

IEC 61850 Comprehensive & Independent Hands-on Training

The Future of Power Systems Requires Comprehensive Know-how

IEC 61850 is the global standard for Power System Automation (generation, transport, distribution ... high, medium and low voltage levels). It allows for an open and "future proof" design, different architectures and possibilities to combine products from multiple vendors. In order for users and system integrators to utilize the benefits of IEC 61850 it is necessary for power utilities, integrators and vendors to education their most crucial asset – people, and start the migration to IEC 61850.



Training is performed in small groups mixing theory and practice

The popular STRI and NettedAutomation hands-on training provides both theory and practice on the application of IEC 61850 in a substation. During the training we follow the planning, design and engineering process for real applications all the way to configuration and testing on a real multivendor test installation. We believe real understanding is the result of both knowledge and hands-on experience. Therefore the training offers a unique combination of presentations, demonstrations and practical workshops in smaller groups.

NettedAutomation (Germany) provide training, consultancy and product support services for the application of distributed automation systems and open communications.

STRI (Sweden) is an accredited high voltage laboratory and independent technical consulting company. We offer IEC 61850 consulting services and independent multivendor interoperability testing. STRI's IEC 61850 lab comprises IEDs and tools from ABB, Areva, Siemens and SEL together with test sets from Omicron, Doble and Megger.

Training Content

The four day training consists of the following modules. Lectures are given in English, questions may be asked in Spanish/Portuguese:

- ❖ **Module 1 Theory**, gives a basic introduction to the IEC 61850 standard for substation applications, power plant applications (hydro, wind, decentralized energy resources) together with a summary with real applications and the demonstration of IEC 61850 software.
- ❖ **Module 2 Application**. gives a more detailed presentation of the IEC 61850 standard for substation and device modeling as well as communication principles (GOOSE, Sample Values, Client/Server applications). This module tells you what you need to know for specification, evaluation, verification and maintenance of IEC 61850 systems (whole substations and IEDs), with real examples and applications based on the STRI IEC61850 test configuration. will present possible functional allocation and architecture for a substation automation with protection and control for transmission and distribution. (On request we can also cover typical IED for generator protection) This covers possible arrangements of the Ethernet for different requirement on redundancy and cyber security.
- ❖ **Module 3: IED interoperability workshop**
IEC 61850 hands-on workshop demonstrating interoperability of protection and control devices from ABB and Siemens. In subgroups the participants browse the IED model of each device (using self-description, validation of model and SCL file) and create outgoing GOOSE messages. After lunch the network traffic is jointly analyzed and the reception of GOOSE messages will be configured in subgroups and tested using IEC 61850 compatible test devices. Configuration is also demonstrated using vendor independent tools. Experience in system debugging and network traffic analysis using third party and open source tools is gained.
- ❖ **Module 4: Engineering & Documentation workshop:**
All devices and the complete system are described in SCL files. It is of utmost importance to keep track of versions and that the Substation Automation System is documented so all involved parties from engineering to maintenance can read and understand the information. The workshop focuses on the design of typical substation functions and the engineering of the substation and IEDs according to the engineering process described in edition 2 of IEC 61850-6 (SCL). The participants will use third-party tool (Helinks) for specification, design and engineering of IEC 61850 systems. The SCD file is also exported to IED configuration tools to configure real IEDs. This workshop requires participants to bring their own PC with administrative rights. Demo tools (from third parties) will be provided prior to day



Hand-on session Itaipu (Brazil/Paraguay)

Training Program

Day 1 – Tuesday 11th of October 2011 Module 1

10 ⁰⁰ –10 ¹⁵	Welcome and course introduction	Instronic
10 ¹⁵ –16 ⁰⁰	IEC 61850	Karlheinz Schwarz, NettedAutomation
16 ⁰⁰ –17 ⁰⁰	Questions, answers and discussions	All

Day 2 – Wednesday 12th of October 2011 Module 2

8 ⁰⁰ –11 ¹⁵	IEC 61850 Communication	Karlheinz Schwarz, NettedAutomation
11 ¹⁵ –12 ¹⁵	Questions, answers and discussions	All
13 ¹⁵ –17 ⁰⁰	IEC61840 Application,	Carl Ohlen, STRI

Day 3 – Thursday 13th of October 2011 Module 3

08 ⁰⁰ –17 ⁰⁰	IEC 61850 interoperability workshop, Module 3	Nicholas Etherden, STRI, Luis Choque
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Day 4 – Friday 14th of October 2011 Module 4

08 ⁰⁰ –17 ⁰⁰	Engineering & Documentation workshop, Module 4	Nicholas Etherden, STRI
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Participants of previous trainings in Ludvika (Sweden), Moscow (Russia), Turin (Italy)

Registration and Price

Modules 1-4: xxx EURO (plus tax if applicable)

Please read more on www.stri.se/iec61850 and www.nettedautomation.com/seminars.

A formal registration form is attached. Formal registration is required latest 1st of September, 2011. We reserve the right to cancel the training course if the number of registered participants is less than 10 at that date. For additional dates and in-house hands-on training courses please contact us (contact see below).

Curriculum vitae of Lecturers

Karlheinz Schwarz received his diploma (masters degree) in Information Technology at the University of Segen (Germany) 1982. He has held a management position within Siemens and has an immense experience in the migration from proprietary or other solutions to standard compliant solutions. He is involved in many standardization activities within IEC, CENELEC, IEEE and DIN since 1985. He received in 2007 the IEC 1906 Award "for his strong involvement in the edition of the IEC 61850 series, its promotion inside and outside IEC, and specifically its adaptation for wind turbine plant control". He has since many years as an independent consultant provided training courses and consulting services for IEC 61850 all over the world. (http://nettedautomation.com/download/Netted-Schwarz-Profile-en_2009-01-21.pdf).

Nicholas Etherden from STRI has a MSc in Engineering Physics from Uppsala University, 2001. After joining ABB as a trainee he worked for half a year in Buenos Aires. He has several years experience from the development of a new IED family for IEC 61850 as application engineer, project manager and product marketing manager at ABB. He is responsible for the STRI IEC 61850 Independent Interoperability Laboratory and a member of IEC TC 57 working group 10 and UCA Iug testing subcommittee. (www.stri.se/iec61850)

Carl Ohlen from STRI has a MSc in Electrical Engineering at The Royal Institute of Technology in Stockholm, 1973. He has more than 30 years of experience in protection, control and substation automation working for Vattenfall, Programma and ABB in Sweden, Switzerland, Brazil and USA. He is author of several CIGRE & IEEE papers as well as books within this field and has held a management position within ABB during the introduction of IEC 61850 IED product family. He is at present STRI Technology Manager for Power Utility Automation.

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We mix theory and hands-on demonstrations to give a comprehensive and in-depths understanding of the IEC 61850 standard