

IEC 61850 Global 2019

Leveraging advanced IEC 61850 features to drive interchangeability within the substation and across the wider smart grid

1-Day Fundamentals of IEC 61850 Workshop
 3-Day Conference, Exhibition & Networking Forum
 1-Day Future Applications of IEC 61850 in New Domains Seminar
14-18 October 2019 | London, United Kingdom



Very Early Bird Discount!
 Register before 28th June
 €300 off delegate passes
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In-depth Insights On:

- ✓ **IEC 61850 Standards Update:** Examining new opportunities afforded by the latest developments from IEC working groups as well as efforts to harmonise end-user implementation across the industry
- ✓ **Top-Down Design:** Developing accurate and comprehensive system specifications that support the fluid interchange of multi-vendor devices
- ✓ **Process Bus Testing:** Comprehensively testing IEC 61850 process bus systems to ensure smooth interoperation and consistent performance
- ✓ **Cyber security:** Securing control systems, networks and user access in accordance with IEC 62351 and other cyber security standards to effectively safeguard multi-vendor IEC 61850 systems
- ✓ **Advanced PAC Architectures:** Implementing centralised and wide-area PAC systems with IEC 61850 to meet the evolving demands of the energy system
- ✓ **IEC 61850 for DER:** Examining the use of IEC 61850 to control EVs, Microgrids, Renewables and Storage systems

20+ Utility Case Studies:

<p>Priyanka Mohapatra Innovation Lead SP Energy Networks</p>	<p>Rannveig Loken Senior Specialist P&C Systems Statnett</p>	<p>Dr. Fouad Abou Chacra Senior Specialist Projects & Innovation DEWA</p>	<p>Thierry Coste Research Engineer EDF</p>
<p>Anders Johansson Power System Specialist Vattenfall</p>	<p>David MacDonald System Monitoring Lead Engineer Iberdrola</p>	<p>Tuan Vu Senior Digital Asset Strategies Engineer Powerlink Queensland</p>	<p>Grégory Huon Head of Engineering Governance Elia & ENTSO-E</p>
<p>Jan Voltman Consultant Qirion (Alliander)</p>	<p>Robbert Koenderman Senior Engineer Qirion (Alliander)</p>	<p>María Avery Fernández Head of Remote Control & Protection Endesa</p>	<p>Gilles Guillet Digital Control System Expert RTE</p>
<p>Nicholas Etherden Senior R&D Engineer at Vattenfall & Convenor IEC TC 88 JWG 25</p>	<p>Colin Scoble Senior Protection Engineer UK Power Networks</p>	<p>Matías Sánchez Mingarro Protection & Applications Project Manager Red Eléctrica de España</p>	<p>Frans Shanyata Projects & Multidisciplinary NamPower</p>
<p>Peng Li Smart Grid Senior Expert Engie Green</p>	<p>Julio E. Dominguez Power System Automation Expert UFD</p>	<p>Mehrdad Vahabi Substation Automation Project Manager Southern California Edison</p>	<p>Mark Thompson Engineering Manager, IEC 61850 Projects National Grid USA</p>

Expert Advice from:

<p>Christoph Brunner President of it4power & Convenor IEC TC 57 WG 10</p>	<p>Frances Cleveland President of Xanthus Consulting International & Convenor IEC TC 57 WG 15</p>	<p>Dr. André Naumann Group Leader Energy Systems Fraunhofer IFF</p>	<p>Paolo Mazza Head of Power Systems Measurement & Diagnostics at RSE & Convenor IEC TC 38 WG 47</p>
<p>Steven Blair Research Fellow University of Strathclyde</p>	<p>Felix Lehfuß Engineer AIT</p>	<p>Andrea Schröder Scientific Associate – Plant Engineering FGH e.V.</p>	<p>Manuel Pitz Real-Time Simulation and Hil RWTH Aachen E.ON Energy Research Center</p>

Technology Innovations from:

<p>Alex Apostolov Principal Engineer OMICRON</p>	<p>Laurent Guise International Standardization Director at Schneider Electric & Convenor IEC TC 57 WG 17</p>	<p>Peter Kreutzer Global Product Manager ABB</p>	<p>Mital Kanabar Senior R&D Applications Manager GE Grid Solutions</p>
<p>Jörg Reuter Director HELINKS</p>	<p>Eric Xu Lead Simulation & Automation Engineer RTDS</p>	<p>Fred Steinhauser IEC 61850 Expert OMICRON</p>	<p>Joel Greene Senior Software Engineer Triangle MicroWorks</p>

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Dear Colleague,

We are delighted to bring you the 6th annual [IEC 61850 Global 2019](#) conference, exhibition and networking forum.

This year's programme draws together 150+ IEC 61850 experts and implementation leaders for a review of the latest utility implementation case-studies and supplier technology innovations.

This year we have expanded the main conference across three days, providing a greater depth and breadth of cutting-edge IEC 61850 case-studies. An updated programme will deep-dive into advanced IEC 61850 implementation challenges, tackling top-down design, the process bus, sophisticated control & protection architectures, advanced cyber-security and more.

Highlights of this year's programme include:

- ✓ **Case-Study Programme** – hear from 20+ international utility IEC 61850 experts and implementation leaders on the lessons learnt from actual deployments of the standard across smart grid infrastructures
- ✓ **Utility Heavy Speaker Line-Up** – selected on the strength of the projects they are involved in, their pivotal roles in implementation decision making, and their insights into lessons learnt and future roadmaps
- ✓ **Roundtable Discussions** – take the opportunity to brainstorm and problem solve with peers from across the IEC 61850 ecosystem
- ✓ **Fundamentals Workshop** – run by Christoph Brunner, Convenor of IEC TC57 WG10, taking place the day before the main conference, this workshop demystifies the fundamental building blocks and provides a comprehensive yet in-depth understanding of IEC 61850
- ✓ **Future Applications Seminar** - hear from the pilot projects that are pushing the boundaries of IEC 61850 implementation to monitor and control a range of grid-edge assets, including microgrids, renewables, energy storage and electric vehicles
- ✓ **Solution Zone** – running alongside the main 3-day conference, the solution zone provides a focused display of IEC 61850 products and services, with experts on hand to discuss your specific challenges and provide tailored advice to help propel your implementation plans to the next level
- ✓ **Live Demo Labs** – a 1:1 private demonstration, providing you with the opportunity to gain hands-on experience of the most advanced and forward-looking IEC 61850 solutions and services
- ✓ **Evening Networking Reception** – taking place the evening of conference day one, this networking event is open to all participants enabling you to relax and unwind, allow new ideas to cement and new partnership opportunities to emerge

We look forward to welcoming you to the event in October 2019!

Kind Regards,



Louis Morgan
Conference Producer | [Smart Grid Forums](#)

PS: Very Early Bird Rates - Save €800 on delegate places and €2000 on exhibitor spaces by booking before Friday 28th June 2019

PPS: Group Booking Discounts – Save a further 10% on 3+ delegates booked from the same organisation at the same time - Call us on **+44 (0)20 3691 1700** to arrange!

Workshop

Monday 14th October 2019

Fundamentals of IEC 61850 Workshop

Workshop Leaders



Christoph Brunner
President of
it4power &
Convenor
IEC TC 57 WG 10



Frances Cleveland
President of
Xanthus
Consulting
International &
Convenor
IEC TC 57 WG 15



Alex Apostolov
Principal Engineer
OMICRON &
Editor-in-Chief
PACWorld

The IEC 61850 standard is an extensive and complex set of international standards specifically designed for substation automation and the smart grid. Now universally recognised as the de-facto standard for power utility compliance, it presents as many challenges as it does opportunities.

During this workshop Christoph Brunner, Convenor of IEC TC 57 WG 10 provides a comprehensive and in-depth insight into the building blocks, key applications and optimal operations of the standard within the substation environment and beyond. Frances Cleveland, Convenor of IEC TC 57 WG 15, and Alex Apostolov, editor-in-chief at PACWorld, will join Christoph and provide up-to-date insights into the latest cybersecurity practises and testing considerations for IEC 61850 systems.

09:30 Registration & Welcome Refreshments

10:30 **Session 1: Fundamentals of IEC 61850 – main features of the standard and implications for the utility engineer**

This session is a short introduction to IEC 61850 for newcomers. The concept of IEC 61850 is introduced with its key objectives and features to support interoperability, free configuration and long term stability. A comparison with other communication standards will be made, and the impact on the utility engineer will be clarified. Edition 1 will be reviewed in relation to its application in different domains. The main features of IEC 61850 – communication, application modeling and engineering process will be introduced including GOOSE messaging and Process bus with sampled values.

12:30 Lunch

13:30 **Session 2: Evolution of the standard – improvements, wider smart grid applications and suitability for new domains**

Understand how the standard grows from Edition 1, the backward compatibility aspects, new features and functionalities, the rate of take up within vendor products and feedback from utility implementations. In this session the major new features introduced will be discussed. The session will also talk about IEC 61850 implementations across the wider smart grid, as well as in new domains such as hydroelectric power plants, distributed energy resources and wind turbines.

14:15 **Session 3: Advanced maintenance testing – challenges of testing in a live substation**

Understand the challenges of maintenance testing in live substations and how the various features available in IEC 61850 can help to address those challenges. Consider testing for various topologies, understand how to use simulation and hierarchical control of test mode. The session will also address how the test source of InRef can be used to solve some of the issues. Requirements for modeling and engineering of the test system will be addressed.

15:00 Afternoon refreshments

15:30 **Session 4: Advanced engineering process – how IEC 61850 is evolving to enhance interoperability of the engineering process**

This session will examine the engineering process across the entire lifecycle of IEC 61850 systems. The challenges of the early implementations will be discussed and how user feedback is helping to gradually enhance the process. Learn, how extensions made to Ed 2.1 of IEC 61850 contribute to the improvement, understand how the specification process will evolve, to assure your automation system will work as expected. The session will address further ongoing work in CIGRE as well as EU-funded research projects.

16:15 **Session 5: Cybersecurity Fundamentals for IEC 61850**

Understand the basic cybersecurity issues and requirements for communicating with IEC 61850 protocols using the IEC 62351 cybersecurity standards, with a focus on authentication of connections, data integrity of messages and role-based access control for authorization of actions.

17:00 **Session 6: Practical Demonstrations and Q&A**

In this final session some practical demonstrations will bring to life the application of IEC 61850 and provide attendees with the chance to have all their questions answered in great depth and detail by the workshop leaders.

17:30 Close of Workshop

Sponsorship & Exhibition Opportunities



Would you like the opportunity to raise your brand profile, demonstrate your products and services, and share your expertise with a highly concentrated and influential group of utility IEC 61850 implementation leaders and decision makers?

Our adjoining exhibition area provides the perfect platform for you to do this and more! Capped at 30 stands we ensure a focused and relevant display of the latest tools, technologies and services for our audience and maximum visibility for each exhibitor.

To find out more about the various sponsorship and exhibition opportunities:

Call: +44 (0)20 3691 1700

Email: registration@smartgrid-forums.com

Download: [Exhibition Opportunities Brochure](#)

Conference Day One | Tuesday 15th October 2019

08:50 Opening remarks from the Chair
Christoph Brunner, President of [IT4Power](#) & Convenor - [IEC TC57 WG10](#)

09:00 **Standards Update: Examining new opportunities afforded by the latest developments from IEC working groups as well as efforts to harmonise end-user implementation across the industry**
Christoph Brunner, President of [it4power](#) & Convenor - [IEC TC57 WG10](#)
Ralph Mackiewicz, VP Business Development – [SISCO](#) & Chairman of Board of Directors - [UCAIug](#)
Vladan Cvejic, Owner of [Power Automation Consulting](#) & IEC 61850 Profile Manager – [ENTSO-E](#)
Johannes Stürmer, Grid Development – [innogy](#) & Active Network Management Taskforce – [E.DSO](#)

10:30 Morning refreshments, networking & exhibition

11:00 **Global Implementation Panel: Exploring global IEC 61850 implementations and comparing levels of penetration globally**

- Examining the drivers for IEC 61850 implementation across the globe
- Comparing the IEC 61850 features and architectures implemented in different regions
- Exploring novel applications of IEC 61850 developed to meet challenging conditions in different areas of the world
- Developing IEC 61850 roadmaps to drive smart grid interoperability on a global scale
- Obtaining a global perspective on IEC 61850 implementation and understanding the common challenges facing the industry

Arnaud Ulian, Project Director, [EDF \(France\)](#) & Chairman, [IEC TC 57](#)
Tuan Vu, Senior Digital Asset Strategies Engineer – [Powerlink Queensland \(Australia\)](#)
Frans Shanyata, Senior Engineer Projects & Multidisciplinary – [NamPower \(Namibia\)](#)
Mark Thompson, Engineering Manager, IEC 61850 Projects – [National Grid \(USA\)](#) (video presentation)

12:30 Lunch, Networking & Exhibition

14:00 **Industrialising IEC 61850: Developing a streamlined engineering process that produces repeatable, scalable and vendor-independent substation design**

- Evaluating the organisational and technical requirements for effectively industrialising IEC 61850-based substation design
- Aligning top-down IEC 61850 design approaches with existing engineering processes to reduce complexity for design teams
- Creating a library of appropriate specification elements that can be reused to rapidly generate accurate, standardised designs for new substations
- Comparing delivered SCD files with specified SSD files and working alongside system integrators to ensure a close fit between specification and delivered solutions
- Establishing an IEC 61850 engineering process that delivers lower lifecycle costs through repeatable, standardised design and enhanced IED interchangeability

David MacDonald, System Monitoring Engineer – [Iberdrola \(Spain\)](#)

14:40 **Multi-Vendor, Multi-Edition Systems: Integrating the latest substation automation technology with legacy systems using IEC 61850**

- Overcoming a range of interoperability challenges to successfully integrate multi-vendor, multi-edition systems
- Ensuring backwards compatibility between edition 1 and edition 2 IEC 61850 systems
- Managing the complexity of integrating six different vendor IED's and one client, using six different software packages
- Developing an effective framework for the integration of IEC 61850 systems across editions and vendors

Jan Voltman, Consultant – [Qirion \(Alliander\) \(Netherlands\)](#)
Robbert Koenderman, Senior Engineer – [Qirion \(Alliander\) \(Netherlands\)](#)

15:20 **Fully Digital Substations: Specifying IEC 61850 process bus systems to support advanced information exchange between processes and enterprise systems**

- Comprehensively capturing the complex requirements of process bus systems in specifications to ensure simplified system integration
- Increasing the efficiency of substation system monitoring using CIM & IEC 61850 engineering processes
- Specifying gateways that effectively transfer data from automation systems to enterprise systems
- Driving predictive and remote maintenance throughout the enterprise through the accurate specification of process bus systems and data transfer mechanisms
- Development of test systems to facilitate functional testing and troubleshooting

Anders Johnsson, Power System Specialist – [Vattenfall \(Sweden\)](#)

16:00 Afternoon refreshments, networking & exhibition

16:30 **Top-Down Design: Developing accurate and comprehensive system specifications that support the fluid interchange of multi-vendor devices**

- Evaluating the business case for top-down design over bottom-up design
- Creating SSD files that comprehensively specify substation automation system functionality and topology
- Accurately mapping desired signal flow through the specification of virtual IEDs, logical nodes and data attributes
- Exploring the potential of ISD files to further improve the top-down design approach
- Leveraging built-in IEC 61850 specification functionality to achieve true interchangeability within substation design

Jörg Reuter, Director – [HELINKS](#)

17:10 **Low-Power Instrument Transformers: Assessing the technological maturity of LPITs in terms of cost, reliability and performance and determining realistic timelines and conditions for their commercial-scale introduction**

- Evaluating LPITs and identifying criteria for optimal implementation
- Comparing the main performance characteristics and sources of error from LPITs with CITs
- Evaluating the IEC 61869 standard and the level of interoperability currently achievable with LPITs
- Establishing appropriate testing methods that ensure successful operation of LPITs in a digital substation environment
- Developing an implementation plan for the adoption of LPITs and examining the use of SAMUs to facilitate gradual transition

Paolo Mazza, Head of Measurements & Diagnostics for Power Systems at [RSE](#) & Convenor – [IEC TC 38 WG 47](#)

17:50 **Roundtable Discussions** - during this session the audience breaks out into several smaller working groups, each focused on a specific theme that arose during the day's presentations. Each working group will comprise of representatives of the entire IEC 61850 community to ensure a well-rounded and holistic discussion. Key issues raised, and solutions proposed will be collated for presentation to the wider group at the end of the session.

19:20 **Networking Reception** - time to relax and unwind after an intensive day of presentations and discussion! All participants are invited to join this networking reception where you will have the opportunity to enjoy the company of colleagues from across the European smart grid technical community.

20:30 Close of conference day one

"The conference is a great opportunity to gain an overview of the market trends, understand the needs of different utilities and find out how they are facing their challenges with IEC 61850." - **Gwennaël Delhière**, Expert Secondary Systems - [Eliä](#)

Conference Day Two | Wednesday 16th October 2019

08:50	Opening remarks from the Chair Alex Apostolov , Principal Engineer at OMICRON & Editor-in-Chief - PACWorld	15:10	Advanced Device Management: Futureproofing IEC 61850 systems through advanced system management capability <ul style="list-style-type: none">Improving the adaptability of IEDs to reduce the cost of future upgradesRemotely configuring IED operational data, including grid topology, protection and PLC parameters, using CID filesObtaining real-time monitoring information through the Buffered Report Control BlockCapturing IED data in asset management and maintenance information systems to facilitate advanced analytics and predictive maintenanceInstituting the Smart Grid Device Management System as a pillar of grid operations, from the process level to data analytics Thierry Coste , Research Engineer – EDF (France)
09:00	C-WAMPACS: Leveraging sophisticated protection, automation & control architectures to meet the evolving demands of the energy system <ul style="list-style-type: none">Integrating multi-vendor IEDs using optimised system architectures to deliver centralised WAMPAC capabilitiesAssessing distributed, centralized and hybrid hierarchical architecturesAnalysing specific examples of C-WAMPACs and exploring the benefits delivered, including System Integrity Protection Schemes (SIPS), Wide Area Situational Awareness (WASA), Fault Location, Isolation and System Restoration (FLISR)Delivering improved reliability, security and efficiency through the development of sophisticated IEC 61850 PAC architectures Alex Apostolov , Principal Engineer at OMICRON & Editor-in-Chief - PACWorld	15:50	Afternoon refreshments, networking & exhibition
09:40	Advanced Maintenance: Optimising IEC 61850 designs, documentation and testing regimes to deliver simplified maintenance and support condition-based maintenance <ul style="list-style-type: none">Effectively incorporating IT and networking skills into maintenance teams to ensure a successful transition to digital maintenance and testingIdentifying substation design principles that reduce maintenance complexity and optimise inventory managementUnderstanding isolation requirements for IEC 61850 systems to facilitate effective testing of IEDs and distributed functionsDeveloping effective IEC 61850 documentation frameworks, including robust functional naming conventions and rigorous procedures for the handling of configuration filesLeveraging improved information access from the process bus to perform advanced analysis of faults and support the move to predictive maintenance Priyanka Mohapatra , Innovation Lead – SP Energy Networks (UK)	16:20	Remote Monitoring & Testing: Remotely monitoring & testing IEC 61850 devices to drive down maintenance costs and improve testing efficiency <ul style="list-style-type: none">Leveraging IEC 61850 Edition 2 testing functionality to isolate and test devices and systems without the need for physical switchingUnderstanding remote testing and monitoring requirements, including virtual isolation functionality, additional testing systems and appropriate interfaces between process and PAC systemsEstablishing a secure and reliable communication link that supports remote control of substation equipment while minimising cybersecurity risksEliminating travel and outage times and increasing testing efficiency through effective remote testing Gilles Guillet , Digital Control System Expert – RTE (France)
10:20	Process Bus Testing: Comprehensively testing IEC 61850 process bus systems to ensure smooth interoperation and consistent performance <ul style="list-style-type: none">Developing a testing regime that ensures digital substation systems closely match operational requirementsIdentifying configuration issues through effective SCD file verificationEnsuring the high availability and reliability of communication networks through effective redundancy, network and time synchronization testingRigorously testing transmission of GOOSE, sampled values and MMS to guarantee interoperability of multi-vendor equipmentUsing IEC 61850 test and simulation mode to assess multi-vendor protection and control performanceAchieving glitch-free interoperation through rigorous testing of process bus systems Rannveig Loken , Senior Specialist Protection & Control Systems – Statnett (Norway)	17:00	Centralised Protection & Control: Consolidating protection and control functions into fewer devices to simplify maintenance and reduce substation footprint <ul style="list-style-type: none">Controlling and monitoring a wide range of substation equipment through a single device and a centralised HMICollecting high-speed, time-synchronized measurements with IEC 61850 that support protection, control, monitoring and asset management from a single high-performance computerDesigning centralised protection architectures to maintain high levels of redundancy and availabilityDeveloping effective testing regimes for centralized protection and controlSimplifying maintenance and testing and reducing substation footprint through the implementation of advanced centralized protection and control schemes Colin Scoble , Senior Protection Engineer – UK Power Networks (UK)
11:00	Morning refreshments, networking & exhibition	17:40	Virtualised Substation Automation and Protection System: Virtualising protection relays into software appliances to eliminate the need for physical hardware <ul style="list-style-type: none">Evaluating the challenges of traditional substation engineering and understanding how the virtualised protection relay concept addresses themDesigning virtualised protection systems for simplified operation and maintenanceEnsuring robust cyber-security in virtualised protection systemsStandardizing virtualised protection designs using the IEC 61850 process busLeveraging automated deployment tools to speed-up roll-out of virtualised protection systems Mehrdad Vahabi , Substation Automation Project Manager – Southern California Edison (USA) (<i>video presentation</i>)
11:30	System Interoperability Panel Discussion: Outlining the challenges vendors face in achieving interoperability and the steps they are taking to address them <ul style="list-style-type: none">Detailing plans for product upgrades to support the latest standardsEvaluating different vendor implementations of IEC 61850 and addressing the challenges of harmonising implementation across vendorsOutlining the challenges in achieving interoperability between the IED and SCADA systemsAddressing the challenges of interoperability between mixed merging units from different vendors within substations Peter Kreutzer , Global Product Manager – ABB Senior Representative – Arteche Mital Kanabar , Senior R&D Applications Engineering Mgr – GE Grid Solutions	18:20	Close of conference day two
13:00	Lunch, networking & exhibition		
14:30	Advanced Testing: Managing testing complexity in multi-vendor multi-edition IEC 61850 systems <ul style="list-style-type: none">Identifying the key causes of testing complexity in advanced IEC 61850 systemsEstablishing design parameters that support testing accuracy once the system is operationalLeveraging testing tools and procedures that accurately predict the behaviour of new functionalities in complex systemsEnsuring that communication failures between IEDs are easily identified, isolated and rectified to avoid wider system impactMaintaining high system performance visibility at all times Fred Steinhauer , IEC 61850 and Digital Substation Expert – OMICRON		

"Excellent way to catch up on what is happening in IEC 61850."
Frank R. Goodman, Team Lead - **San Diego Gas & Electric Company**

Conference Day Three | Thursday 17th October 2019

08:50	Opening remarks from the Chair	14:30	Digital Primary Substations: Standardising IEC 61850 between IEDs and creating an IEC 61850 tool compatible with old legacy devices to achieve big savings in the roll-out of IEC 61850 to existing substations <ul style="list-style-type: none">Comparing different vendor implementations of IEC 61850 and identifying interoperability challengesStandardising specification criteria to avoid incompatibility issues between different vendorsObtaining oscillography from protection devices using IEC 61850 file transfer.Defining an Endesa engineering tool that creates a SCD defining the whole substation communication architecture, including the legacy serial protocols (IEC101, IEC103, DNP3.0, Procome, Modbus RTU and others)Developing an IP-based predictive maintenance tool to remotely monitor substations and improve their efficiency and safety María Avery Fernández , Head of Remote Control & Protection – Endesa (Spain)
09:00	Cybersecurity Frameworks: Securing control systems, networks and user access in accordance with IEC 62351 and other cybersecurity standards to effectively safeguard multi-vendor IEC 61850 systems <ul style="list-style-type: none">Implementing a holistic cybersecurity strategy to secure IEC 61850 systems from a wide range of threatsExamining the progress of IEC 62351 towards comprehensive multi-vendor cybersecurity interoperabilityEnsuring appropriate levels of security across multi-vendor systems to balance security with usability and complexityAddressing the challenge of authenticating mission-critical GOOSE messages and sampled valuesIdentifying best practises for security architecture of IEC 61850 systemsAchieving high levels of cybersecurity in IEC 61850 systems through adoption of standards and best practises including ISO/IEC 27019 and IEC 62443 series Frances Cleveland , President of Xanthus Consulting International & Convenor – IEC TC 57 WG 15	15:10	HVDC Interconnections: Leveraging precise, high-speed IEC 61850 data acquisition to achieve dynamic, multi-modal operation of HVDC interconnections <ul style="list-style-type: none">Using time-domain automation of IEC 61850 systems to instantaneously detect changes in power flow across HDVC interconnectors and support three operational modesObtaining accurate, synchronized, wide-area power flow summation at fixed intervals using GOOSE messages and synchrophasorsMonitoring the angular difference between AC buses with IEC 61850 to support the operation of DC links as simulated AC linesLeveraging advanced hardware and software redundancy methods to achieve secure and dependable IEC 61850-based HVDC control systemsAchieving high-speed, wide-area control of HVDC systems to effectively interconnect multiple substations across hundreds of kilometres Matías Sánchez Mingarro , Protection & Applications Project Manager – Red Eléctrica de España (Spain)
09:40	Intrusion Detection Systems: Deploying intrusion detection systems (IDS) to track industrial assets, OT threats and to monitor IEC 61850 networks and processes with real-time insight <ul style="list-style-type: none">Determining the best placement of IDS within substations to comprehensively safeguard IEC 61850 systemsManaging IDS vendors and product approval to ensure a close match between specified and delivered solutionsFine-tuning IDS for optimal cybersecurity performance alongside IEC 61850 systemsExploring the future roadmap for IDS and examining convergence with other security components Dr. Foud Abou Chacra , Senior Specialist Projects & Innovation – Dubai Electricity & Water Authority (UAE)	16:20	OSMOSE: Improving interoperability frameworks to facilitate plug & play integration and better exploitation of flexibility solutions <ul style="list-style-type: none">Developing an optimal TSO-DSO coordination framework for operational planning and management of flexibility sourcesDeveloping application-specific design & control of Battery Energy Storage Systems (BESS), including multi-service applicationsImplementing enhancements and new concepts for the specification and engineering process in a multivendor environmentLowering the cost of integration and harmonising end-user implementations of IEC 61850 systems to promote a competitive procurement environment Thomas Sterckx , IEC 61850 Expert – Elia (Belgium) & OSMOSE Project Expert – ENTSO-E Christoph Brunner , President of it4power & Convenor - IEC TC57 WG10
10:20	Integrated Monitoring & Configuration: Streamlining IED Management through the integration of real-time monitoring and configuration <ul style="list-style-type: none">Leveraging advanced IED management with IEC 61850 to deliver a closer integration between device configuration and monitoringEvaluating IEC initiatives aimed at providing convergence between configuration and monitoringCombining static information, including SCL files and CIM models, with real-time monitoring data from IEDsDeveloping a digital control centre to facilitate real-time diagnosis and correction of IED faults Julio E. Dominguez , Power Systems Automation Expert – UFD (Spain)	17:00	Substation Digital Twin: Leveraging IEC 61850 and machine learning to achieve advanced monitoring and simulation of substation systems <ul style="list-style-type: none">Integrating substation systems with analytical engines to deliver digital twin functionalityEvaluating the digital twin concept, understanding the range of possibilities afforded and how IEC 61850 can support themAcquiring the appropriate range of substation data with IEC 61850 and developing analytical engines capable of providing real-time insightDeveloping a test-platform that ensures rigorous testing of IEC 61850-based digital twin systemsImproving reliability, safety and overall resilience of substation protection systems through advanced simulation and monitoring Dr. André Naumann , Group Leader Energy Systems – Fraunhofer IFF
11:00	Morning refreshments, networking & exhibition	17:40	Close of conference day three
11:30	Vendor-Independent Testing Tools Panel Discussion: Meeting the need for multi-edition and multi-vendor interoperability for configuration and testing tools <ul style="list-style-type: none">Quantifying the impact the lack of tool interoperability is having on maintenance efficiencyEnsuring that configuration tools can manage a hybrid environment – standardising SCL filesReducing the need for multiple software programmes to configure one deviceTesting multiple device systems effectively to reduce retest requirementsFuture proofing tools for IEC 61850 Edition 3 and 4 Eric Xu , Lead Simulation & Automation Engineer – RTDS Senior Representative – EFACEC Joel Greene , Senior Software Engineer – Triangle MicroWorks Senior Representative – COPA-DATA		
13:00	Lunch, networking & exhibition		

"Gathered a lot of new information about IEC 61850 and also exchanged with experts from different companies such as utilities, vendors and system integrators."
Chen Dehui, Division Chief for International Organization - **State Grid Corporation of China**

Seminar

Friday 18th October 2019

Future Applications of IEC 61850 in New Domains



As the use of IEC 61850 proliferates from the substation across the wider smart grid, this one day seminar showcases innovative applications of IEC 61850 in new domains. A range of leading R&D specialists will be presenting about cutting-edge pilot projects, demonstrating the use of IEC 61850 to achieve advanced monitoring, protection, automation and control of grid-edge assets and DERs.

08:50 Opening remarks from the Chair

09:00 **DER Standards Update: Evaluating recent developments to IEC 61850 that support a more decentralised and flexible energy system through the intelligent operation of grid-edge assets**

- Driving the roll-out of IEC 61850 to the grid edge through development of extensions to the IEC 61850 series standard
- Understanding requirements for handling DER in an energy system and evaluating IEC 61850's potential to meet them, including:
 - Performance, testing, operation and safety requirements
 - Regulatory and functional requirements for devices/systems to provide mandatory and market-based grid support services, including frequency control, reactive power support, demand response and ancillary services
 - Future requirements, including changes to DER services and network codes that promote energy system flexibility
- Using IEC 61850 to monitor, control and automate a range of devices throughout their lifecycles, including feeder equipment, DER generating systems, storage systems, controllable loads, microgrids and EV V2G, while taking into account system management considerations
- Evaluating IEC 61850-8-2 and the use of XMPP to communicate over public networks
- Mapping IEC 61850 data objects to other protocols such as DNP3 and Modbus

Laurent Guise, International Standardization Director at **Schneider Electric** & Convenor – **IEC TC 57 WG 17**

Frances Cleveland, President of **Xanthus Consulting International** & Convenor – **IEC TC 57 WG 15**

09:40 **Open-Source IEC 61850: Leveraging open-source tools to monitor and control DERs over communication networks**

- Understanding the functionality and features of open-source IEC 61850 tools and identifying the range of appropriate use cases
- Understanding open-source implementations of logical nodes to effectively build IEC 61850 data models
- Creating IEC 61850 clients and servers for bespoke applications using open-source stacks
- Supporting innovative use-cases with low-cost custom-made IEC 61850 solutions

Steven Blair, Research Fellow – **University of Strathclyde**

10:20 Morning refreshments

10:50 **Hybrid Wind & Storage: Leveraging IEC 61850 and related standards to achieve advanced control, protection and monitoring of integrated wind & storage systems**

- Examining the regulatory conditions for wind power and evaluating IEC 61850's potential to meet new regulatory requirements
- Evaluating IEC 61850 and IEC 61400-25 and identifying the features and capabilities that support integrated wind & storage systems
- Designing IEC 61850 protection & control architectures to effectively integrate and automate hybrid wind & storage systems
- Using the IEC 61850 process bus to achieve real-time monitoring of DER assets
- Achieving effective integration of wind and storage to effectively deal with surplus generation and deliver more value to customers

Nicholas Etherden, Senior R&D Engineer – **Vattenfall (Sweden)** & Convenor – **TC 88 JWG 25**

11:30 **Wind Power Ancillary Services: Achieving direct control of distribution-grid-connected wind farms with IEC 61850/61400-25 to provide ancillary services at the TSO level, including congestion and voltage support**

- Establishing the range of ancillary services required by a TSO from wind power assets
- Evaluating IEC 61850/61400-25 and understanding their suitability for ancillary service applications
- Developing appropriate system architectures and interfaces for TSO control of distribution-connected wind assets
- Identifying the key activities, timelines and lessons learnt from implementing ancillary services with IEC 61850/61400-25

Peng Li, Smart Grid Senior Expert – **Engie Green (France)**

12:10 **Provision of Flexibility with IEC 61850: Developing IEC 61850-7-420 to include modelling of Smart Grid energy services and sector coupling**

- Developing a registry for the dynamic aggregation of DER resources with IEC 61850
- Defining the capabilities of a variety of DERs using IEC 61850
- Defining IEC 61850 logical nodes for cross-sector applications to facilitate sector coupling between electrical, gas and heat networks
- Reviewing standards developments that facilitate the use of IEC 61850 in conjunction with thermal storage assets

Andrea Schröder, Scientific Associate Plant Engineering – **FGH e.V.**

12:50 Lunch

14:20 **Microgrids: Achieving interoperability and coordinated control in diverse microgrid systems**

- Designing an information model with IEC 61850 that supports advanced control and interoperability of microgrids involving renewable power and energy storage
- Selecting logical nodes, variables and commands, required to achieve coordinated control of microgrids
- Designing microgrid communication architectures that enable efficient communication between devices
- Deploying gateway/client communication to facilitate the exchange of real-time data, control operations and report notifications

Thierry Coste, Research Engineer – **EDF (France)**

Osama Mohammed, Director, Energy Systems Research Laboratory – **Florida International University**

15:40 Afternoon refreshments

16:10 **Battery System Control & Testing: Utilising IEC 61850 MMS to control and test the scalability of battery storage systems**

- Developing a scalable battery storage system with IEC 61850 to assist in local energy management
- Testing the scalability of IEC 61850-based battery controllers to ensure adequate performance in highly complex and undetermined network communication systems
- Using Hardware-in-the-Loop simulation to investigate the delay of IEC 61850 MMS in storage systems composed of multiple batteries
- Addressing the increasing volatility of the energy mix with improved local energy management

Manuel Pitz, Real-Time Simulation and HiL – **RWTH Aachen E.ON Energy Research Center**

16:50 **Vehicle-to-Grid Services: Implementing plug-and-play vehicle-to-grid charging using IEC 61850 to support a wide range of grid services**

- Evaluating a variety of EV charging protocols and determining their potential for integration with IEC 61850
- Assessing IEC 61850-90-8 and IEC 63110 and identifying the range of vehicle-to-grid services supported
- Establishing methodical approaches for testing the integration of grid mobility
- Designing smart charging architectures with IEC 61850 to support vehicle-to-grid services and interoperability with other DERs
- Identifying future developments of IEC 61850 and 63110 that will further support EV charging and vehicle-to-grid services

Felix Lehfuß, Engineer – **Austrian Institute Technology**

17:30 Close of Seminar

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