SMART GRID CENTER
TEXAS A&M ENGINEERING EXPERIMENT STATION

WEBINAR

Improving the Reliability and Health of Distribution Circuits Using Real-Time Diagnostics and Incipient Failure Detection Preventing Outages, Fire Ignition and Safety Hazards

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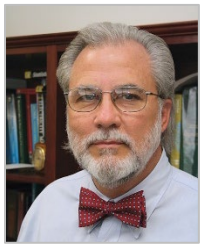
Abstract: Electric power distribution circuits are rigorously built to require little maintenance or inspection. Yet failures do occur leading to outages and unsafe conditions. It has long been known that periodic inspections offer only marginal improvements in operational reliability. Consequently, the operating paradigm of utilities is typically “run to failure”, repair, return to operation. There is little choice. Utilities currently have no systems that offer operators real-time information concerning the health and operational status of circuits. Circuits are either on or off, protection has either operated or not. Operators reactively respond after a failure event. Researchers at Texas A&M University conducted the longest running study of distribution circuits, continuously monitoring over 300 circuits for as long as 15 years resulting in 1500 circuit-years of experience. This resulted in a largest existing database of high fidelity recordings of device failures, misoperations, and protection operations. Using this knowledge, the Power System Automation Laboratory at Texas A&M developed Distribution Fault Anticipation (DFA) technology which provides real-time health assessment and situational awareness for distribution circuits. The system is capable of detecting incipient failure conditions on circuits which ultimately will lead to catastrophic failure resulting in outages, fires, or unsafe lines down. Using advanced expert system algorithms, the very low magnitude initial failure mechanisms in devices can often be detected providing advanced warning that a circuit is not healthy. For the first time, this allows for true condition-based maintenance. The presentation includes actual examples of early failure detection and includes a live demonstration of the DFA system.

March 31, 2021 at 3:00 P.M. CDT

Presenters:



Dr. B. Don Russell is a Regents Professor and Distinguished Professor at Texas A&M University where he is director of the Power System Automation Laboratory. His research work spans 40 years, focused on using advanced digital signal processing and waveform analytics in real-time diagnostic and protection applications to electric distribution systems. Dr. Russell is a member of the United States National Academy of Engineering and a fellow of six technical societies. He is past president of the IEEE Power & Energy Society and currently serves as vice president for administration and secretary of the US national committee of CIGRE.

Carl Benner holds B.S. and M.S. degrees in Electrical Engineering from Texas A&M University in 1986 and 1988. He serves as Research Professor in the Department of Electrical and Computer Engineering at Texas A&M University. His work centers on the application of advanced technologies to the solution of challenging power system problems, with an emphasis on waveform analytics. Mr. Benner is a registered Professional Engineer in the state of Texas. He is a Fellow of IEEE and a member of the IEEE Power and Energy Society, the IEEE Industry Applications Society, and CIGRE.

Jeffrey Wischkaemper is an Assistant Research Professor in the Department of Electrical and Computer Engineering at Texas A&M University. His work includes multiple projects focused on the characterization of vegetation contacts with power lines, low-voltage arcing, and other high-impedance faults.

Karthick Manivannan received the M.S. and Ph.D. degrees in electrical engineering from Texas A&M University, College Station, TX, USA, in 2002 and 2012, respectively. He is a Research Assistant Professor at the Power System Automation Laboratory, College Station. His current research interests include developing algorithms for automatic classification, reporting of power system events, application of signal processing and pattern recognition techniques, data analytics and efficient algorithm design.