

*Holcombe Department of Electrical and Computer Engineering  
Seminar Series*

**Centralized Substation Protection and Control (CPC) Application in  
Enabling DER Integration Using Asynchronous Microgrids**

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**Abstract**

Active distribution networks and microgrid development integrating distributed energy resources (DERs) are changing power system characteristics, at a time when utilities are also focusing on improving customer service and resiliency of the grid. DER and load control at the distribution level is quickly becoming a key requirement of this evolving system. Distributed frequency control of the grid as well as VAR/voltage control will encourage DER expansions when exercised within a microgrid. Microgrids can be asynchronously connected with the main grid to allow distributed frequency control as well as VAR/voltage control. Many operational benefits are obtained by this approach including enhanced voltage and frequency ride through capability of DERs, and others. Improved protection and control technologies are required with this approach, which can usher in newer strategies for protection and control to alleviate the shortcomings of traditional protection and control methodologies.

To chart the development of next generation Protection and Control (P&C) technologies, the IEEE PES Power System Relaying and Control (PSRC) Committee formed a working group to prepare a report describing and analyzing state-of-the-art and emerging technologies for Centralized Protection and Control (CPC) within a substation. This presentation describes the application of CPC, to address the operation, protection and control challenges of active distribution networks with embedded microgrids as a vehicle for enabling DER integration.

**Biography of Speaker**



**Dr. Ratan Das** is the founder of icaPower LLC ([icaPower.com](http://icaPower.com)), which serves customers in power system protection, automation and control. He was the chair of the IEEE Power System Relaying and Control (PSRC) Committee WG K15 on Centralized Substation Protection and Control. He was a guest-editor of the special section on “Frontiers of Power System Protection” in The IEEE Transactions on Power Delivery (PWRD) August 2016 Issue. The special section has the IEEE PSRC WG K15 paper *Advancements in Centralized Protection and Control Within a Substation*, which received the 2016 IEEE PES Technical Committee (PSRC) and PWRD Prize Paper awards.

Dr. Das received his B.E.E. (Hons.) degree from Jadavpur University, Kolkata, India, and M.Sc. and Ph.D. degrees in Electrical Engineering from the University of Saskatchewan, Canada. He has worked in power system protection, automation and control for 30 years: with ABB Inc., USA, for 18 years and with NTPC Ltd., India, for 11 years. Dr. Das holds four patents and has contributed to over 30 publications.