

B5 / D2 Liaison Meeting 2023

Thomas Charton UK D2 Regular Member



cigre

For power system expertise

Cigre D2 Study Committee - Intro

D2 - Information Systems & Telecommunication

- Scope:

All aspects in relation to the use of Information, Telecommunication and Telecontrol systems in the Electric Power Industry (EPI), both for operational and business activities.

Objectives:

- SC D2 mission is:

- To facilitate and promote the progress of engineering and the international exchange of information and knowledge in the field of information systems and telecommunications for power systems;
- To add value to this information and knowledge by means of synthesizing state-of-the-art practices and proposing recommendations.

Cigre D2 Structure

- SC D2 Chair: Mr Victor Tan (AU)
- SC D2 Secretary: Mr Joël Nouard (FR)
- D2 UK Regular Member: Mr Thomas Charton

Key facts:

- 41 members
- 15 active working groups
- 3 Strategic Advisory Groups
 - Core business
 - Cyber Security
 - Telecommunications
- Bi-monthly newsletter

Cairns 2023 Update – Papers

- 20 papers
- Topics
 - Validation of protection applications over **MPLS-TP networks**
 - Drone based visual inspection enhanced by **AI image processing**
 - Automated generation of DNO network models from **GIS** and other data (consumption, generation capacity etc.)
 - Asset health classification based on **big data**
 - **Cyber security for 5G** VPN OT networks
 - Improving resilience of **IP networks** through application of **Quality of Service (QoS)**
 - Improving **maintenance** activities and reporting through **AI tools**
 - Enhancing **IoT sensor networks** – data backhaul, configuration and asset management
 - Application of **3D asset models** to improve operations

Cairns 2023 Update – Papers

- Topics:
 - Asset health monitoring based on **IoT, Edge Computing** with video and acoustic sensors feeding into AI based analysis tools
 - PSCAD/Matlab **co-simulation** to detect false data injection **cyber attacks**, Based on state estimation using AI.
 - Deployment experience with **SIEM** (Security Information and Event Management) and IDS
 - **Inter substation process bus** applications with MPLS-TP networks
 - Asset data management and compliance with **ISO55000**
 - Application of **CIM** for network planning and power system development
 - Deployment of a **risk based model for Security Operations Centres (SOC)**

Cairns – Highlights and Industry Challenges



More details can be found in D2 special report (see KMS)

Tutorials/Workshops:

- D2 Tutorial – Time in Communication Networks, Protection and Control Applications -> see TB892
- Enabling Teleprotection over Packet Switched Networks -> WG D2.58

Feedback - Key Topics of Interest



- Artificial Intelligence and Machine Learning applications in asset management
- Industrial Internet of Things (IIoT)
- Cybersecurity for
 - DER/Microgrids
 - EV infrastructure
 - Data diodes
 - Blockchain application
 - Digital twins
 - Virtualised infrastructure (computing and networking)
 - Supply chain security

Feedback - Key Topics of Interest



- Wireless networking including 5G for IoT
- Transition to packet switched operational telecommunication networks
- Advanced asset management of telecommunications assets
- Time distribution over WAN
- Telecommunications supporting a remote workforce

CIGRE strategy review



- CIGRE is reviewing its strategy and priorities
 - For D2 this means our mission will remain

Study Committee D2's mission is to **develop, facilitate collaboration,** and **disseminate knowledge** within the power industry in the areas of **Information Systems, Telecommunications, and Cybersecurity**

- However more collaboration across committees will be required to ensure digitalisation and cyber security become embedded in all areas.
- Extend collaboration to other areas and be a “more open” organisation

New Working Groups – Proposed

Ideas:

- Cybersecurity of Energy Operators Supply Chain – ToR drafted
- An assessment of EPU digital certificate management schemes – ToR drafted

Upcoming new WGs:

Approved in 2023:

| Number | Title | UK Member/Status |
|--------|--|------------------|
| D2.58 | Monitoring, maintenance and control of packet networks & services – From situational awareness to network control | Approved |

Technical Brochures/publications

- During the last year the following key documents from Study Committee D2 were published:
 - TB 892: Data Management
- Previous publications:
 - TB 884: Time in Communications networks, Protection and Control applications
 - TB 866: Enabling Software Defined Networking for electric power utilities
 - TB 840: Cyber Security for Contingency Operations
 - TB 796: Cyber security – future threats
 - TB 746 Design, Deployment and Maintenance of Optical Cables associated to Overhead HV Transmission Lines.

D2 WG opportunities and status

| WG | Title | Convener | Supervising AG | 2020 | | 2021 | | 2022 | | 2023 | | 2024 | | 2025 | | 2026 | | | |
|--------------|---|------------------------------------|----------------|--------------------------|----|------|----|------|----|------|----|------|----|------|----|------|--|--|--|
| | | | | S1 | S2 | S1 | S2 | S1 | S2 | S1 | S2 | S1 | S2 | S1 | S2 | | | | |
| WG D2.44 | Usage of public or private wireless communication infrastructures for monitoring and maintenance of grid assets and facilities | A. PINHEL (BR) | AGD2.03 | Convener changed in 2023 | | | | | | | | | | | | | | | |
| JWG D2/C6.47 | Advanced consumer side energy resource management systems | A.A. NEBERA (RU) | AGD2.01 | | | | | | | | | | | | | | | | |
| JWG D2/C2.48 | Enhanced information and data exchange to enable future transmission and distribution interoperability | G. TAYLOR (GB) | AGD2.01 | | | | | | | | | | | | | | | | |
| JWG B2/D2.72 | Condition Monitoring and Remote Sensing of Overhead Lines | Y. CHEN (CN) A. KULKARNI (GB) | AGD2.01 | | | | | | | | | | | | | | | | |
| WG D2.49 | Augmented reality to support EPU's operation and maintenance | ??? | AGD2.01 | Convener changed in 2023 | | | | | | | | | | | | | | | |
| WG D2.51 | Implementation of Security Operations Centers (SOC) in Electric Power Industry as Part of Situational Awareness System | A.B. SENGUPTA (IN) | AGD2.02 | Convener changed in 2022 | | | | | | | | | | | | | | | |
| WG D2.52 | AI Application and Technology on Power Industry | KUN LUN GAO (CN) | AGD2.01 | | | | | | | | | | | | | | | | |
| WG D2.53 | Technology and Applications of Internet of Things in Power Systems | ZHENGYUN SUN (CN) | AGD2.01 | | | | | | | | | | | | | | | | |
| WG D2.54 | Regulatory approaches to enhance EPU's cybersecurity frameworks | E. RAGAZZI (IT) U. FINARDI (IT) | AGD2.02 | Convener changed in 2022 | | | | | | | | | | | | | | | |
| WG D2.55 | Application of 5G Technology to Smart Grids | KUN LUN GAO (CN) | AGD2.03 | created in 2022 | | | | | | | | | | | | | | | |
| WG D2.56 | Interdependence and Security of Cyber-Physical Power System | QINGLAI GUO (CN) | AGD2.01 | created in 2022 | | | | | | | | | | | | | | | |
| WG A2/D2.65 | Transformer Digital Twin – concept and future perspectives | P. PICHER (CA) | AGD2.01 | created in 2022 | | | | | | | | | | | | | | | |
| WG B3/D2.62 | Life-long Supervision and Management of Substations by use of Sensors, Mobile Devices, Information and Communication Technologies | N. FANTANA (DE) | AGD2.01 | created in 2022 | | | | | | | | | | | | | | | |
| WG D2.57 | CIM (Common Information Model) Methodology | R. BOGOMOLOV (RU) | AGD2.01 | created in 2022 | | | | | | | | | | | | | | | |
| WG D2.58 | Monitoring, Maintenance and Control of Packet Networks & Services – From Situational Awareness to Network Control | B. SHEZI (ZA) | AGD2.03 | created in 2023 | | | | | | | | | | | | | | | |

Topics of symposium 2025:

- ✓ **System Development and Economics** (C1, C5)
- ✓ **System Design, Construction, Operation, Maintenance** (A1, A2, A3, B1, B2, B3, C2, D2)
- ✓ **Power Quality Performance** (C4, C6)
- ✓ **Power System Dynamics** (C2, C4)
- ✓ **Insulation Coordination** (B1,B2, C4)
- ✓ **Renewable Energy, DER, Microgrids, EV, Storage** (C1, C2, C4, C6)
- ✓ **Power Networks with High Percentage of Renewables** (C1, C2, C6)
- ✓ **Electrical Installations on Artificial Islands: Use of the sea where land is a deficit** (B1, B3, C3, C6)
- ✓ **Interconnection between Desert and continental climate zones** (B2, B4, C1, C5, C6)
- ✓ **DC applications in Distribution and Transmission: OHL, UG, Submarine** (B1, C4, C6)
- ✓ **Substations, Switchgears, MV and HV Equipment** (A2, A3, B1, B2, B3)
- ✓ **Communication , Cyber Security** (A1, B5, D2)
- ✓ **Innovations and Developments of Technologies, IT and AI tools for O&M** (A1, A2, A3, B1, B2, B3, C4, C6, D2)
- ✓ **Asset Management for Utilities , Power Systems and Industry** (A1, B1, B3, C2, C4, C5)

Future Events & AOB

- **D2 Webinars for 2024**
 - Time synchronisation
 - Teleprotection over packet networks
 - Work from other WGs nearing completion
- **D2 UK - One day conference – spring 2024**
 - Risk modelling, next gen intrusion detection and prevention, patch/asset management
 - Packet switched network deployment for Operational Telecommunications
 - Use cases for AI, BIM, CIM, GIS, Robotics, IoT, Edge processing, wireless telecommunications

Future Events & AOB

- **D2-UK Webinars for 2024**
 - Application of AI tools to power system operation
- **Paris Session, 25 – 30/08/2024**
- **PS1: IT/OT solutions to improve the efficiency and resilience of electric power systems:**
 - **IoT architectures** and applications in physical asset management
 - Applications and Platforms of **Artificial Intelligence, Big Data and Analytics** in operation and maintenance
 - Technical challenges in the development of **digital twins** in operation and maintenance of power systems and DERs
 - Business Continuity **Architectures in the Cloud**

Future Events & AOB

- **Paris Session, 25 – 30/08/2024**
- **PS 2: Cybersecurity in emerging application domains and technologies for securing energy organisations:**
 - Cybersecurity for **DER and microgrid** control infrastructures
 - Cybersecurity for **Energy Communities'** digitalization
 - Cybersecurity for **Electric Vehicle charging** and discharging control
 - Cybersecurity in **cloud-based applications** of EPU

Future Events & AOB

- **Paris Session, 25 – 30/08/2024**
- **PS 3: Meeting the challenges of energy transition with reliable, scalable, and efficient telecommunications networks:**
 - Building scalable and resilient networks with **management, automation and orchestration** solutions and methods.
 - Integration of current and new **wireless technologies** in meeting the requirements of power utility applications.
 - Techniques and methods in building **resilient networks** to support critical utility applications

For further details please contact me by email

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