

SASensor – An Investment with futureproof benefits

CPC providing accurate substation monitoring and efficient operation

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Key Benefits

The reports of IEEE, EPRI, Tampere University confirm the below benefits:

Business and financial

- Reduction in CI / CML.
- Lower initial and lifetime cost than traditional technologies.
- Reduction of network reinforcement.

Installation operation and maintenance

- Limited device types, limited stock holding.
- Easy to install, operate and maintain.
- Simplification of device management and version control
- Limited Manpower skills needed.

Reliability

- Dual redundancy.
- High availability and long MTTF.
- Easy remote settings check.

Flexibility

- High fidelity data on real time platform.
- Able to host best in class algorithms for protection, condition monitoring, control, data analytics.
- Active protection and management schemes.

Security

- Hardened single access point.
- reduction of attack vectors.
- Easy management of role based access.

“The power system dynamic characteristics are changing due to continuous integration of renewable energy sources into the electric grid. Utilities are focusing on improving customer service and resiliency of the grid by using advanced monitoring and control technologies. These industry initiatives require a renewed attention to protection, automation and control strategies that take advantage of available technologies while promoting newer ones.”

IEEE working group paper entitled “Looking into the future Protection, Automation and Control systems [ieee_PES_PSRC_wg K15_Report_CPC_Dec_2015 (2).pdf(secured)]

Locamation and Alliander have industrialised SASensor as a Centralised Protection and Control solution for substation automation. With over 100+ substations at Alliander and international customers (i.e. SSE, Ellevio, Elektrilevi) SASensor has more than 4-million operation hours.

Central Protection and Control

The IEEE have issued a report on the future of Protection, Automation and Control systems and the move towards Centralised Protection and Control systems [WG K15 of the Substation Protection Subcommittee]. The report concludes that CPC technology significantly improves the reliability of protection and control systems at an affordable cost – with enhanced application capability and maintainability for both hardware replacement and software upgrade.

Digital Substation Platform

SASensor is a Digital Substation Platform going beyond the recommendations in the report, making High fidelity measurement data available for flexible software based functionality that can be adapted to changing needs of the Network.

SASensor

The learnings from over 10 years of experience, field operation and international deployments as well as the IT/OT integration best practices are continuously rolled-into the product. Going forward the focus will be on open data platform and interoperability to fully realize the promises of the CPC approach as described in the table below.

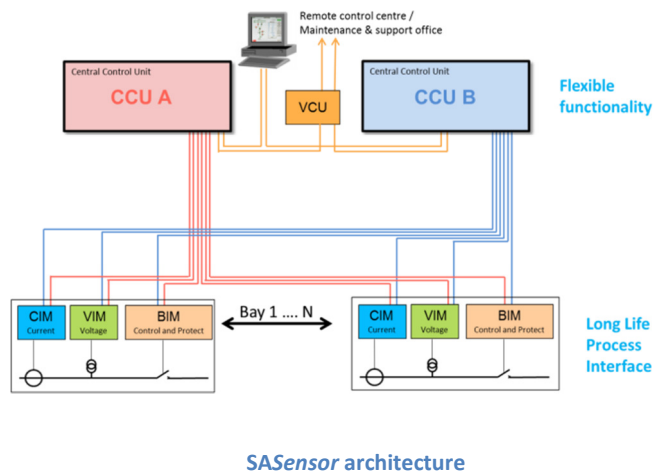
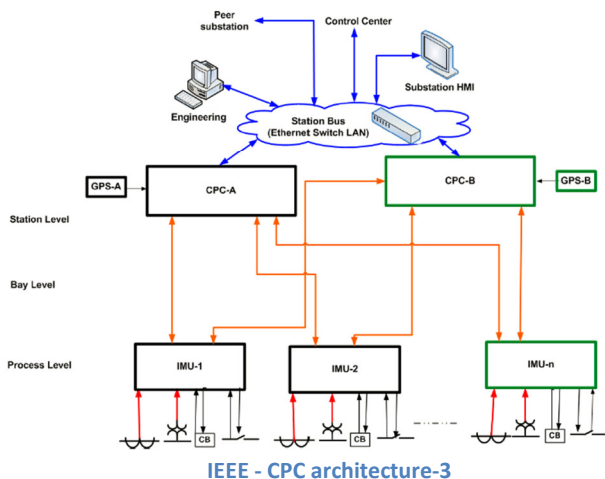
Feature	Traditional	SASensor technology	CPC approach
Relay Asset Management	Many relays need to be separately identified, specified, configured, tested, and maintained along with separate records for each device		A limited number of devices need to be identified, specified, configured, tested, and maintained along with separate records for each device
Device Management	Each protection IED in a substation typically has numerous configuration choices to enable various features		A reduced count of devices makes management easier and also the feature set is reduced and limited compared to traditional methods
Maintenance	Routine maintenance can be frequent and requires experienced and well-trained staff along with expensive calibrated testing equipment		Limited maintenance is required as the entire substation P&C system uses fewer physical devices, though experienced and well trained staff are still required for maintenance
Security	Multitude of protection IEDs provides more access points for cyber threats		Very limited number of access points which can also be managed better
Interoperability	Disparate protocols and difficult to standardize. Modifications to the substation automation system can be complicated		Capitalizes mainly on the IEC 61850 technology and can be more easily adopted than the distributed protection IED model
Substation Master Interface	Depending upon the technology, the protection IED may have no communication interface with an RTU or data concentrator. More recent technologies have protection IEDs tightly integrated into a substation automation system to transfer data in and out of the substation with limited intelligence		The CPC becomes the “Gatekeeper” of Device Dynamic Models. Relays are ubiquitous. This provides a master intelligent node for substation-to-substation interaction. Collected data is reduced to information via the dynamic state estimation. Information is exchanged between substations, with control center and downstream intelligent devices versus raw data; tremendous reduction in communication needs

SASensor Today

SASensor in relation to the IEEE results.

SASensor background

The close cooperation of Alliander and Locamation has led to the current SASensor architecture. From the beginning it was clear that using the Centralised Protection and Control architecture as described in IEEE architecture-3 solved substation internal timing issues and enabled functionality like Breaker Failure Protection and CIM Backup Protection eliminating single point of failure at CIM/CT without incrementing the amount of hardware. CAPEX can be reduced due to simplified engineering, reduced installation costs and more effective testing & commissioning. OPEX can be reduced due to less site visits, simplified maintenance and less management effort for device passwords, settings management and version control.



SASensor

The strategy of Locamation is to continuously pursue highest engineering and development standards, working with partners when possible, creating our own solutions when needed. SASensor is being selected by customers like for example Elektrilevi, SSE, Ellevio for its safety, simplicity and reliability.

On top of the inherent benefits of Centralised Protection and Control the following results were achieved;

- Reduction in cable failures of 10%, target of increasing these to 25% with partner cooperation.
- Reduction of fault restoration time from 1hr30 minutes to 1 hour.
- Simple to retrofit, train, operate and maintain, minimal wiring required. Standardisation of device types.
- Simplifying engineering, commissioning and material management by reduction of device types.
- Integration of top of class third party protection functions onto the Digital Substation Platform.
- Separation of slow and fast ageing components.
- Reduction in manpower due to remote access for settings check

Conclusion

Substation automation moved from physical, to analogue, to digital, to Bay oriented “fly by wire” to Centralised “fly by light” to fully leverage the benefits of safety, security, reliability and efficient operation.

SASensor is a **Centralised Protection and Control** system with over 100+ systems in operation, 10 years of experience and over 4 million working hours.