



# Technology Deployment Fact Sheet

## *Multiple Deployment of Remote Characterization Platform (Andros Robot)*



### SUMMARY

The Andros robot is a robotic characterization platform for use in facility areas that are not accessible by humans based on principles of ALARA. It is configured for fully remote collection of characterization data such as radiation field intensity and dose rates, video, and smear samples. Survey of the ventilation tunnel at the Hanford Site 221-U Facility was accomplished as part of the Canyon Disposition Initiative (CDI) Project. The CDI Project is analyzing alternatives for the final disposition of the five large chemical processing facilities (canyons) at the Hanford Site. The 221-U Facility serves as the pilot facility for the CDI Project.

The objective of the deployment was to complete an initial characterization of the ventilation tunnel in the 221-U Facility. No human access has been allowed in this tunnel since construction, nearly 50 years ago. The Andros robot was deployed in September 1999. The robot traversed the entire length of the tunnel 228.6 m (750 ft) collecting gross radiation data and videotaping the condition of the tunnel. Two smear samples were taken, and radiation sensor units were placed throughout the tunnel for data collection.

### INNOVATIVE TECHNOLOGY DESCRIPTION

This remote characterization system was developed by the Department of Energy Robotics Crosscut

Program (RBX) at Pacific Northwest National Laboratory.

The system is designed for deployment in areas where personnel are prohibited access, such as high radiation areas or areas of unknown contamination. The Andros robot operates using 110 VAC power and can drive on and off of the custom-designed, crane-deployable lifting fixture. Communication is via a hardwire umbilical system. The lifting fixture has a color and a black and white camera and two sets of lights.

### BASELINE DESCRIPTION

Prior to this deployment, the general physical and radiological conditions in the ventilation tunnel were unknown and, as such, personnel access was prohibited. This remote characterization system was considered an enabling technology.

### DEPLOYMENT DESCRIPTION

The Andros robot completed an initial characterization deployment in the 221-U Facility ventilation tunnel in September 1999.

The ventilation tunnel deployment was completed with the following:

- A Remotec Andros Mark VI robot configured with two camera and lighting systems (one color and one black and white camera)
- A real-time gross gamma detector
- Smear sample pads
- Radiation sensor units (Scout Remote Spectral Gamma Sensors)
- A lifting fixture (with camera and lights) for the robot, cable, and cable payout system
- An operator control station with video recording equipment.

The system was operationally tested outside the 221-U Facility, then lifted, via a mobile crane, into the ventilation tunnel via a 0.9-m by 0.9-m (3-ft by 3-ft) access chimney. The robot traversed the entire length of the tunnel and back. The tunnel is approximately 3 m (10 ft) wide, 3 m (10 ft) high, and 228.6 m (750 ft) long. Gamma radiation data and video footage were taken to document the condition of the tunnel. Two smear samples were taken off the floor: one at the end of the tunnel, and the second at one of the higher radiation areas (about 182.8 m [600 ft] from the entrance).

Deployment of the Andros robot was accomplished through the support of the Deactivation and Decommissioning Focus Area, which is managed by the Federal Energy Technology Center. This work was conducted as part of the 221-U Facility characterization in support of the CDI Project. Characterization information is being obtained to support a Record of Decision for the 221-U Facility. The Record of Decision will establish regulatory and technical precedence for future disposition of the other chemical processing facilities (canyons). The Andros robot had been previously deployed into the railroad tunnel at the 221-U Facility.

## **DETAILS OF BENEFITS**

This system allows the safe collection of critical characterization data, from hazardous facility areas, that are necessary for the Record of Decision process. Remote operations allow minimization of exposure and health risks for laborers during characterization activities in high radiation areas or areas that are unsuitable for manned entry.

## **CONTACTS**

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