

The intelligent digital substation



SASensor[®]

Substation intelligence, future proof by design!

Software defined substation monitoring,
protection, control and communication

- Increase safety & reliability
- Improve efficiency & flexibility
- Proven technology
- Reduce Total Cost of Ownership
- Be ready for the future

up to **30%**
configuration &
testing reduction

over **50%**
stock reduction
thanks to less devices

up to **80%**
less copper
wiring

up to **30%**
SAIDI / SAIFI
reduction



SASensor substation automation, future-proof by design!

Electrical grids are evolving to enable the bi-directional flow of energy, information and transactions. Increasing decentralisation of intermittent generation and the rapid change in electricity demand challenge the reliability, efficiency and future-proofness of the present distribution networks. With over 130 installations in Europe, SASensor has proven to be one of the most highly reliable substation automation solutions.

A new, dynamic electric grid management solution is required to cope with the increase of distributed and more intermittent power generation and evolving automation-, control- and protection schemes. Add the need to manage an aging distribution infrastructure at lower costs, the different lifecycles and divergent speed of functional evolution of components along with the lurking cyber security threats; it becomes clear that a new systemic approach is needed. SASensor provides an effective and efficient solution to cope with these challenges.

Digital substations, the critical node in your transition

We believe that electrical substations are the critical nodes of the grid evolution. A smart grid requires digital and intelligent substations first.

Software Defined

Our SASensor digital substation automation system is designed along the Centralised Protection and Control (CPC) principles. CPC relies on a secure, resilient, redundant and time synchronized architecture. It provides the benefits of a data driven and software defined architecture such as: improved quality of information and fewer components.

Simplicity & functional flexibility

The SASensor system uses a minimal number of discrete “boxes” to implement the complete substation automation functionality. The primary interface modules digitize voltage and current measurements and process digital I/O signals. A central control unit processes the data from the interface modules. The SASensor software executes the essential protection, monitoring and control functions.

Sustainable investment

SASensor incorporates comprehensive protection logics to coop with renewables, their intermittent behavior, changing loads and the required flexibility in system settings. As an excellent data and information collector, SASensor provides value to your organisation's DMU with regards to condition based maintenance, reactive power management, grid analytics/planning or else, dependent on your specific needs.

The workflow from single line diagram, testing, and commissioning is supported by the integrated engineering tools. These tools also provide the flexibility to enhance the platform with new algorithms, new logic, or certified 3rd party applications and data analysis. The 3rd party algorithms add additional intelligence to

Intelligence



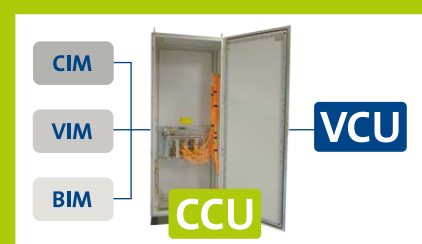
SASensor is the substation automation solution that offers the required functionality for today's electrical grid. The digital, open system is easy to upgrade and suitable for new (3rd party) functionality for today and tomorrow.

Communication



The Versatile Communication Unit (VCU) enables secured connection with remote services (remote control centre and/or the office) for safe, continuous access to all digital substation information.

Central Processing



The Central Control Unit (CCU 600 series) is an “all-in-one-box” unit. The “off-the-shelf” Single Board Computer (SBC) has a configurable number of fiber optic interface boards and acts as ethernet switch.

improve grid performance, simplify the IT architecture and reduce the strain on existing SCADA systems.

Future-proof

The generic design of SASensor allows adding new functions all through the entire life cycle of the substation since all of the substation functionality is defined in the software. All functional enhancements of the SASensor automation system are software upgrades that can easily be executed without any required outages. This ensures future readiness for any emerging needs driven by the energy transition.

Separation of concerns

The distribution network operator benefits from the separation of the functions and the generic hardware that interface with the primary equipment. Intelligent devices generally have a relative short lifetime compared to primary equipment. Our robust generic interface modules for voltage, current and I/Os ensure a 30+ years lifetime. The substation automation functionality (intelligence) runs on a redundant Central Control Unit that can easily be updated and upgraded.

This separation between functions and generic (easily exchangeable) hardware, ensures that the

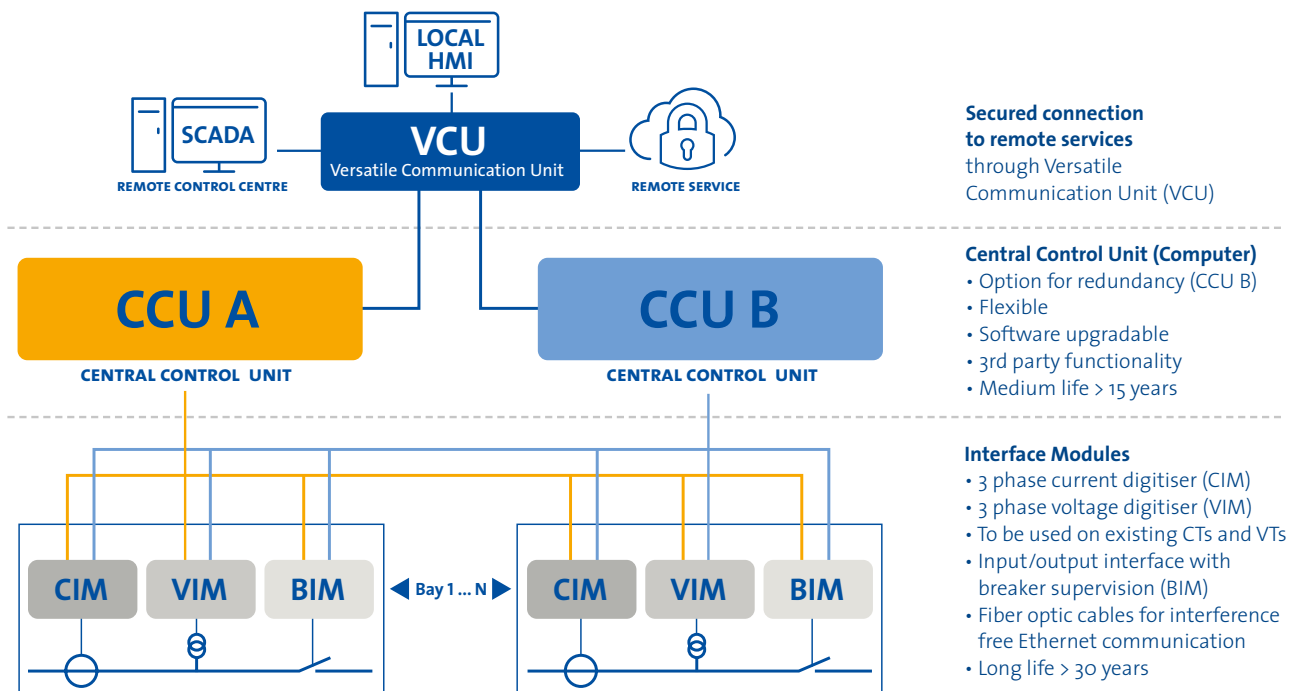
substation fleet will be kept always up to date with the latest versions. Functional flexibility with a long lifetime for substation intelligence has never been that simple, reliable and cost effective.

Ease of implementation

Digitization of substations is easily done with SASensor. The system re-uses signals from the CT's and VT's and connects the interface modules to the central processing units by fiber optics. Engineering, configuration and installation times are reduced significantly. Moreover, the implementation, testing and release of new functionality do not require circuit intervention.

SASensor's Architecture

Reliable, Affordable, Future-proof



Secured connection to remote services through Versatile Communication Unit (VCU)

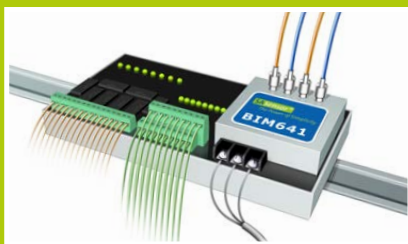
Central Control Unit (Computer)

- Option for redundancy (CCU B)
- Flexible
- Software upgradable
- 3rd party functionality
- Medium life > 15 years

Interface Modules

- 3 phase current digitiser (CIM)
- 3 phase voltage digitiser (VIM)
- To be used on existing CTs and VTs
- Input/output interface with breaker supervision (BIM)
- Fiber optic cables for interference free Ethernet communication
- Long life > 30 years

Analogue/Digital conversion of system values



The **Breaker Interface Module (BIM)** is a compact input/output interface that operates and monitors switchgear and position indications. It's an essential part of control scenarios like load control or voltage control.



The **Current Interface Module (CIM)** measures and digitises the phase currents supplied by the secondary windings of a conventional current transformer (CT).



The **Voltage Interface Module (VIM)** measures and digitises the phase voltages supplied by the secondary windings of a conventional voltage transformer (VT).

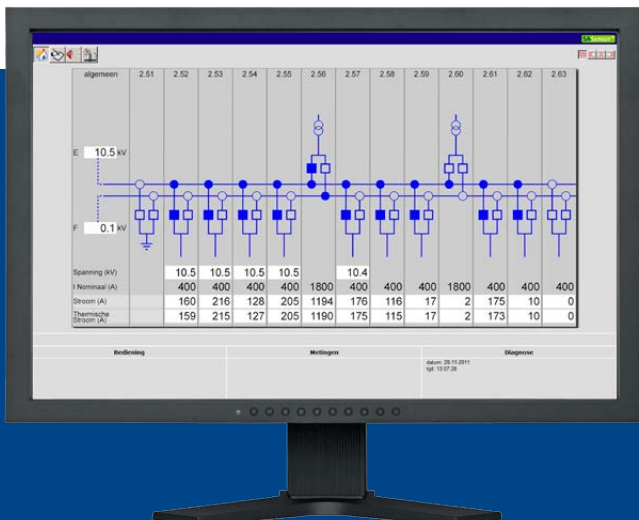
Transforming power networks into digital grids



Digitising critical nodes ensure a future-proof grid operation in the most efficient way.



Your digital substation, accessible in the substation or from remote.



SASensor Functionality

General and comms

- Station overall overview in HMI
- Function Block Designer; flexibility to any logic
- Secured VPN Connection
- Remote monitoring and control
- IEC 60870-5-101/104, DNP3
- Interlocking (graphical)
- Data (high fidelity) logger
- System configuration tool

Monitoring

- Measurements / High fidelity data
- Alarm and Event recording and handling
- Digital Fault Recording (DFR)
- Fault place localisation
- Trend information
- Power Quality (PQ)

Control

- Operation/Switching
- Configuration and Setting
- Voltage regulation control (ANSI 90)
- Auto Reclosure (AR) / (ANSI 79)
- Auto Reserve Switching
- Flexibility to any logic

Protection

- Over Current protection (PTOC) / (ANSI 50/51; ANSI 67)
- Breaker Failure Protection (BFP) / (ANSI 50BF)
- Over- and under- voltage protection (POUV) / (ANSI 27)
- Neutral overvoltage protection (PZSO) / (ANSI 59N)
- Earth Fault Protection (ANSI 50N/51N)
- Directional earth fault protection (PDEF) / (ANSI 67N)
- Arcing earth fault protection (PAEF) / (ANSI 67NIEF)
- Distance protection (PDIS) / (ANSI 21)
- Transformer differential protection (PTDF) / (ANSI 87T)
- Over/Under frequency (ANSI 81O / ANSI 81U)
- Frequency rate of change (ANSI 81R)
- Directional Earth fault 4 stage (ANSI 67N)
- Synchrocheck
- Transformer neutral over current (ANSI 50N/51N)
- Restricted earth fault protection (ANSI 87N)
- Line differential protection (ANSI 87)
- Busbar protection (ANSI 87B)
- Reverse-phase or phase-balance current (ANSI 46)
- Neutral Admittance Protection (ANSI 21YN)

The interface: All-in-One

SASensor HMI provides an overall station overview and ensures a seamless set-up and operation of all business and mission critical functions. The quick status dashboard and the bay-oriented approach for functions ensure ease of:

- Configuration and set-up
- Operation and Control
- Maintenance and settings management
- Data collection and analytics

The Function Block Designer as part of the HMI, ensures a graphical creation of functions and interlocks.

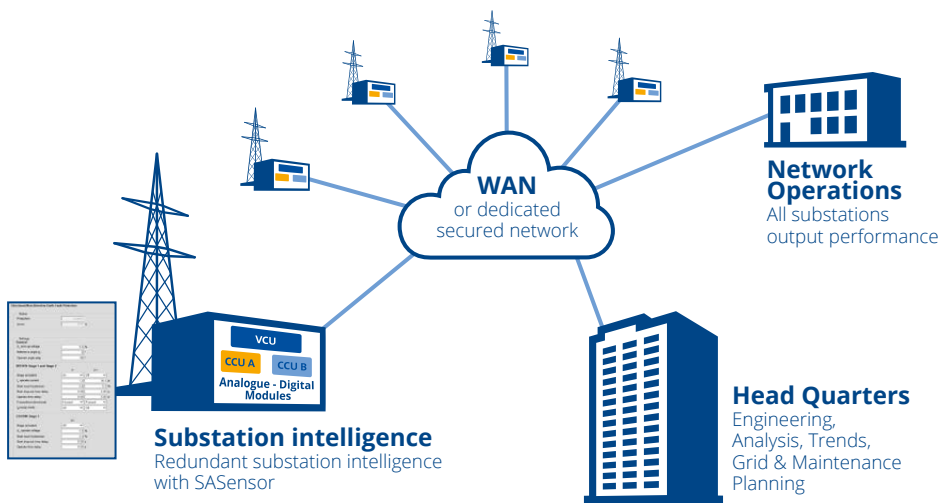
Case Study

Back to simplicity with increased functional flexibility at Ellevio

Ellevio Sweden wanted a simplified, standardisable, easy to install and maintain substation platform with flexible functionality. Supported by local partner 'Protrol' the SASensor Centralised Protection and Control solution was installed in primary substation Kyrkviken.



The existing substation Kyrkviken is now digitised with SASensor technology.



Ellevio executed the project with Locamation as a complete future-proof substation automation solution, working with best in class suppliers to enable specialised third party functions such as Protrol's Arcing Earth Fault function.

"This is really smart grid in practice. The open platform enables a flexibility that we have been striving for. I believe that this will be the start of a technology shift in the control equipment area."

Bengt Almgren, Head of Regional Networks, Ellevio

ELLEVIO

Challenge

- Standardise substation systems to accommodate different stakeholders.
- Provide Ellevio with a flexible, futureproof solution for substation intelligence.
- Create an upgradable system which can be used for standardising all substation protection, control and automation systems.
- Comprehensive investment plan to refurbish large number of substations

Solution

- Use the Software Defined SASensor centralised protection and control solution to create a future-proof base.
- Use the Function Block Designer to create interlocks, logic and new functionality and provide real-time graphical insight in system and component status.
- Add 3rd party functionality to meet required specifications.

Benefits

- Reduce effort in engineering, configuration, testing and training.
- Simplify maintenance and spare part management due to limited number of device types.
- Reduce CAPEX and OPEX.
- Pave the road for smart substation upgrades

Lower cost of ownership. Please do the math yourself.

The value of SASensor is evident and works its way through the whole organisation. Savings are ensured during the whole lifetime. Locamation is pleased to guide and advise you through all potentials for building your own business case to create a future proof electricity distribution.



Interested?

Big changes ahead and a lot of information in front of you. We can imagine that Locamation's SASensor will not be the only answer to your challenge. Moreover, it will be a different kind of solution than the traditional alternatives. We are pleased to inform and advise you how SASensor can make the difference in securing a reliable, affordable and future-proof electricity distribution for your organisation.

Interested but... ...I need more information.

We invite you to have a 1-on-1 workshop with us. We will explain the SASensor approach in detail and discuss your specific grid challenges.

Together we will explore the potential of centralised protection and control solutions for your network.

We will make a technical and financial proposal for your specific substation requirements and highlight your potential CAPEX, OPEX, Efficiency, Standardisation and Flexibility improvements.

Interested and... ...I want to experience it.

Take your step into the future...We offer very attractive trial installation packages that allow you to:

- Build experience with the value and simplicity of SASensor substation automation
- Provide better insight and learn more about your network and its behaviour/faults
- Analyse protection behaviour of SASensor compared to traditional equipment
- Co-create the ideal CPC solution

The energy transition has already started, don't wait.



Our inspiration

DSOs are challenged to shape their long-term distribution network investment to a rapidly changing environment. This inspired us to build a Software Defined solution based on generic long lifetime hardware and a flexible software platform for future needs. We help our customers to improve reliability and to optimise the distribution of renewable energy - making the energy transition happen in the most effective and efficient way.



Locamation B.V.

Colosseum 11
7521 PV Enschede
The Netherlands

T: +31(0)88 1660100
E: info@locamation.com
I: www.locamation.com

Sales Support
E: sales@locamation.com

For the latest product
information visit:
www.locamation.com

Locamation is the leading solutions provider for Centralised substation Protection and Control (CPC) systems. Founded in 1983, the company is backed by leading utilities and provides grid operators, a simple, flexible and upgradeable solution for substation intelligence.

With over 130 installations and more than 4 million hours of operation Locamation's SASensor CPC is the most widely adopted Centralised Protection and Control system in the world. With a proven track record, Locamation delivers scalable and future-proof solutions that meet today's substation automation requirements. The SASensor CPC application and data platform provides asset insights, fault identification and location and thus shortens

customer minutes lost and reduces customer interruptions.

Locamation's SASensor CPC solutions comprise of an industrial computing unit, sensors providing high fidelity data and a software defined platform providing protection, control, monitoring, communication and asset management functions.

- Over 4.5 million operating hours
- Over 130+ installations in Europe
- Over 30 years of experience
- No more than 5 main components
- One simple main principle
- Particularly suitable for primary substations (HV/MV) and MV switching stations