



Interactive Computer-Enhanced Remote Viewing System (ICERVS)



Developer: Mechanical Technology, Inc.
Contract Number: DE-AC21-92MC29113
Crosscutting Area: N/A

Deactivation & Decommissioning
FOCUS AREA

Problem:

Remediation activities conducted using robotics can be expensive and slow due to the time needed to analyze geometric information regarding the site and to provide the robotics operator with that information in a form that can be efficiently used.

Solution:

The Integrated Computer Enhanced Remote Viewing System (ICERVS) can provide a reliable geometric description of a remote environment.

The ICERVS will serve as a critical subsystem that will allow robotics remediation tasks to be conducted more effectively and economically than with present systems. The system will help an operator to analyze a scene and generate additional geometric data for automating significant portions of the remediation activity. The ICERVS supports the robotic remediation of hazardous environments such as underground storage tanks, buried waste sites, and contaminated production facilities.

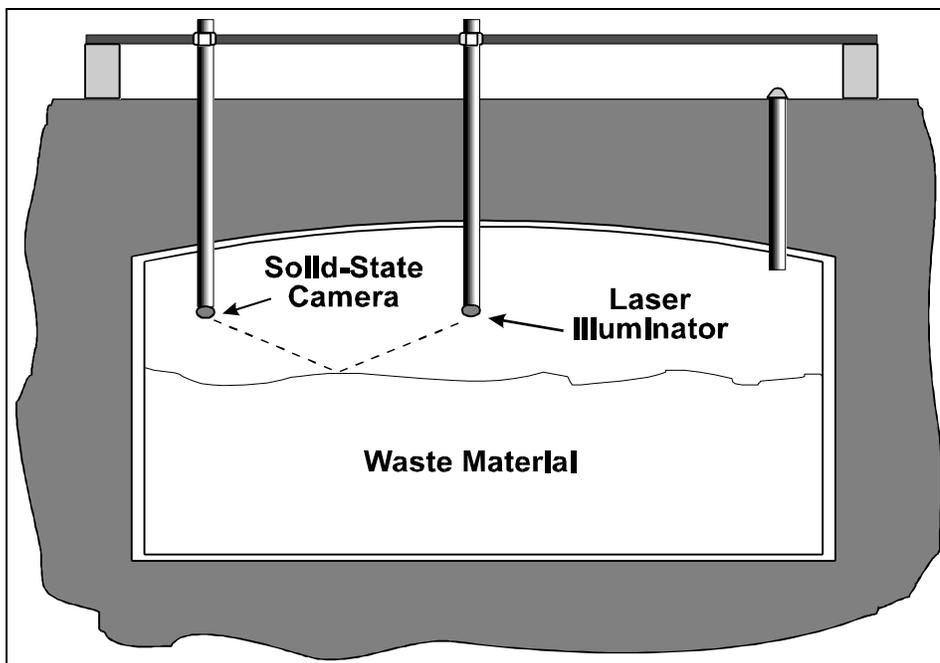
Benefits:

- ▶ Storage and display of empirical sensor data
- ▶ Ability to update segments of the geometric description of the task space
- ▶ Side-by-side comparisons of a live TV scene and a computer generated view of the same scene

Technology:

ICERVS provides a means of deriving a reliable geometric description more effectively and efficiently than current systems by combining a number of technologies:

- ▶ Sensing of the environment to acquire dimensional and material property data
- ▶ Integration of acquired data into a common data structure based on octree technology
- ▶ Presentation of data to robotic task planners for analysis and visualization
- ▶ Interactive synthesis of



geometric/surface models to denote features of interest in the environment and transfer of this information to robot control and collision avoidance systems

►Integration and display of both empirical- and geometric-based data representations to describe a workspace which leads to more productive scene analysis and more cost-effective robotic remediation

Project Conclusion:

This project was completed in October 1996. Mechanical Technology, Inc. (MTI) has developed and field demonstrated the ICERVS at Oak Ridge National Laboratory and Sandia National Laboratory.

The severe demands of remote robotic operation in environmental cleanup applications mandate the use of 3-D mapping sensors to convey the characteristics of work environments to operators. Advanced systems such as the MTI ICERVS can provide the interactive visualization and modeling capabilities needed to enable operators to interpret sensor data and effectively use it to construct or update 3-D computer aided design (CAD) descriptions of the work environment.

ICERVS can input data from different sources, provide robust visualization of both sensor data and geometric object models, provide interactive tools for creating and editing geometric objects, and export

the resulting objects to robotic control systems for use in task and motion planning. As such, ICERVS fills a critical need in the effective deployment of robots in remote work environments.

Contacts:

MTI designs and develops intelligent custom systems with measurement and data acquisition capabilities. For information on this project, the contractor contact is:

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DOE's Federal Energy Technology Center supports the Environmental Management - Office of Science and Technology by contracting the research and development of new technologies for waste site characterization and cleanup. For information regarding this project, the DOE contact is:

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