Project 13-6:
Centralized vs. Distributed FA and Impacts on Distribution Performance

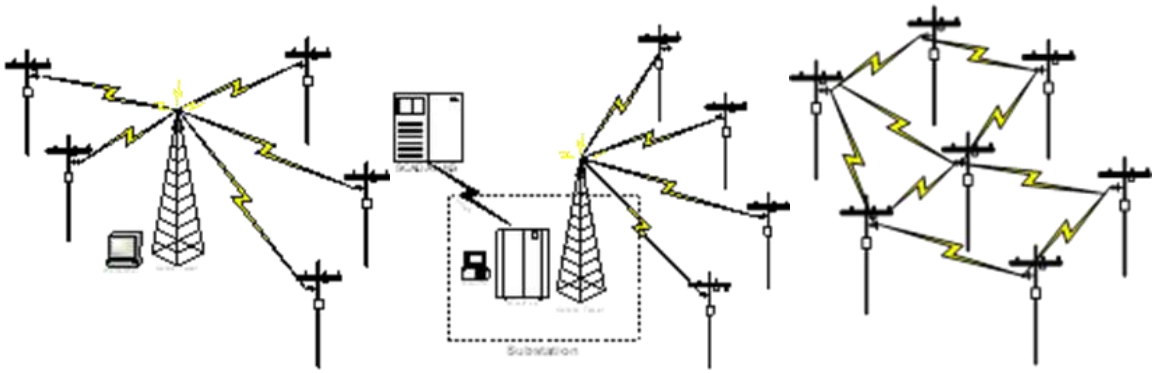
Final Report: January 2013; available online @ www.dstar.org

Project Summary:

This project report gives a broad overview of the technical issues surrounding the distribution automation (DA) architecture, and the utility applications that could be supported. It attempts to identify and relate the needs of particular DA applications to communication needs and architecture impacts.

Distribution utilities, particularly IOUs, are under constant pressure to improve their quality of service as well as financial performance. In particular, system reliability, operational efficiency and asset performance have come under increasing scrutiny in recent years. In response (and driven by other factors), some utilities have been implementing distribution automation (DA) programs to improve performance and manage assets more effectively. DA primarily attempts to improve reliability and operational efficiency by enabling monitoring and control of field assets. Technology improvements in the area of smart meters, communication, and embedded microcontroller based protection devices etc. can help improve DA applications.

The major components in any DA application, includes sensors and control devices, typically located across the network, communication to these remote elements and a data processing/ computation block to make use of the information and determine control actions. DA has become possible with the emergence of communication technologies, better sensors and improved computational intelligence. Based on communications, location of computational intelligence and operating devices the dominant architectural arrangements are centralized (controlled by central DMS/SCADA), decentralized (substation-centered, using a substation-based controller), and distributed or peer-to-peer control. A schematic representation of the three architectures is as shown below.



Distribution Automation Architectures

Each of these implementations, centralized, decentralized or distributed, has its pros and cons with regard to operating flexibility, communication needs, impact on distribution system operations, dependability, speed, complexity and cost. Ultimately, choice of “right” automation scheme would also

depend on other factors such as system topology, loading and capacity, legacy devices, performance requirements, etc. The overall goal of the project was to investigate feeder automation (FA) schemes and compare the pros and cons, performance and economics of the various architectural arrangements.

The study performed a comprehensive review of literature and case studies from actual FA implementations as well as a review of published and unpublished sources of information for key takeaways, findings and observations.

Table of Contents:

Who Should Use:

Distribution Operations, Planning, Standards, Power Quality and Reliability Groups

For the complete report on Project 13-6: Centralized vs. Distributed FA and Impacts on Distribution Performance, visit www.dstar.org.

LAVELLE FREEMAN
GE Energy Consulting
Technical Director
DSTAR Program Manager

GE Power
1 River Road
Schenectady, NY 12345
(518) 385-3335

CONTACT ME
Lavelle.Freeman@ge.com