measures to prevent similar future occurrences. Until recently, there was no way to recover flight recorders aboard aircraft lost in water crashes.

The Pinger, now serving 95 percent of the airline industry, provides an answer. Key element of the Pinger system is a small, battery-powered transmitter, or homing beacon, included as part of the recorder package. For as long as 30 days, the transmitter sends out an acoustic signal from water depths up to 20,000 feet. The other element of the system is a receiver, used by search crews to home in on the transmitter's signal. Originating as a U.S. Navy project, this device was refined and further developed by NASA's Langley Research Center to retrieve submerged nose cones from research rockets. NASA's contractor for the transmitter portion of the system was Dukane Corp., St. Charles, Ill. who subsequently developed the commercial version.

Personal Alarm System

Trouble in the classroom is an unpleasant fact of modern life. Space technology can't stop the trouble from occurring, but it can prevent it from spreading.

In recognition of this, NASA and the Sacramento, Cal. Unified School District developed a personal security system based on space telemetry technology. The first application was for schools, but the simplicity and reliability of the system has made it more widely applicable.

The heart of the system is an ultrasonic pen-size transmitter. It can be used by prison guards, teachers, or others such as the handicapped and the elderly.

A police officer demonstrates how he would use the SCAN (Silent Communications Alarm Network) security system to summon aid in a cell block emergency. The pen-size SCAN device is an ultrasonic transmitter which sends a wireless alarm signal to the ceiling-mounted receiver, connected to a central display panel. At the central console, visual and audible alarms alert other police personnel and indicate location of the trouble.

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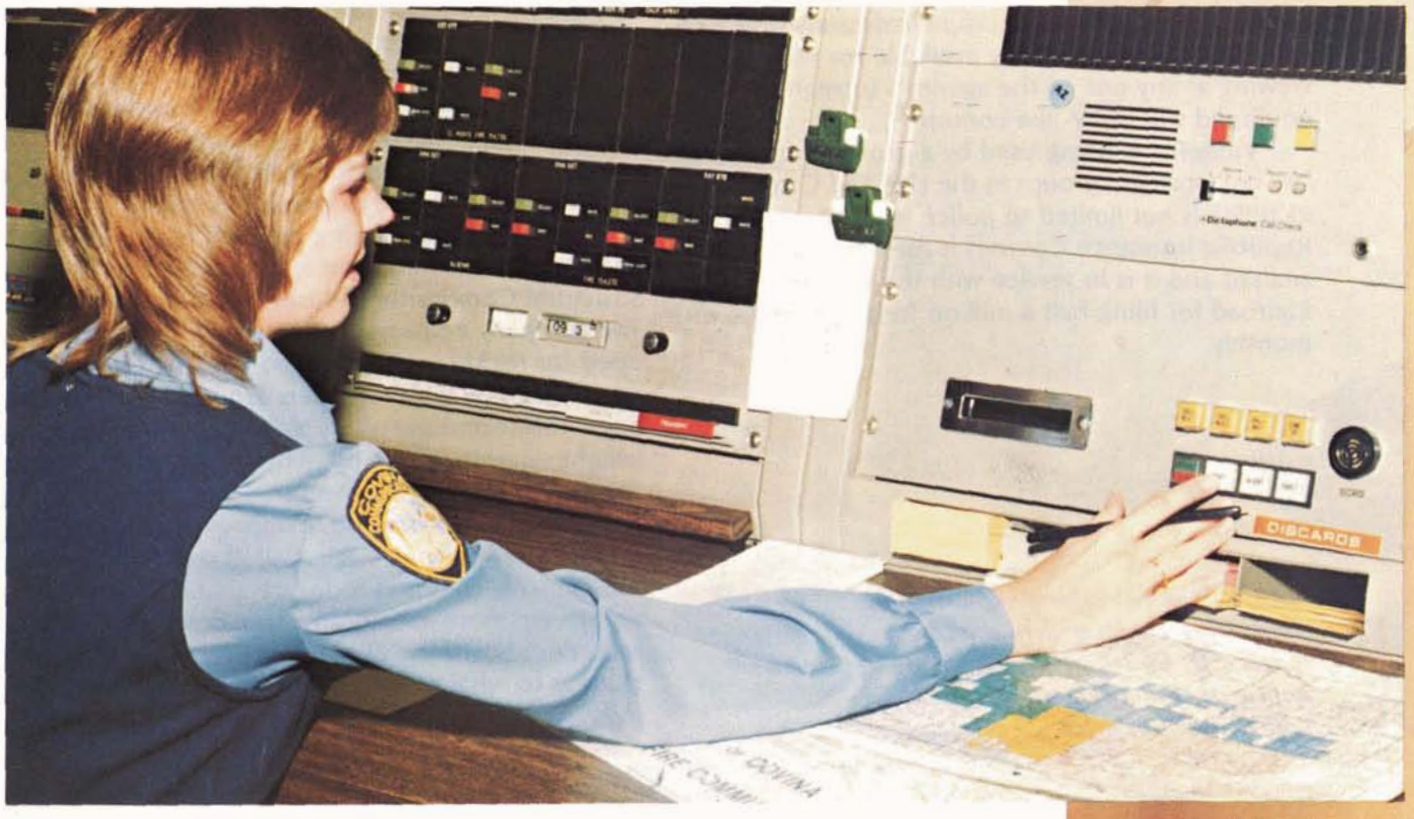

When a problem arises, be it a threat of violence or a medical crisis, the pen transmits a silent signal to a nearby receiver. Within an institution, apartment or office building, the receiver may be one of many that are wired to a central console that will display the exact location of the emergency. With smaller systems, the receiver can sound an alarm, initiate an automatic telephone call, or activate any other type of equipment including doors, lights, machinery, etc. Sentry Products Inc., San Jose, refined the original system and now sells it under NASA license.

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Skid-Resistance Research

Skidding causes many traffic accidents. Streets and highways with skid-resisting surfaces reduce the incidence of such accidents. In fact, resurfacing roads to improve skid resistance is now required by federal law. Skid resistance is measured by road testing with specially equipped skid trailers. A project underway at NASA-Langley may considerably reduce the cost of skid trailers, thus making them more widely available to highway departments.

For testing the skid resistance of aircraft runways, Langley engineers developed a relatively inexpensive test vehicle and a "pulsed braking" technique that is now being applied experimentally to road testing. The vehicle is a standard automobile modified to incorporate instrumentation, special test tires and valves, and a trailing fifth wheel for monitoring distance and velocity. The instrumentation includes a low-cost meter, a set of accelerometers that sense motion changes, and a chart recorder.

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A NASA-developed five-wheeled vehicle serves as a mobile laboratory for testing roadway skid resistance. It does a job comparable to more expensive test vehicles, but at a fraction of the cost. Cost is a big factor to many communities, which need skid resistance data for improving road surfaces but can't afford highly expensive skid trailers and their elaborate instrumentation.