

## **2.1 Telerobotic and Manually Deployed Non Destructive Evaluation (NDE) Technologies for Storage Container Integrity Assessment**

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### **Abstract**

Oceaneering Space Systems (OSS) has developed electromagnetic non-destructive evaluation (NDE) technologies that can be deployed telerobotically, manually, or as part of an automated system.

An end effector equipped with on-board lighting, camera, and defect detection and sizing capabilities was demonstrated at the Hanford Light Duty Utility Arm (LDUA) cold test facility in February '97. Crack and pit defect detection and sizing is accomplished with the Alternating Current Field Measurement (ACFM) sensor-this technology works through non-conductive coatings and in-situ waste. ACFM can be used to inspect any conductive material. This robotic tank inspection end effector (RTIEE) prototype has been radiation hardened and is prepared for deployment.

Electromagnetic sensors that measure the thickness of Carbon Steel (up to 1/2 inch thick), Stainless Steel and other metals such as Aluminum have also been developed. A portable hand held tool for the wall thickness measurement on Carbon Steel storage containers has been built and is being prepared for demonstration.

When operated in a dry measurement environment (e.g., the inspection of a inner liner of a double shell tank from the annulus), electromagnetic sensors function with no couplant. The sensors can be used in wet environment or in direct contact with waste materials. Electromagnetic sensors do not require prior cleaning of the inspection surface since wall electric contact and uniform acoustical coupling to the inspection surface are not required.

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