# Smart Microgrid Network

Area : Distribution, Automation, Communications, Signal Processing
(Sensors, Monitoring and Fault Detection)

Project Leader: Dr. Julian Meng

A robust and reliable integrated sensor network is needed to provide information on the overall grid integrity and health. This is an important requirement for intentional islanding operation and enables its ride-through capability when the Microgrid becomes disconnected from the grid, and for safety and power quality issues during unintentional islanding conditions. For re-connection, it is important for the Microgrid to determine when the grid recovery occurs for grid re-synchronization.

A specialized communications and sensor module will be integrated and/or embedded within energy sources of Microgrid to acquire and measure required system parameters such as power quality, voltage, frequency stability and faults. Low cost and reliability will be key requirements. A wireless physical layer will be most likely be implemented in the location diversity of the Microgrid energy sources. This will require the development of hardware and firmware of desired signal processing and data acquisition capabilities (in combination with analog sensors and physical layer interfaces) that is capable of determining unhealthy grid operation in a fast and accurate manner as defined by the relevant standards requirement (e.g. currently in-draft IEEE Standard 1547.4). This information will be conveyed for distributed automation of the Microgrid using the appropriate communication protocols. A typical module configuration is shown below[1] :
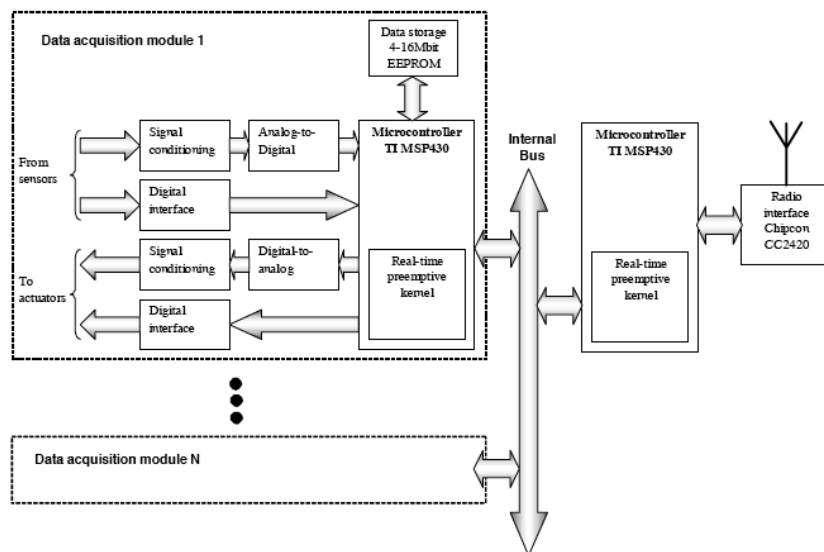
 A number of these modules will be configured in an autonomous and self-healing network to satisfy the requirements of the Microgrid.

Desired Background: Signal processing, wireless communications, Power, Software development (C++ , Matlab).

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[1] Reference: "Wireless Intelligent Sensor Network for Autonomous Structural Health Monitoring" Sazonov et al.