

Study Committee B1

Insulated Cables

10879_2022

Maintenance and asset management digitalisation with the supervision of monitoring systems

Mathieu GROULT

Laura CORDEBART

Matthieu CABAU

RTE

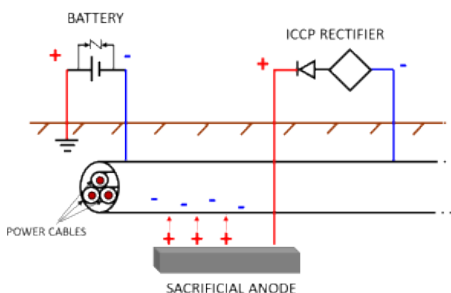


Ongoing project in experimentation

Cathodic Protection Monitoring

Corrosion protection systems in France :

- Various systems : drainage or cathodic protection
- Regulation require to check equipments (rectifier, battery and drainage) **every month**



Cathodic Protection Monitoring to optimize maintenance teams workload
In line with RTE industrial strategy plan : couple digital network with power grid

From the sensors to the intranet application :

- Tailor-made IoT and Big Data architecture
- Strong Cyber-Security requirements

Rectifier, battery and drainage

SENSOR

LoRaWan

LoRaWan core network server

TSO server

JARVIS



Measured data :

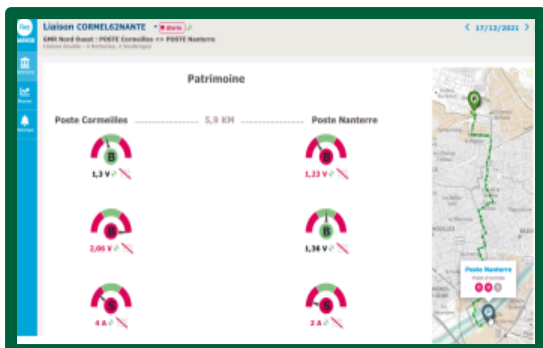
- ✓ Battery **voltage**
- ✓ Rectifier **current and voltage**
- ✓ Drainage **current**

Sensors used for the project :

- LoRaWan network allows for low-power wide-area network
- Sensors powered by batteries with a lifespan of 5 years

The Supervision application "JARVIS" :

- Display the measurements collected by sensors data
- Alarms triggered when thresholds are exceeded



Alarms management :

- Training to involve teams in maintenance processes evolution,
- Analysis of alarms detected during the past month per equipment and for each cable,
- Provide a "go" or a "no-go" decision for on-site visit.

<http://www.cigre.org>

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Supervision system still in development

Thermal and acoustic sensing centralised monitoring project

Strategy for DTS & DAS systems in France:

- Interconnectors (land and subsea)
- Offshore wind farms export cables
- Domestic transmission system “safety nets”

From the sensors to the intranet application:

- Export the Data: DTS Temperature profiles / DAS alarms in .csv files
- Collect the Data: in an internal cloud using SFTP protocol
- Display the Data: through an intranet web application



Integrate all Temperature and Acoustic monitoring systems into a unique **supervision system (Jarvis)**, user-friendly and largely accessible to end-users in maintenance teams

The Supervision application “JARVIS”:

- Provides general information of the asset
- Displays:
 - DTS Temperature profile & history
 - Temperature alarms generated in the cloud
 - DAS alarms

Alarms management:

- DAS alarms – TPI: too many alarms → locate zones with most TPI alarms for annual route inspection focus
- DAS alarms – Fault: after confirmation using “electrical grid state” tools, faster fault location and on-site verification
- DTS alarms: Analysis of temperature profile, trend, location and, if needed, local maintenance team on-site check → 3 possibilities:
 - Remedying the thermal problem (manure deposit displacement...)
 - Zone under surveillance
 - No threat → alarm cleared

