CIGRE Study Committee B5

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

<table>
<tr><td>WG [1]N° B5.81</td><td colspan="2">Name of Convenor: John Wright (GB)
E-mail address: john.w.wright@ge.com</td></tr>
<tr><td colspan="2">Strategic Directions #[2]: 2</td><td>Sustainable Development Goal #[3]: 9, 12</td></tr>
<tr><td colspan="3">The JWG applies to distribution networks: ☒ Yes / ☐ No</td></tr>
<tr><td colspan="3">Potential Benefit of WG work #[4] : 1, 2, 3</td></tr>
<tr><td colspan="3">Title of the Group: Obsolescence Management for Protection, Automation and Control Systems</td></tr>
<tr><td colspan="3">Scope, deliverables and proposed time schedule of the WG:

Background:

Even within Protection, Automation and Control Systems (PACS) operated by the same utility, their components can be of different technologies and manufacturers. Some of them may have been commissioned decades ago and partially refurbished.

The complete or partial refurbishment of PACS is in general well integrated in the asset management process of the utilities and is addressed by several Technical Brochures [1] [2] [4] and past SC B5 Preferential Subjects [3] [5] [6]. In some of them, obsolescence management has been mentioned as one aspect to be addressed in the PACS life cycle management.

The deployment of IEC 61850 based PACS provides communication and functional interoperability between components, Intelligent Electronic Device (IEDs) and functions. In this context, the replacement of individual IEDs or components can now be envisaged instead of complete or partial PACS refurbishment. This also contributes to increase the sustainability of the utility's assets.

These evolutions push utilities to increase the duration of use of IEDs and other components of the PACS and to move to replacement of components instead of a complete or partial refurbishment. This can only be achieved by a proper obsolescence management for this equipment. The Technical Brochure developed by WG B5.81 will focus on this aspect.

In addition, utilities are faced with similar requirements for PACS using proprietary communication protocols and / or hardwired signal exchange. They also need to manage firmware and component obsolescence. Associated with this are the hardware / software configuration change, assurance aspects, anticipated more frequent patch update for cyber security, new functional requirements, adaptation to modifications occurred on the primary equipment homologation process, etc.

Other aspects that affect obsolescence management decisions include major functional device failures, change in specifications and required functionality, knowledge of utility personnel for obsolete systems, outage availability, access to the equipment, component challenges and constraints induced by manufacturers to move to new altered firmware with different functionality. Some of these subjects relate to the PACS asset management, covered by WG B5.63.

The application of IEC 61850 solutions from PAC systems with Process Bus implementation, where the signals in the control room are acquired from the switchyard on by an Ethernet communication network, will significantly contribute to managing obsolescence of systems</td></tr>
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and devices, since modernisation of parts of the PAC will not necessarily require replacement of panels and wired signals. Aspects related to the use of the process bus in the switchyard are covered by B5.59.

Purpose/Objective/Benefit of this work:

The Technical Brochure and other deliverables produced by WG B5.81 will support utilities for the obsolescence management of PACS and its components.

Scope:

The Technical Brochure shall discuss the following points:

- Description of the key factors related to obsolescence, the associated needs and the industry background
- Recommendation for utility policy to be implemented for obsolescence management, including:
    - description and criteria for application of different strategies
    - differentiated obsolescence management for different components, systems, technologies or manufacturers, including patch management
    - support from Original Equipment Manufacturers for utility obsolescence management
    - scope of obsolescence management applied to the complete equipment, parts of the equipment or individual electronic components
    - use of specialised service providers (brokers, repair, etc) for active obsolescence management
    - training and skill retention
    - compatibility assurance and testing
- Retrofit with first generation IEC 61850 systems (ed1)
    - discussion and definition of the term “retrofit of ed1”. There are several options or approaches.
    - limitations related to lack of available conformance test of ed1 (UCA)
- Implementation of procedures for IEC 61850 ed2 and higher, based on documents being developed by IEC TC57 WG10.
- Retrofit mixing IEC 61850 ed1 / ed2 / etc…
- Avoid vendor lock in
- Obsolescence management of the substation communication equipment (RTU, Protection IED, LAN, switches, servers)
- Obsolescence of the time synchronisation service,
- Obsolescence of operating systems of substation computers and software (configuration tools, etc.)
- Opportunities of hardware independent PACS for obsolescence management
- Update of guidelines and manuals

In order to illustrate these issues, the WG shall describe several use cases and discuss advantages and drawbacks. These use cases should include:

- maintain electromechanical parts for given functions, e.g. interlocking,
- proprietary PACS to be refurbished in IEC 61850
- Migration of IEC 61850 based PACS:
    - How to address migration of communication network (10 Mbit / 100 Mbit).
    - How to update architecture?
- shift from analog to digital interfaces for functions

Out of scope:

- PACS Asset Management (covered by ongoing WG B5.63)

- Considerations of implementation of PACS function in generic hardware (covered by ongoing B5.60). However, obsolescence aspects of this hardware are to be discussed.
- PACS architecture
- PACS process interface (covered by B5.59). However, obsolescence aspects of this hardware are to be discussed.

Remarks:

- Liaise and avoid overlap with ongoing WG B5.63 (PACS Asset Management)
- Liaison member from SC D2 in the WG

References

[1] TB 464 Maintenance Strategies for Digital Substation Automation Systems (WG B5.06 2011)

[2] TB 448 Refurbishment Strategies based on Life Cycle Cost and Technical Constraints (WG B5.08 2011)

[3] PS1 B5 colloquium 2009 (Jeju, KR): Strategies for the Life-Time Maintenance of Substation Automation Systems

[4] TB 687 Experience concerning availability and reliability of DSAS (WG B5.42 2017)

[5] PS1 B5 Session 2016 (Paris, FR): Experience on Protection Automation and Control System (PACS) Optimization and Life Time Asset Management

[6] PS1 B5 colloquium 2017 (Auckland, NZ): Challenges of design and maintenance of IEC 61850 based systems

Deliverables:

☒ Annual Progress and Activity Report to Study Committee
☒ Technical Brochure and Executive Summary in Electra
☐ Electra Report
☐ Future Connections
☐ CIGRE Science & Engineering (CSE) Journal
☒ Tutorial
☐ Webinar

Time Schedule:

• Recruit members (National Committees)	Q1 2023
• Develop final work plan	Q2 2023
• Draft TB for Study Committee Review	Q4 2026
• Final TB	Q1 2027
• Tutorial	Q2 2027
• Webinar	

Approval by Technical Council Chairman:

Date: February 10th 2023

Notes:
[1] Working Group (WG) or Joint WG (JWG),
[2] See attached Table 1,
[3]See attached Table 2 and CIGRE reference Paper: Sustainability – at the heart of CIGRE's work.
[4] See attached Table 3
WG Membership: refer Comments at end of document

Table 1: Strategic directions of the Technical Council

1	The electrical power system of the future reinforcing the End-to-End nature of CIGRE: respond to speed of changes in the industry by preparing and disseminating state-of-the-art technological advances
2	Making the best use of the existing systems
3	Focus on the environment and sustainability (in case the WG shows a direct contribution to at least one SDG)
4	Preparation of material readable for non-technical audience

Table 2: Environmental requirements and sustainable development goals

	CIGRE selected the 7 SDGs that are the most relevant to CIGRE. In case the WG work refers to other SDGs or do not address any specific SDG, it will be quoted 0.
0	Other SDGs or not applied
7	**SDG 7: Affordable and clean energy** Increase share of renewable energy; e.g. expand infrastructure for supplying sustainable energy services; ensure universal access to affordable, reliable, and modern energy services; energy efficiency; facilitate access to clean energy research and technology
9	**SDG 9: Industry, innovation and infrastructure** Facilitate sustainable infrastructure development; facilitate technological and technical support
11	**SDG 11: Sustainable cities and communities** Increase attention on sustainable and resilient buildings utilizing local (raw) materials, power for electric vehicles, strengthening long-line transmission and distribution systems to import necessary power to cities, developing micro-grids to reinforce the sustainable nature of cities; protect and safeguard the world's cultural and natural heritage; reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and waste management
12	**SDG 12: Responsible consumption and production** E.g. Promote public procurement practices that are sustainable; address reducing use of SF6 and promote alternatives, encourage companies to adopt sustainable practices and to integrate sustainability information into their reporting cycle, address inefficient fossil-fuel subsidies that encourage wasteful consumption
13	**SDG 13: Climate action** E.g. Increase share of renewable or other CO_2-free energy; energy efficiency; expand infrastructure for supplying sustainable energy; strengthen resilience and adaptive capacity to climate-related hazards and natural disasters; integrate climate change measures into national policies, strategies and planning; improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
14	**SDG 14: Life below water** E.g. Effects of offshore windfarms; effects of submarine cables on sea-life
15	**SDG 15: Life on land** E.g. Attention for vegetation management; bird collisions; integration of substations and lines into the landscape

Table 3: Potential benefit of work

1	Commercial, business, social and economic benefits for industry or the community can be identified as a direct result of this work
2	Existing or future high interest in the work from a wide range of stakeholders
3	Work is likely to contribute to new or revised industry standards or with other long term interest for the Electric Power Industry
4	State-of-the-art or innovative solutions or new technical directions
5	Guide or survey related to existing techniques; or an update on past work or previous Technical Brochures
6	Work likely to contribute to improved safety.

Comments:

1) CIGRE Official Study Committee Rules: WG Membership

https://www.cigre.org/GB/about/official-documents

a. Only one member per country (by exception of SC Chair)

b. WG nominees must first be supported by their National Committee (or local SC Member) as an appropriate representative of their country.

c. Acceptance of the nomination is granted by the SC Chair and advised to the WG Convener

2) Collaboration Space

https://www.cigre.org/article/GB/collaborative-tools-2

CIGRE will provision the WG with a dedicated Knowledge Management System Space.

The WG will use the KMS for drafting collaboration, capture and retention of discussion and meeting records.

Official country WG Members will be sent registration instructions by the Convener.

Official country WG Members may request the WG Convener to allow additional access for an extra national subject matter specialist to aid in the work at the national level, including NGN members.