Water Quality Monitor

In the photo above, the cylindrical container being lowered into the water is a water quality probe developed by NASA's Langley Research Center for the Environmental Protection Agency (EPA) in an applications engineering project. It is part of a system—which also includes recording equipment in the helicopter—for on-the-spot analysis of water samples. It gives EPA immediate and more accurate information than the earlier method, in which samples are transported to a laboratory for analysis. Designed primarily for rapid assessment of hazardous spills in coastal and inland waters, the system provides a wide range of biological and chemical information relative to water pollution.

Lowered into the water at a selected site, the system's sensors acquire data—for example, the presence of harmful microorganisms—and automatically transmit the information to the helicopter cockpit, where it is recorded. The helicopter then flies to the next site, covering as many as 28 closely-located data stations in one hour. The system greatly increases the number of samples EPA can take in a given time, and the resulting information is more accurate because analysis is immediate. Where tests indicate that more detailed analysis is required, the helicopter-borne probe can obtain a water sample for laboratory use. In developing the system, Langley Research Center adapted several aerospace technologies, particularly microelectronics.

Weather Forecasting Aid

Weather forecasters are usually very precise in reporting such conditions as temperature, wind velocity and humidity. They also provide exact information on barometric pressure at a given moment, and whether the barometer is "rising" or "falling"—but not how rapidly or how slowly it is rising or falling. Until now, there has not been available an instrument which measures precisely the current rate of change of barometric pressure. A meteorological instrument called a barograph traces the historical ups and downs of barometric pressure and plots a rising or falling curve, but, updated every three hours, it is only momentarily accurate at each updating.

The instrument pictured below, a spinoff from environmental control technology developed for NASA's Space Shuttle, goes a step further. Called a Barorator and developed by Carleton Controls Corporation, East Aurora, New York, it provides a reading of the barometric rate of change in millibars per hour. The information is provided to the meteorologist every 15 minutes on an automatic printout. Tied in with other weather data, pressure rate of change information adds a useful dimension for predicting exactly when a high or low pressure weather system will reach a particular locale. It is also useful in tracking high altitude air movements such as jetstreams and it has special potential for predicting the onset of severe storms or tornadoes, which are accompanied by sharp drops in barometric pressure. In tests, the Barorator has given two to three hour warnings of severe storms. The instrument is in use at the University of Mexico's Storm Studies Center.

Heart of the Barorator is a vibrating wire pressure transducer which senses and measures pressure changes. In the Space Shuttle, the transducer, together with associated electronic microprocessors, alerts the crew to any measurable increase or decrease in cabin pressure.