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# Studienkomitee B5

## SC-B5 Protection and Automation

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## SCOPE

- Improved concepts of Substation Automation Systems
- Technical recommendations for IEC 61850
- Application of numerical protections and substation automation systems
- Methods to improve the performance of protection systems
- Protection implications of new generation technologies.





## SC-B5 Protection and Automation

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- B5 Chairman  
Iony Patriota de Siqueira, D.Sc. (BR)
- B5 Secretary  
Ms. Rannveig S. J. Løken (NO)
  
- Members:
  - ♦ 36 from 24 countries
  - ♦ 24 Regular Members and 12 Observer Members



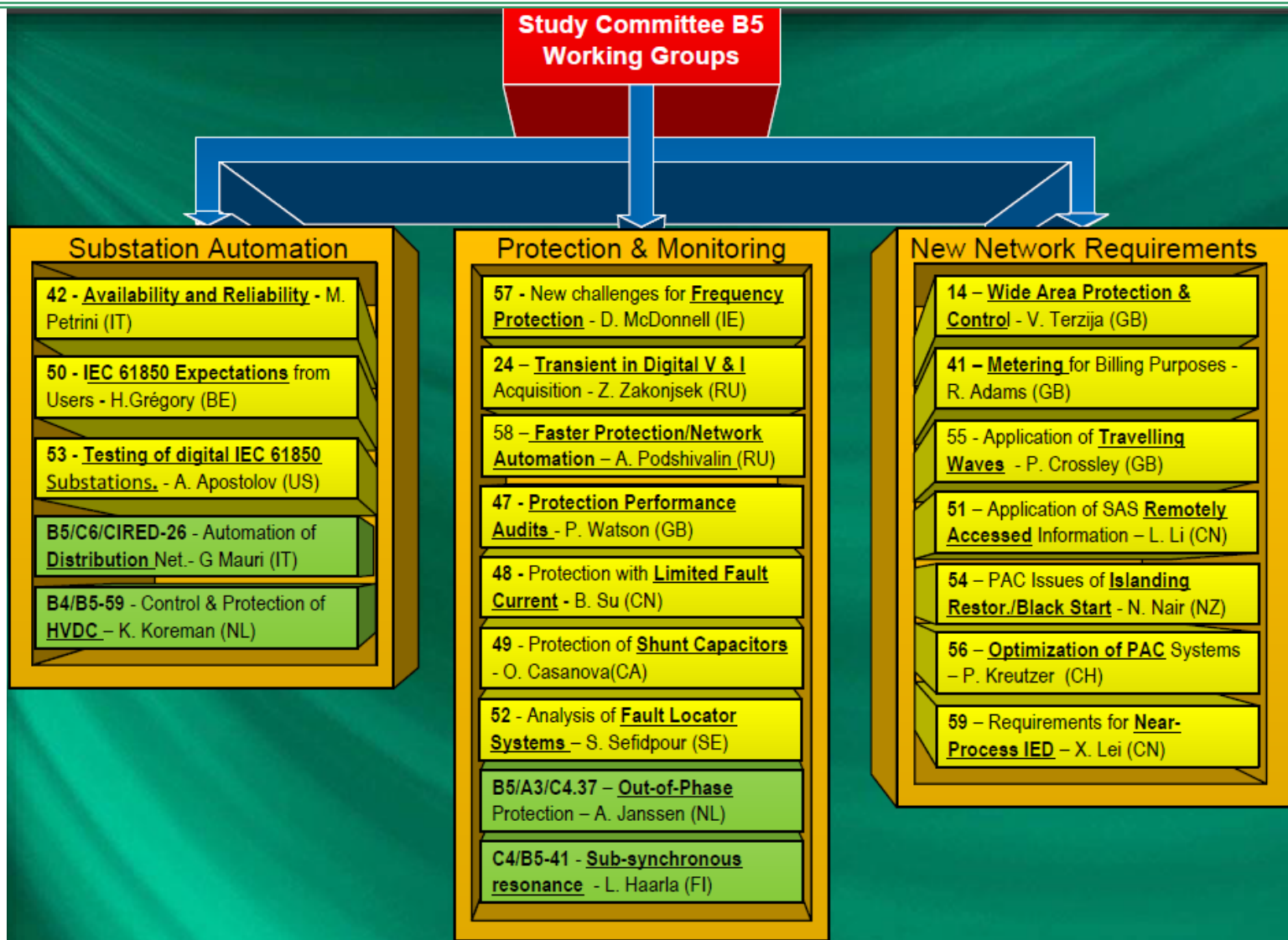


## B5 Preferential Subjects 2016

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- **PS1 - Protection Automation and Control System (PACS), Optimization and Life Time Asset Management**
  - ♦ 21 papers
  - ♦ Lifecycle documentation and management
  - ♦ Optimization of data acquisition and PACS design
  - ♦ Optimization of PACS maintenance
  - ♦ Optimization of PACS from grid level view
  
- **PS2 - Coordination of Generator and Power System Protection**
  - ♦ 14 papers
  - ♦ Coordination of power plant protection and the power system protection
  - ♦ Transient stability studies and new protection suggestions
  - ♦ Requirements for distributed Energy Resources

# SC B5 Working Groups





## B5 TM51 Volker Leitloff (FR)

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- **Methods for Specification of Functional Requirements of Protection, Automation and Control**
  - ♦ **Method for formal functional description of requirements** to be added to specifications
  - ♦ Recommendations for documentation and file formats
  - ♦ **Base for functional testing**
  - ♦ **Include expected behavior** in case of degraded conditions (invalid or questionable input, loss of time synchronization)



## B5 TM51 Volker Leitloff (FR)

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### ▪ PACS Asset Management

- ♦ Maintainability of PACS
- ♦ **Cloud based** asset management
- ♦ Requirements related to IED and PACS component replacement and maintenance
- ♦ Use of configuration tools in maintenance phase
- ♦ Secondary system items to be monitored for PACS asset management
- ♦ Subcontracting PACS asset management to third parties
- ♦ Tools to be used for PACS asset management and their interaction with other tools



## B5 TM52 Bodgan Kasztenny (CA)

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- **PAC Systems With Hardware Independent Functionality**
  - ♦ **Functionality separated from hardware** and portable across new hardware platforms over a life span of primary equipment
  - ♦ Relays become applications **run on generic platforms**
  - ♦ Relay applications reach unprecedented maturity levels by being in **operation for decades**
  - ♦ New options for consolidating relay applications (from multiple devices to a station in a box)
  - ♦ New business models for providing protection





## B5 TM53 Richard Adams (GB)

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### ▪ Life cycle testing of Synchrophasor based Systems used for Protection, Monitoring and Control

#### Problems

- ♦ 87L schemes traditionally designed for 64kbps (DS0) symmetrical channels
- ♦ GPS-based time synchronization for asymmetrical channels
- ♦ New 87L schemes emerge that work over layer 2 Ethernet
- ♦ TDM-channels are being phased out, MPLS proposed as a replacement
- ♦ Difficult transition period ahead of us



## B5 TM53 Richard Adams (GB)

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### ▪ Impact of low Inertia Networks on Protection and Control

System fault levels are forecast to fall dramatically posing problems to protection to **distinguish between load and fault levels**.

Low system inertia caused by:

- ♦ Application of power electronics
- ♦ New non synchronous generation sources
- ♦ Battery storage and type of loads
- ♦ Interconnectors



# SC-B5 Protection and Automation

Country	Activities related to B5
Australia	Major interest in the potential for process bus in retrofit applications and Transgrid is installing their first site early next year.
Belgium	Deployment and use of an <b>Automatic Fault Analysis tool</b>
BRAZIL	Electricity <b>production matrix will be increasingly diverse</b> , complex and distributed. Wind 10 GW (out of about 146 GW installed capacity). Solar photovoltaics lags behind. Direct impact can be expected in the protection and automation of the country's electrical system.
China	"Specification on standardized design of relaying protection and safety automatic devices", "Specification of relaying protection and safety automatic device testing", "Regulations on testing of relaying protection and safety automatic device".
Finland	Fingrid participates in ENTSO-E working groups and task forces (e.g. IEC 61850)
India	Training of utility engineers in Power system Protection: Training in Current Practices of Power system protection to utilities in India.



## SC-B5 Protection and Automation

The Netherlands	B5 organising at least one event every year. This is a success, as each event has ~ 100 participants.
Norway	Statnett, the Norwegian TSO, are now seriously considering <b>fully digital substations</b> and will install a pilot installation during 2017
New Zealand	Actively engaging younger members into CIGRE and B5 activities
Portugal	Project; <b>Substation Of the Future &amp; Power System Simulation</b>
United Kingdom	Bi-monthly Webinars have been organized as a new initiative to present newly published TBs
US	Cumulative US <b>Microgrid</b> Capacity Forecast to <b>Exceed 3.7 GW</b> by 2020 2016, 13 microgrids and 4 project expansions have been completed, representing 148 MW of newly-operational capacity.
South Africa	The extension of the 765kV super grid on the Tx System is almost complete with the final substation near Cape Town energised and anticipated to take load later this year after completion of offline construction.



## Preferential Subjects for 2018

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- **PS1:**  
User experience and current practice of **IEC61850 process bus** experience with interoperability and performance of PAC systems with NCIT, MUs and process-bus relays Metering and Monitoring Systems in a **Full Digital Substation**
- **PS2:**  
Protection under System Emergency Conditions

- **CIGRE Technical Committee Award**

Dr. Peter Crossley (GB)



- **SC B5 Outstanding Service Award**

Dr. Klaus-Peter Brand (CH)





**HERZLICHEN DANK FÜR IHRE  
AUFMERKSAMKEIT !**