TECH NOTE #023:: Integrating a Weather Station into a QuantumX / catman monitoring setup from HBK

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Abstract

This Tech Note describes how to digitally integrate a weather station as additional relevant information source concerning ambient conditions in structural monitoring of bridges, wind energy plants, buildings, or any other construction.

Weather Talk

Especially in large scale monitoring applications data from weather stations plays a relevant role when evaluating the sensor data and predicting the overall condition health and its maintenance.

Informative atmospheric conditions are:
- Mean wind speed (kn or m/s)
- Wind gust speed (kn or m/s)
- Wind direction (degrees)
- Barometric pressure (hPa or mbar)
- Air or ambient temperature (°C or °F)
- Air humidity (%)
- Precipitation (mm)
- …

Bringing meteorological data time sync'd into relation of tactile or non-tactile measured sensor data focusing on the construction under investigation makes sense and one can see its influence measuring strain, forces, acceleration, noise / acoustics, displacement, inclination and the many other physical quantitates and helps compensating load influences and improves the overall picture over time.
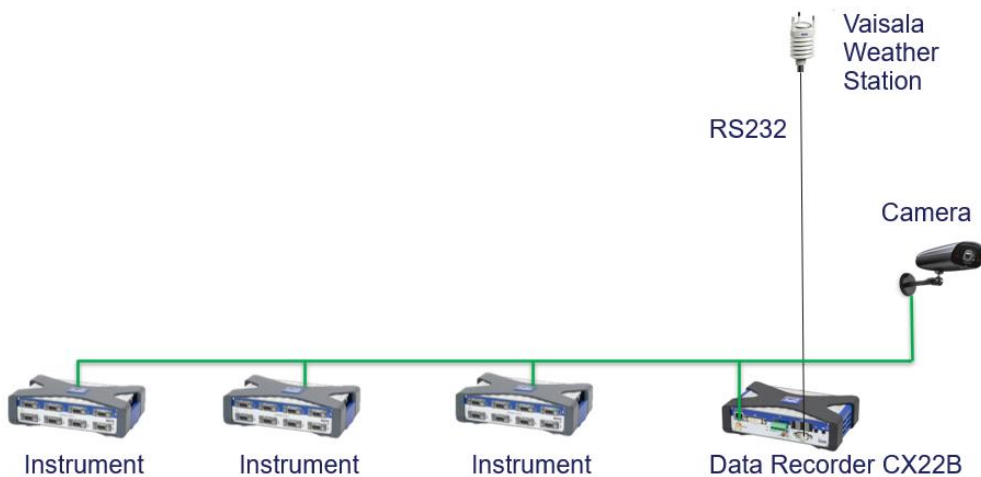
Weather Station

We do have several ways integrating different weather stations into catman data acquisition software:

- Support of NMEA protocol via RS232 and USB
- Direct support of Vaisala WTX weather stations
- CAN bus integration
- EtherCAT signals reading
- Integrating catman and the Weather station via OPC UA or MQTT into a larger monitoring setup.
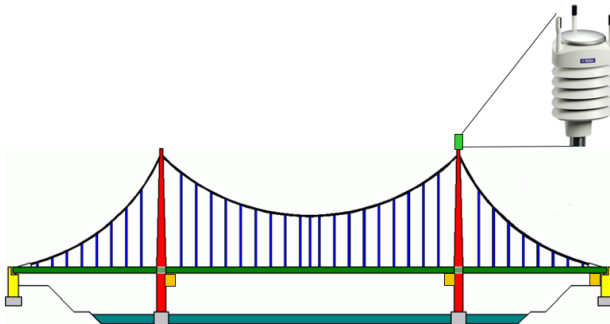
Example:

Vaisala Weather Transmitter WXT520 and following units

- Measures 6 most essential weather parameters
- Wind speed:0 ... 60 m/s
- Wind direction:0 ... 360°
- Liquid precipitation: Rainfall, rainfall duration, rain intensity
- Barometric pressure: 600 ... 1100 hPa
- Air temperature: -52 ... +60 °C (-60 ... +140 °F)
- Relative humidity: 0 ... 100 %RH
- Low power consumption - works also with solar panels
- Connection: RS232, NMEA
- IP66 graded, so basically ready for outdoor installation.

Link to Vaisala.

Workflow

In case you use the latest catman version and the Vaisala weather station is connected via RS232 to the data recorder CX22B-W just start catman, add the weather station manually as "additional device" and fill out the setup dialogue.

Prepare the WXT before you connect it to QuantumX Data Recorder and catman. It must be configured properly by using the Vaisala config software tool, so that catman is able to acquire the weather data without any issue.

- Automatic composite NMEA messages must be turned ON.
- All other messages must be turned OFF
- In the composite message config panel (the right hand panel in the Vaisala config tool) the messages "min/max wind speed, direction" must be turned OFF.

In catman device setup, the channels / signals to be acquired are selectable and comprise for example wind speed and direction, barometric pressure, air temperature, rel. humidity, rainfall, and hail.
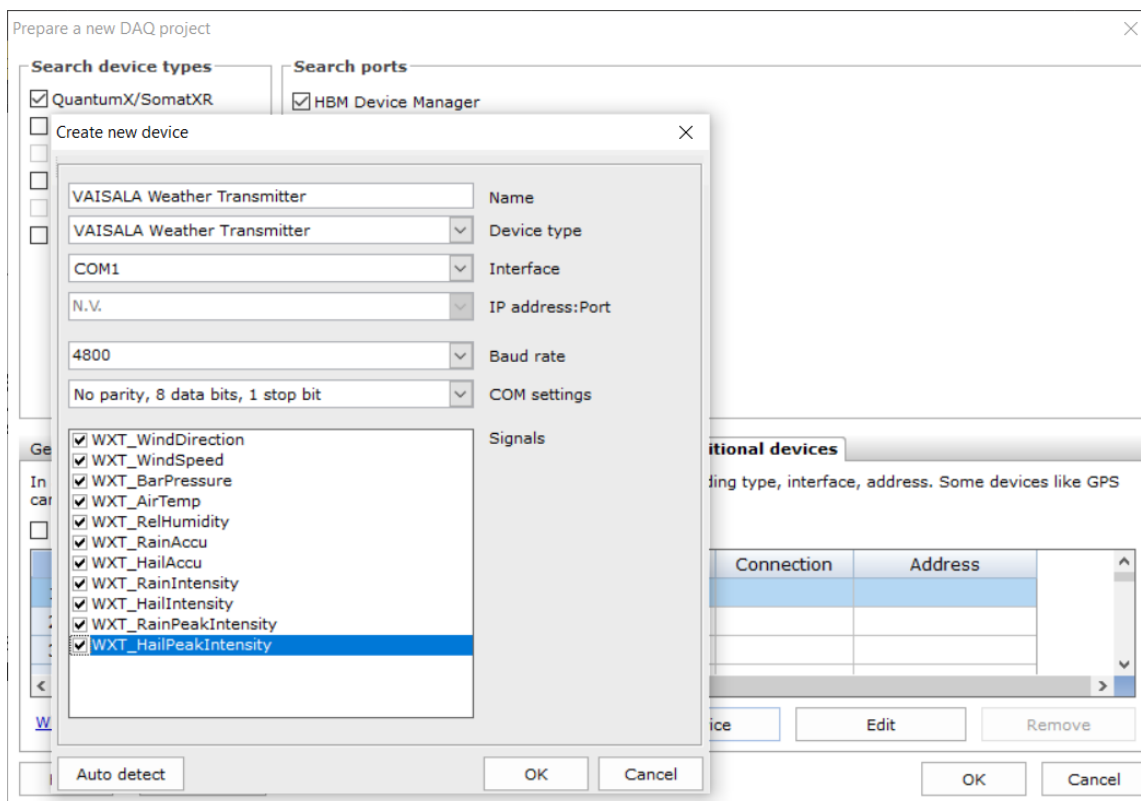
Check the latest news and download catman which can run on your PC or on QuantumX Data Recorder CX22B-W. Further reading can be found in the software.

Good luck with the weather….

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