

Marmot Creek Research Site Telemetry Configuration

Site description and instrumentation

Marmot Creek research site is located on the eastern slopes of Rocky Mountains in Alberta, Canada. The site is dominated by the needle leaf vegetation and poorly developed mountain soils. Precipitation, snow depth, soil moisture, soil temperature, short and longwave radiation, air temperature, humidity, wind speed, and turbulent fluxes of heat and water vapour data sets are collected and used for the hydrological modelling of the Marmot Creek Basin. Time series records are obtained at Hay Meadow, Upper Clearing, Vista View, Fisera Ridge, and Centennial Ridge hydro-meteorological stations equipped with different sensor configurations and Campbell Scientific data loggers.

Communication equipment and methods

The telemetry network consists of one Raven CDMA cellular modem and RF401 spread spectrum radio modem located at the Upper Clearing base station, four additional RF401 modems located at each of the Meteorological stations serviced by telemetry, and the desktop computer located at the University of Saskatchewan. The radios connected to the data loggers at each of the meteorological stations talk to the base station on an ongoing basis. All of the data loggers and RF401 radios have PacBus addresses and they operate as PacBus Nodes. Also, data loggers are set to operate as routers enabling routing inside this network through the various paths. The telemetry network configuration is presented in Figure 1.

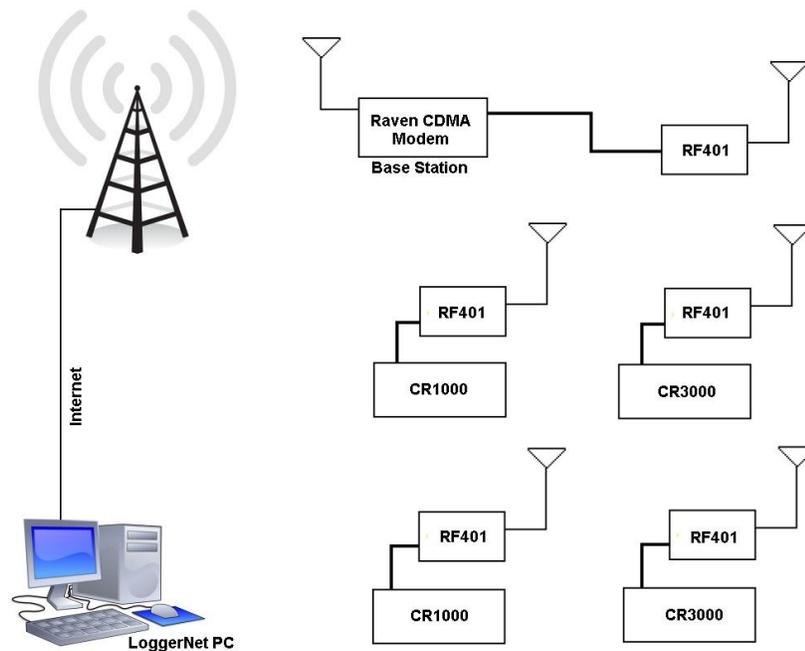


Figure 1: PacBus Network with mixed Loggers and Raven to RF401 Base

Data collection and processing

At the intervals prescribed within the LoggerNet application running on a desktop computer, data is collected from the meteorological stations. The Raven CDMA transfers data utilizing a dynamic IP address and its static alias associated through the Airlink IPmanager software. The unique PakBus address is assigned to each of the dataloggers in this telemetry network. In most cases, logger data files at the off-site location will be appended on a daily, four-hourly and hourly basis. In addition to the scheduled intervals, field data can be downloaded on demand through the LoggerNet application.

LoggerNet "Task Master" utility is used to execute custom programs after each successful collection of the field data. Also, the utility can be used to start scheduled executions of different programs and operations. For Marmot Creek records, Task Master is used to rename the collected data logger files and upload them to the FTP server.

Data publishing

Field data downloaded to the off-site computer are accessed by the RTMCPRO LoggerNet utility. Last measured values are mapped to the specified locations on a web page. The web server hosts different RTMC files for daily summary information, station data tables, alarms, and other records. The main interface contains individual windows for the main screen web page as well as the screens for individual stations, weekly data graphs, and site information. RTMC files interface with the web page via the RTMC Web Server desktop utility.

Centre for Hydrology, University of Saskatchewan. *University of Saskatchewan Hydrology Field Data Retrieval and Management Manual*. 2009. PDF file.