

Study Committee D2 Annual Report 2020

Information Systems and Telecommunication



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SCD2 Mission and scope

Mission

- To facilitate and promote the **progress of engineering** on Information & Communication Technology (ICT) for Electric Power Industries
- To publicize and promote **state-of-the-art practices**

Principal areas of interest

- Studying and considering **the evolution of information and telecommunication technologies** to cope with traditional and new requirements driven by the digital transformation in power industry including extension of Distributed Energy Resources
- Assessment of Technologies and architecture to assure **business continuity and disaster recovery**
- **Overcoming security threats** in the deployment of the networks of the future and especially in Smart Grids

Scope

- **Interoperability and data exchange** between Electricity Network Grid Operators, System Operators, Market Operators, Generation Companies, Industrial Product Manufacturers, Telco Operators, ICT services providers, Energy Regulators, Certification Entities
- **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
- **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 (Smart Grid Architecture Model domain)
- **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, Fog and Cloud Computing, Network Function Virtualization, as well as the processing of large quantity of information (big data) in the domains of asset health, system operation, smart metering.

- **Cyber Security:**

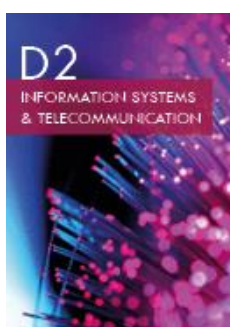
- Assessment and promotion of best practices, tools and solutions of cyber security from field equipment (protection) to corporate IT supporting the whole resilience strategy along the system life cycle: design, implementation, testing, operation and maintenance.
- Cyber security challenges related to new devices, technologies and DER interconnection and the additional data exchanges between Transmission System Operators, Distribution System Operators and Significant Grid Users, as required by the flexibility management of future grids

Membership

The members' renewal campaign for 2020 – 2022 term is over, at the moment SC D2 consists of the 24 regular members, 2 additional regular members and 12 observer members representing overall 36 countries.

Advisory Groups

Title	Convener	
Core business information systems and services	Marcelo Costa de Araujo (BR) marcelo.araujo@eletronorte.gov.br	
Cyber security	 Giovanna Dondossola (IT) giovanna.dondossola@rse-web.it	
Telecommunication networks, services and technology	Victor Tan (AU) victor@vtanconsulting.com	



Technical Brochure

- TB 796 “Cyber security : Future Threats and Impact on Electric Power Utility Organizations and Operations”

This Technical Brochure offers an insight into the evolution of the cyber-physical security threat landscape for the next 20 years. The approach used is well-aligned with the concepts described for the “Grid Architecture of the Future.” Based on the guidance provided by a world-wide survey of stakeholders, the most important issues were addressed. Using a well-defined model-based system engineering process, multiple solutions were analysed to improve the maturity posture of the technical staff and identify the spy craft tools needed for a proactive or anticipatory response to these threats.



Article in CIGRE Science and Engineering

- **“Boosting Cybersecurity in Communication Gateways for Better Substation Protection and Control”** Joshua. LIN*, CENTER LIANG Project Lead Senior Engineer MOXA Inc., Taiwan

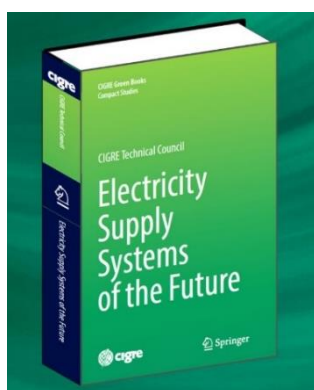
This paper explores all the different challenges of cyber security at the substation level and provides an overview of the main existing technologies and solutions.



Article in Future Connections

- D2 article **“About the key role of cyber security in power system resilience”** has been published in Future Connections Newsletter #2”

The article focuses on Cyber Security hot topics for Power Industry.



Green Book

- Preparation of D2 chapter for **“Electricity supply system of the future”** Green Book

e-Session

SC D2 e-session was held from 25th to 26th September 2020. The event included four sessions covering the three preferential subjects for the presentation of fifty-eight papers from twenty-seven countries, as well as one tutorial.

To be mentioned the participation in C6 panel on End-to-end power systems enabling the energy transition and market transformation.

Tutorials

- Chengdu Symposium, 20-25 September 2019, Tutorial “Enhanced Information and Data Exchange to Enable Future Transmission and Distribution Interoperability” presented by Gareth Taylor (GB)
- Southern Africa 9th Regional conference, 01 October 2019, Tutorial “ICT Solutions for Distributed Energy Resources (DERs) and Microgrids” presented by Zwelandile Mbebe (ZA) and Victor Tan (AT)
- University of KwaZulu Natal, 31 October 2019, Tutorial in web format “Artificial Intelligence in the Power Grid of the Future” presented by Marcelo Costa de Araujo (BR)
- e-Session 2020, 24 August – 3 September, Tutorial based on technical brochure “Cybersecurity: future threats and impact on organizations and operations” presented by Dennis K. Holstein (US) and Chen-Ching Liu (US)

The tutorials based on technical brochures have also been presented on CIGRE webinar platform. You can consult the 2020 webinars’ program at: <https://www.cigre.org/GB/events/cigre-academy-webinars>

Twelve active Working Groups by the end of the year

The total number of Working Groups at the end of 2020 was 12, gathering more than 200 experts from 40 countries. New working groups, launched in 2020, include:

- **D2.52** “Artificial Intelligence Application and Technology on Power Industry”
- **D2.53** “Technology and Applications of Internet of Things in Power Systems”

Business-related

JWG D2/C6.47 “Advanced Consumer Side **Energy Resource Management** Systems”

JWG D2/C2.48 “Enhanced Information and Data Exchange to enable Future **Transmission and Distribution Interoperability**”

JWG B2/D2.72 “**Condition Monitoring** and Remote Sensing of Overhead Lines”

JWG D2.49 “**Augmented reality** / Virtual Reality to Support Operation and

Cyber Security

WG D2.45 “Impact of governance **regulations** and constraints on EPU sensitive data distribution and location of data storage”

WG D2.50 “Electric power utilities` cybersecurity for contingency operations”

WG D2.51 “Implementation of SOC in EPI as Part of Situational Awareness System”

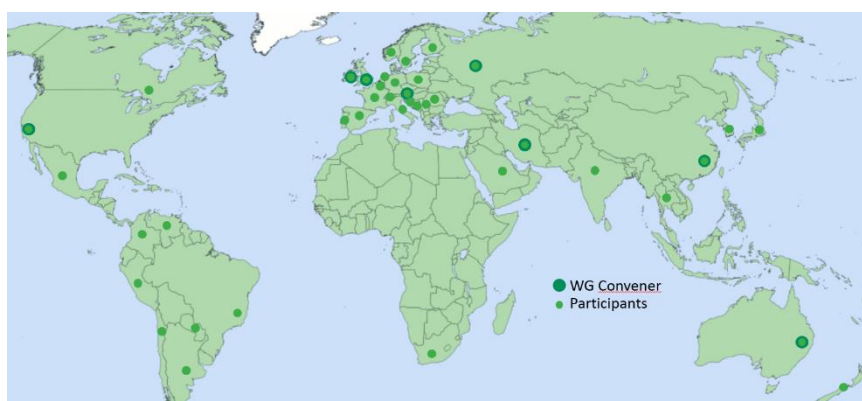
Plus : Active link with **IEC TC57 WG15**, on IEC 62351

Telecommunication infrastructure or services

WG B5/D2.67 “**Time** in Communication Networks, Protection and Control Applications – Time Sources and Distribution Methods”

WG D2.43 “Enabling **Software Defined Networking** for EPU telecom applications”

WG D2.44 “Usage of public or private wireless communication infrastructures for monitoring and **maintenance of grid assets** and facilities”



At the moment, almost half of our Working Groups are joint. This is a nice illustration of the collaboration strategy of SC D2 with other Study Committees.

Figure 1 – SC D2 members and experts global diversity

Conclusion

2020 has brought new challenges and new visions on the development of core and emerging IT (IoT, Bid Data, AI, Cloud, etc.), cybersecurity and telecommunication technologies from the viewpoint of ensuring sustainable operation of electric power utilities in force majeure clauses like the coronavirus pandemic the world has faced. Now we can hardly exaggerate the role of remote control, additional cybersecurity measures and new methods of telecommunications. In this regard, cooperation with other CIGRE study committees remains essential for joint research using the mechanisms of joint working groups as well as joint events: symposiums, panels, tutorials. We are extremely grateful for the ongoing members and experts’ support and looking forward to our face-to-face discussion of the hottest topics during CIGRE 2021 Centennial Session.