TRACTION
POWER
SYSTEMS

Sécheron

INTELLIGENT OPERATION AND MAINTENANCE SYSTEM

STELLA-**IOMS**

July • August • September • October • November
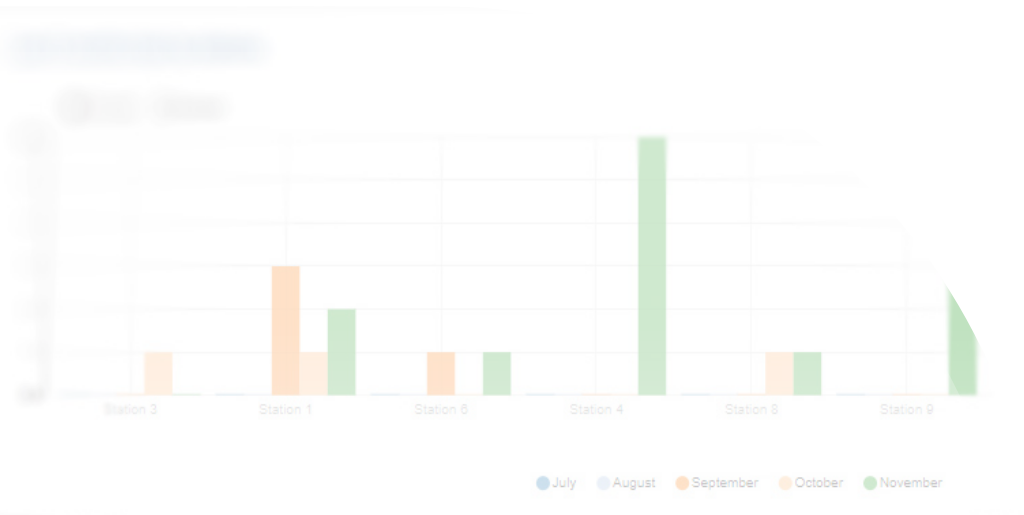
Connected IOMS Gateway

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STELLA

Sécheron has been developing and manufacturing safety devices for DC traction systems for the railway industry for decades. We have drawn upon our extensive experience with DC traction systems and the related industry standards to develop our STELLA product range.

All STELLA products, including control and protection devices (SEPCOS range), control and supervision (KEOPS), stray current monitoring system (SCMS) and for the help of operation and predictive maintenance (IOMS), are designed based on our strong experience in the field and customer feedback to answer the railway requirement and simplify our customer's follow up of their traction power substations.

STELLA products are designed with the latest technology, with the modular design allowing the customer needs to be met even on the most complex of projects.

GENERAL INFORMATION

The Intelligent Operation & Maintenance System (IOMS) developed by Sécheron is a software as a service (SaaS) for collecting data from the traction power substation to optimize customer operations, maintenance activities and resources. The IOMS is part of the Asset Management strategy of owners and end-users.

The data analysis is achieved by algorithms implemented in the product developed specifically for railway applications.
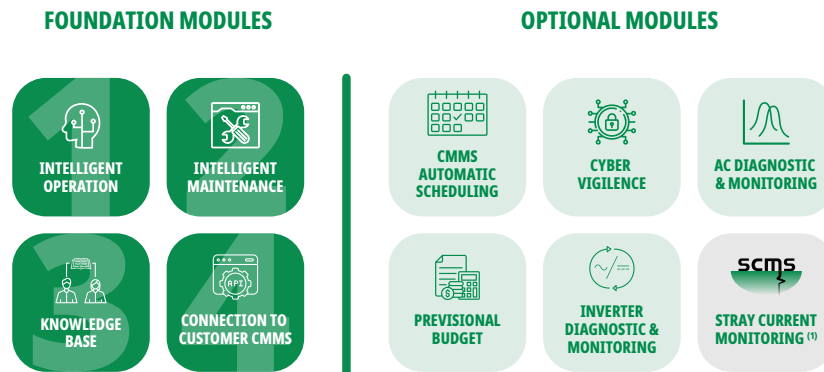
IOMS is composed of two main modules: Intelligent Operation and Maintenance.

MAIN **BENEFITS**

- ✔ Reduce operational risks by detection of critical events and troubleshooting analysis in the traction system network
- ✔ Increase of the lifetime of the assets (decrease of Life Cycle Costs)
- ✔ Optimize maintenance operations (visit TPS upon trigger & alarms)
- ✔ Improve system availability with efficient preventive and predictive maintenance
- ✔ Lower exploitation and maintenance costs
- ✔ Improve operation management and decision making tool
- ✔ Perfect traceability of history and foreseen actions (maintenance report automatically generated and archived)
- ✔ Decrease spare parts management costs
- ✔ Stock management system for spare parts (including order lead time) / dealing directly with the original manufacturer
- ✔ Safe and reliable

DESCRIPTION

IOMS is a modular product and could be declined in several versions, according to the following modules:

FOUNDATION MODULES

INTELLIGENT OPERATION

INTELLIGENT MAINTENANCE

KNOWLEDGE BASE

CONNECTION TO CUSTOMER CMMS

OPTIONAL MODULES

CMMS AUTOMATIC SCHEDULING

CYBER VIGILENCE

AC DIAGNOSTIC & MONITORING

PREVISIONAL BUDGET

INVERTER DIAGNOSTIC & MONITORING

scms
STRAY CURRENT MONITORING [1]

[1] Soon to be available.

1. Intelligent Operation

The Intelligent Operation module monitors critical processes/equipment from a central dashboard for increased efficiency. It allows the diagnosis of problems remotely, reducing the occurence of "no fault found" outcomes.

2. Intelligent Maintenance

The Intelligent Maintenance module computes the data collected on each device. Using various algorithms, the system calculates wear, generates events, alarms, notifications, and reports to notify the line owner about operating analysis and optimization or to plan maintenance actions.

3. Knowledge Base

The IOMS system incorporates an extensive knowledge base, which includes comprehensive maintenance sheets for Sécheron's devices.

4. Connection to customer CMMS

The IOMS embeds an API (Application Programming Interface) to facilitate the integration of our system in the global customer asset management. It serves as a software interface, allowing the IOMS to offer services to other software components, like the customer CMMS.

COST FACTORS

DOWNTIME & REPLACEMENT

UNNECESSARY MAINTENANCE

RAPID INTERVENTION
Depend on threshold

MAINTENANCE & FAULT INDUCED COSTS

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CORRECTIVE
Upon system failure

PREVENTIVE - PLANNED
Based on a time schedule or number of operations

PREVENTIVE CONDITIONAL PREDICTIVE
Upon system trigger, alarm...

MACHINE LEARNING & AI
Based on real-time analysis
Available in future releases

MAINTENANCE LEVEL OF INTELLIGENCE / COMPLEXITY

Maintenance actions and IOMS scope.

FOUNDATION MODULES

INTELLIGENT OPERATION

The information produced by the Intelligent Operation module is used to optimize its network usage and reduce maintenance activities.

⫽ Main features

- The Intelligent Operation module monitors:
  - Alarms and notify if there is an abnormal rate in a particular level (substation, cubicle, equipment, component)
  - Power consumptions and generate periodic reports
  - Temperatures
  - Software versions, disk space, etc.
  - Equipment downtime and fault rate

- The Intelligent Operation module provides:
  - A user-friendly dashboard that offers a good overview and highlights all necessary information about the substation
  - Maintenance and operation videos (similar to e-learning management system)
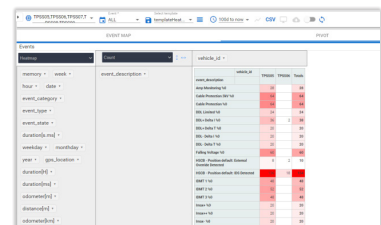
⫽ Functions

The Intelligent Operation module contains several functions, here are some of them.

Protections trip

The protection tripping menu is used to summarize the tripping operations and sort them by types/equipment/date. These information helps the operator to generate statistics for analysis to determine the root cause of a potential issue in the traction network. It also helps to predict failures.
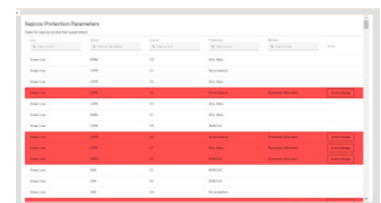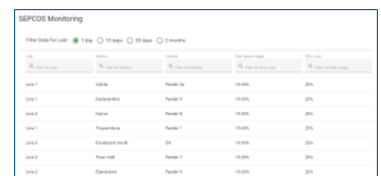
Visualization and reporting

The device menu gives the operator the visibility on the installed software status of the SEPCOS (control & protection relay), such as:

- Installed version (Monitoring the software updates / Highlight if software updates are required)
- Parameters (Check if the set of parameters is identical for same type of cubicle)
- Backups (Status of the protection relay saved in case of replacement / retrofit …)
- Cyber vigilance : Monitoring of the CPU load / Free disk space and manage alarms in case of abnormal activities
- Fault Recorder : Download automaticaly in Comtrade format all detection curves recorder by the protection relay

INTELLIGENT MAINTENANCE

Main features

The main functionality of the predictive maintenance module of IOMS is the optimization of maintenance activities scheduling.

- Its main goal is to reduce equipment failures, increase reliability and improve asset performance
- The system tracks, analyse and compute data to give an overview of the status of the installation not only at the present time but also in a foreseen future
- Each maintenance action (Substation, Cubicle, Device level) can create an alarm to the maintenance contractor and generate a report including the description of the alarm (including time stamp), the action that should be taken, work instructions, materials list (including Sécheron item number), tools needed and the average time to perform the service
- Complete product documentation is embedded in the system and relevant chapters can be highlighted depending on the action to perform

Functions

The Maintenance module contains several functions, here are three of them.
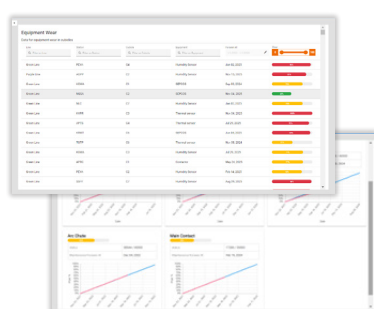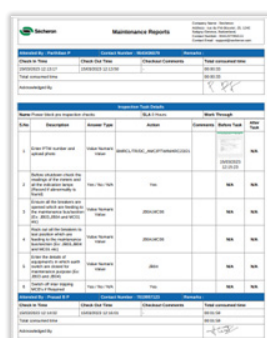
Overview

- Get an overview of the system
- Sort/filter according to different parameters (substation, cubicle, etc.) and check the detailed status
- See the current usage of each equipment
- See the forecast for the usage expiration
- Override the current usage percentage according to field feedback
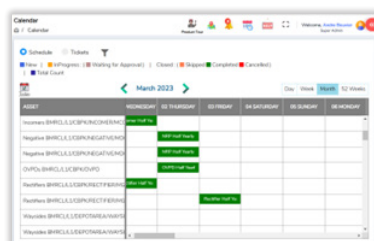
Schedule [1]

- Get an overview of the upcoming actions
- Add new actions that were not automatically created
- Remove/ Reschedule upcoming actions
- Plan/group future actions
- Assign actions to a team

Automatic maintenance report [1]

- Automatically generated by the system
- Actions checklist
- Replaced items list
- Tools list

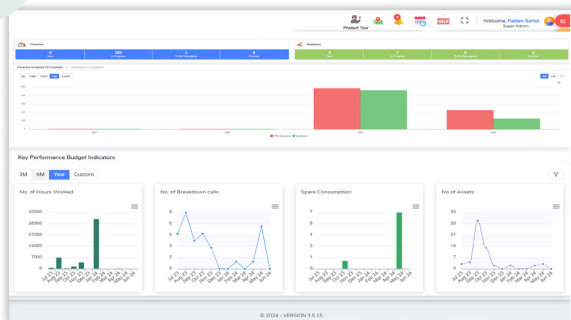[1] With optional CMMS module

FOUNDATION MODULES

KNOWLEDGE BASE

IOMS system embeds an important knowledge base including detailed maintenance sheets for Secheron's devices. It also includes a large documentation set like electrical drawings, logic diagrams, product user guide, …


CONNECTION TO CUSTOMER CMMS

Connecting to a CMMS (Computerized Maintenance Management System) via an API (Application Programming Interface) allows seamless communication between our IOMS and the customer's CMMS.

For each maintenance action defined by the IOMS, a set of documents will be prepared, including all necessary information (schedule, expected time for the action, maintenance plan, etc.), and sent to the customer's CMMS using the API to be scheduled in the customer's asset management workflow.

MOBILE APPLICATION

To facilitate the on-site maintenance actions and the reporting for operators, a mobile application is available and covers the CMMS parts.
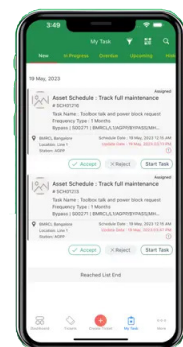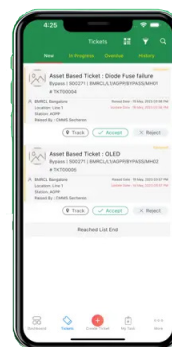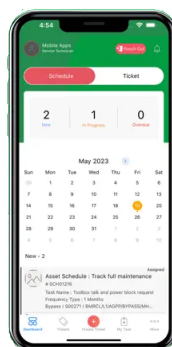
ARCHITECTURE

The IOMS gateway collects all the information available in the traction power substation network and pushes it to the IOMS server (unidirectional connection for safety).

The core IOMS system can run on a cloud based server.

- Remote and safe connection to IOMS data and reports
- Backups and redundancy assured by the cloud provider
- Remote maintenance and updates possible
- System easily scalable

IOMS Gateway

SCADA
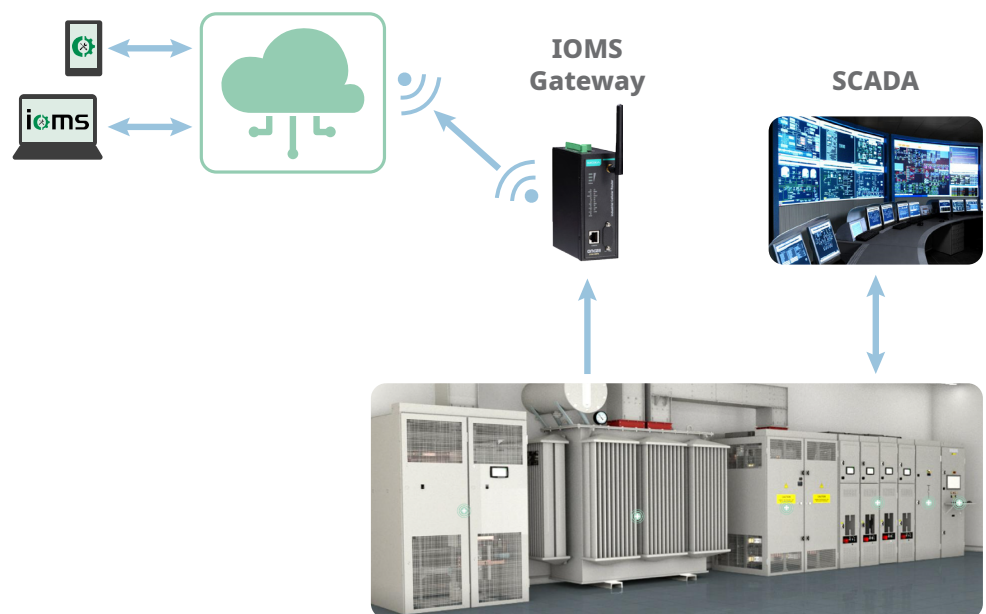
Cloud based single connection

RELATED PRODUCT

EVA+

RAIL DATA MANAGEMENT

EVA+ can easily integrate the IOMS/TELOC Event Recorder and Energy data to provide valuable insights into fleet activity, providing a unified solution for infrastructure and rolling stock equipment management.

Refer to **Brochure EVA+**

Sécheron