

CENTRAL WEATHER BUREAU TAIWAN FLOOD FORECASTING



7/17/2006

SYSTEM TO MEASURE RAINFALL & OTHER MET DATA FOR AN ISLAND-WIDE NETWORK FOR CENTRALIZED FORECASTING INCLUDING TELEVISED RAINFALL MAP DISPLAYS.



The Central Weather Bureau (CWB) has primary responsibility for flood forecasting and flood warnings throughout all basins within the island of Taiwan. Each year in late May, the rainy season begins. During the following two to three months, continual typhoon rainstorms sweep over the island, often dropping more than 200 mm (-8 inches) of rain within a 24-hour period. During a rainfall event, hydrologic and meteorologic information must be disseminated to the general public in realtime to prevent loss of life and damages.

Sutron was contracted to provide a turnkey system to measure rainfall and other meteorological data, transmit the data to regional data processing stations, process and store the data received, generate alarm messages and graphical displays, and distribute the information across an island-wide network for centralized forecasting including televised rainfall map displays.

Because of Taiwan's rugged terrain, Sutron provided a one-way radio system with intelligent remote telemetry units (R TUs). The rainfall and meteorology telemetry system consists of 36 automatic rainfall only RTU stations, 14 automatic meteorological RTU stations, 5 single-type repeater stations, 2 parallel-type repeater stations, and 1 regional receiving station. An existing CWB system that collects hydrologic (rainfall and stream gage height) data from 29 sites was integrated into a second regional data processing station to allow use of the sophisticated software system provided by Sutron. Figure 1 presents the system configuration for the rainfall and meteorological telemetry system.

OWNER: Central Weather Bureau, Taipei, Taiwan, Republic of China

PROJECT: Flood Forecasting/Warning System

PURPOSE: System to measure rainfall and other meteorological data, transmit the data to regional data processing stations, process and store the data received, generate alarm messages and graphical displays, and distribute the information across an island-wide network for centralized forecasting including televised rainfall map displays.

EQUIPMENT: \$1.7 million, 36 rainfall stations, 14 automatic weather stations, 5 single-type repeater stations, 2 parallel-type repeater stations, 1 receiving station, and integration of existing system

DATE: 1988

The rainfall stations utilize a tipping bucket collector that is accurate to 0.5 mm and transmits each tip of the bucket. The rainfall collectors provided above 1,800 m (-5,900 ft) were installed with heaters. The rainfall transmitters are event-driven with programmable delay transmit sequences. If no rainfall is collected during a 6-hour period, a test signal is transmitted.

The meteorological stations collect 10-minute average

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7/17/2006

wind speed and direction, observed air temperature (at transmit time), and daily accumulated minutes of sunshine, and transmit the data on a 1-hour scheduled basis. Some meteorological stations also collect rainfall data with simultaneous scheduled and event-driven transmissions. Each meteorological station maintains the previous 1 hour of data and can be interfaced in the field with a direct memory pack to collect the data for later verification at the receiving station.

The data processing system provided by Sutron consists of two Digital Equipment Corporation (DEC) MicroVAX II super-microcomputers at the regional data processing stations and a DEC VAX 8200 super-minicomputer at the

central data processing station. All three computers are linked together via DEC-Vax DECnet. The operator interface equipment includes two DEC VT240 video display terminals, six DEC LA100 hardcopy terminals, two DEC CT1600 Chinese character terminals, two Selanar XL100 video display terminals, and two Tektronix 4125 color graphic terminals. The terminals are linked with the computer system through an Equinox private branch exchange (PBX). The Tektronix terminals were provided with color copiers. The central data processing station was provided with a video camera, video recorder, and video projector to provide graphic displays both in a briefing room and over emergency televised broadcasts.

Sutron provided its licensed software package, the VAX Data Management System (VAX/DMS), for the data processing requirements on all three computers. The VAX/DMS provided realtime acquisition, processing, and storage of both hydrologic and meteorologic data. The software also provides interactive software to retrieve, edit, and display both current and long-term data. CWB utilizes the VAX/DMS to generate 1/2 hour, 1-, 2-, 3-, 6-, 12-, and 24-hour summary reports on conditions throughout their basins.

The highlight of the VAX/DMS software is the graphical presentation of the data in realtime. A variety of displays are generated by the software to show trend information (hydrographs) at a particular site, current conditions at all sites on a map display, or hourly interval rainfall summaries on an isohyetal (contour) map display. The map displays are provided for both individual basins and the entire island. An example of a map display is shown in Figure 2. The graphic presentations are then recorded using the video equipment, displayed in a briefing room, or, during emergencies, shown continuously over the government's public television channels in bus stations, public areas, etc.

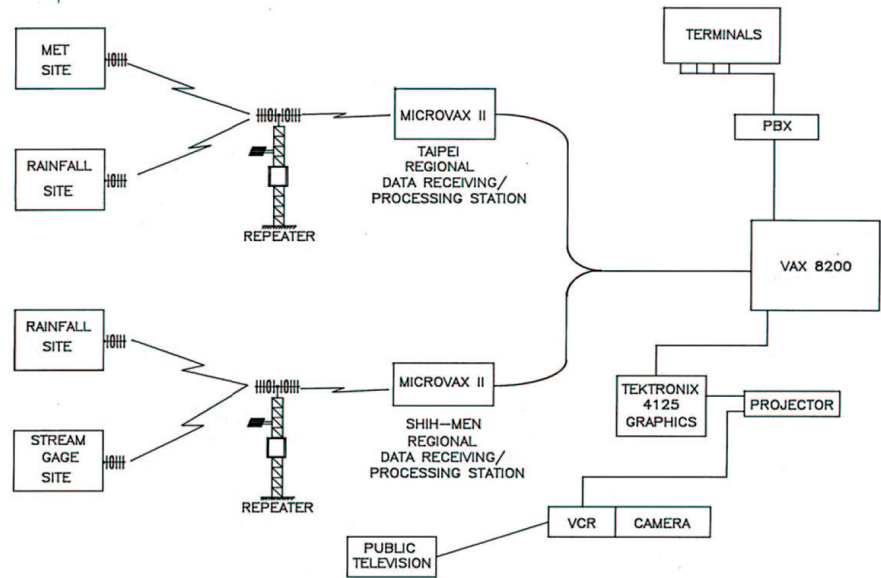


Figure 1
TAIWAN RAINFALL AND METEOROLOGY TELEMETRY SYSTEM