

# Modular Remote Monitoring System

## A Modular Remote Monitoring System for Critical Infrastructure Applications

Implementing a near real-time monitoring solution for multiple applications including, physical security, tamper indication, fire detection, leak detection, environmental controls, physical location tracking, and emergency accountability tracking. Framatome has developed an integrated monitoring package consisting of hardened wireless sensors and communication infrastructure designed to significantly increase efficiencies in the monitoring of critical plant systems and equipment for unauthorized access and abnormal operating conditions.

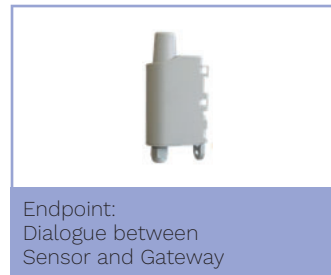
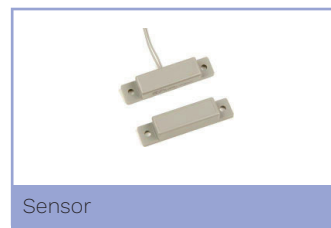
An increase in cyber security regulations have created a heightened awareness of the potential threats to critical infrastructure. There is a need for innovative remote monitoring solutions which have a comprehensive capability of detecting, responding, and recovering from unauthorized access or abnormal operating conditions.

Results of unauthorized access and/or abnormal conditions have the potential to significantly impact capital, operational, and maintenance costs. Framatome's Modular Remote Monitoring System will provide enterprise flexibility by optimizing workforce bandwidth, increasing the efficiency of program maintenance, and improving operational performance without compromising security.

## Fully Adaptable and Flexible Technology

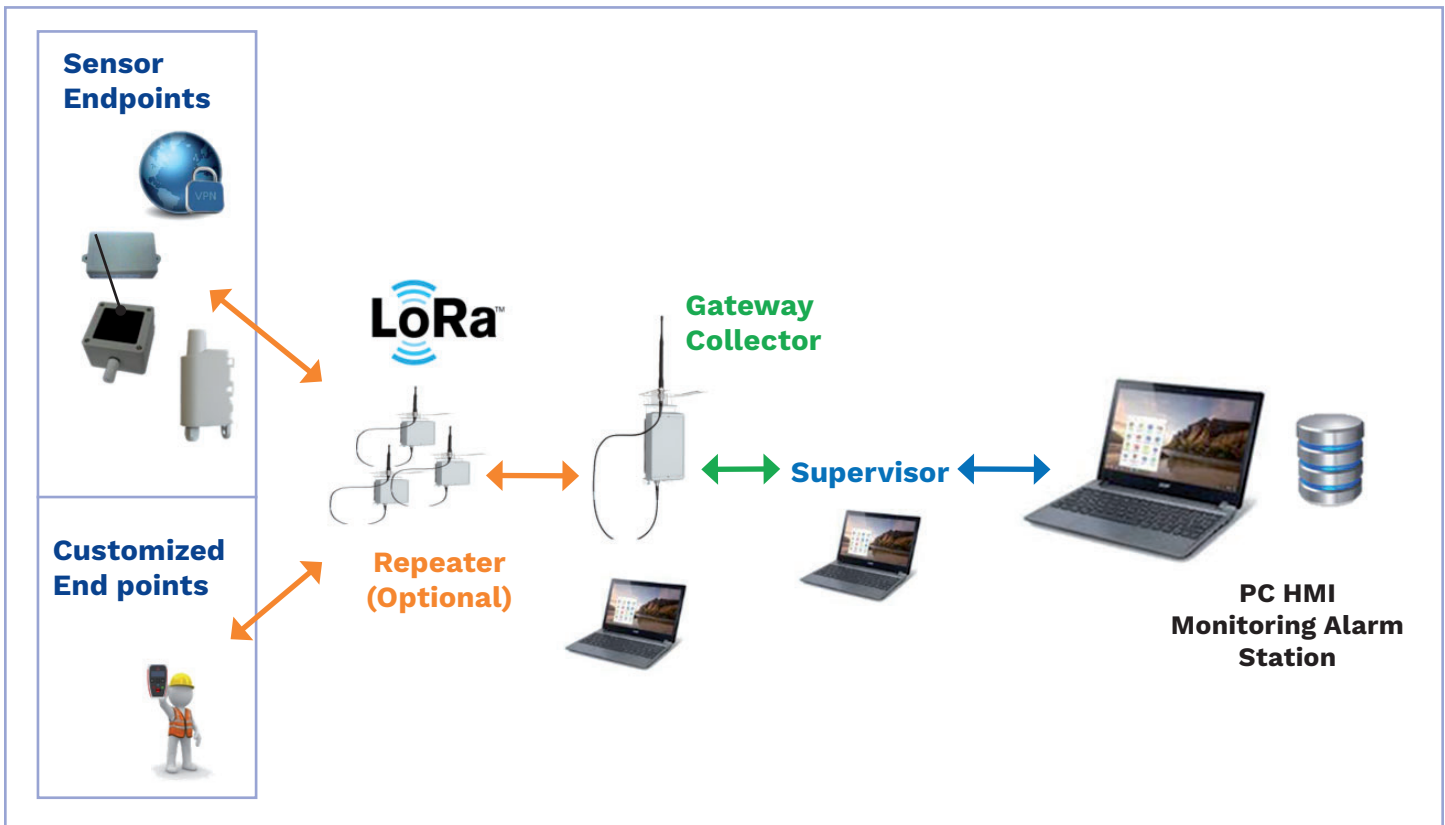
The integrated monitoring package's network architecture and modular ability make this product a versatile and expandable system. Integrating seamlessly into the network, numerous sensor types can be deployed to monitor critical plant systems and equipment. Some of these sensors include:

- Motion detection
- Smoke detection
- Temperature
- Pressure/flow
- Location/proximity
- Tamper indication
- Humidity



## Features and Benefits

- NRC, IAEA, and NERC/CIP compliant
- Endpoints operate on 3.6V and have a power output of 50mW
- Low upfront initial cost with minimal maintenance
- Battery life of endpoints is 1-2 years depending on frequency of data transmitted
- Endpoints can be used in a variety of outdoor situations
  - -20 to 167° F (-30 to 75°C)
  - Endpoints are sealed; dust and moisture resistant
- Endpoint to gateway transmission utilizes 128 bit AES encryption
- Gateway communicates to the supervisor via VPN or SSL
- LoRa wireless signal operates at 915Mhz
- LoRa wireless signals can penetrate containment and other thick mediums
- Endpoints can accept voltage, current, and dry contact sensors



## Tamper Indication Device (TID) Program

The TID program is designed on a star network architecture which requires minimal infrastructure to be deployed and provides greater wireless coverage than traditional network configurations. Sensors monitor for indications of physical tamper using commercial off the shelf equipment (i.e. balanced magnetic switch).

Upon activation, a signal is transmitted via wireless LoRa to the HMI alarm station. The main monitoring station can monitor hundreds of individual TIDs. The alarm station also has the ability to monitor the status of all deployed endpoints and other parameters such as battery level.

End points have the ability to utilize dry contact, current, or voltage sensors giving expanded capability

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for an array of sensor applications. Additional capabilities include customized end points for the transmission of data to individual users and devices on the network. The supervisor is versatile and is used to track all TIDs (complex or simple) within the TID program.

## Delivering the Nuclear Promise®

Framatome provides a diverse portfolio of digital, cyber and physical solutions that help utility teams meet regulatory requirements while saving money. We understand that the real success is in an ongoing relationship — one where we work together to make the right decisions for your plant and Delivering the Nuclear Promise®. Implementing a TID Program for near real-time monitoring of critical assets/devices will support reducing overall O&M costs as well as increasing equipment reliability, operating efficiency, and meeting current regulatory requirements.

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