

PROJECT FACT SHEET

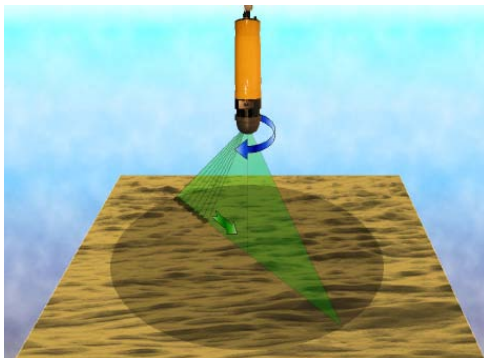
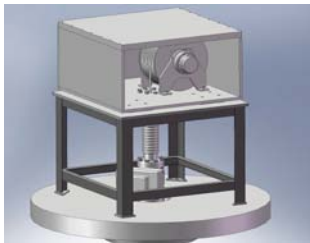
Development and Demonstration of a Near-Real-Time Solid-Liquid Interface Monitor

FIU's Applied Research Center (ARC) is supporting the U.S. Department of Energy's Office of River Protection in its mission to facilitate the retrieval and treatment of high-level radioactive waste stored in underground tanks at the Hanford site. The ability to monitor the interface between liquids containing suspended solids and settled solids in these tanks remains a critical technology gap. FIU is assisting the Hanford Tank Farm Operators by systems integration of a sonar based system that can monitor the solid-liquid interface.

ARC has developed a near-real-time solid-liquid interface monitor (SLIM), essential for effective retrieval and loading of solids into intermediate tanks at Hanford. The SLIM is a sonar-based system that is capable of withstanding high-level radiation and highly caustic solution (pH>14), being deployed through a 4-inch riser at the top of the tank, operating in liquid 2 feet or more above the settled solids layer and identifying the average interface elevation integrated over an area of at least 5 ft². The high-resolution profiling sonar provides a 3-dimensional map of the surrounding environment with a resolution of 15 millimeter at 1 meter.

Project Objectives

The overall objective of this project is to design, fabricate and deploy a remote 3D mapping system to estimate HL slurry waste fill volume within the tanks.



A cutaway 3D model depicts the reel system that will lower the sonar into the tank. The assembled enclosure will isolate the surrounding environment from radiation effects while the sonar is deployed. A drawing depicts the 3D profiling sonar principle of operation.

Project Benefits

Benefits of developing the Solid Liquid Interface Monitor are:

- Improve HLW retrieval efficiency
- Assist in maximizing the utilization of available tank space in the double-shell receiver tanks.
- Protect workers and minimize dose by remote operation of monitoring activities,
- Reduce environmental risk by ensuring that HLW tanks cannot be overfilled.

Project Accomplishments

- Completed mechanical, instrumentation and control design of system in accordance with Hanford specifications.
- Completed selection of 3D profiling sonar for system integration.
- Performed system structural Finite Element Analysis (FEA)
- Completed system in-house fabrication.