand that filtered in from apparent pipe separation.



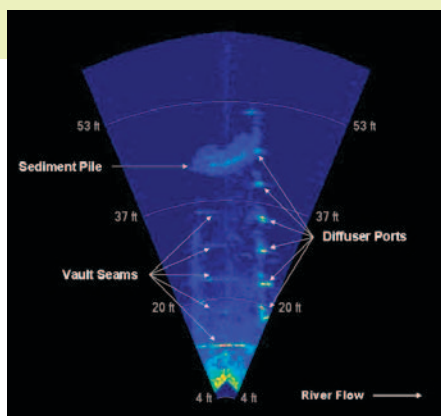
The Renton EBO was a difficult inspection because of extremely low visibility, making the sonar capabilities vital for navigating more than 500 feet of pipe, and for determining the condition of the outfall diffuser structure. Based on the sonar images, staff was able to determine that there was a significant build up of sediment at the end of the structure.

“There is not a more suitable technology for confined underwater inspections, and I’m sure glad that we have this tool in-house,” he said.

ESS has also conducted two inspections of the lake line flap gates in north Lake Washington for WTD. The images that were provided from these inspections were helpful for determining needed maintenance.

The ROV was a significant investment up front, but has more than paid for itself with the lost equipment it has recovered. One of those items was a \$75,000 water quality instrument that measures conductivity, temperature and depth. The instrument, known as a CTD, broke free from the crane on Liberty during in rough seas off Alki Point in Puget Sound. Soon after the mishap, the crew was on site with the ROV. The ROV’s BlueView Sonar was quickly able to locate a sonar target in the vicinity that appeared to have the correct signature. Once within visual range, the crew was able to identify the CTD with the ROV camera. The ROV attached a retrieval line and in less than 10 minutes, the CTD was back on board the Liberty.

For more information on the Lab’s ROV and services, contact Ben Budka, 206-684-2328 or ben.budka@kingcounty.gov or Jim Devereaux, 206-684-2398, or jim.devereaux@kingcounty.gov.



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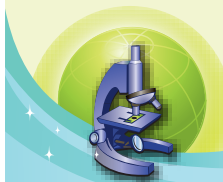
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