

Trailer Body
BUILDERS
October 1993

**Robotic Aerial Platform
Insulates Linemen from
Weather, High Voltage**
—See page 58



Utility Equipment Issue



Robotic lineman performs at the Reach All exhibit at ICUEE. The Aerial Integrated Robotics unit is a prototype developed jointly by several companies, including Pacific Gas & Electric, Reach All, and Kraft TeleRobotics.

Robotic Lineman Attracts a Crowd at ICUEE

The lineman for an electric utility had been severely injured earlier in his career, yet there he was—picking up tools and performing routine tasks while suspended by an aerial device near the top of a pole. He even crushed an aluminum soft drink can when the job was done.

But nothing was typical about the tools he used to perform these tasks. A pair of robotic arms did all the work as the lineman sat inside a glass enclosure and operated the robotic arms.

The work was part of a demonstration of a prototype aerial integrated robotics (AIR) unit being developed by Reach All, Pacific Gas & Electric, Kraft TeleRobotics, Chevrolet, and Reading Body Works.

The periodic demonstrations of the AIR drew crowds at the International Construction and Utility Equipment Exposition.

The robotic arms simulate (and sometimes amplify) the human movements of the operator. Developed by Kraft TeleRobotics in Overland Park, Kansas, the robotic arms are directed through electroproportional hydraulic controls using fiber-optic signals. A hydraulically driven electric generator at the pod powers the robotic arms and the accessories.

According to Reach All, the robotic arm manipulators have force feedback sensitivity, enabling the operator to “feel” what he is doing. Controls are adjustable to match the amount of precision the task requires. An example of a precise job that the arm can perform: threading a nut onto a bolt.

Inside the pod, formerly the cabin of a helicopter, the operator is protected from wind, rain, and extreme temperatures. He also is isolated from the electricity running through the electrical distribution lines nearby,

which means that repairs and maintenance can be performed with the lines hot. The prototype has been dielectrically tested in excess of 1,000 kv.

Each robotic arm can lift 100 lb and each arm’s squeeze pressure is rated at 200 lb. The arms can reach 62” above base, 16” below base, and 51” horizontally. They can grasp a variety of tools developed by Black & Decker, Husky Tools, and Safety Line Inc.

The prototype displayed at ICUEE represents the first of what the developers have planned as a three-phase program. The first phase was development of the prototype, completed earlier this year. The next step is work environment analysis, followed by a third stage when a material-handling jib will be added and other alterations made to the AIR. The companies believe the project will prove feasible for use by other utility companies. □