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Flux Measurement System Software Package

GENERAL

The Flux Measurement System, (FMS) Software Package produces estimates of momentum flux, sensible heat flux, and latent heat flux by applying the Eddy Covariance Method to measurements of atmospheric conditions. The minimum configuration of a flux measurement system requires a Sonic Anemometer/ Thermometer. For an eddy covariance system, the DataPacker can also be used to combine various analog outputs with the sonic output.

The Flux Measurement System Software is a Linux®-based software package designed to accomplish data collection, storage and processing.

The FMS receives sampled raw data from the attached instruments. The data are then processed and the raw data, as well as the processed data, can be stored on the data storage device installed in the system.

ARCHITECTURE

The FMS system uses the ATI DataPacker for the time-sensitive tasks of instrument triggering, data collection, and initial data storage, and then a Linux®-based personal computer for system control, longer-term storage, data analysis, and data visualization.

The system may be configured with an unreliable or part-time data link between the DataPacker and the supervisory personal computer, and the FMS system will provide for data integrity.

FEATURES

- **Multi-tasking**
- **User configurable**
- **Self-starting**

INSTRUMENTS SUPPORTED

The following instruments can currently be supported by the FMS Software:

- **ATI Sonic Anemometer/Thermometer**
- **ATI DataPacker**
- **Analytical Applications Infrared Hygrometer**
- **Analytical Applications Infrared Analyzer**
- **LICOR #6262 Hygrometer**
- **LICOR #LI-7500 Analyzer**
- **Analog Inputs**

Other instruments can be added as required.

FLEXABILITY

When a Sonic Anemometer is connected to the FMS, the following parameters can be measured:

- Vector Averaged Wind Speed
- Vector Averaged Wind Direction
- Standard Deviation
- Momentum Flux
- Friction Velocity
- Sensible Heat Flux

By adding a fast response hygrometer, and/or analyzer, along with a temperature sensor and pressure sensor, the following parameters can also be measured:

- Latent Heat Flux
- Mixing Ratio
- Vapor Pressure
- Air Density
- Specific Heat at Constant Pressure
- Heat of Vaporization
- H_2O Flux
- Flux of measured component (i.e. CO_2, etc.)

STORAGE

The data are stored on either a fixed hard drive, or other data storage device installed in the system. Both raw data and processed data can be stored. The data are stored as ASCII text.

ATI can provide custom data formats should the need arise.

HARDWARE

The basic hardware requirements are as follows:

- IMB compatible PC, @1.0GHz (or better)
- 256 meg RAM (or better)

The system will support the following hardware:

- A/D boards from most manufacturers
- D/A boards from most manufacturers.
- Serial I/O boards
- Hard and floppy drives

Other hardware can be added as required.