

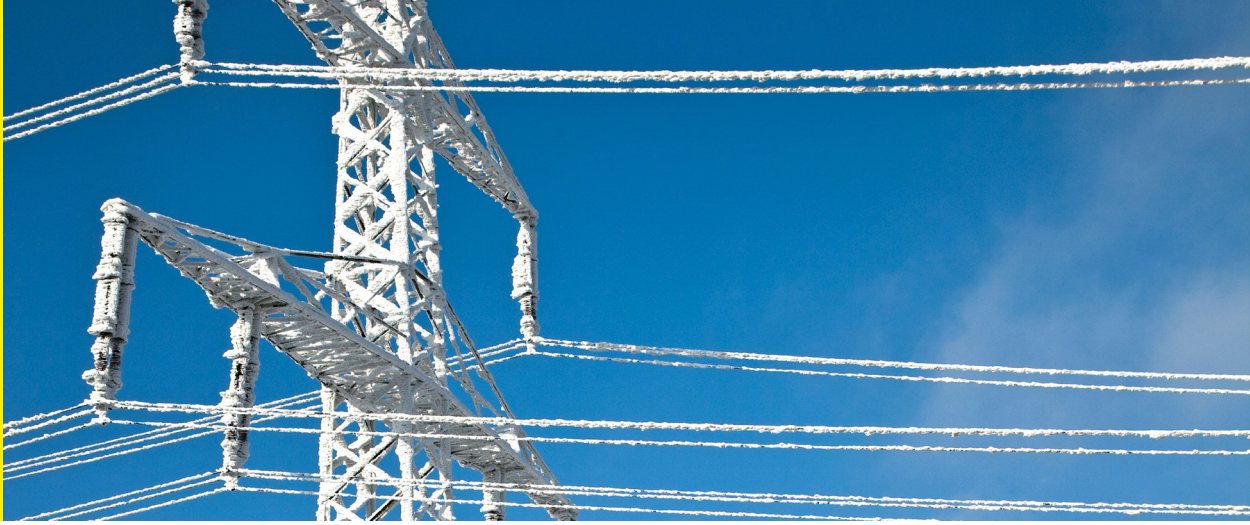
# **ASTROSE®**

## POWER LINE MONITORING



 **Fraunhofer**  
IZM

**IOT**   
MADE IN GERMANY



## MONITORING POWER LINES WITH ASTROSE®

ASTROSE® is a smart and cost saving IoT system for high voltage power line monitoring with wireless sensor nodes.

By providing a continuous stream of data, grid operators can optimize the current-carrying capacity of their power lines, spot any critical states and track operating data over time. The many unique capabilities of ASTROSE® promise substantial commercial benefits when operating or managing power grids.

ASTROSE® is an autonomous ultra-low power system designed to be highly efficient and effective in the following applications:

- Increasing the current-carrying capacity of the line (ampacity)
- Detection of ice load
- Detecting active hazards, including downed lines and earth faults
- Allowing video surveillance of operating equipment and line routes

ASTROSE® provides a comprehensive technical portfolio of sensor capabilities for the distributed monitoring of relevant properties of the lines:

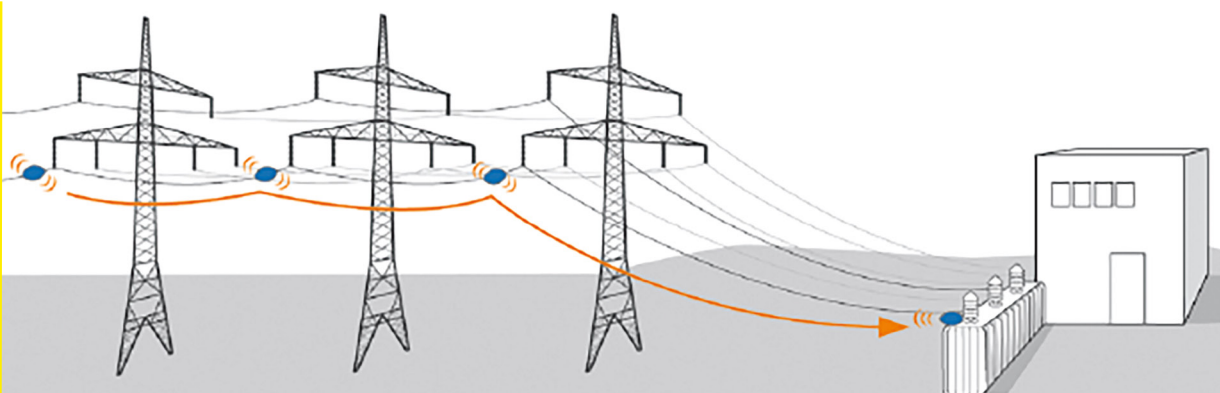
- Conductor temperature
- Current through the conductor
- Inclination of conductor
- Torsion of conductor
- Voltage

The captured data can be transmitted by several secure means of communication:

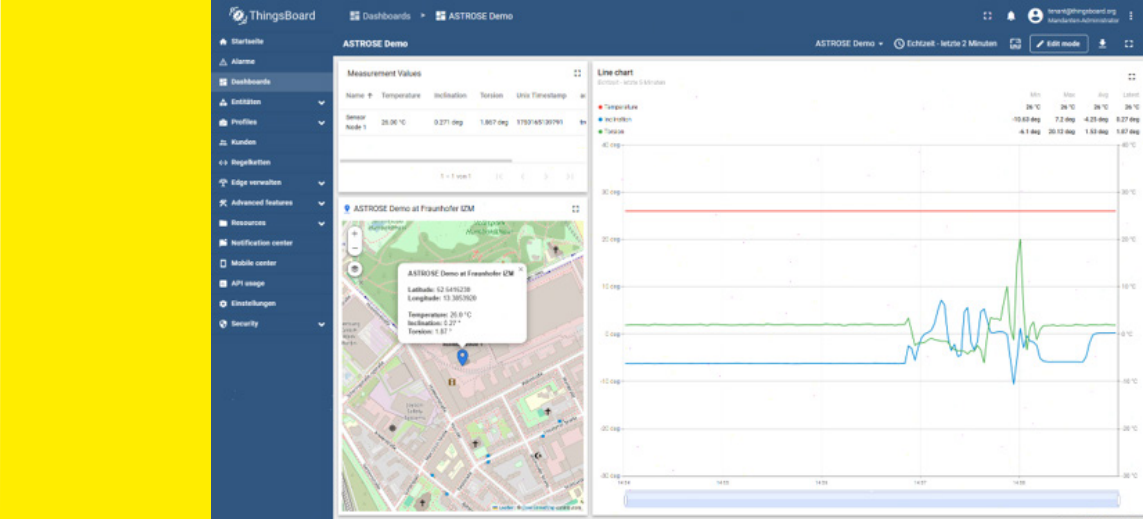
- Cellular communication
- Satellite communication
- LoRaWAN®
- LoRa® technology for sensor-to-sensor communication chains

Control centres can receive the individual or aggregated measurements by SCADA communication protocol:

- DNP 3
- IEC60870-5-101/104







# WIRELESS SENSOR NODE

The ASTROSE® wireless sensor nodes are especially designed for operation on high voltage overhead powerlines communicating real-time data securely to the base station. They are designed for maintenance-free operation. The nodes harvest their needed power directly from the electrostatic field around the conductor. No minimum current is required for operation. The nodes should be installed on the line in the immediate proximity of the isolators. The installation process is comfortable and finished in a few minutes.

# BASE STATION

When LoRa is used as the communication technology, the base stations receive the data collected by the sensor nodes and pass it on to the ASTROSE® server. It can be located in grid substations, transformer stations or directly on pylons. For cellular or satellite communication ASTROSE® provides a gateway for information exchange.

# SERVER

The ASTROSE® server can be an industry-grade PC or a virtualized environment that stores all data from the monitoring system in a dedicated database. A range of software modules is available for the application-specific and AI-enhanced processing of this data.

# AMPACITY CALCULATION

The actual line capacity can be calculated by the system using the CIGRE method. Data is available by SCADA interface or optional on a web based dash board.

# ICE LOAD DETECTION

The ASTROSE® system recognizes ice load on the conductor by combining changes in the inclination of the sensor nodes with live weather information.



## PROPERTIES OF ASTROSE®



- Designed for high voltage AC operation
- Line data captured every minute
- Innovative power harvesting
- Ampacity calculation
- Automatic relaunch of the sensor grid after outages
- Communication technologies: cellular, satellite, LoRa®, LoRaWAN®

## BENEFITS OF ASTROSE®



- ASTROSE® - foundation for AAR and DLR operations
- Fast installation of the sensor nodes
- Low weight of the sensor node: 3.8kg
- ASTROSE® requires no additional infrastructure for communication
- Monitoring even with deenergized lines
- Optional cloud access by web interface

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Visit our website:  
[www.astrose.de](http://www.astrose.de)

