

# Environmental Monitoring Systems



# **ERRTS**<sup>TM</sup>

*Event Report Radio Telemetry System for Flood Warning, Automatic  
Weather Station, Forest Fire Monitoring System, Tidal & Pollution Monitoring*

# Environmental Monitoring means Environmental Protection

Throughout history, mankind has sought indicators that could predict nature's moods. Early warning has always been vital to our ability to cope with nature. Today, we cannot rely on studying the actions of ants and birds - we need reliable data gathering systems in the field that can accurately determine when and where floods, fires, pollution and other potentially damaging events are likely to occur. The same information is critical for long term planning of infrastructure needs.

The Event Reporting Radio Telemetry System (ERRTS) is a proven remote monitoring system that provides real time reporting of a wide range of environmental conditions. Environmental parameters are measured in the field and transmitted over long distance by radio, to computer stations which display and analyse the information. ERRTS conforms to the international ALERT and enhanced IFLAWS specification, which details the common requirements for high reliability environmental monitoring systems.

## ERRTS™ is Real-time

ERRTS reports field data in real time, as it happens, giving authorities the earliest possible warning of impending flood, fire or other risks. Emergency services have time to develop strategies and implement actions to handle the problem.

The ELPRO ERRTS system consists of any number of field stations and computer base stations. Field stations can be fitted with different sensors to provide a variety of monitoring functions. A computer base station comprises a radio receiver/decoder and a computer that analyses the field data and generates warning alarms, as well as long term trend information for infrastructure planning.

There is no limit to the number of computer base stations in a system. ERRTS 'report only' operation eliminates complex two way radio equipment. The system operates on a single regular transmission cycle that enables reliable communications over a much larger distance than a conventional radio telemetry system. This efficient communications philosophy also allows it to cost effectively serve multiple independent base stations. Several authorities are able to co-operatively share the cost of the system and access data that is unique to each authority's needs.



## ERRTS Field Stations are designed for the Field

The ERRTS field stations are designed to be true "field" stations and do not require mains power. The field stations use extremely low power, with electronics powering down to an "idle" state between measurements. The stations may be powered for long periods from a simple sealed battery, or indefinitely by adding a small solar panel.

Depending on the requirements of a particular installation, the ERRTS telemetry system can be fitted with ELPRO's VHF or UHF radio receivers, transmitters and power amplifiers to provide affordable and dependable radio communications.

Field stations comprise a microprocessor based controller, a UHF/VHF radio transmitter and a sealed lead acid battery, all assembled into a cylindrical "canister" manufactured from 2.5mm marine grade aluminium. The canister is designed for IP67 "submersible" water and dust protection. The removable top of the field station canister contains military spec waterproof connectors for the various transducers, and the radio aerial connection.



Connectors are also provided for an optional solar panel.

The basic ERRTS field station provides three signal inputs :-

- A pulse accumulator input suitable for the connection of a rain gauge or flow meter
- A digital shaft encoder input to provide extremely accurate water gauging measurements of dams, lakes, tides, or streams.
- A high resolution analogue input suitable for 4-20mA transducers.

The number of signal measurements may be increased by adding the AWS (Automatic Weather Station) option to the field station :-

- Two frequency inputs for wind speed and direction measurements from an anemometer.
- Four inputs which may be configured to be either 4-20mA analogue signals, or pulse accumulator inputs.

### Simple Operation with Powerful Features

The ERRTS field station achieves remarkable reliability, by combining a simple operating philosophy with powerful intelligent features. Each field station will transmit a radio message whenever an input signal has changed by a pre-set amount (this amount is the "sensitivity").

As the nature and dynamics of different measurements will be different, the user is able to select an individual sensitivity for each measured signal.

The field station will also transmit report messages at pre-set time periods, to provide an integrity update of the measured signals, and to test the integrity of the radio channel.

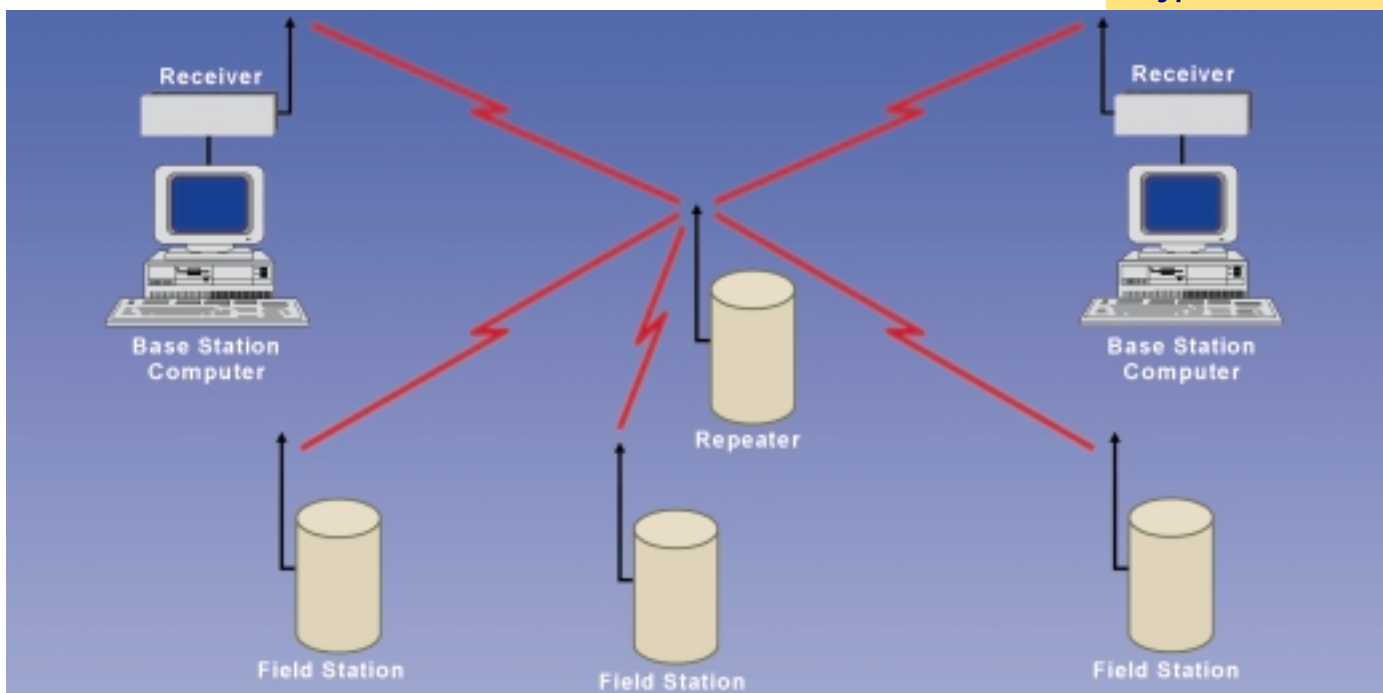
If an individual signal is changing rapidly (for example, a rain gauge signal during torrential rain), the field station will go into "paralysis" to avoid transmitting continuous messages and jamming the radio channel. Under these conditions, the field station will revert to transmitting messages on a fast time cycle, until the measured signal has returned to its normal dynamic conditions. Each signal has individual "paralysis" values, which are set to reflect the nature of the measured parameter and the update response required by the user.

All field station parameters such as station identification, analogue sensitivity and store and forward status are easily configured from a PC.

### Data Logging

The field station Logger option also provides data logging features. The logger option has 256 KB of RAM memory which may be used for logging all or some of the measured signals. The logged data may be retrieved by connecting a portable computer to the field station's serial port. The data logging feature is desirable for protecting critical data against radio communications failure. In some cases, measured data is necessary to meet statutory requirements, and the data logger ensures that the information is not lost because of interference or radio failure.

### Typical Network



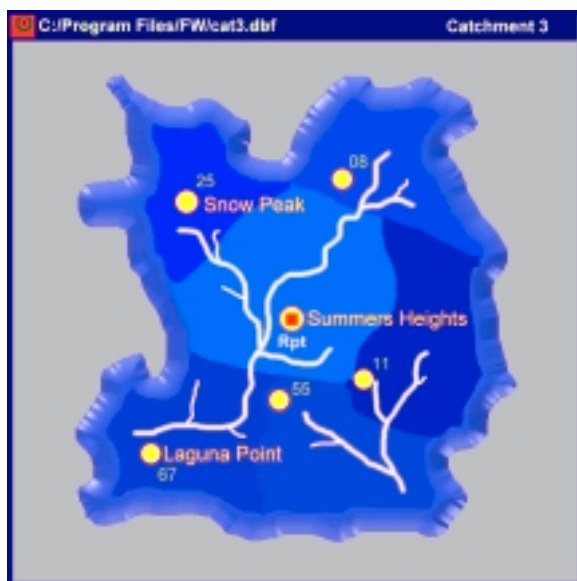
## Repeater Stations

Any field stations may be configured to act as a repeater station. A repeater station will receive messages from remote field stations, and re-transmit the messages to the base stations. Repeaters will listen before transmitting, to reduce data collisions. Quite long transmission distances can be achieved.

A repeater station can also act as a normal field station, collecting data and transmitting this data to the base stations. A repeater station is fitted with a radio receiver, so that it can "hear" the transmissions from the remote stations. As the receiver is powered continuously, a mains or solar supply is necessary.

## ERRTS Computer Stations

There is a wide variety of third-party computer packages available for use with ERRTS. These packages are developed for specialised applications such as early flood warning, fire and forestry management, pollution and environmental monitoring, and dam hydrology supervision.



An ERRTS system can have multiple computer stations, allowing systems to be shared by many authorities. Computer stations receive and store the field data and provide immediate warning of alarm conditions. Software packages interface to telephone alarm diallers, alarm pagers or cellular SMS, for quick annunciation of alarm conditions.



The computer packages display dynamic graphical images of the system for fast operator access. Historical, real-time and comparative trends allow operators to quickly monitor system changes. The packages also provide modelling functions for prediction of future conditions such as flood levels, fire risk, environmental damage etc.

The software packages provide a historical data base for long term infrastructure planning - the data base can be shared by networking locally via LAN or remotely via dial-up telephone modem.

ELPRO is able to recommend a software package for your application. ELPRO also provides engineering services to assist with the design and configuration of the whole system.

## Optional Floodwarning "Tree"

Flood warning stations are available with the ERRTS field station canister encased in a 3 metre high x 300 mm diameter aluminium tube or "tree". The "tree" is protected in bronze green heavy duty paint so that it will blend into a natural environment. At the top of the "tree" is a tipping bucket rain gauge. The 3 metre height of the "tree" protects the station against flood water, and raises the rain gauge above low plants which may affect the measurement accuracy. The electronics canister sits in the bottom of the sealed tube, under the level of the ground. This provides a stable temperature and good earthing protection against lightning surges.

The optional flood warning "tree" is easy to install, and provides good protection against natural elements, animals and vandalism.

## Test Equipment

ELPRO Technologies has designed specific ERRTS test equipment to assist with installation, maintenance and on-going support of the ERRTS system.

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