CONSEIL INTERNATIONAL DES GRANDS RESEAUX ELECTRIQUES
INTERNATIONAL COUNCIL ON LARGE ELECTRIC SYSTEMS

STUDY COMMITTEE D2
INFORMATION SYSTEMS AND TELECOMMUNICATION

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2017 Colloquium
September20 to 22, 2017
Moscow–RUSSIA

PS1.3

Applications based on PMU technology for MicroGrid

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In recent years, we can notice high demand for IED application of various functional purposes with the support for synchrophasor measurement technology in MicroGrid. Main advantages of synchrophasor measurement are related to the possibility of calculating parameters of a MicroGrid mode by a certain connection and by parameters of electrical network on any level of control. This opens great opportunities for control normal and emergency system conditions of MicroGrid. In the present report, the author describes the process of development and implementation of compact multi-function IED with the support for synchrophasor measurement technology, including IED with embedded phasor data concentrator (PDC) and GPS receiver. In order to expand functional possibilities in the mentioned IED, measurement of equivalent synchrophasors of current and voltage (taking into account higher harmonics) is performed. Expanding the application field for devices of synchrophasor measurement requires in the majority of cases improving the algorithms for signal processing for improving main performance of IED, for example, speed of respond and signal processing accuracy. Issues of improving the algorithm for functioning of IED by using filter synthesis method based on using extended spectral representations of signals and filters as well as optimization methods with limitations are considered in the report. Moreover, the report includes examples of filter synthesis for various application fields: LAMS, relay protection, devices for operational and emergency control system.