Klaus-Peter Brand

April 2006
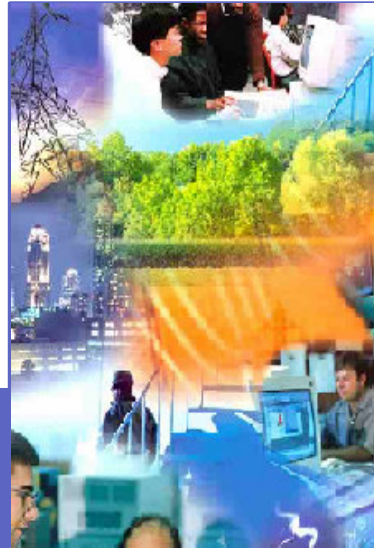
**The future
of
IEC 61850**

ABB

IEC 61850 - The Future

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Maintenance of the basic standard

□ **Maintenance of IEC 61850**

- to fix bugs and unclear definitions
- to introduce extensions as feedback from first applications
- to co-ordinate with non-substation domains

□ **Maintenance process**

- **Step 1** – Collection and handling of Technical Issues (Tissues)
  *Feedback from implementations, etc. → Data base (**short** term)*
- **Step 2** – Creating Amendments
  *Official IEC Documents (**mid** term)*
- **Step 3** – Creation of a **second Version** of the standard
  *Official IEC Documents (**long** term)*

CD (committee draft for comments)
for parts 7-3, 7-4 and 6 distributed 2005

CDV (committee draft for voting)
for parts 7-3, 7-4 and 6 in 2006

„short cut"

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Quality Assurance
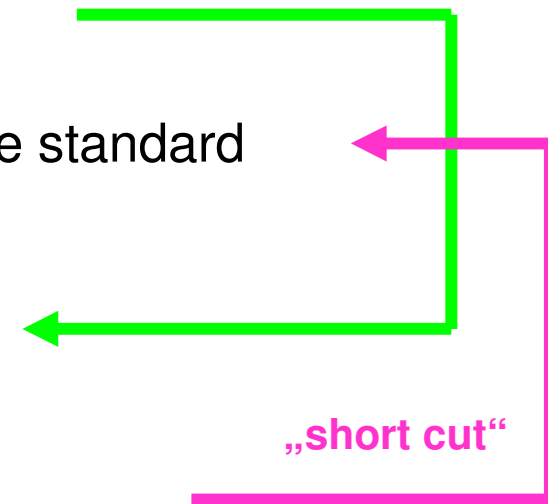
❑ Change of WG10 name in
   Power system IED communication and associated data models

❑ Common meetings of IEC 61850 related Working Groups
   WG 10, WG 13, WG 15, WG 17, WG 18, WG 19

❑ Common meetings especially with
   WG10 Power system IED communication and associated data models
   WG17 Communication systems for distributed energy resources (DER)
   WG18 Hydroelectric power plants – communication for monitoring and control

❑ **Goal: Safeguarding of a common Data Model**

Quality Assurance by UCA International

❑ Standard part *IEC 61850-10*

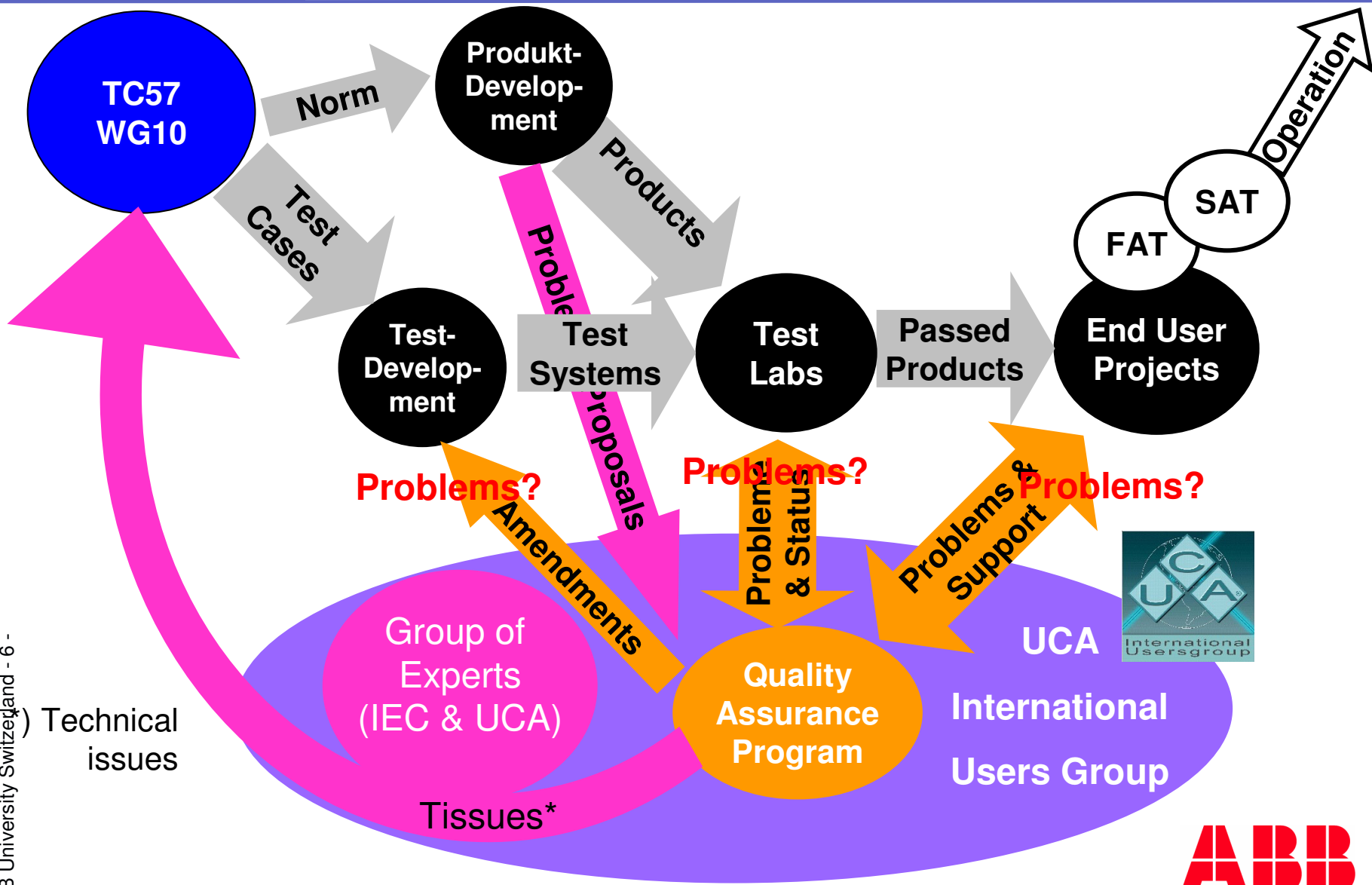   ❑ is the basis of Test Procedures (Conformance testing)

❑ **Users group *UCA International***

    creates plan for Quality Assurance based on

    ❑ detailed Test Procedures

    ❑ certifies Test Centers (Accreditation)

❑ UCA International

❑ is the User group both for Utilities and Manufactuers

❑ is not dealing with the frozen UCA2.0

❑ is focused on promotion of IEC 61850, CIM (IEC 61970), TASE2 (IEC 60870-6)

❑ Nearly all activities belong to IEC 61850

Quality Assurance Program

Maintenance of IEC 61850

TC57 WG10

Norm → Produkt-Development

Products

Test Cases

Test-Development

Test Systems

Test Labs

Passed Products

End User Projects

FAT SAT Operation

Problem Proposals

Amendments

Problems?

Problem & Status

Problems?

Problems & Support

Problems?

Group of Experts (IEC & UCA)

Quality Assurance Program

UCA International Users Group

Tissues*

*) Technical issues

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IEC 62271-003 (prepared by IEC SC17C WG11)
High voltage switchgear and assemblies with digital interfaces based on IEC 61850

This standard is a **Product Standard** for Switchgear with an **Interface** according to **IEC 61850**. This implies also an extension of Sensor Nodes (LN **S...**) for Supervision of switchgear and gas volumes in GIS

IEEE Working Group H5
Relaying Communications Subcommittee

H5a – Common Format for IED Configuration Data
Standardization of „common" **Configuration data** of IEDs, especially **for Protection Devices**

H5b - Common Format for IED Event Data
Standardization at least for the most common Event data
in XML-Format z.B. for Event list, Short fault reports, etc.

H5c - Common Format for IED Sampled Data (= Samples)
Short-term: **Converter** between the formats of Comtrade, Power Quality, and IEC 61850.
Medium-term: **Use** of the IEC 61850 format for a new **Comtrade** Version (Version 3)
Long-term: **Use of the** IEC 61850 formats for **Power Quality Input Data**

IEC SC17C WG11

This Working Group is preparing the standard

IEC 62271-003

High voltage switchgear and assemblies with digital interfaces based on IEC 61850

This standard is a **Product Standard** for switchgear with an **interface according to IEC 61850**. Part of it is the extension of sensor nodes (LN S...) for the supervision of switches and gas volumes of GIS

New IEC 61850 work voted and started

❑ **Connection with Network Control Center**

for SCADA, Supervision, etc.

57/760/NP (NEW WORK ITEM PROPOSAL)
Use of IEC 61850 for the communication between control centers and substations
100% Yes in September 2006
Work started in IEC TC57 WG19 in January 2006

❑ **Connection between Substations**

for Interlocking, Automatics, Line Protection, usw.

57/759/NP (NEW WORK ITEM PROPOSAL)
Use of IEC 61850 for the communication between substations
100% Yes in September 2006
Work started in IEC TC57 WG10 in March 2006

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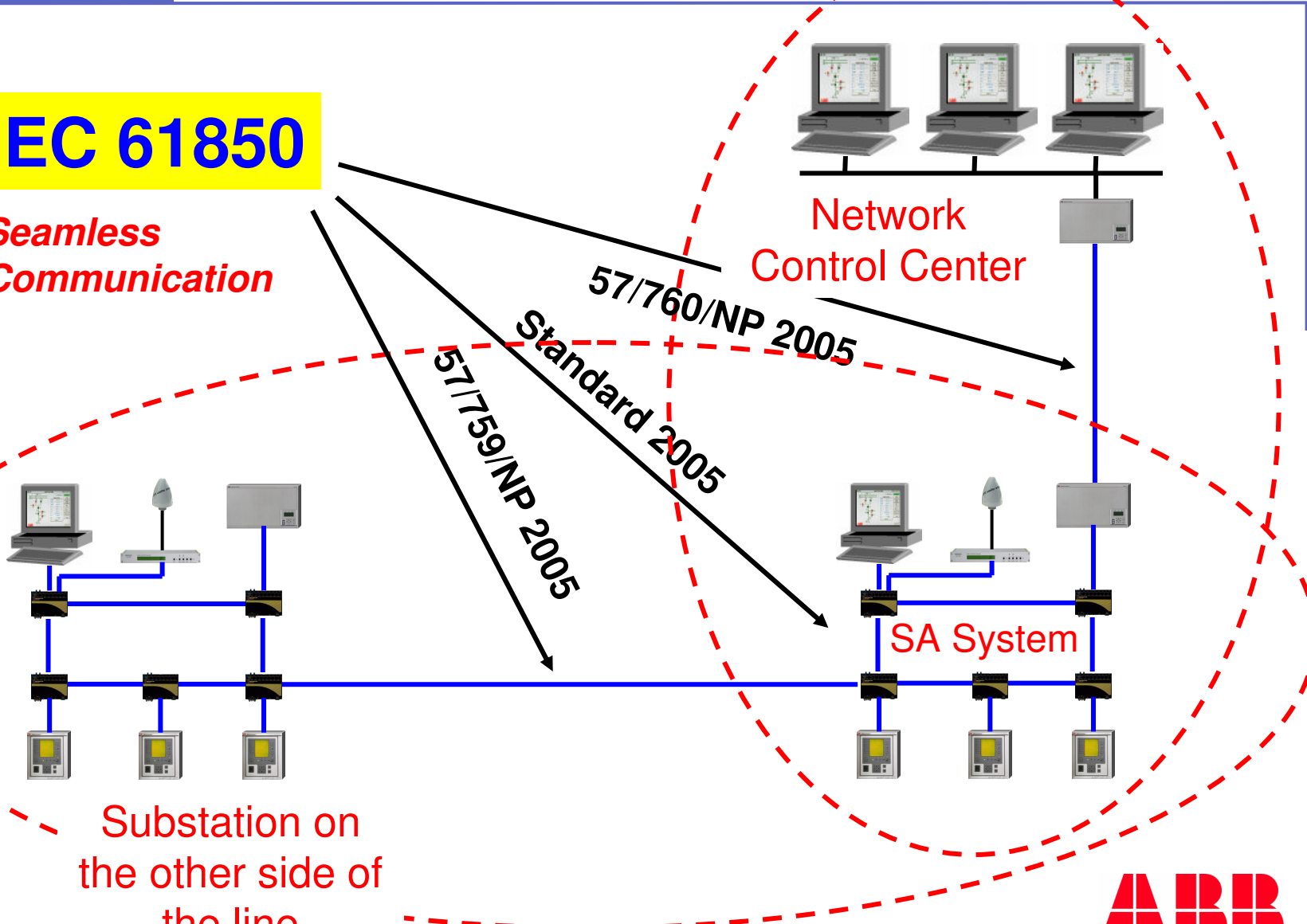# Seamless Integration of SA in Network Tasks

IEC 61850

Seamless Communication

Network Control Center

57/760/NP 2005

Standard 2005

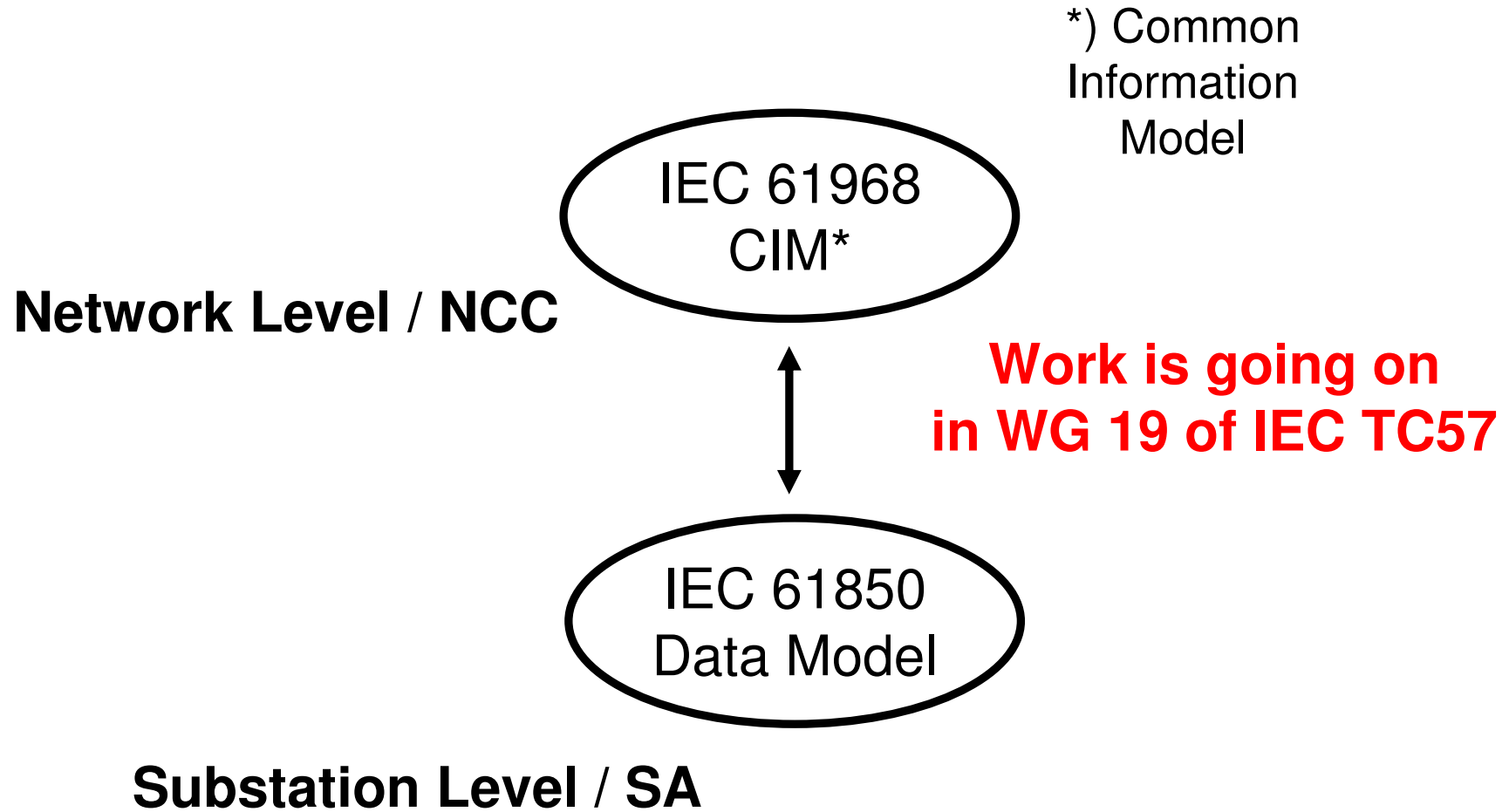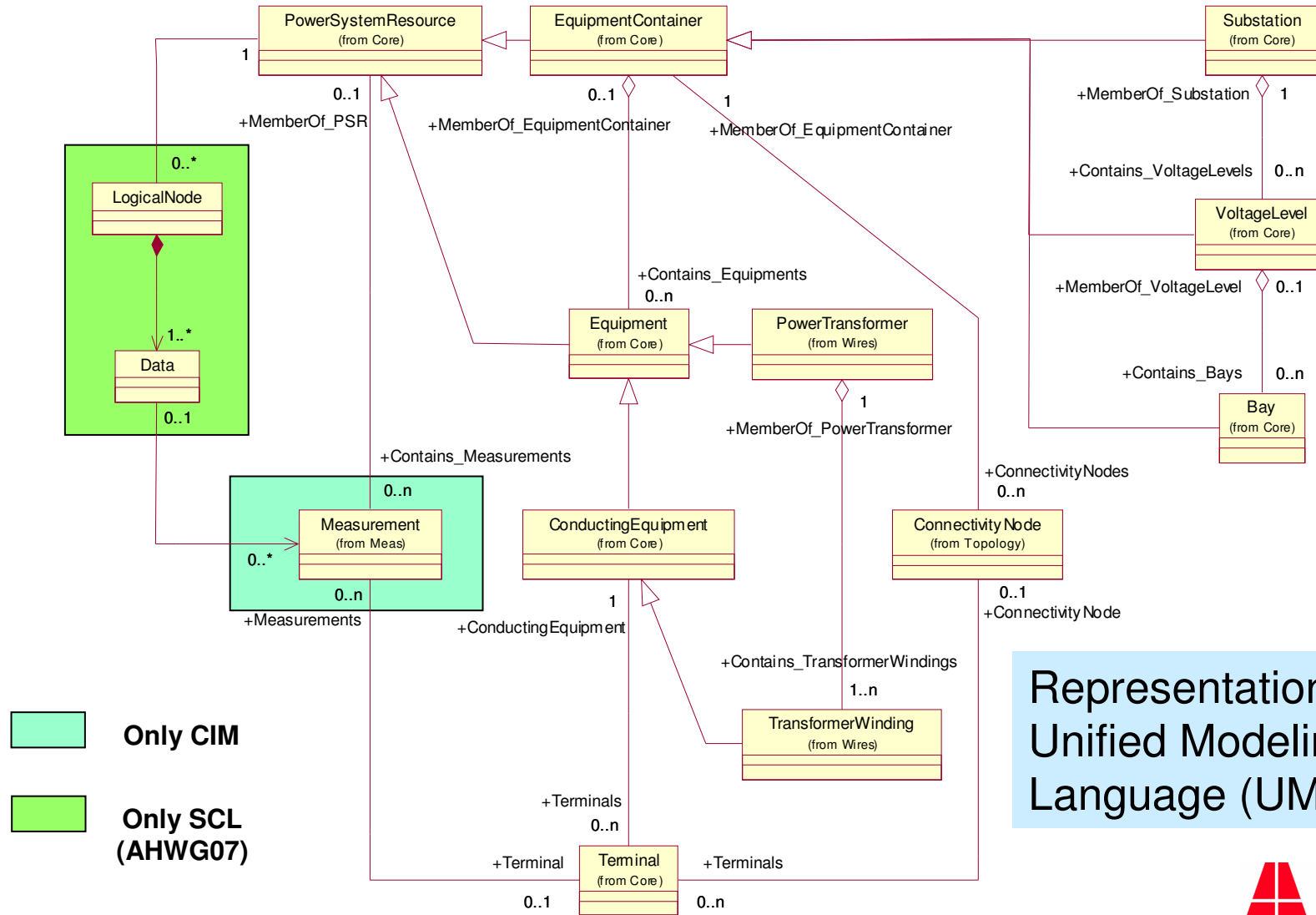57/759/NP 2005

SA System

Substation on the other side of the line

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New The unified Data Model

*) Common Information Model

IEC 61968 CIM*

Network Level / NCC

Work is going on in WG 19 of IEC TC57

IEC 61850 Data Model

Substation Level / SA

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Model compatibility: SCL and CIM

Bild 47.1

Representation by Unified Modeling Language (UML)

Only CIM

Only SCL (AHWG07)

Application for Wind Generators and Wind Parks (Wind Power)

❑ Work going on in IEC TC 88 - Project group PT 61400-25

❑ Status CD (for Comments), CDV (for first Voting coming soon)

Basic Task:

Extension of the SA specific Data Model of the standard IEC 61850 with objects (Logical Nodes, Data), which are needed for Communication in Wind Power Plants.

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Application for Hydro Power Plants (Hydro Power)

❑ Work going on in WG 18 of IEC TC57

❑ Status CD (for comments)

Basic Task :

Extension of the SA specific Data Model
of the standard IEC 61850
with objects (Logical Nodes, Data), which are needed
for Communication in **Hydro Power Plants**.

Distributed Energy Resources

Application for Distributed Energy Production (Distributed Energy Resources / DER)

- ❑ Work is going on in WG 17 of IEC TC57
- ❑ Status CD (for comments)
- ❑ CDV coming soon

Basic Task :

Extension of the SA specific Data Model
of the standard IEC 61850
with objects (Logical Nodes, Data), which are needed
for Communication in systems of
Distributed Energy Production.

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List of benefits

1. Interoperability provided
2. Free configuration supported
3. Long term stability guaranteed
4. Optimization of SA architectures possible
5. Peer-to-peer communication provided
6. Data exchange configurable
7. Semantic understanding of data at the receiver supported
8. Independency from technology like that of sensors
9. Quality assurance program in operation
10. Seamless communication for utilities
11. Seamless data model for utilities

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1) IEC 61850 is more than a communication standard, since it provides a comprehensive Data model and a formal System description. The *Benefits today* are based on all these discussed **features** of the standard

2) The *future Benefits* – today already allowing planning and investments – are based on the extendibility and the **broad application** of this standard in the utility area

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System Benefits

Statements

"The benefit of an IEC61850 device is not in the price of the device: it is in lower cost to use the device."

"The benefit of an IEC61850 system is not in buying the system: it is in lower costs to engineer and commission the substation system."

"The cost of an installed device is 7 times the value of the device."

The benefit of IEC 61850 is not on device level but on system level ! But all devices have to be designed to fit perfectly into the IEC 61850 based systems.

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Published statement to cost savings

"The flexibility provided by the IEC61850/UCA-MMS protocols has the potential for saving **millions of dollars** in development costs for utilities and manufacturers, since it eliminates the need for protocol converters and lengthy, complex database mapping when integrating devices from different manufacturers."

Gustavo Brunello, GE,
Electricity Today, Issue 4, 2003, page 10

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