

SUBSTATION CONTROL SCHEME FOR UPGRADING OF EXISTING CONVENTIONAL CONTROL SYSTEM TO SUBSTATION AUTOMATION SYSTEM

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As a result of the great advancements in the automation, protection and communication systems of transmission and distribution substations, it is necessary to upgrade the conventional control systems of existing substations to modern Substation Automation Systems (SAS) according to IEC-61850 standard. Usually, existing substations are controlled via conventional control systems comprised of a set of manually operated control panels, one panel for each substation bay, located in the substation control room. On the other hand, in modern automated substations, these traditional control panels are replaced with operating stations and Human Machine Interface (HMI). In this paper, a novel control scheme is developed in details in order to provide a practical solution for upgrading of existing conventional controlled substations to Substation Automation Systems while avoiding the replacement of the whole control infrastructure of the substation. This control scheme is implemented using a centralized control philosophy with a redundant Bay-Control Units (BCU) capable of handling multiple substation bays so; the entire substation can be controlled from a central control system. Multiplexing configuration is used to enable the operator to select one bay at a time to be controlled and then execute the required control action. The interfacing of the proposed control scheme with the SCADA system is also provided. This scheme will replace the conventional control systems in existing substations while saving significant number of bay control units in automated substations.

**This paper was presented at Saudi Arabia Smart Grid 2013, Jeddah*



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