



**US Army Corps  
of Engineers®**

Engineer Research and  
Development Center

## Navigation Systems Research Program

# Robotics for Navigation Systems

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- Problem** The vast majority of the civil works (CW) infrastructure managed by the CoE is aged significantly. For example, of the 240 lock chambers 122 of these are older than 50 years (Mike Kidby, 2006 Navigation Workshop). While most of this infrastructure is durable construction, maintenance and repairs are still required. The largest portion of the \$1.7B FY06 budget for navigation was committed to O&M. Clearly, the infrastructure is aging, as evidenced by unscheduled closures that were 46,000 hrs in 2004 vs. 57,000 hrs for scheduled closures (Mike Kidby, 2006 Navigation Workshop).
- There is little doubt that the difficulty in inspecting infrastructure below the water line has resulted in much of it not being inspected as frequently as prudence would dictate. The result is that we are now seeing much of the CW maintenance budget being consumed by unscheduled repairs. In order to reverse this trend and avoid the potential for catastrophic failures, increased inspection is needed.
- Research Approach** The approach of this project is to identify the potential for robotic technologies in CoE CW systems primarily for inspection requirements. An assessment of available ROV technologies will be made including the platforms themselves as well as the instruments and systems they support. Isolated users of ROVs already exist in the CoE and these will be selectively interviewed and their experiences summarized. We will also prepare case studies where data is sufficient to estimate cost to benefit. A demonstration will be scoped and planned where manufacturers will be invited to showcase their systems at a CoE facility for inspection applications.
- Labs/others involved** ERDC Cold Regions Research and Engineering Laboratory (CRREL), Huntington District CoE, various ROV manufacturers.
- Final Products** The first objective of this project is to bring the benefits of ROV's to the CoE. A second objective will be to make the ROV manufacturers more aware of the CoE needs and thus encourage them to better tailor their equipment to CoE applications. The planned demonstration will help accomplish both of these objectives. A Tech Note will be published that will include the case studies as well the other project findings.
- Point of Contact** James Lever, 603-646-4309, James.H.Lever@erdc.usace.army.mil