

Asset monitoring for Power Transmission Towers

Challenge: Global Warming and Vandalism Risk Critical Power Transmission Assets

High voltage power transmission networks are made of high rising metal towers (pylons) that span vast distances along diverse terrain. Global warming creates increasingly extreme weather conditions that risk the proper ongoing operation of these critical infrastructure assets, while intentional sabotage such as transformer vandalism and fiber or copper theft leads to prolonged power outages, as well as heavy financial losses.

These threats mean that there's an increased need for proper monitoring of power transmission towers, however, the most advanced inspection method currently in use relies on visual aerial images, typically collected by helicopters. The problem with this method is that it's costly, time-consuming and isn't sufficient to provide actual updated information.

Solution: RAD's Secure IIoT Gateway for Transmission Tower Monitoring

The Industrial Internet of Things (IIoT) can significantly improve pylon monitoring. It involves the use of connected devices, sensors and analytics to gather data from physical assets. This data is then used to optimize operations, improve efficiency and reduce costs.



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Application Brief

Asset monitoring for Power Transmission Tower

RAD's ruggedized SecFlow IIoT Gateway is installed on each pylon, together with relevant sensors and a solar powered battery pack. SecFlow serves as an all-in-one connectivity and Edge Computing unit, featuring all necessary functionalities for a secure, effective and economical asset monitoring:



LoRaWAN, fiber and an LTE radio -

The SecFlow features LoRa slave and master functionality to deliver LoRa messages from towers to central network servers over fiber or LTE. The distance between gateways can reach 10-15km (6-9Mi) and covers many towers, depending on the location of antennas and the surrounding terrain. The LoRaWAN (Long Range Wide Area Network) wireless communication technology is particularly well-suited for remote asset monitoring and IIoT, thanks to its long range, low power consumption, scalability to support many devices without compromising performance, and encryption-based security.



Sensors -

The SecFlow connects to a variety of sensors that are installed on transmission towers to monitor their condition and detect any potential issues before they lead to outages or other problems. These include vibration and strain sensors that detect structural damage, temperature and humidity sensors, Infrared sensors, and more. The sensors are connected to the SecFlow using RS-485 connectors, Ethernet, WiFi, or LoRa.



Docker-based IoT agent -

The SecFlow features a Docker container, which hosts an advanced IoT agent. The agent polls and retrieves data from the sensors using MODBUS protocol, then converts the MODBUS data to MQTT messages that are sent to a central collector on the backend servers. The IoT agent also queues the messages locally until a scheduled LoRaWAN transmission window is available.



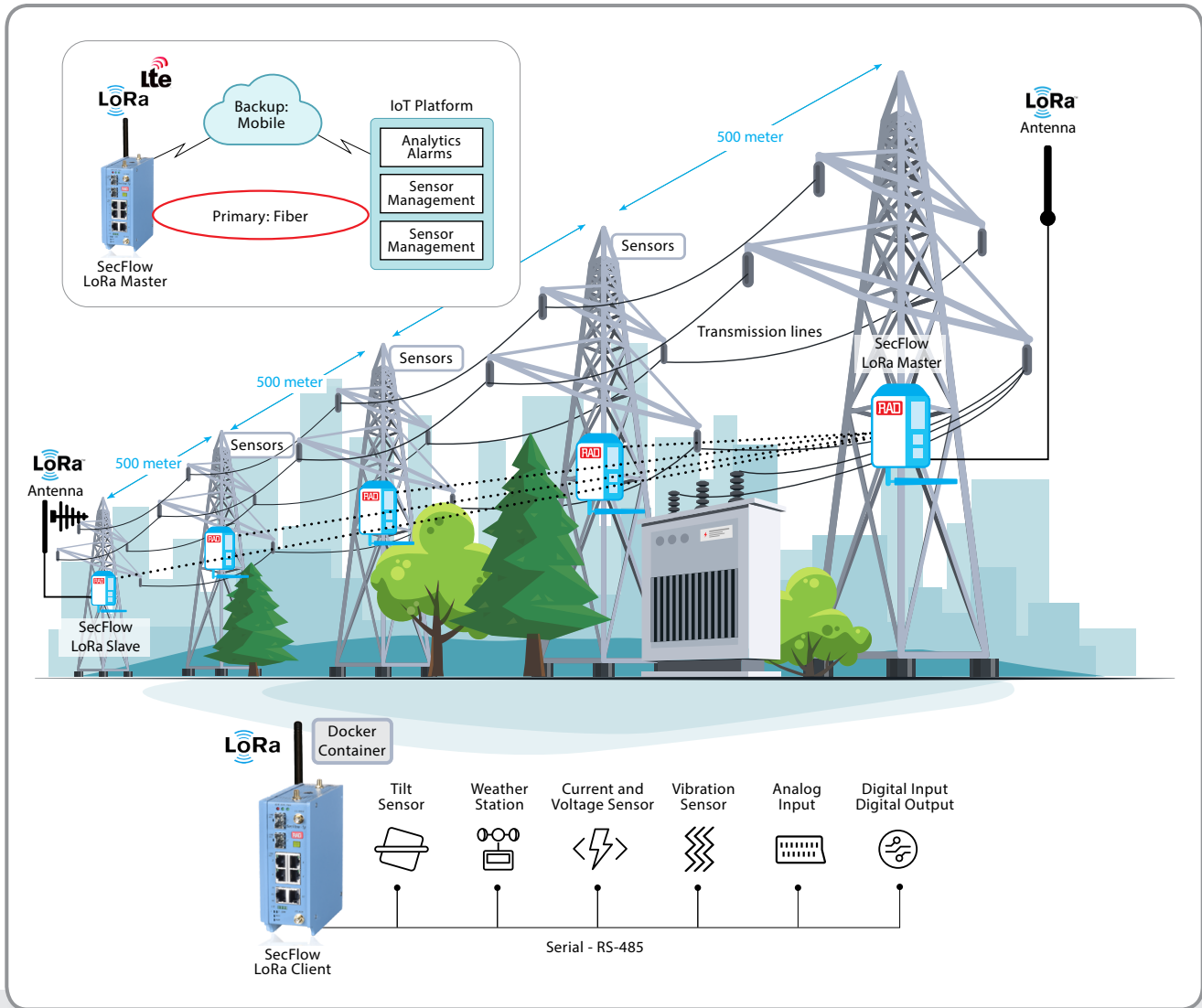
Solar-based battery pack -

The gateway and sensors are powered using a battery power bank, whose status is also monitored by the SecFlow. If power down/up of the battery is needed (e.g., due to poor weather), the SecFlow reboots and seamlessly resumes communication, transmitting any queued sensor data.

RAD's asset monitoring solution also supports video streaming from CCTV cameras to the operation center over LTE. Alternatively, local video recording can be stored and retrieved when needed.

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Value Proposition: Reliability, Flexibility & Efficiency

- Robustness in extreme conditions
- Super-low power consumption by design
- Docker-based Edge Computing, flexible software selection
- Compatibility with any IoT platform, LoRa LNS or packet forwarder
- No hidden licensing costs
- Unique LoRaWAN master & slave architecture
- eSIM support
- Real time geo-location support
- Flexible connectivity options

[Learn more about RAD's SecFlow here»](#)

To discuss your Remote monitoring needs for power transmission towers, contact us at market@rad.com.



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