



## IEC Standards for Power Systems – Generation, Transmission, Distribution, ... Design, Bidding, Engineering, Automation, Monitoring, Information Management, Maintenance, ...



### Supplier experience profile on using Tamarack's IEC 61850 Stack

NettedAutomation has provided support for the system integration of the Tamarack IEC 61850 Stack (now Triangle Microworks) for several projects for more than 10 years:

- Linux port of the stack (to a DIMM PC) - our own solution
- Vattenfall Windpower system (Sweden)
- Cummins Diesel Genset integration (USA)
- Transformer Condition Monitoring (RWE Germany)
- Demo clients and servers for training purposes

NettedAutomation has programming support by two senior programmers.

#### 1. Linux port of the stack (to a DIMM PC)

NettedAutomation has ported the Tamarack IEC 61850 Stack to a Linux based DIMM PC in 2000. The UCA™ In-a-LINUX-box is a complete PC, with embedded UCA/MMS, ftp, telnet, and Web server solution for manufacturers of any kind of intelligent electronic devices (IED), or for products with embedded control, who need a way to rapidly create smart UCA/MMS, Web, Internet, and Ethernet-ready devices.

[http://www.nettedautomation.com/solutions/uca/linux/uca\\_linuxbox/inaLINUXbox\\_01.html](http://www.nettedautomation.com/solutions/uca/linux/uca_linuxbox/inaLINUXbox_01.html)

#### 2. Vattenfall Windpower system (Sweden)

Elforsk (Stockholm/Sweden) has sponsored a joint Swedish-Danish work to find, and to make recommendations on a common solution for communication with wind power plants in 2000. The group asked NettedAutomation to implement an IEC 61850 standard based solution using Tamarack's communication stack. The solution has been tested at a wind power plant at Näsudden on Gotland in Sweden.

Results and conclusions from the tests conducted in Sweden and in Denmark are documented in a separate Elforsk report, "Wind power communications – Verification report and recommendation". Elforsk rapport 02:14

[http://www.nettedautomation.com/download/02\\_14\\_rapport.pdf](http://www.nettedautomation.com/download/02_14_rapport.pdf)

Wind power communication – Design and implementation of test environment for IEC61850/UCA2  
Elforsk rapport 02:16

[http://www.nettedautomation.com/download/02\\_16\\_rapport.pdf](http://www.nettedautomation.com/download/02_16_rapport.pdf)

The success of the project led to the new work in IEC TC 88 (Windturbines) to extend the IEC 61850 information models (IEC 61400-25-2) and communication service mappings (IEC 61400-25-4). The standard series IEC 61400-25 has been published recently.

### 3. Cummins Diesel Genset integration (USA)

NettedAutomation has developed the CEIDS DER/ADA Mapping Validation Trial for a Cummins Diesel Genset applying Tamarack's IEC 61850 stack.

The solution maps a subset of the network variables provided by a Cummins Genset using the GOAL serial protocol (LON Works) communications to the DER object models. This mapping was intended to test the object models specified in the "Utility Communications Architecture (UCA®) Object Models for Distributed Energy Resources (UCA-DER) Draft version 2, Sept. 15, 2003".

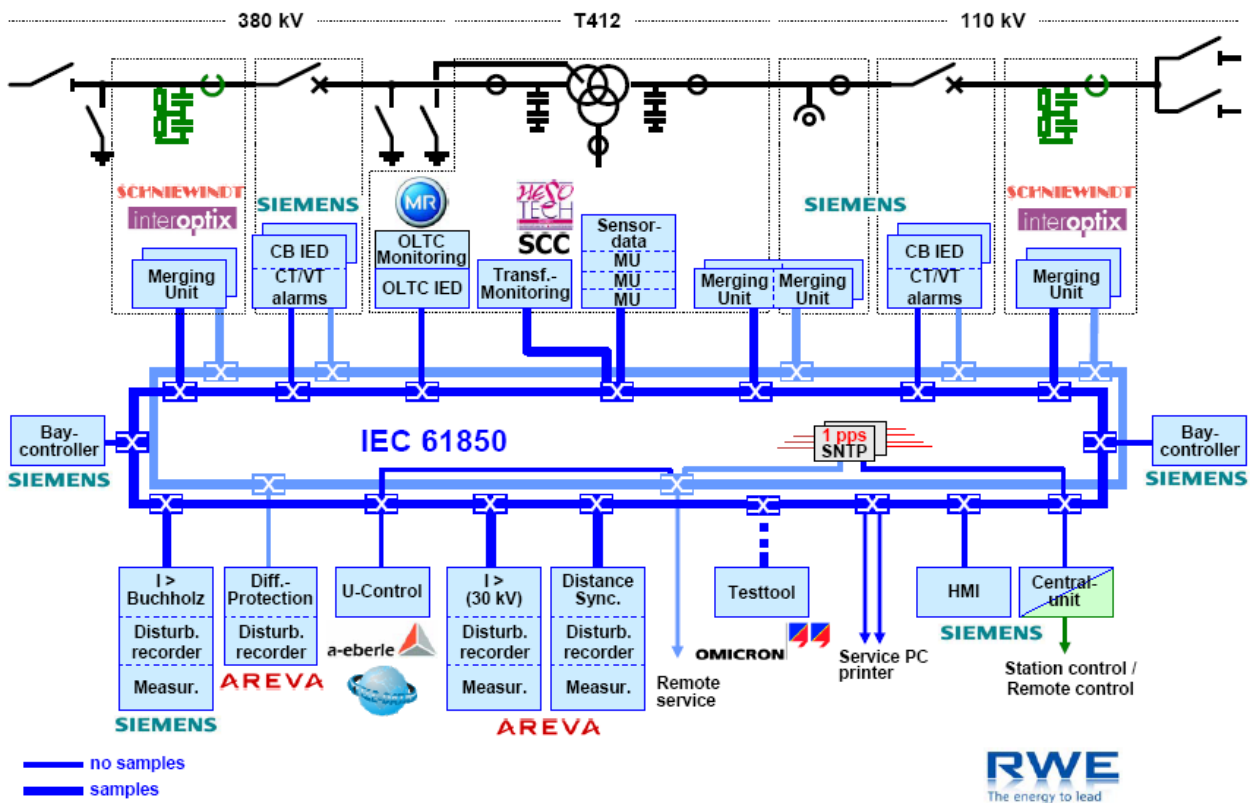
The selected objects are mapped to the Tamarack IEC 61850 (UCA) server software. Data values are retrieved from a real Cummins Controller PCC 3200 over the GOAL serial protocol. For convenience purposes there is a version developed that purely simulates all values. This version can run on a standard PC.

Report: "Test of DER Object Models using the Tamarack software, Report by Karlheinz Schwarz, NettedAutomation GmbH, 2004-06-18 – Draft 1.3"

### 4. Transformer Condition Monitoring (RWE Germany)

NettedAutomation and HesoTech have provided the transformer monitoring system for the RWE R&D project "IEC 61850 Process Bus" using the Tamarack IEC 61850 stack in 2008. The solution implemented comprises the client and server. Further a client DDL has been developed for easy access of an IEC 61850 server.

RWE is the second biggest German utility. The R&D project "IEC 61850 Process Bus" is intended to implement and test the process bus application of IEC 61850. The pilot project is running in a real substation replacing conventional CTs and VTs, circuit breaker control, protection and control systems:



In addition to the transformer protection a merging unit for the current and voltage samples of the transformer has been implemented on a standard PLC platform (Beckhoff PLC).

## 5. Demo clients and servers for training purposes

NettedAutomation has used the Tamarack 61850 Stack for several demonstration and hands-on projects for their training courses since the late nineties.

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