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**Heart Monitoring by Satellite** The ambulance antenna shown is a specially designed system that allows satellite-relayed two-way communications between a moving emergency vehicle and a hospital emergency room. It is a key component of a demonstration program aimed at showing how emergency medical service can be provided to people in remote rural areas. Satellite communication permits immediate, hospital-guided treatment of heart attacks or other emergencies by ambulance personnel, saving vital time when the scene of the emergency is remote from the hospital. If widely adopted, the system could save tens of thousands of lives annually in the U.S. alone, medical experts say.

The problem in conventional communication with rural areas is the fact that radio signals travel in line of sight. They may be blocked by tall buildings, hills and mountains, or even by the curvature of the Earth, so signal range is sharply limited. Microwave relay towers could solve the problem, but a complete network of repeater towers would be extremely expensive. The satellite provides an obstruction-free relay station in space.

An example of the satellite's utility was a test in which voice and data signals were relayed between an ambulance in rural Alabama and Forrest County General Hospital in Hattiesburg, Mississippi, some 200 miles away.

Equipped with a battery-powered Telecare II Advanced Life Support Unit (also an aerospace spinoff) the ambulance team transmitted a simulated heart attack victim's electrocardiogram. The signals were beamed to NASA's ATS-3 satellite, operating in stationary orbit 22,300 miles above Ecuador, thence to the emergency room of Forrest General. The space-relayed EKG, together with two-way conversation capability, enabled a hospital physician to advise ambulance personnel as to life-saving pre-hospital treatment. The antenna played an important part. Designed for low height above the ambulance roof and sufficient mechanical strength to withstand road speeds up to 70 miles per hour, it is an omni-directional antenna that requires no operator adjustment as the ambulance speeds toward the hospital.

The demonstration was a cooperative project involving NASA's National Space Technology Laboratories in Mississippi; the Mississippi governor's Office of Science and Technology; and the Southern Regional Medical Consortium, comprised of Forrest County General Hospital, the University of Southern Mississippi, and the Southeast Mississippi Air Ambulance District. The antenna was designed and built by General Electric Company's Corporate Research and Development Center, Schenectady, New York.

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