

Study Committee D2 Annual Report 2018

Mr Joël NOUARD – SC D2 Secretary

Foreword of the new Chair: Dr. Olga V. Sinenko (RU)

Study Committee D2 appears to be one of the youngest SCs of CIGRE (note: SC D2 was created in 2004, earlier it was SC35), but we can hardly exaggerate its role, so rapidly growing nowadays, because information technology supports absolutely all spheres of human activity, including all the branches of the electric power industry. The main slogan of CIGRE - "for sustainable energy" - is based on the most progressive achievements in the field of automated control systems development, Big Data, Cloud Computing Architecture, Internet of things (IoT), blockchain and cybersecurity. SC D2 provides the favourable professional platform for the work of international experts for IT in energy power sector and a unique opportunity in exchanging experience and state-of-the art solutions in this area.

Scope, Organization and Membership

Study Committee D2 focuses on the study of information systems and telecommunication technologies and their application in the power utility environment. Its scope is:

- ICT applied to digital networks from UHV to distribution (smart meter, IoT, big data, EMS, etc...).
- Communication solutions for information exchange in the smart delivery of electrical energy
- Interoperability and data exchange (file format, frequency, etc.) between network operators, market players, off-grid premises
- Cyber security issues from field equipment to corporate IT (Governance constraints, system design, implementation, testing, operation and maintenance...)
- Technologies and architecture to ensure business continuity and disaster recovery
- IT systems to support the decision-making process in Asset Management

As defined by CIGRE structure, SC D2 is a horizontal Study Committee, which means that its purpose is to interact with the rest of SCs in order to gather their specific requirements and disseminate the knowledge and capabilities in the field of information and telecommunication technologies.

The members of the SC D2 come from power utilities, manufacturers, consultants and research institutes. The balance between information technology and telecommunication specialist guarantees a seamless approach to the power utility challenges.

We value the support from our experts from across the globe. There are about 215 experts from 41 countries contributing to the working bodies (3 advisory groups, 5 working groups and 4 joined working Groups) of SC D2.

SC D2 has a liaison of type A with IEC TC 57 on "Power System Management and Associated Information Exchange". Other organisations of interest for SC D2 activities are also monitored, i.e. "IEEE Power Engineering Society".

Study Committee D2 Organisation

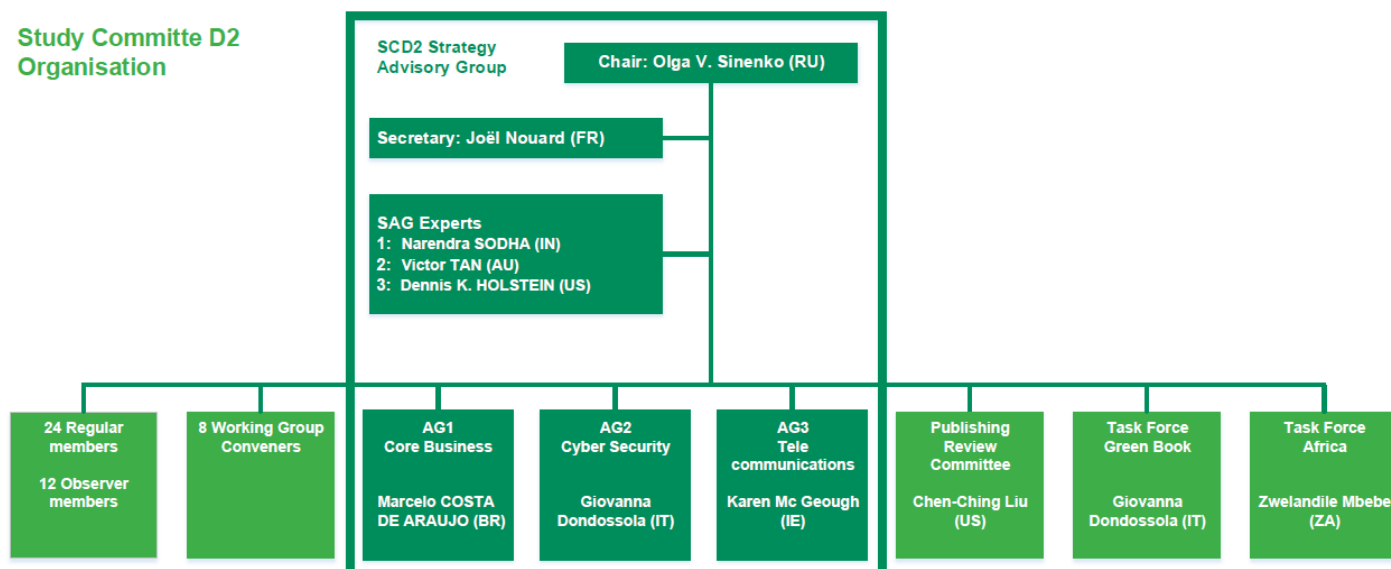


Figure 1 – Study Committee D2 organisation

Workstreams

Our working groups are arranged in 3 key work streams supported by the 3 advisory groups:

- **AG D2.01: Core business information systems and services.**

This advisory group is ITS' users oriented. It monitors the needs and the stakes of the users in their core business which is linked with ITS like Telecontrol, asset management, customer relationship etc.

- **AG D2.02: Cybersecurity.**

This Advisory Group fosters the adoption of specialized cybersecurity measures to protect Operational Systems

- **AG D2.03: Telecommunication networks, services and technology.**

This Advisory group focuses on pure telecommunication issues like transmission media, protocols, network architecture, service provision, etc.

The course of present and future technical activities of the study committee addresses 4 technical directions:

- **TD 1: Telecom network technologies and management.**

Studying and considering telecommunication technologies and architecture evolution. Assessment of technologies and architecture to ensure business continuity and disaster recovery. Telecommunication network management when deploying new technologies and architectures.

- **TD 2: Implementation of the networks of the future.**

Monitoring of on-the-field experiences and proof of concepts of smart technologies, impact on the existing ICT systems such as telecommunication network and equipment, SCADA, enterprise business functions (SGAM domain)

- **TD 3: New digital trends used by EPU and new business services.**

Monitoring on the field experiences on the deployment of digital equipment such as IEDs, PMUs, IoT, as well as the processing of large quantity of information (big data) in the domains of asset health, system operation, metering...

- **TD 4: Cyber Security.**

Assessment and promotion of best practices of cyber security from field equipment (protection) to corporate IT: system design, implementation, testing, operation and maintenance.

Task Force – Dissemination of CIGRE knowledge in Africa

Following the signature by **CIGRE** and the **World Bank**, last August, of a MoU to improve dissemination of CIGRE work results and support African electricity system developments, SCD2 has set up a Task Force focused on dissemination of D2 CIGRE knowledge. The leader of this TF is Mr Zwelandile Mbebe (ZA), and the scope is:

- Systematic effort to improve dissemination of information and resources for Africa in cooperation between CIGRE and the World Bank (WB).
- Focusing on assisting African countries to develop internal expertise by providing access to unbiased, up to-date technical experience in several innovative ways.
- Conduct a survey to assess the readiness of African utilities ICT and Telecommunications Infrastructure to implement microgrids and rural electrification.
- Understand each African country's legislation, regulatory requirements and Code of Practice (CoD) and standards adhered by EPI's.
- Universities – including centres of excellence – are additional very promising target partners for know-how transfer to pursue all-important “self-empowerment”.
- For this, the dissemination of CIGRE work results in Africa itself is crucial and needs to be systematically stepped up.

Events

For the 47th CIGRE Session SC D2 received 24 papers, covering the following subjects:

PS1: Opportunities and challenges in ICT applied to microgrid and DER

- Communication solutions to remotely monitor and operate off-grid premises
- Facilities for control, monitoring, physical security and safety
- Standards, interoperability and cyber security issues

PS2: Potential applications and implementation of network and infrastructure virtualisation

- Opportunities and benefits using Software Defined Networking and Network Function Virtualisation (SDN/NFV)
- Issues identified in implementation and operation of virtualisation architectures
- Strategies to operate a secure SDN/NFV deployment

PS3: Maintaining reliable and secure operation in an evolving environment

- ICT to support asset management and maintenance
- Life cycle management and integration of legacy and new devices
- Situational awareness, risk management and cyber incident responses

The Group Discussion Meeting provided more than a hundred people with the opportunity to take part in the discussion based on prepared contributions of the author`s on the questions of special reporters.

PS1 was introduced by **Mrs Giovanna Dondossola (IT)**, Special Reporter. She provided a few references on DER system and microgrid architectures, emerging IT and communication technologies applicable to DER and microgrid facilities, their interoperability and cyber security standards.

PS2 was introduced by **Mr Victor TAN (AU)**, Special Reporter. The focus of the preferential subject was to identify opportunities, benefits and issues in server virtualisation, software defined network (SDN) and network function virtualisation (NFV) in the Electric Power Utility (EPU) environment.

PS3 was introduced by **Mr Narendra Singh Sodha (IN)**, Special Reporter. The papers were focused on ICT applied to the networks of the future, Telecommunication networks in Electric Power utilities (architectures, media, protocols...), New ICT architectures to control the bulk power systems (smart meter, smart grid, intelligent grid, control centres EMS, MMS etc...), ICT governance within utilities-in-house versus outsourced & Information security within the Electric Power Utilities are major thrust area for all EPUs across the globe. Asset Management with intervention of IT & OT has further added value.

Tutorial

During Paris Session, **Mr Dennis K. Holstein (US)** presented a Tutorial related to the Technical Brochure 698 **“Framework for EPU Operators to Manage the Response to a Cyber Initiated Threat to their Critical Infrastructures”**.

The highlight of this tutorial was the need for a security center of excellence to off-load security management from personnel responsible for operation of the secondary system. This need introduced the concept of an integrated security operations center (ISOC) that would be staffed with personnel skilled in cybersecurity threat assessment. ISOC personnel would work closely with responsible organizational units to determine the risk to reliable power delivery. In addition to the personnel with up-to-date security skills, the ISOC would include advanced technologies to monitor activities and data that could be precursors to a cyber-attack on the utility's systems. ISOC is envisioned as the lead organization for coordinating the plans to improve security

awareness and deployment of technologies to address the dynamic threat landscape. The recommendations offered in TB 698 are currently being pursued in other active working groups (B5.66 and D2.46) and are the basis for new working group proposals.

Poster session

During a Poster Session 22 Authors presented their work. Three Working Groups (WG D2.43, JWG D2/C2.41, JWG D2/C6.46) also presented a poster.



Future Events

In June 2019, SC D2 will hold a Colloquium in Helsinki, where SC D2 annual meeting will take place. The preferential subjects for the Colloquium are:

PS 1: Information and communication technology (ICT) supporting energy transition

- Big data, data analytics using artificial intelligence (AI) for securing the electric power utilities operations;
- Cloud computing;
- Machine learning.

PS 2: Cyber security

- Threats management in electric power utilities (EPU);
- Security assessments tools;
- Cyber security maintenance in power system operation;
- Electric power utilities credential management with blockchain technology;
- Big data used for detecting cyber anomalies in electric power utility informational and operational technology (IT/OT).

PS 3: New internet of things (IoT) application to support electric power utilities

- 5G for utility networks;
- New internet of things applications to support electric power utilities;
- Cybersecurity issues in internet of things.

Mr. Marcelo Araujo (BR) is Special Reporter for PS1, **Mrs. Giovanna Dondossola** (IT) is Special Reporter for PS2 and **Mr. Sampsamatti Tanner** (FI) is Special Reporter for PS3.

In September 2019, SCD2 will participate in CHENGDU SYMPOSIUM 2019 together with B3, C6, B5, C1, C3.

Future tutorials

During SC D2 Colloquium in Helsinki the following tutorials will be presented:

- Tutorial 1. “Advanced Utility Data Management and Analytics for Improved Operation Situational Awareness of EPU Operations” Alberto Del Rosso (US) TB 732
- Tutorial 2. “Design, deployment and maintenance of optical cables associated to overhead HV transmission lines” Sacha Kwik (ES) TB 746
- Tutorial 3. “Cyber security” Giovanna Dondossola (IT)

Working groups

The total number of Working Groups at the end of 2018 was 9, gathering around 215 experts from 41 countries. New working groups, launched in 2018, include:

- **D2.46** – Cybersecurity future threats and impact on EPU organizations and operations
- **D2/C6.47** – Advanced consumer side energy resource management systems
- **D2/C2.48** – Enhanced information and data exchange to enable future transmission and distribution interoperability
- **B5/D2.67** – Time in Communication Networks, Protection and Control Applications – Time Sources and Distribution Methods

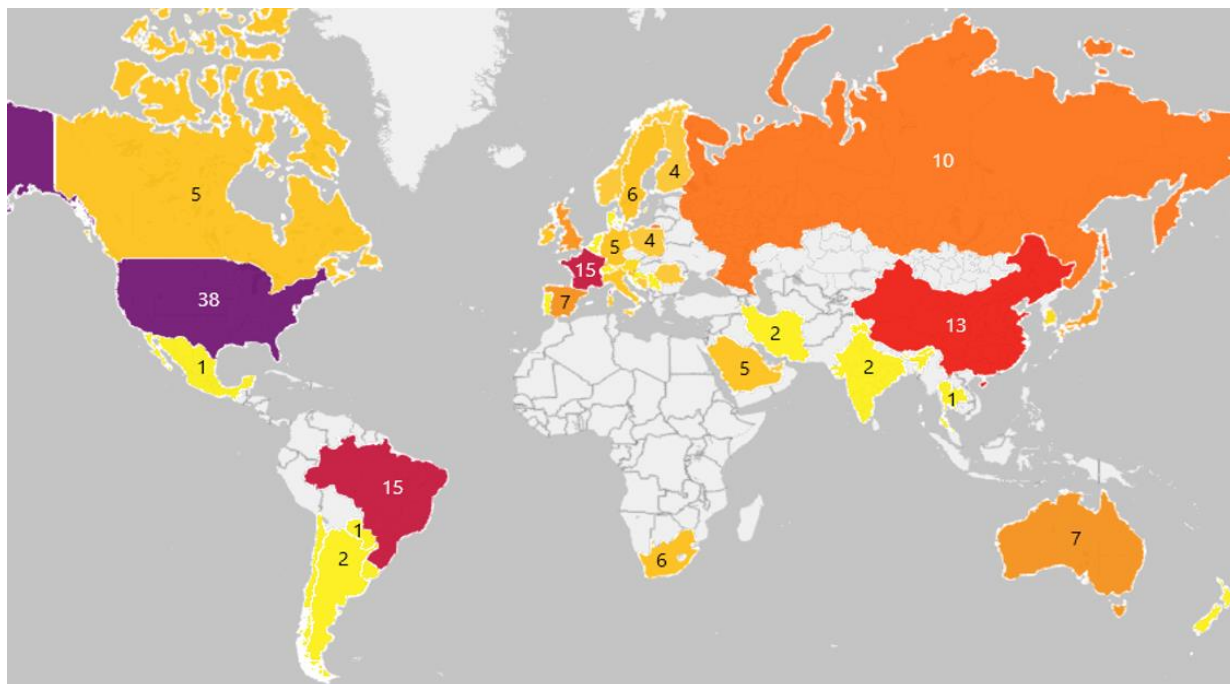


Figure 2 – SC D2 members and experts global diversity

Publications

Recent publication for Study Committee D2 include:

- **TB 732** – Advanced Utility Data Management and Analytics for Improved Operation Situational Awareness of EPU Operations, based on the results of WG D2/C2.41 work.
- **TB 746** – Design, Deployment, and Maintenance of Optical Cables associated to Overhead HV Transmission Lines, based on the results of JWG D2/B2.39 work.
- Presently WG D2.40 is at the stage of reviewing its TB “REMOTE SECURITY SERVICE REQUIREMENT OBJECTIVES” and expects to be published at the beginning of 2019.

Conclusion

This year, Study Committee D2 continues its work in addressing the needs of EPU operators around the globe. SC D2 realizes the strong need for cooperation with other SCs and have already defined the priority list of SCs for close cooperation as well as cooperation with other international organizations. SC D2 actively supports CIGRE Africa dissemination initiative introducing its own Africa Task Force. We are extremely grateful for the on-going support of members and experts as we continue towards the development of our part in the network of the future.