Siemens Distribution Feeder Automation (SDFA)

Developed in the USA
Siemens Distribution Feeder Automation (SDFA)
Defining a Smarter Grid

Feeder Automation
New type of Real-time FLISR System

Volt/VAR, CVR
New type of Real-time Volt/VAR System

Highly Adaptive Protection Systems
New Protection methods

NERC CIP
Cyber Security

Interoperable
Deploy in Greenfield and Brownfield Projects

Comms. Friendly
Small Bandwidth

U.S. DOE
Siemens Distribution Feeder Automation (SDFA)
An Entirely New Product Design & System Approach

AUTOMATICALLY LOCATE AND ISOLATE FAULTED LINE SECTIONS
AND RESTORE SERVICE TO HEALTHY LINE SECTIONS (FLISR)

Automatic Primary Switches
- Bridges Vector OH SW
- SDR Reclosers

Automation Controllers + SW
- SIPROTEC 7SJ80
- SIPROTEC 7SC80
- IEC 61850 Protocol
- SW: DIGSI and FASE

Communication
- RuggedCom WiMax
- Wi-Fi
- Direct Fiber

HMI Options
- SICAM SCC
- DNP 3.0 Slave
- 7SJ64 HMI
- IEC 61850

Features and Applications
- Peer-to-peer logic and control (no centralized controller)
- jDiff™ Differential protection technique over comm link
- Automatic Transfer Scheme (ATS) for critical loads
- Fault Location, Isolation and Service Restoration (FLISR)
- Load Management and Load Balancing
- Volt / VAR Control and Conservation Voltage Reduction (CVR)

Benefits
- Keep the lights on! Reduce truck rolls and crew size
- ATS & FLISR at a lower cost than alternative solutions
- FLISR minimizes outage time (Address SAIDI, SAIFI)
- Scalable from small to large projects (ATS to FLISR)
- Compatible with existing SCADA, CBs, reclosers & SWs
- Siemens will supply as turnkey solution
Siemens Distribution Feeder Automation (SDFA)

Typical Installation

- Works with any vendor switch or recloser
- Low-cost Automation Controllers
- IP-based peer-to-peer Comm
- Optional substation-hardened HMI
- Compatible with existing protection, integrates with SCADA and SA
Siemens Distribution Feeder Automation (SDFA)

Key Differentiators

• Minimize number of consumers exposed to power system faults through line sectionalizing.

• Provide all consumer line sections with alternative power source at high-speed.

• Minimize line section outages times though new innovative high-speed sequence switching.

• Optimize switching sequences caused by temporary and permanent power system faults.

• j-Diff™ Fault Location & Protection Technology provides a new and uncomplicated solution for automating distribution feeders.

• Completely program an entire automated feeder system in minutes.

• “Ready to install” delivery model from Siemens means project execution is fast and trouble-free.

• Expert support due to local product development.
Siemens Distribution Feeder Automation (SDFA)

What makes this a Compelling Solution?

Problem: Keeping the lights on!

- Reduce outage size and duration.
- Locate faults faster with less driving time.
- Reduce crew size to isolate and restore.
- Reduce windshield time, particularly with long distribution lines.

Solution: SDFA allows utilities to “do more with less”

- Fast transfer scheme for critical loads (e.g., hospital)
- Perform isolation and restoration faster than standard recloser technology, and sometimes at a lower CAPEX cost.
- Increase billing revenue through fewer and smaller outages.
- Improve service – Resolve outages before customer calls.
- Service a larger territory with fewer linemen.
- Make use of adaptive settings for storm conditions to reduce SCADA operator work load.
Siemens Distribution Feeder Automation (SDFA) Supports Multiple DA Applications

Open Transition Mode

Closed Transition Mode

SDFA-ATS

SDFA-FLISR

SDFA-VR

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Siemens Distribution Feeder Automation (SDFA-ATS)
Ultra High-speed Source Transfer for Critical Loads

1. Detect Loss of Power Source
2. Disconnect Failed Preferred Source
3. Connect Alternative Source

- Simple and affordable
- Works with third-party reclosers
- Turn-key design and field support

Auto Return to Preferred Source
Down Stream Fault Disable Transfer

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Siemens Distribution Feeder Automation (SDFA-ATS)
Typical Installation
Siemens Distribution Feeder Automation (SDFA-FLISR)
Case Study: A&N Electric Coop

Customer Challenge
• A&N Electric’s distribution network contained a critical hospital load that was manually controlled
• A fault in connected feeder could lead to a long outage before the system could be reconfigured to supply power to the hospital from an alternate substation source
• Other restoration solutions were considered too slow

Siemens Solution
• SDFA is a new type of DA solution for protecting and automating distribution feeders using open standards
• High-speed Fault Location, Isolation & Restoration
• Uses conventional Siemens hardware & industry-standard IEC 61850 integration methods and software
• Siemens developed high-speed restoration logic and new graphical feeder automation configuration wizard
• First use of IEC 61850 over WiMax for DA application

Customer Benefits
• Isolate and restore faster than alternative solutions
• Minimize outage time and dispatch expenses
• Eliminate hospital’s need to implement downtime procedures when no SDFA was available
• Improve customer service – Resolve outages before customers call
Siemens Distribution Feeder Automation (SDFA-FLISR)
Optional PC-based HMI
Siemens Distribution Feeder Automation (SDFA-VR)

Typical Installation

Communication
(RuggedMax WiMax)
(Siemens SCALANCE WiFi)

Automatic Controllable Switchgear
- Vector OH Switch
- Capacitor Bank

Control Cabinets
- Capacitor Control
- Tap Chance & Feeder control

Automation Controllers
7SJ64 Tap Change
7SJ80 Line End, Cap, Feeder
- PLC Functionality
- IEC61850
Siemens Distribution Feeder Automation (SDFA-VR)

Typical Network Architecture
Siemens Distribution Feeder Automation (SDFA) Turnkey Design and Delivery

Project Management

Engineering

Production

IEC 61850 System Test

Support

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Siemens Distribution Feeder Automation (SDFA)
Support Services

FAT Tests

Field Startup Support

Training

After Sales Technical Support
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Why SDFA?

- Scalable: Automate in Manageable Steps
- User Friendly Programming Tools Graphic Drag / Drop
- Interoperable: Works with 3rd-party Vendor Equipment
- Performance: Operational Speed
- Optional HMI: Real-time Operational & Non-Operational
- Smart Grid Ready: Automation & Protection in Synch
Thank you for your attention!