

**CIGRE Study Committee B3**

**PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP <sup>(1)</sup>**

<b>WG N° B3.44</b>	<b>Name of Convener:</b> Nicolaie L. Fantana (DE) <b>E-mail address:</b> nicolaie.fantana@de.abb.com	
<b>Technical Issues # <sup>(2)</sup>:</b> 5, 8	<b>Strategic Directions # <sup>(3)</sup>:</b> 1, 2	
<b>The WG applies to distribution networks <sup>(4)</sup>:</b> Yes		
<b>Title of the Group:</b> Substation servicing and supervision using mobile devices and smart sensing		
<p><b>Scope, deliverables and proposed time schedule of the Group:</b></p> <p><b>Background:</b></p> <p>The use of mobile devices, internet technologies and inter-connected smart sensor systems in industrial and home activities are progressing at very fast pace. These systems are already affecting our personal lives and will impact substation whole-of-life supervision and on-site servicing activities too. The expected changes may come from providing on demand additional enriched, context aware, real time information, to the mobile user, offering new distributed data collection, processing and analysis means, but also from changing the way human inspector/service personnel interact with substation installations/equipment.</p> <p>Interconnected smart sensors and mobile devices are expected to actively contribute to better substation supervision adding value for utilities, and will become integrated part of our power industry and substation life supervision, servicing and management approaches.</p> <p>The WG will investigate how such technologies (mobile devices, distributed sensing etc.) may affect substation activities and human interactions. It will consider the status, evolution and trends and make recommendations to be better prepared for the future technological evolution and human needs. The WG will use expertise available in SC B3 but is open for cooperation and interaction with other SC or IEEE substation committee. Previous WG work will be taken into account such as from WG B3.12, “Obtaining value from substation condition monitoring”, which mainly focussed on obtaining value from existing on-line condition monitoring installations, or ongoing WG B3.34 work, focussed on the expected impact of future/smart grid concepts on substation management.</p> <p><b>Scope:</b></p> <p>The goal of the WG is to analyse the growing potential of mobile devices and smart sensing technologies for use in substation supervision and servicing. In particular new ways of supervision and servicing will be identified. Also important will be to analyse the new interactions of the user with the substation installations and the use of remote enterprise information while on-site. New type of interactions will be enabled by mobile devices, communication and sensing technologies, or will be required by the user. Finally the WG’s aim is to give an overview, analyse cases and derive a set of recommendations and examples to assist users to prepare for the technology changes to come. Such changes could be in the way we supervise and operate substation equipment, but also on how humans interact with the substation during life activities.</p> <p>A set of scenarios for substation supervision or servicing, using mobile and smart sensing, e.g. “internet of things” (IoT)<sup>1</sup> technologies, will be identified and analysed to identify capabilities, benefits and challenges in application or to point toward arrangements, architectures or</p>		

<sup>1</sup> The Internet of Things (IoT) is the interconnection of uniquely identifiable embedded computing devices within the existing Internet infrastructure. Typically, IoT is expected to offer advanced connectivity of devices, systems, and services that goes beyond machine-to-machine communications (M2M) and covers a variety of protocols, domains, and applications.

topologies which can be used considering immediate use and long-time life management of substation equipment. Besides reaching the desired functionality in the scenarios, aspects such as cyber-security, links to sub-systems e.g. with IEC 61850 data collection and interlinking with data in the enterprise will be considered. The brochure and recommendations should raise the awareness regarding expected changes in substations, equipment, technology and interactions with focus on new ways to supervise, operate and the long-time maintenance and management of substations and all installed equipment.

The main steps envisaged are to:

1. Identify status, trends and challenges for smart interconnected sensing and mobile technologies usable for substations. Define a clear scope for WG work.
2. Perform a world-wide survey to identify present status in power electric industry, related to mobile devices and smart sensing, ICT, IoT (internet of things) technology aspects, expected/needed new interactions modes, open questions, user expectations, concerns or limitations. Involve experts from utilities, manufacturers, research, start-up, academia etc.
3. Describe a set of use scenarios for substation supervision, servicing and short/long time management involving smart interconnected sensing and tagging and mobile technologies. Consider the immediate ad-hoc (live) and long-time use of such systems, over power equipment lifetime. Consider data collection and data integration in utilities, as well as arrangements and architectures for use in especially brown field situations.
4. Analyze scenarios in terms of technical challenges and interactions, pros and cons, usability aspects, integration in substation, user required skills, cyber security, standardization, lifetime aspects etc. Findings are presented as a set of systematic conclusions and recommendations on usage possibilities, technologies, challenges and benefits.
5. Write a technical brochure with guiding recommendations and an Electra paper. Write a common document/report/white paper with CIGRE IEEE participation.

The WG expects to collaborate with CIGRE Study Committees B5, D2, A2 and A3 and also with IEEE.

**Deliverables:** Technical brochure, summary in Electra, Tutorial

**Time Schedule:** start: First Quarter 2015

**Final report:** 2018

**Comments from Chairmen of SCs concerned:**

**Approval by Technical Committee Chairman:**

**Date:** 17/03/2015



<sup>(1)</sup> or Joint Working Group (JWG) - <sup>(2)</sup> See attached table 1 - <sup>(3)</sup> See attached table 2

<sup>(4)</sup> Delete as appropriate

**Table 1: Technical Issues of the TC project “Network of the Future” (cf. Electra 256 June 2011)**

<b>1</b>	Active Distribution Networks resulting in bidirectional flows within distribution level and to the upstream network.
<b>2</b>	The application of advanced metering and resulting massive need for exchange of information.
<b>3</b>	The growth in the application of HVDC and power electronics at all voltage levels and its impact on power quality, system control, and system security, and standardisation.
<b>4</b>	The need for the development and massive installation of energy storage systems, and the impact this can have on the power system development and operation.
<b>5</b>	New concepts for system operation and control to take account of active customer interactions and different generation types.
<b>6</b>	New concepts for protection to respond to the developing grid and different characteristics of generation.
<b>7</b>	New concepts in planning to take into account increasing environmental constraints, and new technology solutions for active and reactive power flow control.
<b>8</b>	New tools for system technical performance assessment, because of new Customer, Generator and Network characteristics.
<b>9</b>	Increase of right of way capacity and use of overhead, underground and subsea infrastructure, and its consequence on the technical performance and reliability of the network.
<b>10</b>	An increasing need for keeping Stakeholders aware of the technical and commercial consequences and keeping them engaged during the development of the network of the future.

**Table 2: Strategic directions of the TC (cf. Electra 249 April 2010)**

<b>1</b>	The electrical power system of the future
<b>2</b>	Making the best use of the existing system
<b>3</b>	Focus on the environment and sustainability
<b>4</b>	Preparation of material readable for non technical audience