



Johannes Björkgren



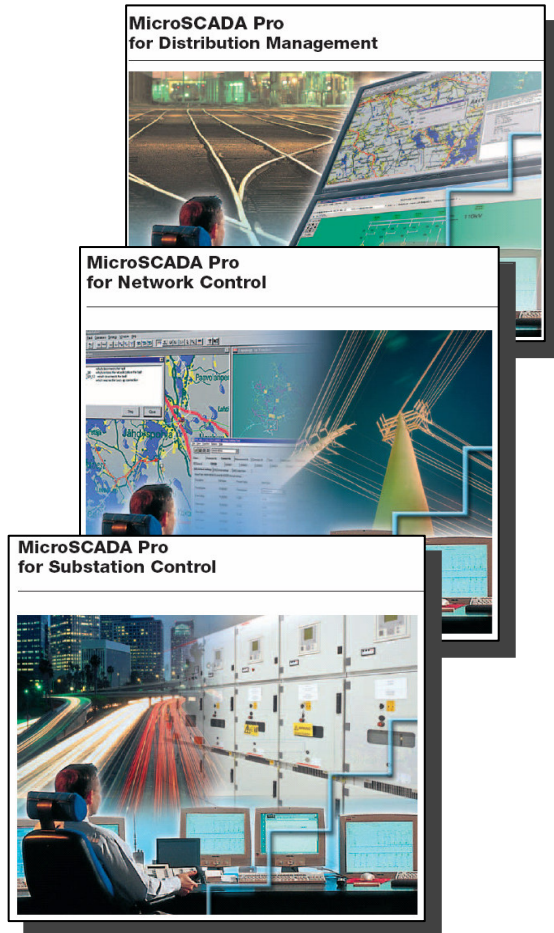
A modular and future proof HSI concept

Rio de Janeiro
April 23-25, 2006





- Introduction
- Application areas
- Graphical user interface
- Communication gateways
- Distribution Management
- Sales & marketing material
- Evolutionary development
- Summary



- State-of-the-art monitoring and control system for transmission and distribution applications
- MicroSCADA Pro – product family
 - Control System SYS 600
 - Communication Gateway COM 500
 - Distribution Management System DMS 600

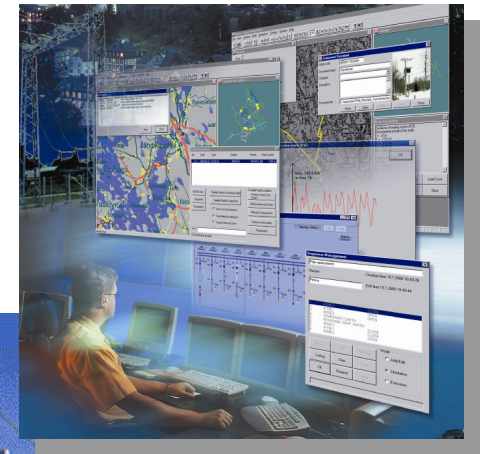
ABB ensures grid and network reliability through innovation, experience and commitment



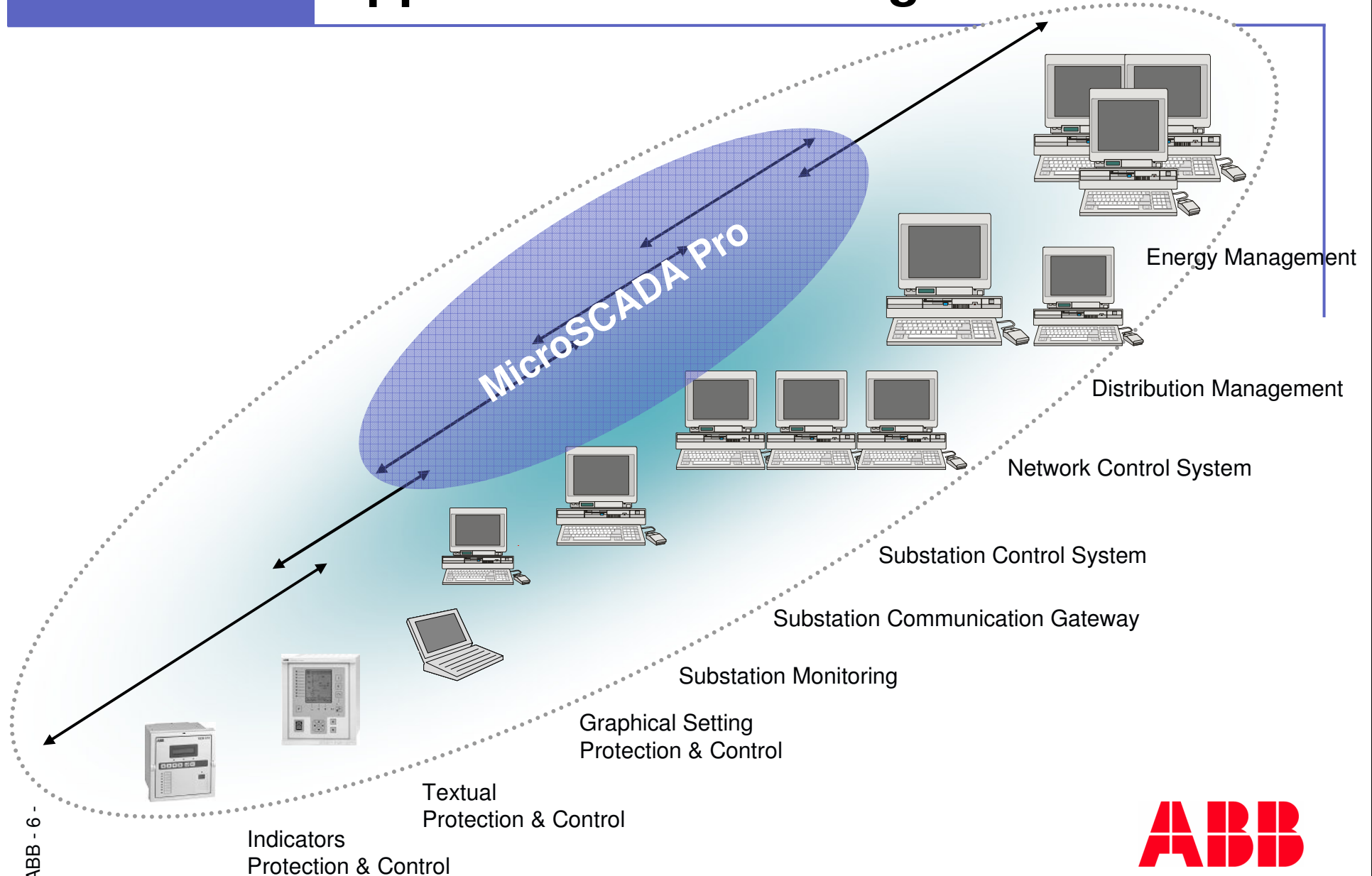
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- **Electrical** applications in:
 - Utilities
 - SA and SCADA/DMS
 - Industry
 - SA and Industrial SCADA
 - Railway
 - SCADA/DMS
- **Non-electrical** applications in:
 - District heating
 - Water & waste water
 - Oil and gas



Application Positioning



- For automation of both transmission and distribution substations
- Scalable
 - From compact single system to distributed Hot Stand-by system
- Open communication
 - By standard and de-facto standard communication protocols including IEC 61850
 - Integrated gateway functionality towards SCADA level
 - OPC connectivity, to e.g. process control systems
- Tight P&C IED integration
 - Setting tools
 - Disturbance Collector tool
 - Power Quality tools



IEC 61850 compliant

MicroSCADA Pro is compliant with the IEC 61850 standard for substation automation.

This means that it can operate together with IEC 61850 compliant IEDs, tools and systems, which simplifies system engineering.

It also features both OPC server and client interfaces to enable easy integration with market and application specific systems and devices.

With IEC 61850 support, MicroSCADA Pro creates seamless communication and connectivity opportunities for its users.



MicroSCADA Pro engineering

All included for engineering

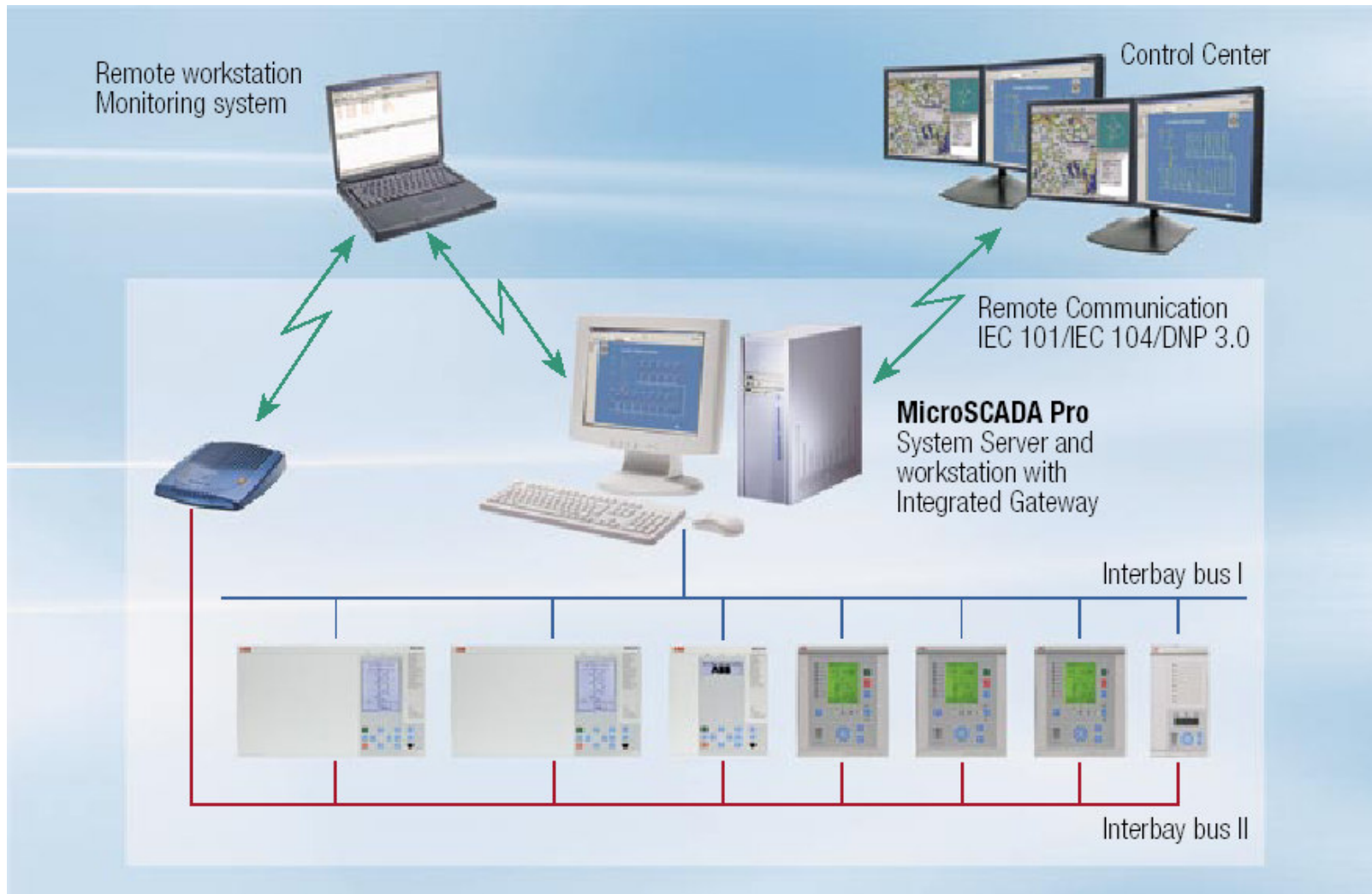
MicroSCADA Pro supports ABB's unique connectivity package concept, which simplifies system engineering and reduces the risks of errors in system integration. The connectivity packages contain a complete description of the IEDs, consisting of data signals, parameters, addresses and IED documentation.

MicroSCADA Pro automatically configures the signal data based on the information provided by the connectivity package, which significantly reduces engineering time.

The MicroSCADA Pro software package contains complete engineering tool set, connectivity packages and libraries including symbols and control dialogs. The copy and paste functions enable, for instance, easy system extension. Thus MicroSCADA Pro also offers a ready-to-use engineering environment for system integrators.



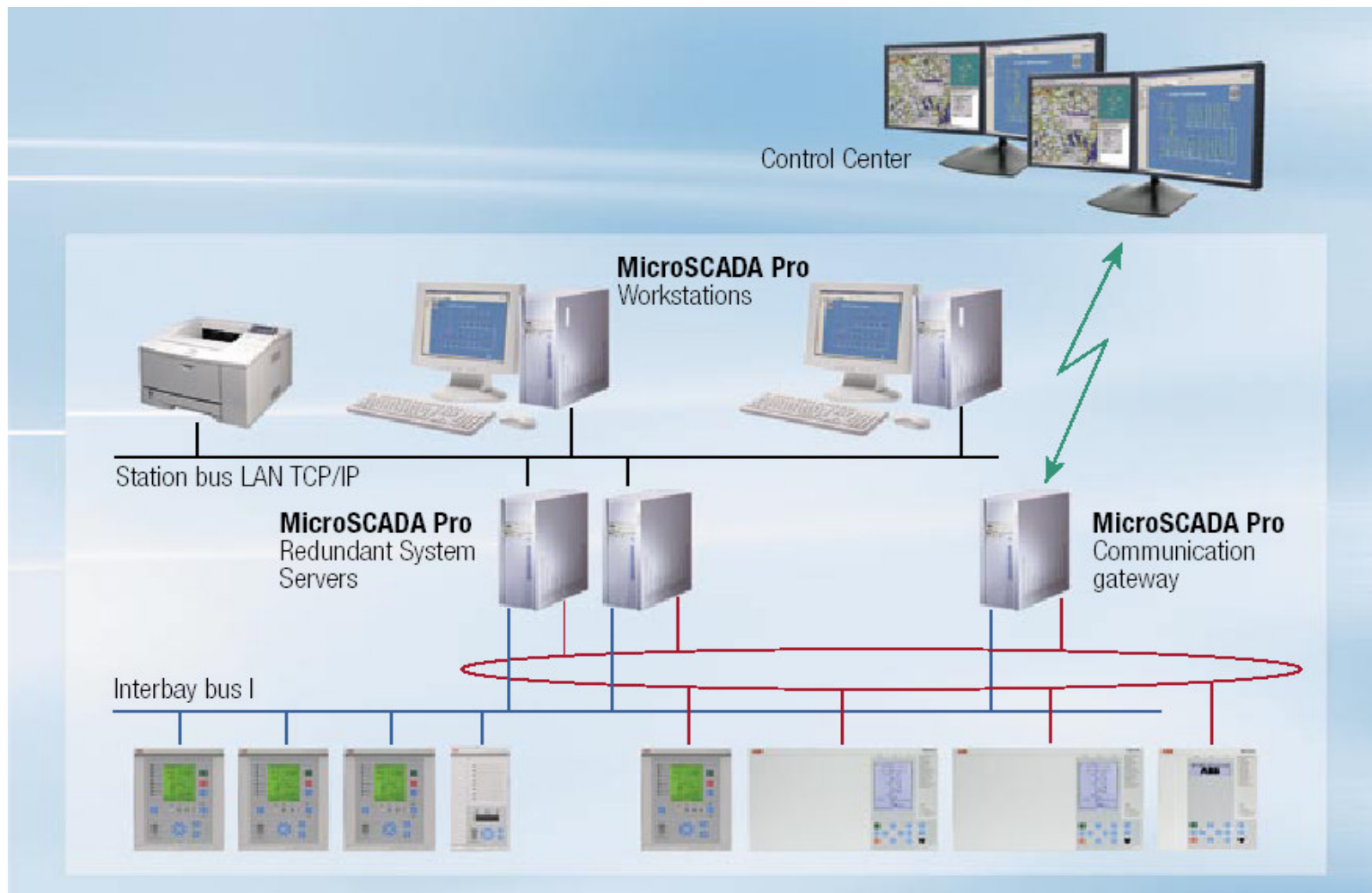
Substation Automation System



Integrated Substation Control and Gateway. Remote workstation for monitoring and service connections.



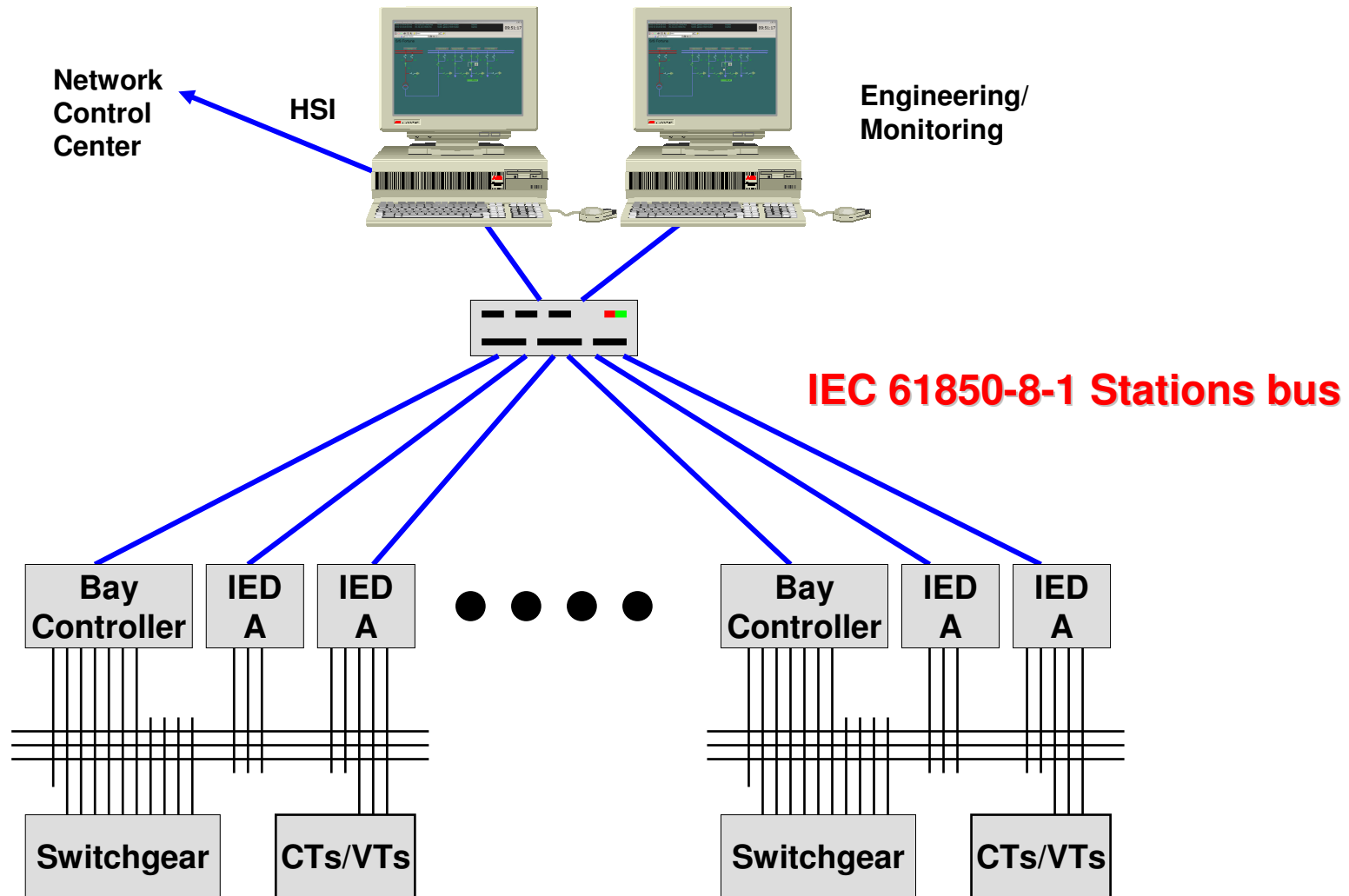
Substation Automation System



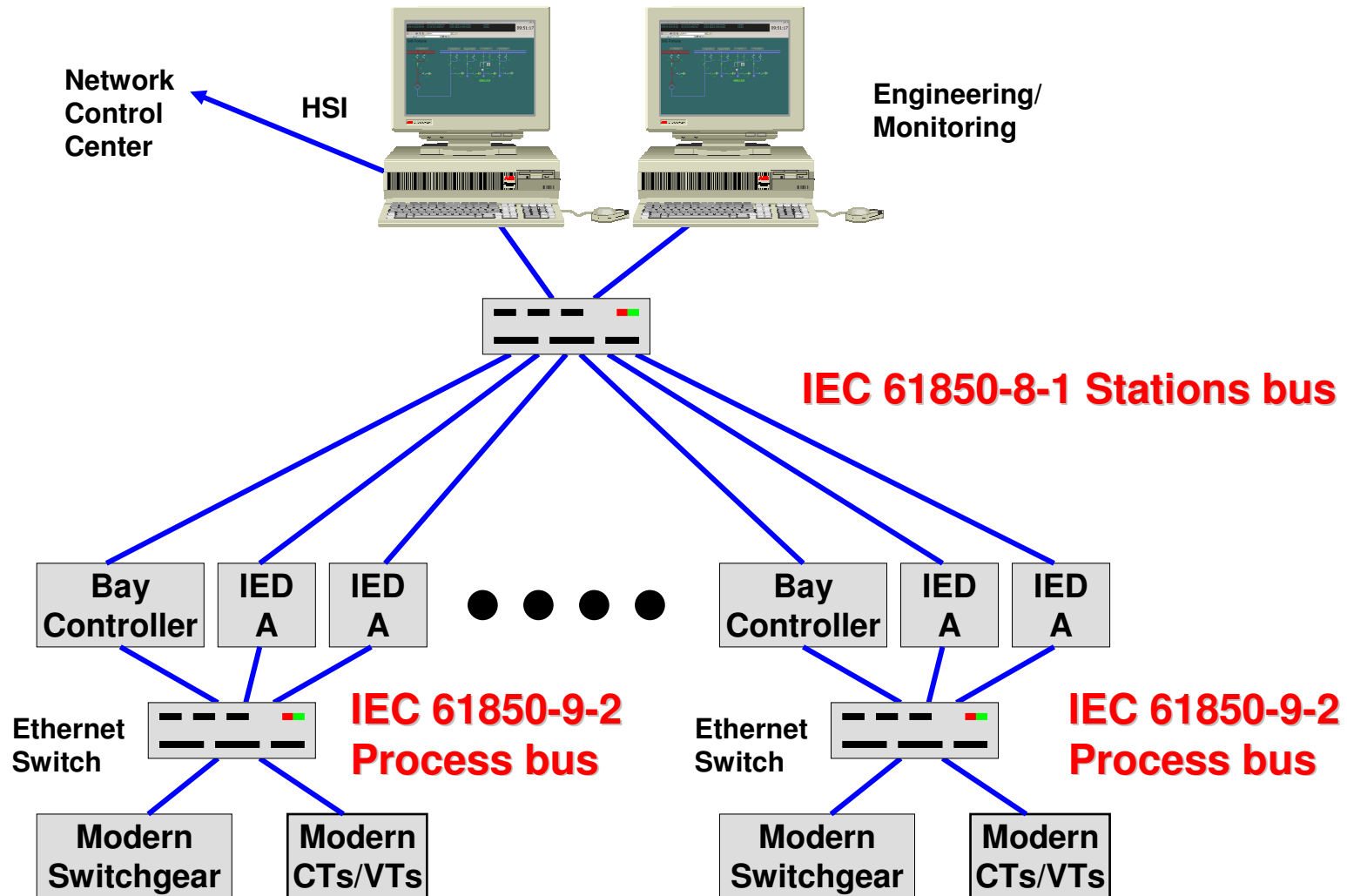
Combined IEC 61850 and LON based system with redundant system servers, two workstations and separate gateway.



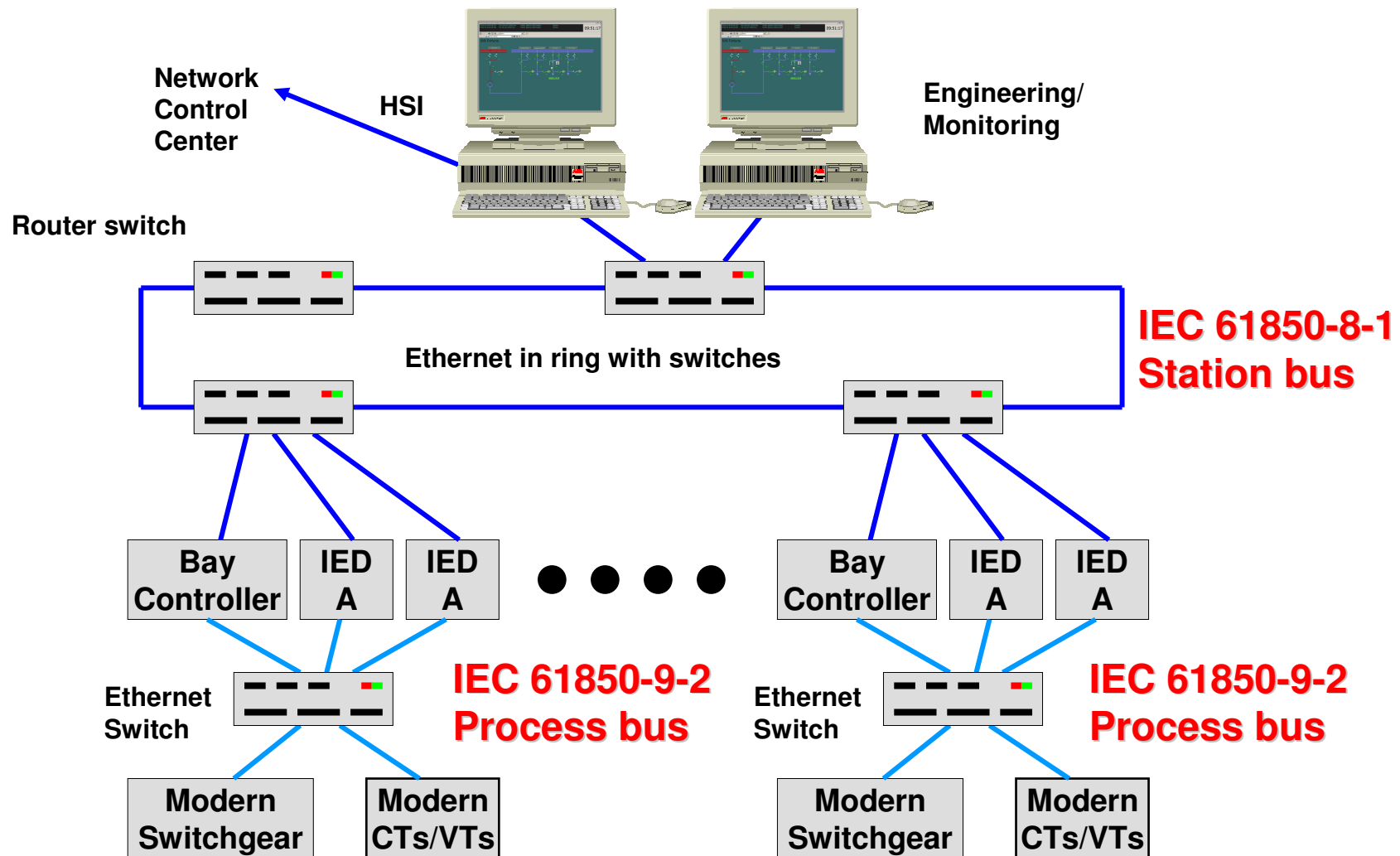
Station bus and conventional process



Separate station and process busses



Station bus in ring



- For distribution networks in utilities and industries
- Scalable
 - From standard SCADA to full-fledged Distribution Management
- Superior process graphics
 - From single line diagram to world map picture (zoom, panning and de-cluttering)
 - Busbar and network colouring
 - Tight P&C IED integration
- Safe and quick network restoration
 - Advanced and instant fault location and isolation
 - Automatic power restoration

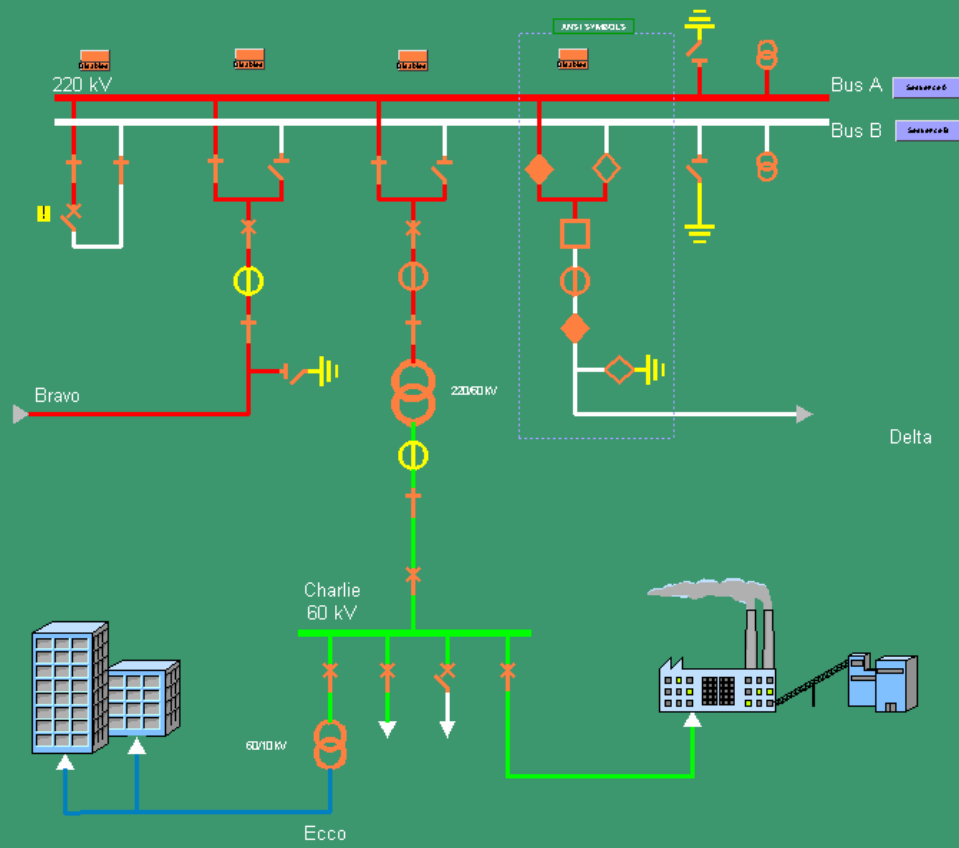


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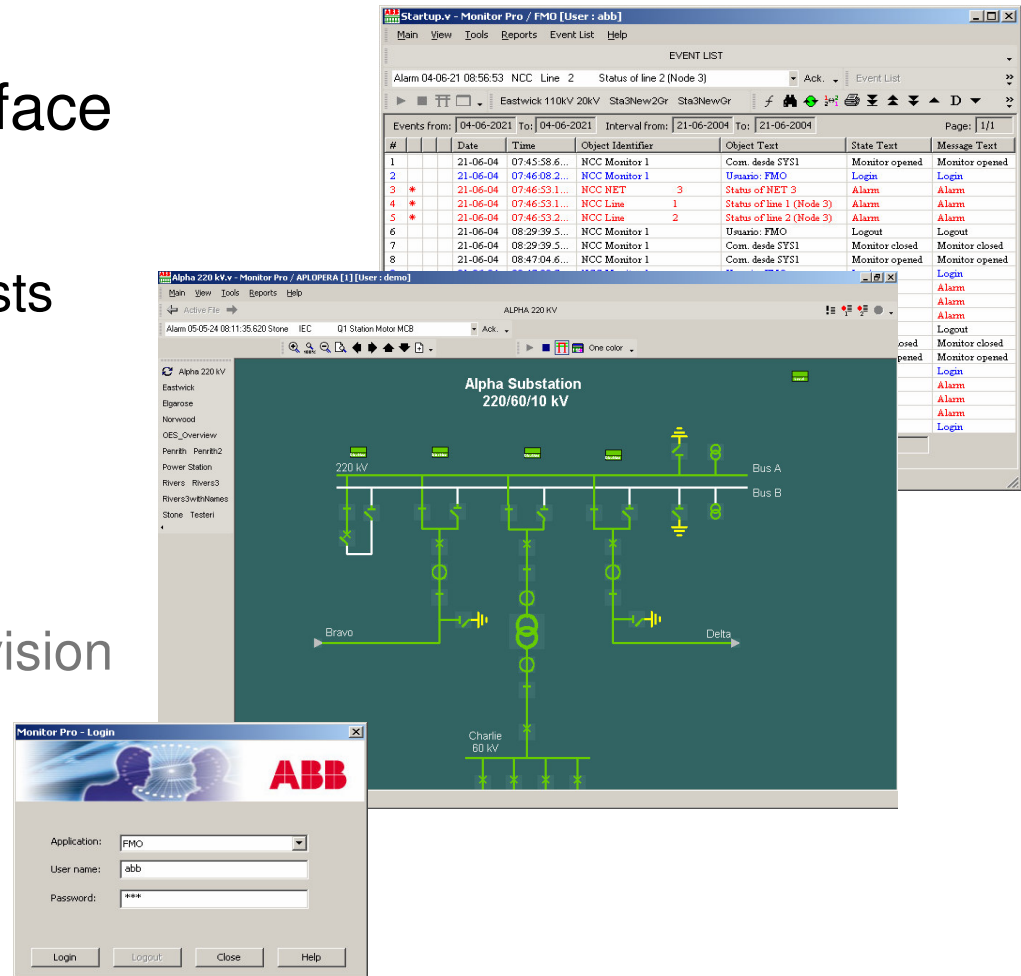
Alarm 06-03-28 15:57:30.215 ALP BAY1 ME1 Neutral current IO Ack.

- Alpha 220 kV
- Eastwick
- Elgarose
- Norwood
- OES_Overview
- Paimio K618
- paimio Penrith
- Penrith2 Rivers
- Rivers3withNames
- Stone tst

Alpha Substation 220/60/10 kV



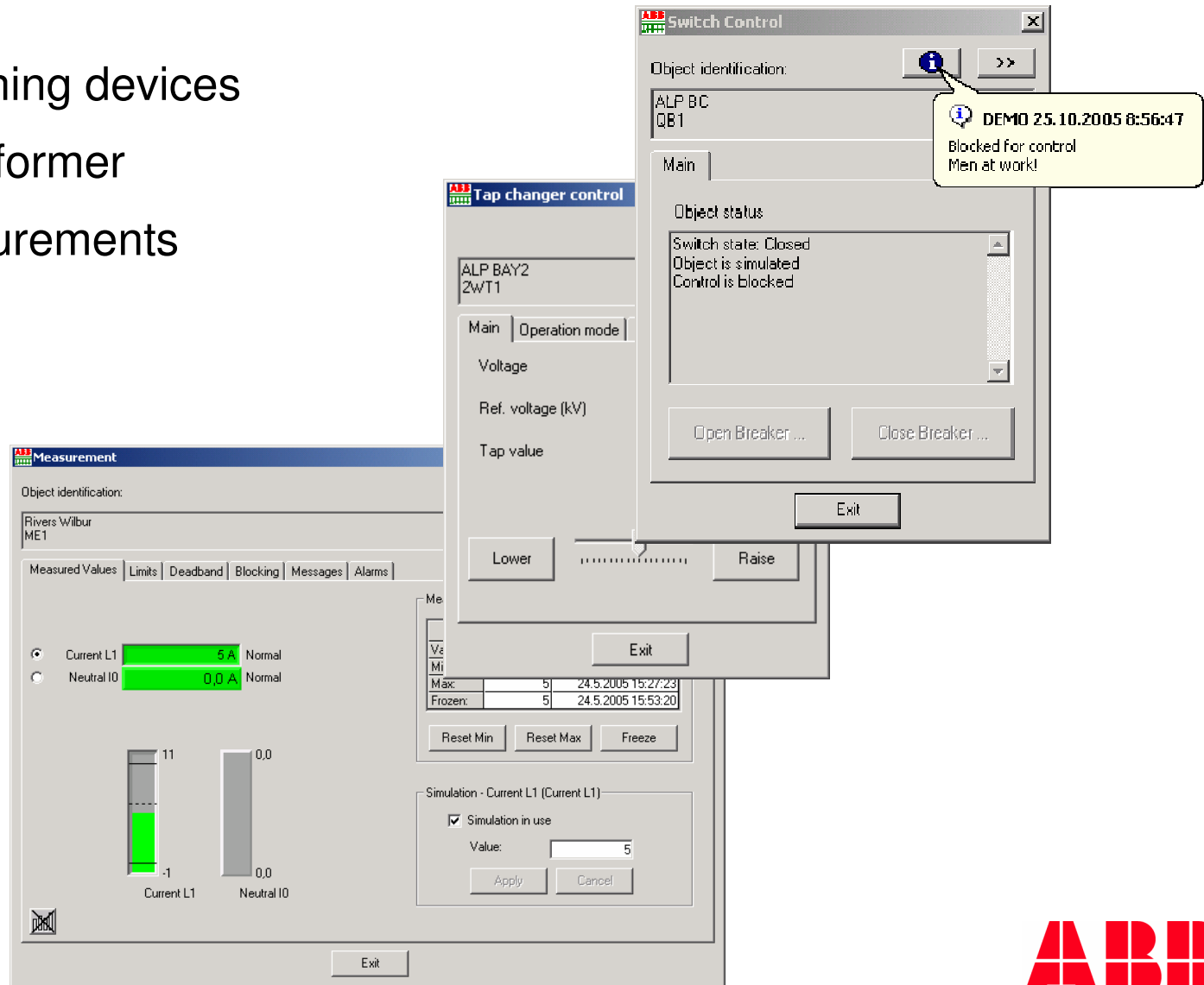
- Superior User Interface
 - Process Displays
 - Alarm and Event Lists
 - Blocking List
 - Trends
 - Reports
 - System Self Supervision



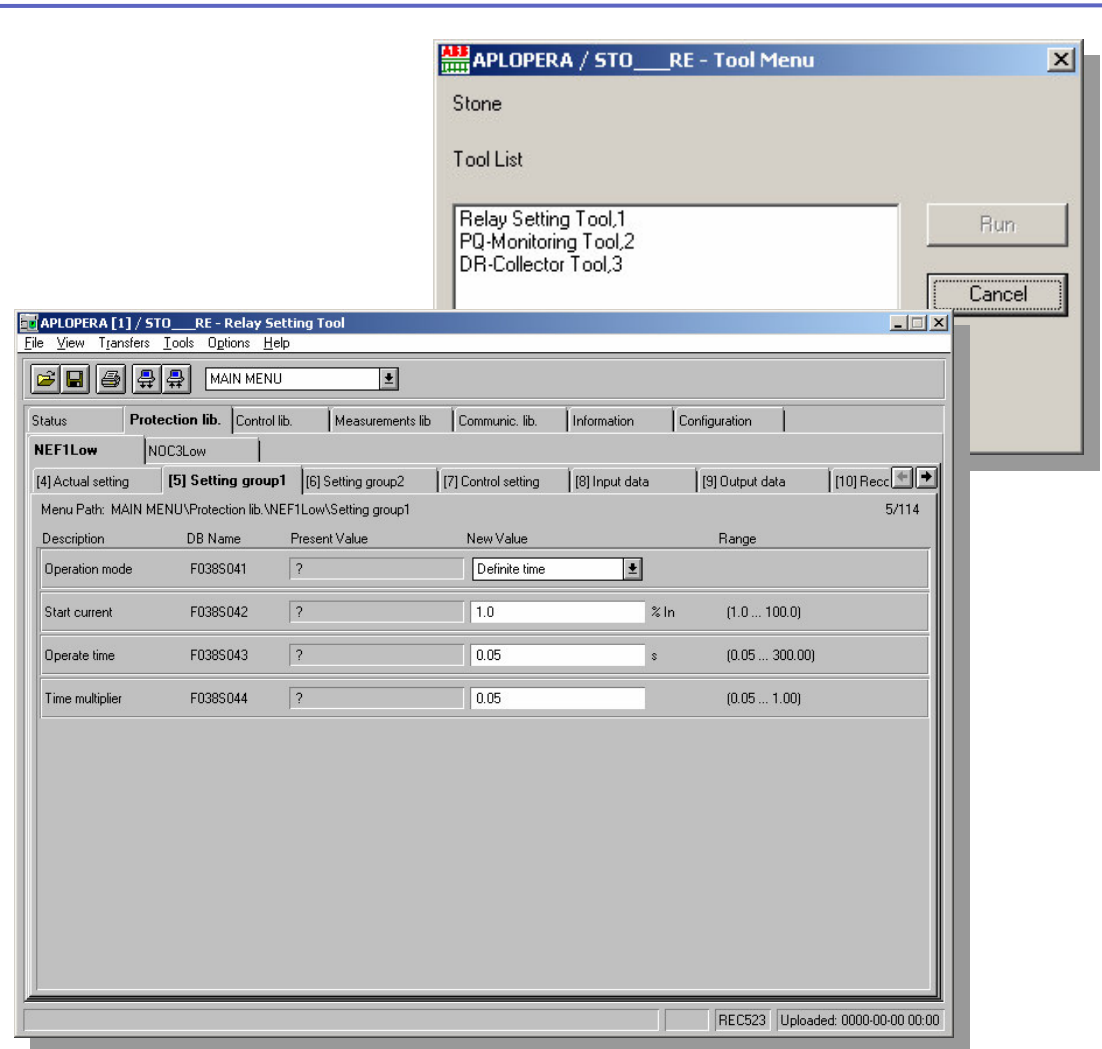
- Single line diagrams
 - Indications
 - Control
 - Dynamic coloring
- Relay Tools
- Zoom, Pan, De-clutter
- Context menus
- Tool-tips
- Works together with LIB pictures



- Switching devices
- Transformer
- Measurements



- Relay Tools
 - Relay Setting Tool
 - PQ Power Quality Monitoring Tool
 - DR-Collector Tool



Information integration

Rivers, Winniford, REx670

- Drawings
- Maintenance report
- Operation Manual

220/60 kV

Line distance protection IED REL 670

Buyer's Guide
IEC 61850-91-2
Version 0. Page 4

IED	IED Name	IED Type	IED Model	IED Manufacturer	IED Version	IED Location	IED Status	IED Description	IED Comments
IED1	IED1	IED1	IED1	IED1	IED1	IED1	IED1	IED1	IED1
IED2	IED2	IED2	IED2	IED2	IED2	IED2	IED2	IED2	IED2
IED3	IED3	IED3	IED3	IED3	IED3	IED3	IED3	IED3	IED3
IED4	IED4	IED4	IED4	IED4	IED4	IED4	IED4	IED4	IED4
IED5	IED5	IED5	IED5	IED5	IED5	IED5	IED5	IED5	IED5
IED6	IED6	IED6	IED6	IED6	IED6	IED6	IED6	IED6	IED6
IED7	IED7	IED7	IED7	IED7	IED7	IED7	IED7	IED7	IED7
IED8	IED8	IED8	IED8	IED8	IED8	IED8	IED8	IED8	IED8
IED9	IED9	IED9	IED9	IED9	IED9	IED9	IED9	IED9	IED9
IED10	IED10	IED10	IED10	IED10	IED10	IED10	IED10	IED10	IED10

Functionality

Differential protection

High impedance differential protection

The high impedance differential protection can be used for protection of lines with high impedance and can be used for protection of lines with low impedance. It can be used for protection of lines with high impedance and can be used for protection of lines with low impedance.

Distance protection

Distance protection zones (PDR, 2T1)

The low impedance protection in a five zone IED is implemented with the following characteristics:

- Zone 1: 80% of the protection zone
- Zone 2: 120% of the protection zone
- Zone 3: 140% of the protection zone
- Zone 4: 160% of the protection zone
- Zone 5: 180% of the protection zone

The protection has a flexibility to load impedance which allows the possibility to detect high impedance faults on heavily loaded lines (see Table 1).

The impedance measurement of impedance for each fault is implemented with a variable scale both in phase reduction and the distance measurement with single phase measurement.

Both in adaptive load compensation algorithm provide monitoring of load in real reporting power flow.

ABB Reader [MicroSCADA Pro.pdf]

How did they manage to restore power so quickly?

With MicroSCADA Pro from ABB

- Superior power system management, particularly in disturbance situations
- Efficient and safe access to the protection and control IEDs
- Safe and quick network restoration, initiated automatically or manually
- Advanced and robust fault location and isolation
- Seamless integration through an extensive selection of protocols and standards, e.g. IEC 61850
- Scalable from substation automation to full-scale distribution management systems

at 4:00 p.m.

at 4:05 p.m.

Internet Explorer

- Tool-tips
- Context menus
- Fast and easy navigation to information:
 - Drawings
 - Documents
 - Manuals
 - Maintenance reports
 - Internet links

- All texts in several languages (also object text)
- Layout settings
- Find
- Filtering
- Programmable coloring
- Copy/Paste
- Comments in Event list

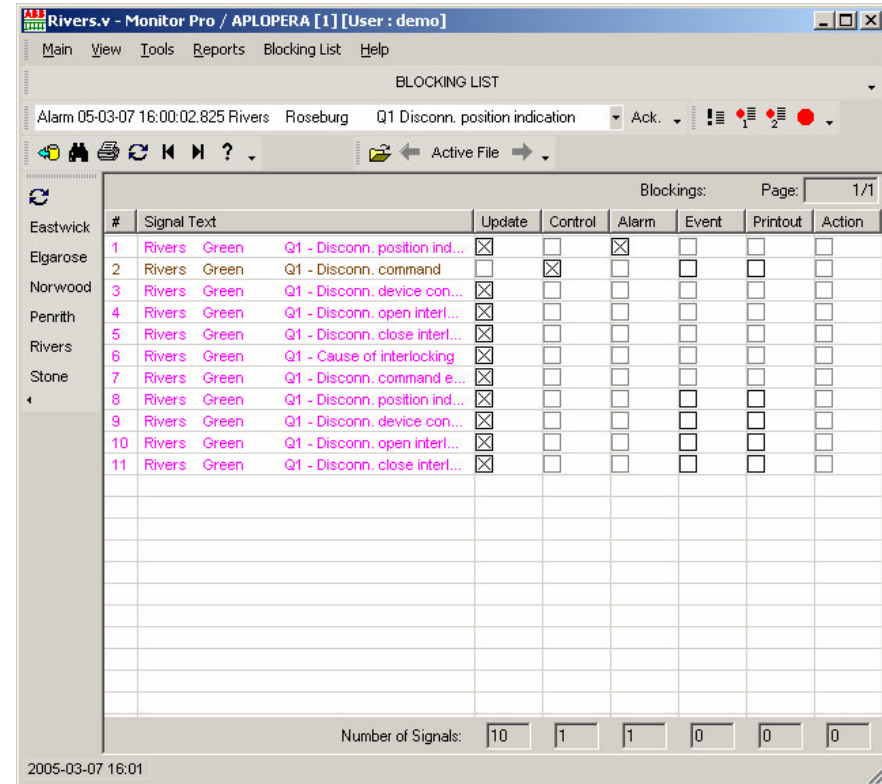
The screenshot shows two overlapping windows from the MicroSCADA Pro software. The top window is titled 'EVENT LIST' and displays a table of events with columns for #, Date, Time, Object Identifier, Object Text, and Event text. The bottom window is titled 'ALARM LIST TEMPLATE 1' and displays two tables: 'PERSISTING ALARMS' and 'FLEETING ALARMS'. The 'PERSISTING ALARMS' table has columns for #, Date, Time, Station, Bay, De..., Object Text, and Status. The 'FLEETING ALARMS' table has columns for #, Date, Time, Station, Bay, De..., Object Text, and Status. Both windows include a search bar, navigation buttons, and a status bar at the bottom.

#	Date	Time	Object Identifier	Object Text	Event text
48	05-03-07	15:38:17.788	Rivers Oaks Q1	Disconn. open select command	On
49	05-03-07	15:38:18.829	Rivers Oaks Q1	Disconn. execute command	On
50	05-03-07	15:38:18.830	NCC 1	LoginMgr User:DEMO	Operation performed
51	05-03-07	15:38:28.894	Rivers Barnes Q2	Disconn. close select command	On
52	05-03-07	15:38:29.815	Rivers Barnes Q2	Disconn. execute command	On
53	05-03-07	15:38:29.816	NCC 1	LoginMgr User:DEMO	Operation performed
54	05-03-07	15:38:29.825	Rivers Barnes Q2	Disconn. position indication	Closed
55	05-03-07	15:38:36.094	Rivers Barnes Q2	Disconn. open select command	On
56	05-03-07	15:38:36.886	Rivers Barnes Q2	Disconn. execute command	On updated

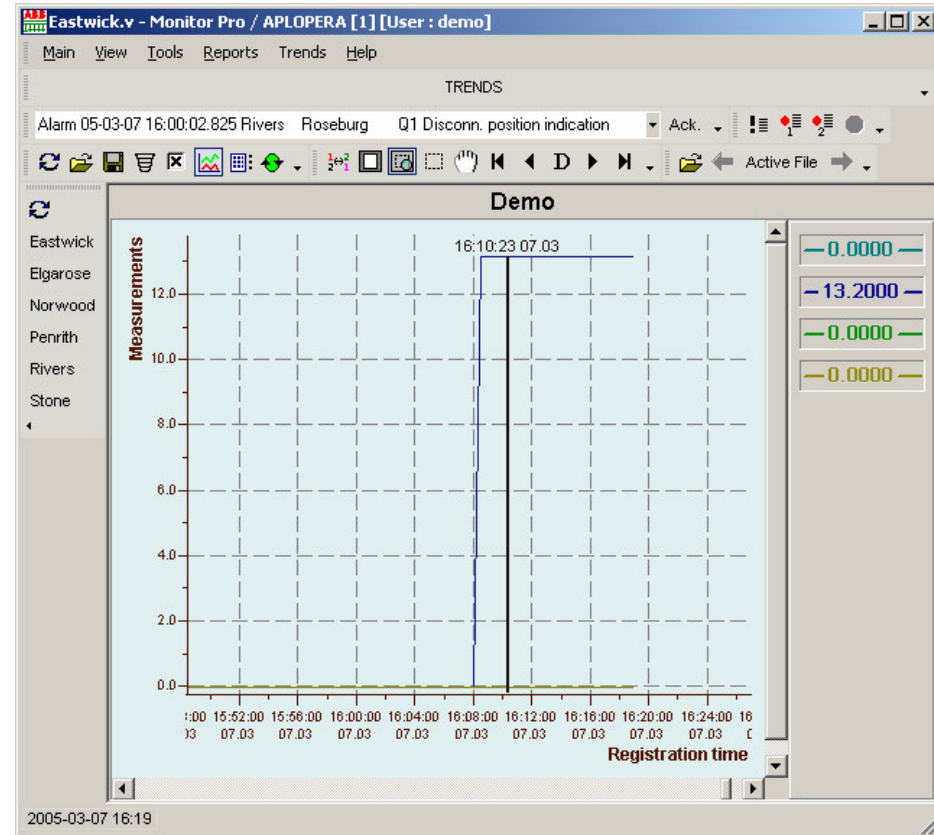
#	Date	Time	Station	Bay	De...	Object Text	Status
1	05-03-07	16:00:02.825	Rivers	Roseburg	Q1	Disconn. position indication	Alarm
2	05-03-07	15:38:39.680	Rivers	Barnes	Q2	Disconn. position indication	Ack.
3	05-03-07	14:26:47.699	Elgarose	Millwood	Q1	Disconn. position indication	Ack.
4	05-03-07	14:26:47.689	Penrith	Durton	Q0	Breaker position indication	Ack.
5	05-03-07	14:26:47.679	Penrith	Renwick	Q0	Breaker position indication	Ack.
6	05-03-07	14:26:47.669	Millwood	PDC	Q1	Disconn. position indication	Ack.
7	05-03-07	14:26:47.669	Stone	IEC	Q1	Station Motor MCB	Ack.
8	05-03-07	14:26:47.669	Stone	IEC	Q1	Gas too Low	Ack.
9	05-03-07	14:26:47.669	Stone	IEC	Q1	Station Stone Door Switch	Ack.
10	05-03-07	14:26:47.629	Rivers	Winchester	Q1	Disconn. position indication	Ack.

Blocking list

- Object texts in several languages
- Find
- Copy/Paste

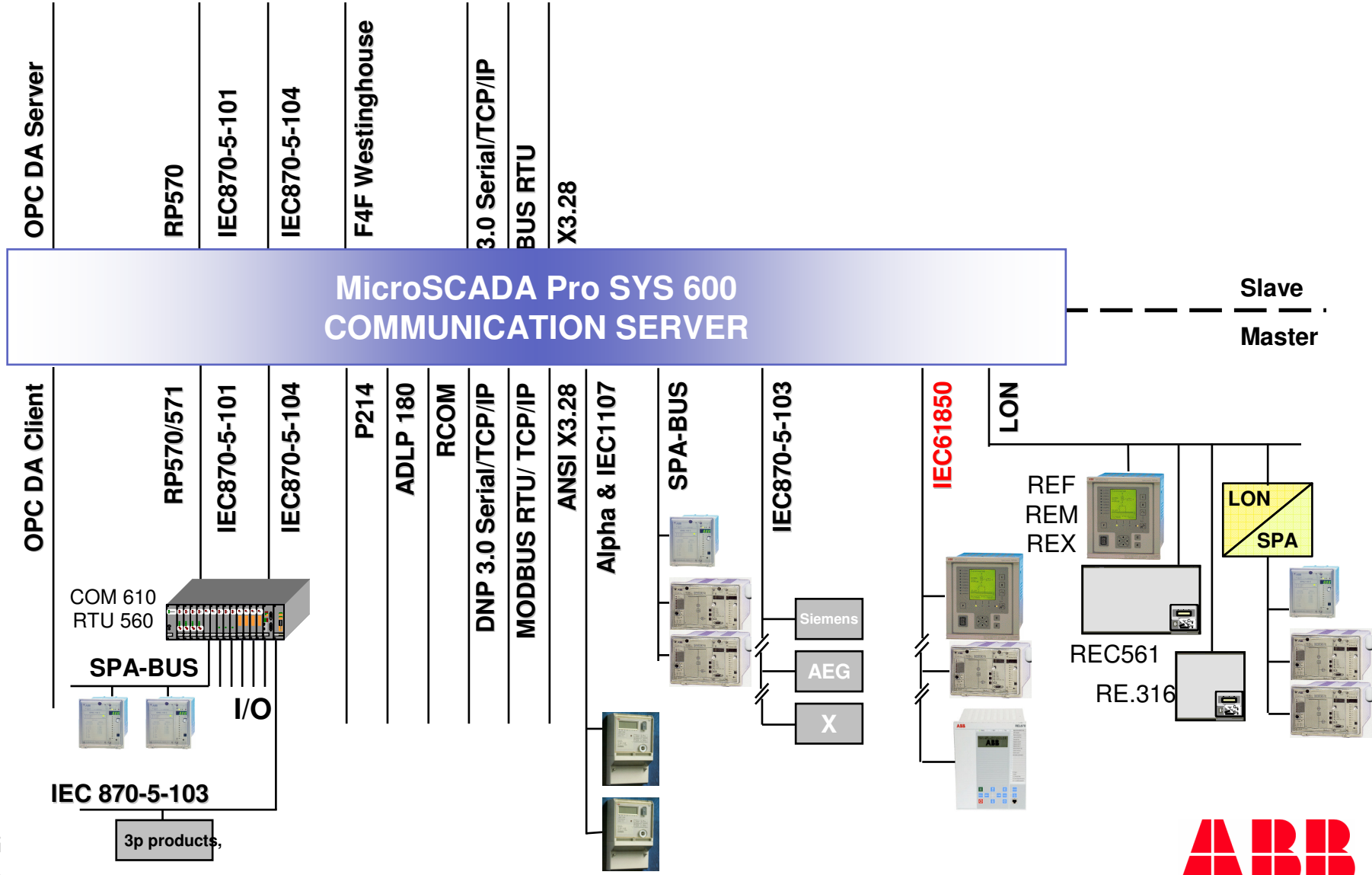


- Zoom/Pan
- Copy/Paste
- Export .csv

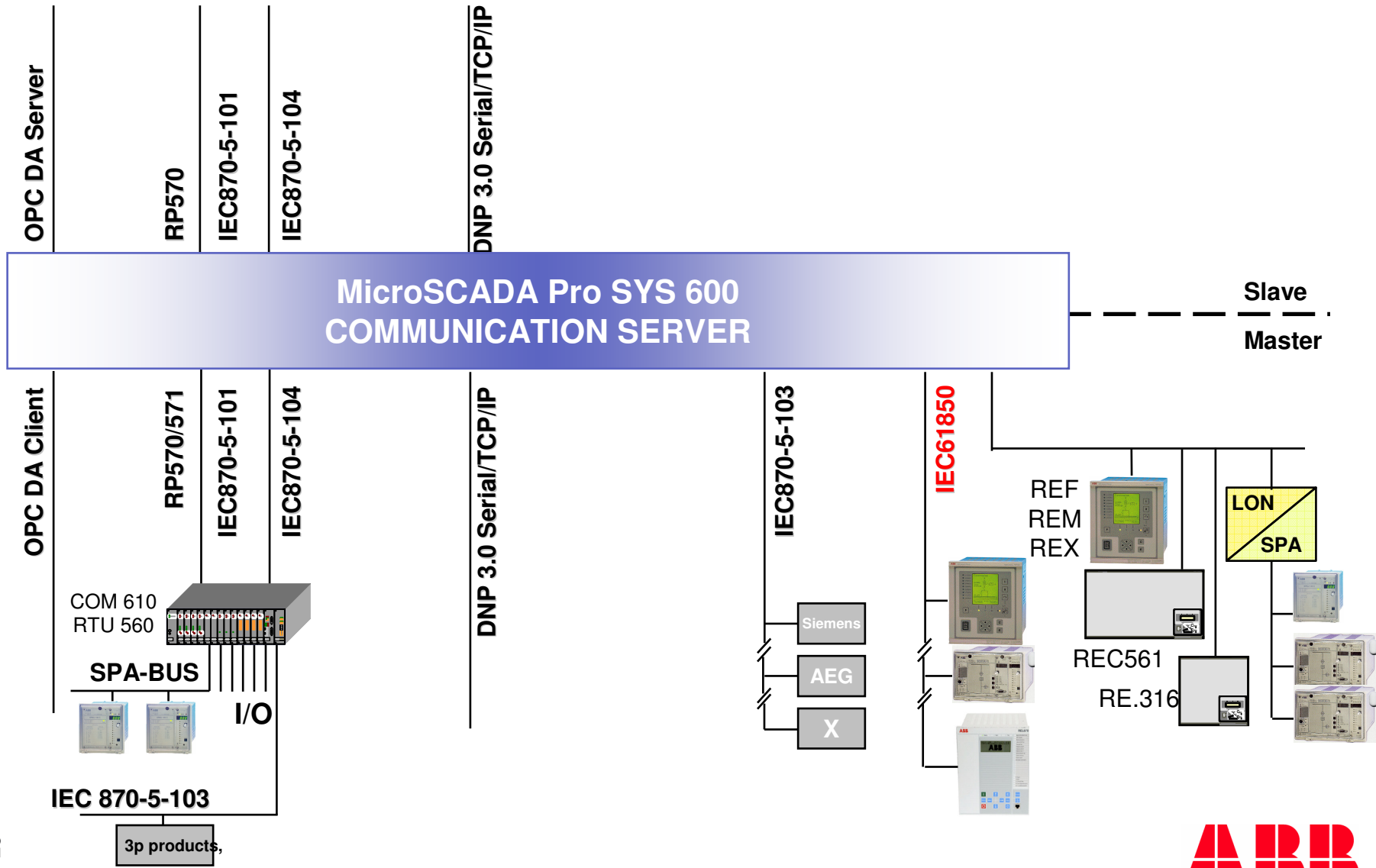


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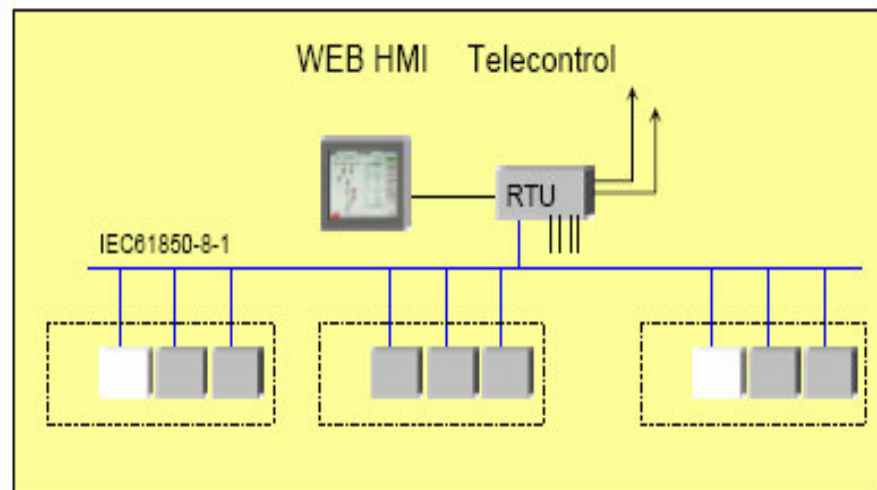
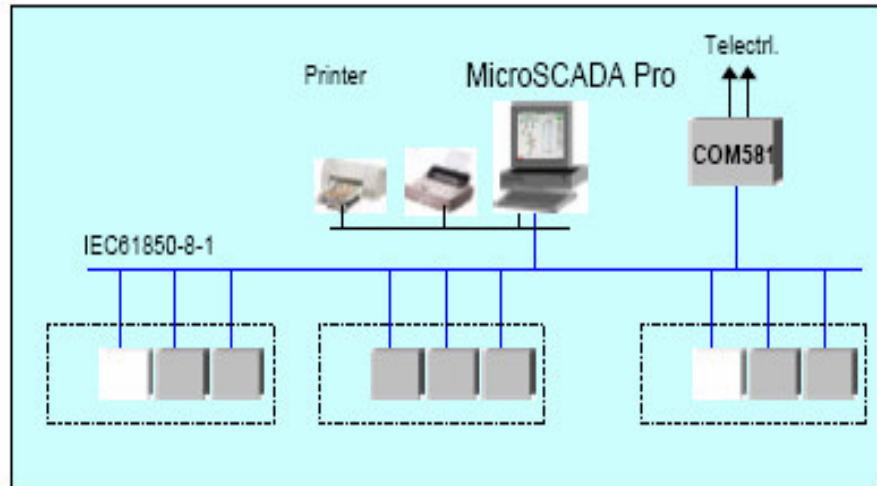
COM500 Communication protocols



COM500 Communication protocols



Communication gateways



- COM581 as high end gateway
 - Distributed IEC61850 architecture MicroSCADA Pro and COM581 as standalone gateway
 - High end application (high number of Data Points)
- RTU560 as low end station controller
 - Classical RTU solutions with IEC61850
 - Low end application IEC61850-

Communication gateway COM 610

- Pre-configured embedded communication gateway for Industry and Utility Substations
- Remote communication:
 - IEC 60870-5-101/104
 - DNP 3.0 Serial, LAN/WAN
 - External OPC server
 - SPA Router
- Process communication:
 - LON/LAG
 - SPA
 - IEC 61850-8-1 Client
 - IEC 60870-5-103

No moving parts - no fans, no harddisks



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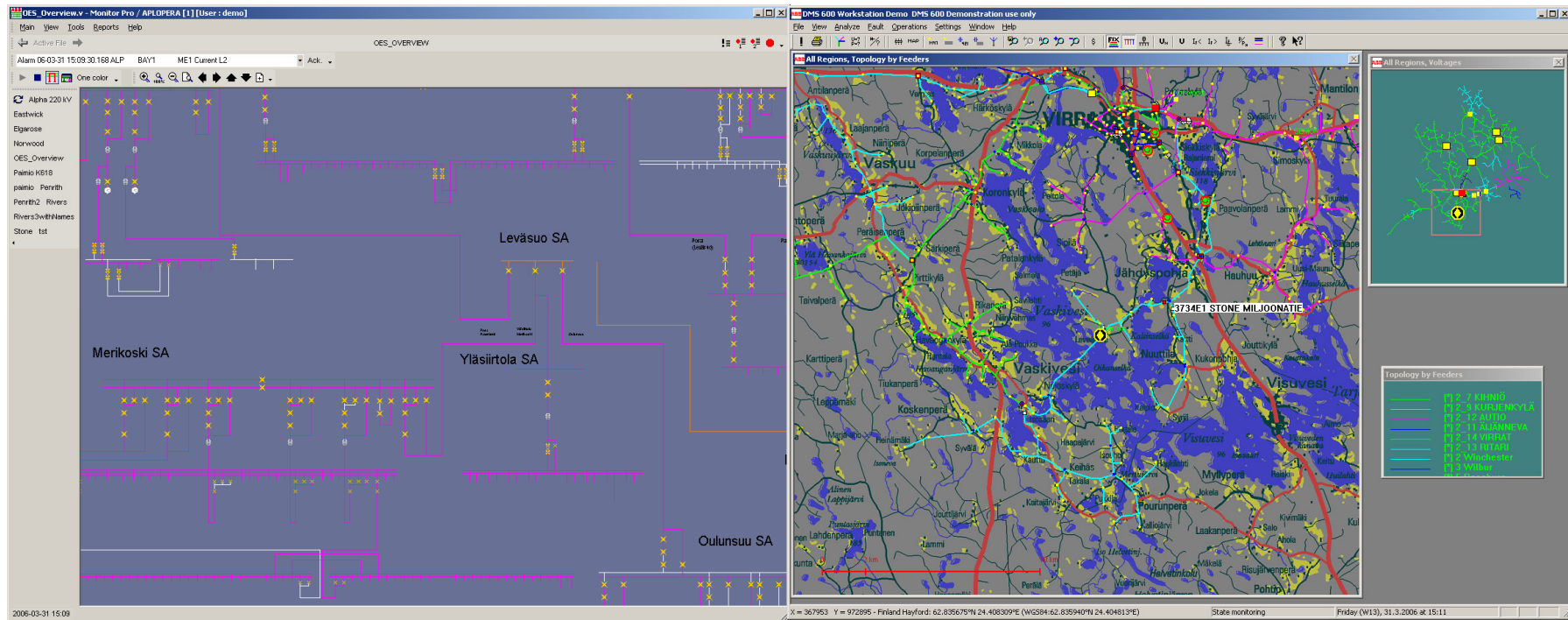
Distribution Management DMS 600



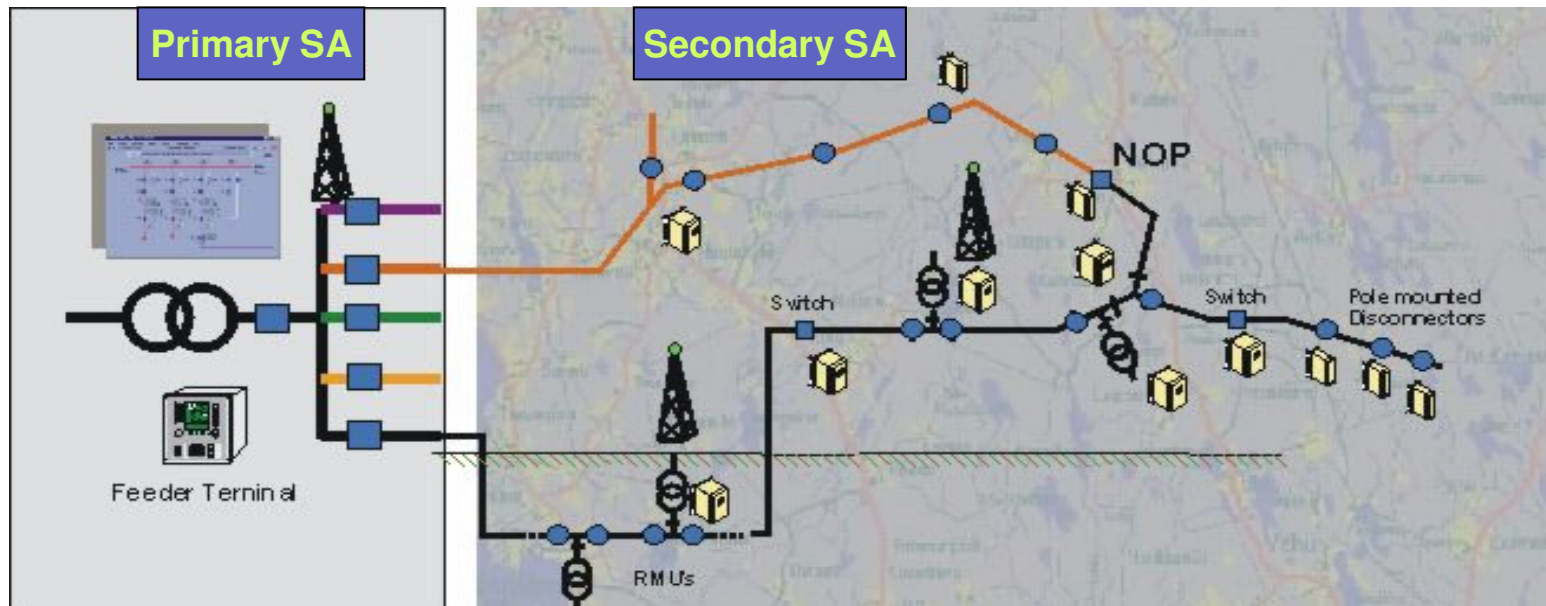
Traditional SCADA functionality with on-line data integrated with:

- Distribution Network Information
 - Network Database with network modeling down to MV/LV substations (even to low voltage network)
- Background maps
- Applications using the modeled network
 - Fault location, outage reporting, trace, locate ...

Network Control and DMS



Network Control Centre, SCADA, DMS and other IT systems



- The complete DA system requires that all levels are integrated
- Advanced DMS functions in NCS require data from Substations and feeders to provide the best results

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MicroSCADA Pro for SA

MicroSCADA Pro
for Substation Automation

Innovation from **ABB**

ABB

Perfect control – anywhere, anytime

MicroSCADA Pro is an instrument for today and tomorrow. Start for instance with monitoring of gateway, remotely and integrated control, monitoring, reporting or other additional functionalities in response to your needs for use. With MicroSCADA Pro your investment is secured with every step you take.

Complete functionality
MicroSCADA Pro is designed for complete functionality in the substation and control of complete substation. It offers a wide range of functions and features. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications.

Secure operation and high reliability
MicroSCADA Pro is designed for secure operation and high reliability. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications.

Proven safety
MicroSCADA Pro is designed for proven safety. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications.

MicroSCADA Pro Top Five to save cost and optimize asset utilization

- 1. Always correct actions**
The MicroSCADA Pro instrument is designed to ensure the safety of necessary actions. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications.
- 2. Disturbance analysis**
MicroSCADA Pro is designed for disturbance analysis. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications.
- 3. Power quality monitoring**
MicroSCADA Pro is designed for power quality monitoring. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications.
- 4. Optimized maintenance**
MicroSCADA Pro is designed for optimized maintenance. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications.
- 5. Power quality monitoring**
MicroSCADA Pro is designed for power quality monitoring. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications.

Easy to handle and expand

MicroSCADA Pro is a basic design that allows you to expand the functionality of your SCADA system. MicroSCADA Pro is a basic design that allows you to expand the functionality of your SCADA system. MicroSCADA Pro is a basic design that allows you to expand the functionality of your SCADA system.

Designed to communicate and connect

MicroSCADA Pro makes the quickest control and data transfer of your substation. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications.

Open to integrate with other systems
MicroSCADA Pro is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications.

ICS-Net/Control
MicroSCADA Pro is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications.

Advanced reporting
MicroSCADA Pro is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications.

More than 20 years experience

MicroSCADA Pro is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications.

Location aware report
MicroSCADA Pro is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications.

Training
MicroSCADA Pro is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications. It is designed to be used in a wide range of applications.

How did they power s

With Micro3

- Superior power syst
- Efficient and safe ac
- Safe and quick new
- Advanced and inste
- Seamless integratio
- Scalable from subst



How did they restore power



With Micro



operate instantly, which helps you to decrease outages. It enables you to utilize full-scale distribution communication protocols to minimize the downtime in operation in different environments.

Connect your local ABB to global support by

www.abb.com/substationautomation

Editorial

For the April 2005 issue of Electrical Magazine

ABB's new MicroSCADA Pro cuts outage time

ABB favours new MicroSCADA Pro for efficient power system management. The well-known MicroSCADA technology provides several new features giving normal but especially in disturbance situations resulting in significant improvement.

A MicroSCADA Pro operator's workplace provides a user-friendly monitoring of the power system. New features such as zooming, that right information from a system overview to detailed information at the right time.

Scalability

MicroSCADA Pro can be used for real-time process control for scale distribution management system (DMS) to reduce outage situations, and to optimize distribution network. It allows system and new functionality can be added stepwise on top of the existing

In substation automation applications MicroSCADA Pro extends gateway for efficient remote control of a substation, up to combine local control and monitoring functions with remote control. Substation automation system can be easily integrated in a MicroSCADA system to allow control of several substations from one control room such as single line diagrams, made for the substation automation in the network control system.

Outages from hours to less than a minute

MicroSCADA Pro provides tools for advanced distribution management. Outages from hours to less than a minute. Fault location of MicroSCADA the location of the fault instantaneously and shows the exact location map. After this, the restoration support provides the operator with configuring of the whole network to be executed to minimize the isolated and the network fast and safely restored from the control room. Supports also completely automatic restoration of the network.

For more information please contact:

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olof.lundstrom@fi.abb.com

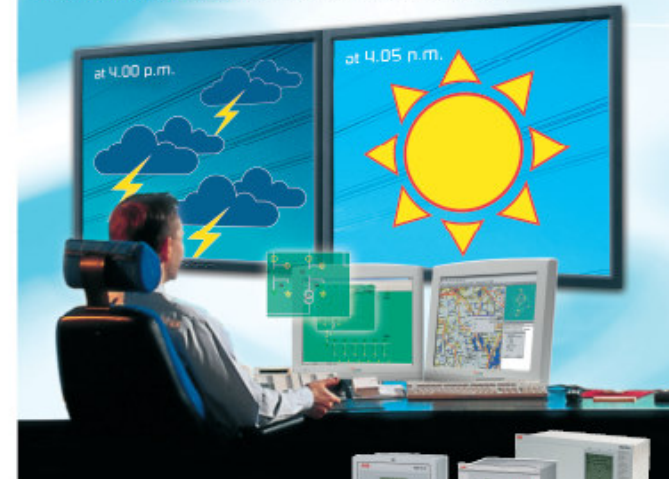
Matti Nyström
Tel: +46 21 321 1
Fax: +46 21 32 41
matti.nystrom@se.abb.com



How did they manage to restore power so quickly?

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- Safe and quick network restoration, initiated automatically or manually
- Advanced and instant fault location and isolation
- Seamless integration through an extensive selection of protocols and standards, e.g. IEC 61850
- Scalable from substation automation to full-scale distribution management systems



■ MicroSCADA Portal

■ <http://www.abb.com/microscada>

The screenshot shows a web browser window titled "The ABB Group - Microsoft Internet Explorer provided by ABB". The address bar contains "http://www.abb.com/microscada". The page features the ABB logo at the top left and a navigation menu with links for "About ABB", "Products & services", "Sustainability", "News center", "Technology", "Careers", and "Investor relations". A sidebar on the left lists "Microscada" and "MicroSCADA Pro". The main content area is titled "MicroSCADA Pro" and contains the following text:

This page gives you access to all necessary documents and information for marketing, offering and engineering MicroSCADA Pro. Documents for older versions of MicroSCADA and Open++ Opera are also found from these pages.

Note: Technical Bulletin [Please Read!](#)

Below the text is a graphic of two silhouettes of people facing each other, with a network of glowing lines connecting them. At the bottom of the main content area, it says "Last edited 2005-09-20" and provides links for "Printer version", "E-mail this page", and "Bookmark this page". A footer link reads "Provider information/Impressum © Copyright 2005 ABB. All rights reserved".

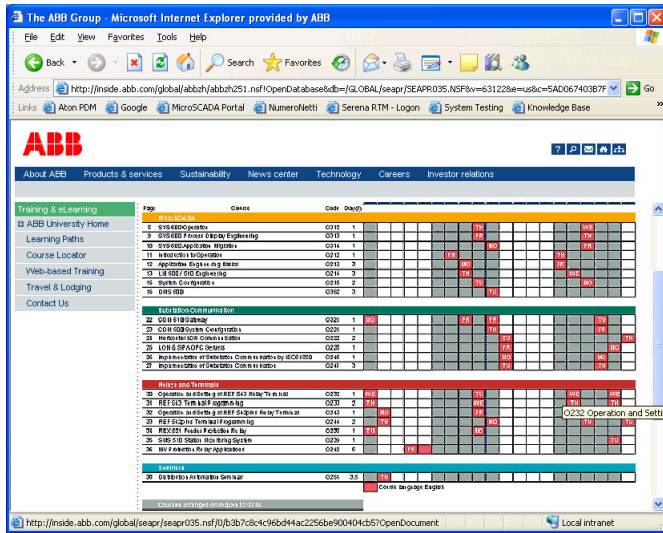
On the right side of the page, there is a "SEARCH" box with an "OK" button and a "LINKS" section with the following items:

- + Documentation
- + Downloads
- + Marketing
- + News
- + Support and Training
- + Relays & Terminals

The browser's status bar at the bottom indicates "Local intranet zone".

New Training Courses

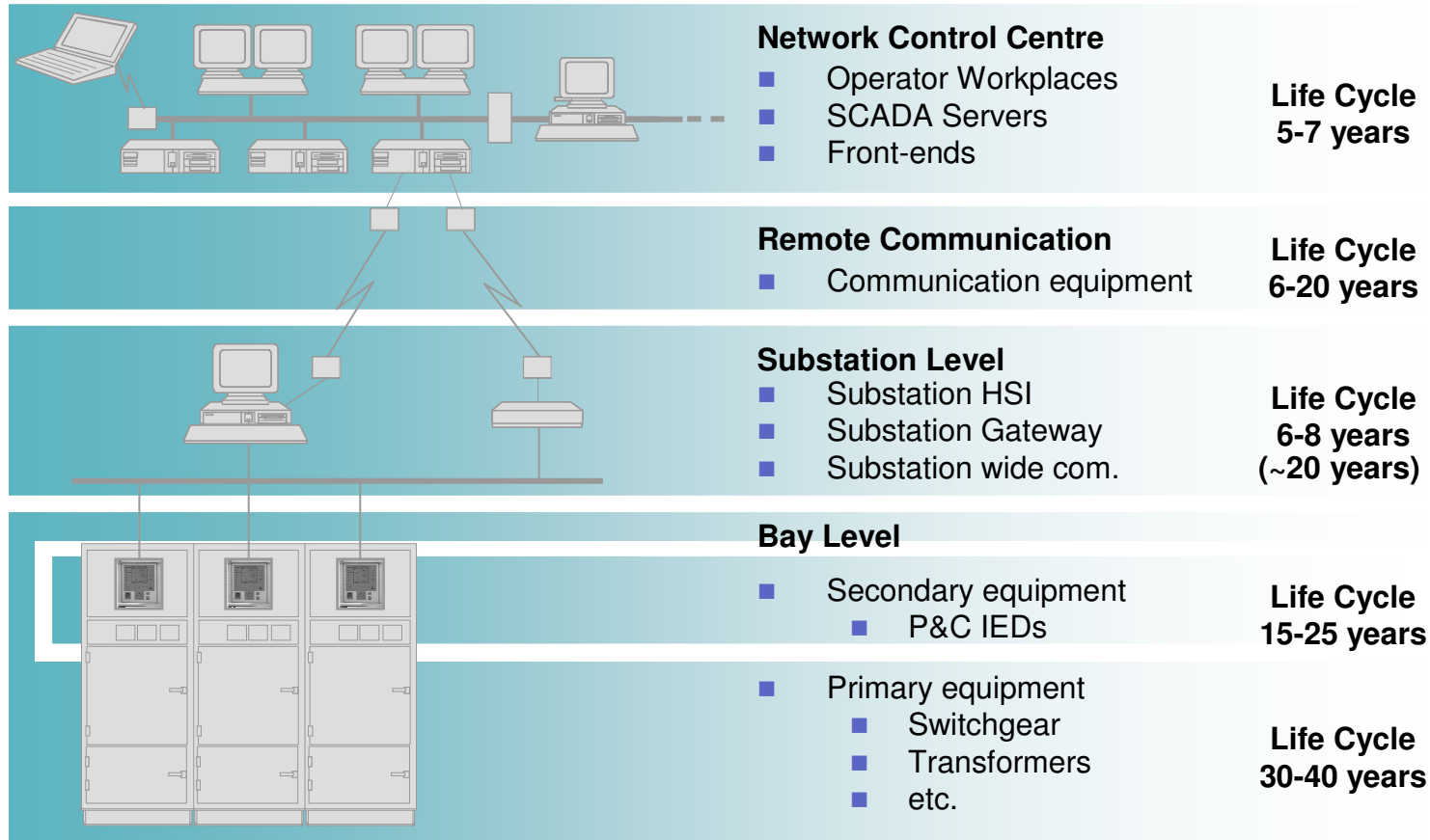
- SYS 600 Operation
- SYS 600 Process Display Engineering
- SYS 600 Application Migration
- Substation Communication with IEC 61850



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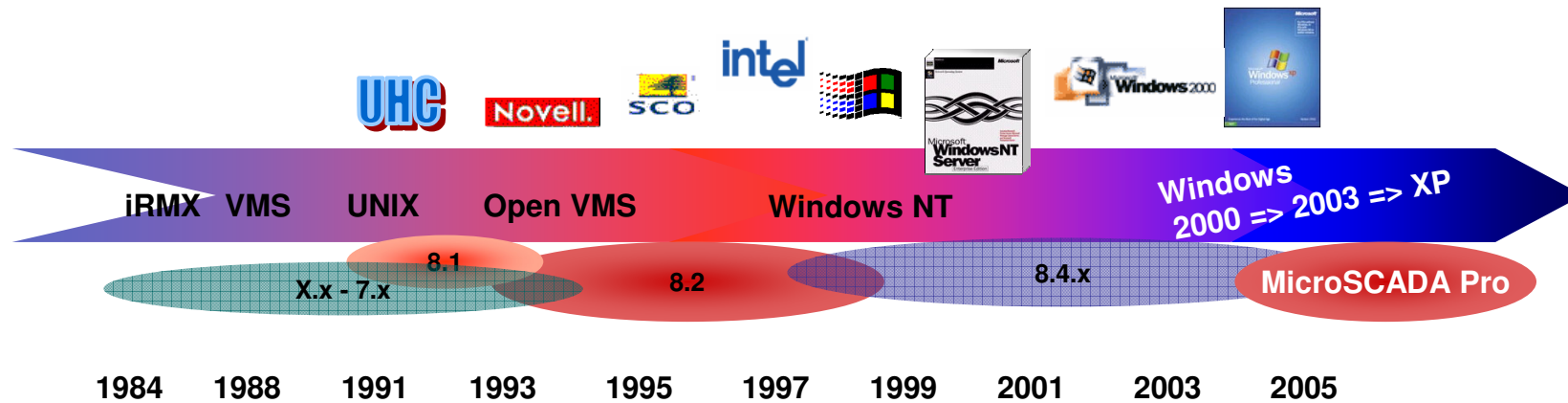


■ Life Cycle in the Power Process



Evolutionary development

- Creates a bridge between the technology active today and the technology to be used to tomorrow
 - Enable customers to relocate existing solutions to more modern environment



- Key factors
 - Upgradeability and system **continuity**
 - Enable **relocation of existing solutions** to a more modern environment
 - Preserves an existing solution **investment** and the functionality
 - **Safe investment** when using ABB's solution

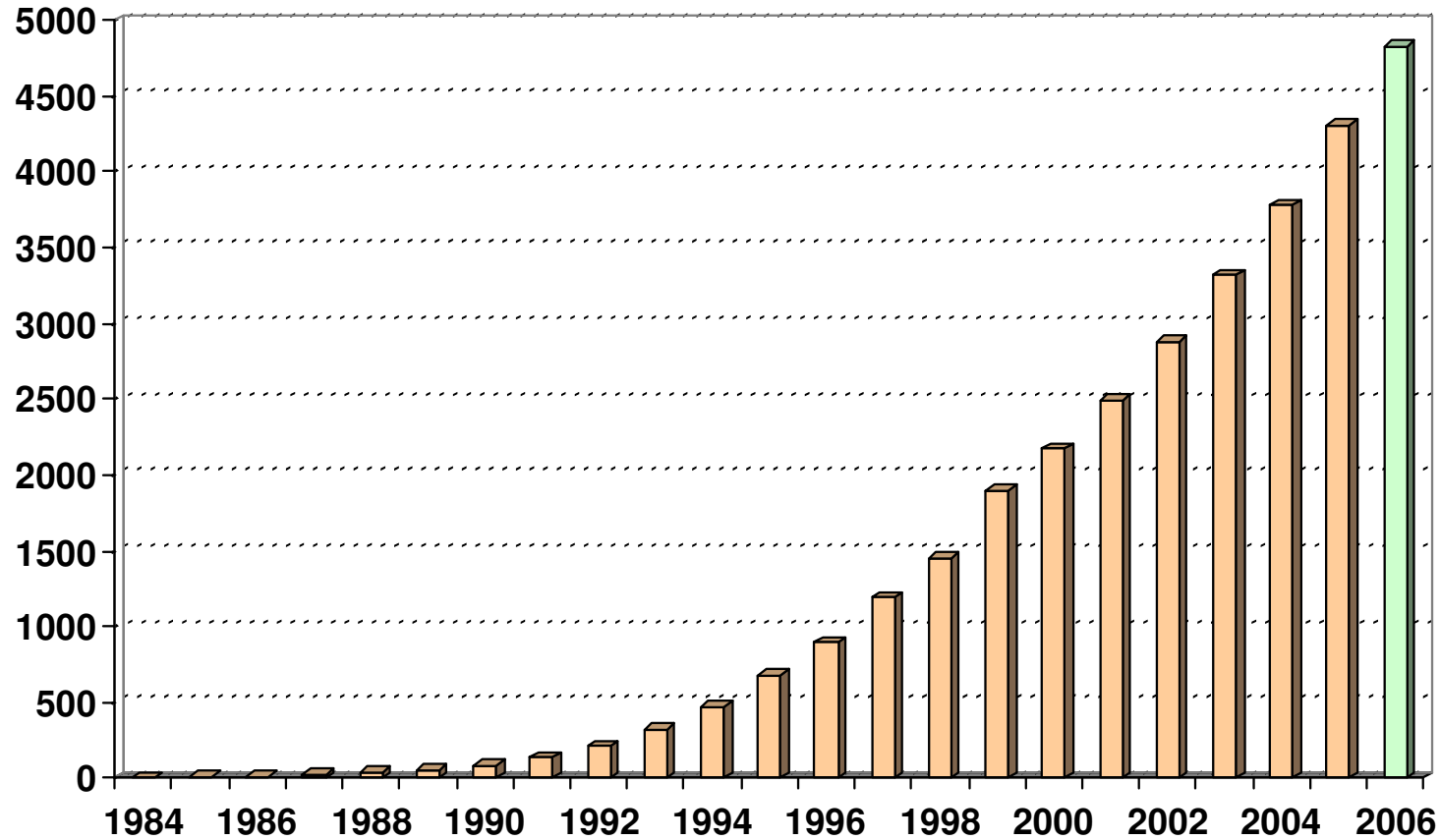


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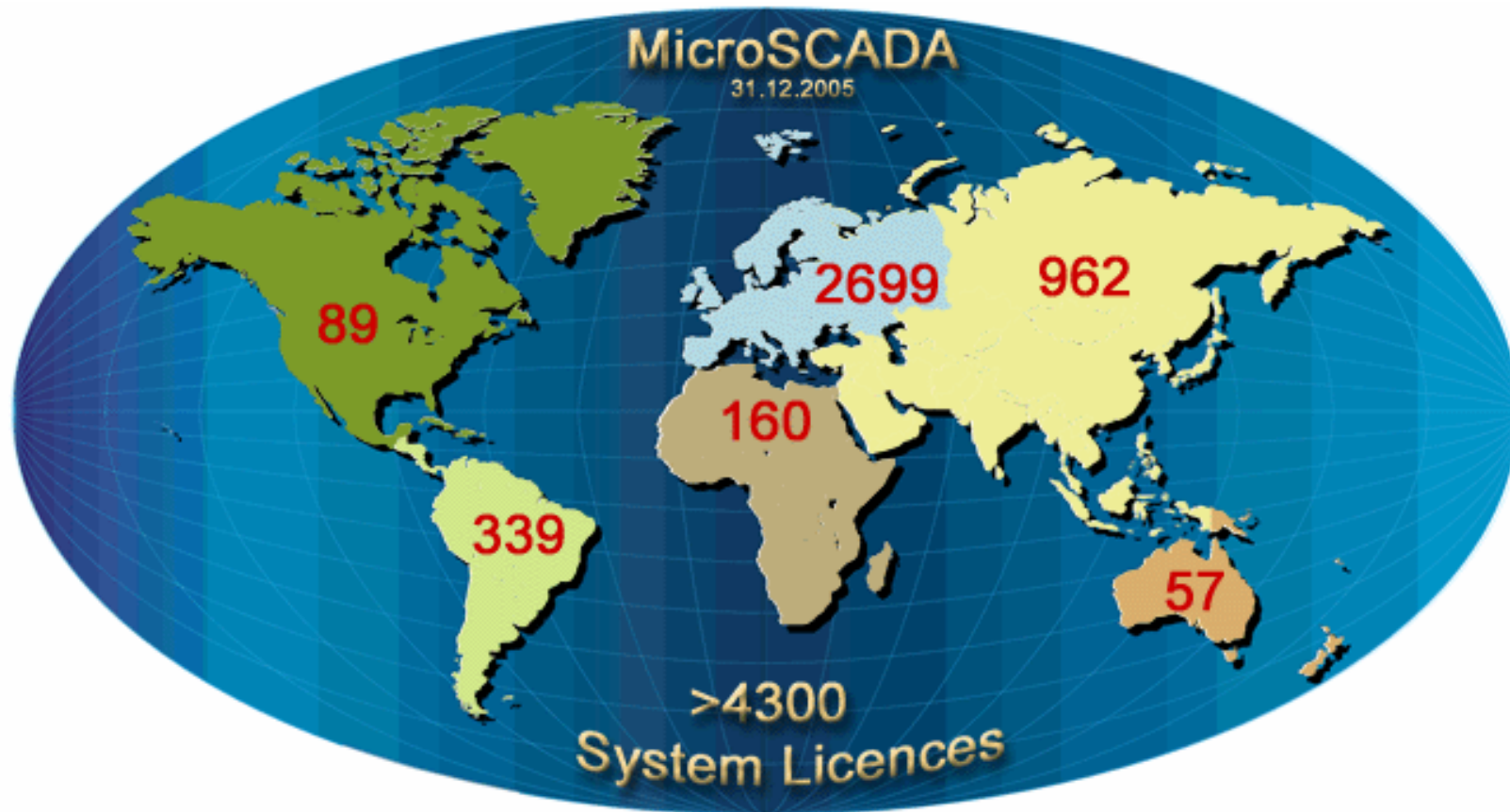
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MicroSCADA Licenses in numbers



4443 MicroSCADA Licenses (31.03 2006)

MicroSCADA Systems



- Easy overview and manageability of the whole network
- High quality of the power supply
- Short outage times in fault and maintenance situations
- Scalable from Substation Automation to SCADA/DMS
- Open communication and integration
- IEC 61850



...for complete power system
control and automation

