

S&C Electric Company

Smart Grid Delegation

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Presenter Contact Information

Witold Bik

Vice President

Automation Systems Division

S&C Electric Company

Alameda, CA

E-Mail: WBik@sandc.com

Phone: 510-864-9300

Agenda

- S&C Company Overview
- History of Innovation
- S&C Products and Solutions
- Vision for Smart Grid Technology



Who Is S&C Electric Company?

- Headquartered in Chicago, Illinois, USA
- Operations in six countries
- Employee owned
- 2200 employees globally



Statement of Purpose

"Within our chosen specialty of electric power switching and protection, we will retain a pre-eminent position in the marketplace by satisfying the needs of our customers through the development and manufacture of innovative and reliable products and services that represent the best long-term value."

100 Year Heritage of Industry Leadership

Key Facts:

What We Do	Switching, protection, and control systems for electric power delivery systems
Customers	<ul style="list-style-type: none">• Electric utilities – T&D systems• Large power users (universities, factories, etc.)
Geographic Reach	<ul style="list-style-type: none">• Operations around the world, including China, Mexico, Brazil, Canada, and the UK• Headquarters and main production facilities in Chicago

S&C Electric Headquarters – Chicago, Illinois USA



Other U.S. Locations



Milwaukee, Wisconsin, USA



Orlando, Florida, USA

S&C Regional Centers

- Developed to provide local support to the region
 - stronger local support due to geographical proximity
 - local manufacturing operations provide enhanced responsiveness to customer requirements
 - products and services adapted to meet the needs of customers in that region

S&C Electric Canada Ltd.



S&C Electric (Suzhou) Co. Ltd.



S&C Electric Mexicana



S&C Electric do Brasil Ltda.



S&C Electric Europe Ltd.

Swansea,
Wales



S&C Organizational Structure

Product Divisions	<ul style="list-style-type: none">• 5 S&C business units, organized by product type and technology• Each division includes marketing, engineering, and manufacturing teams
Power Systems Services	<ul style="list-style-type: none">• Services business unit with offerings ranging from engineering services to field services
R&D	<ul style="list-style-type: none">• Develop major new product platforms• Lead advanced technology work
International Operations	<ul style="list-style-type: none">• Subsidiaries based outside U.S.• Sales team covering markets outside U.S.
Support Organizations	<ul style="list-style-type: none">• Include U.S. Sales, IT, Human Resources

The S&C Difference

- Employee owned
- Focus on employees
- Culture of diversity
- Unmatched customer support



Heritage of Innovation Sets S&C Apart

How Does S&C Provide the Best Long-Term Value in the Industry?

- A history of innovative new products and services
- Continued investment in technology
 - S&C reinvests 90% of profits back in business
- The highest-quality products and services
- Superior customer service

Investment in R&D

- Expertise in leading-edge technologies allows S&C to deliver innovative products, such as:
 - IntelliTEAM II
 - PureWave Power Electronic Switching Systems
 - PulseClosing Technology™
- S&C holds thousands of patents



Investment in Plant and Equipment

- Extensive investments in design, laboratory, and production facilities
 - computer-aided design cuts development time
 - high-voltage, chemical, mechanical, and materials laboratories prove design concepts by closely replicating field conditions
 - CNC machine tools produce parts accurately and efficiently



Quality in Design

- Quality and reliability designed into every product
- All new products undergo rigorous design testing to ensure the highest quality



Quality in Manufacturing

- All operations include quality procedures
- State-of-the-art quality assurance equipment
- Feedback mechanisms identify and correct quality issues
- Employee-driven programs focused on continuous improvement



Superior Customer Service

- Comprehensive support both before and after equipment and services are delivered
- Feedback system ensures that S&C responds to and resolves all customer issues in a timely fashion



S&C's Advanced Technology Center



- 8,000 square foot green roof
- Use of recycled content and locally produced building materials
- Holds LEED “Gold Certification” rating per the U.S. Green Building Council

- Newest company investment
- 43,000 square feet with numerous energy efficient and sustainable design features

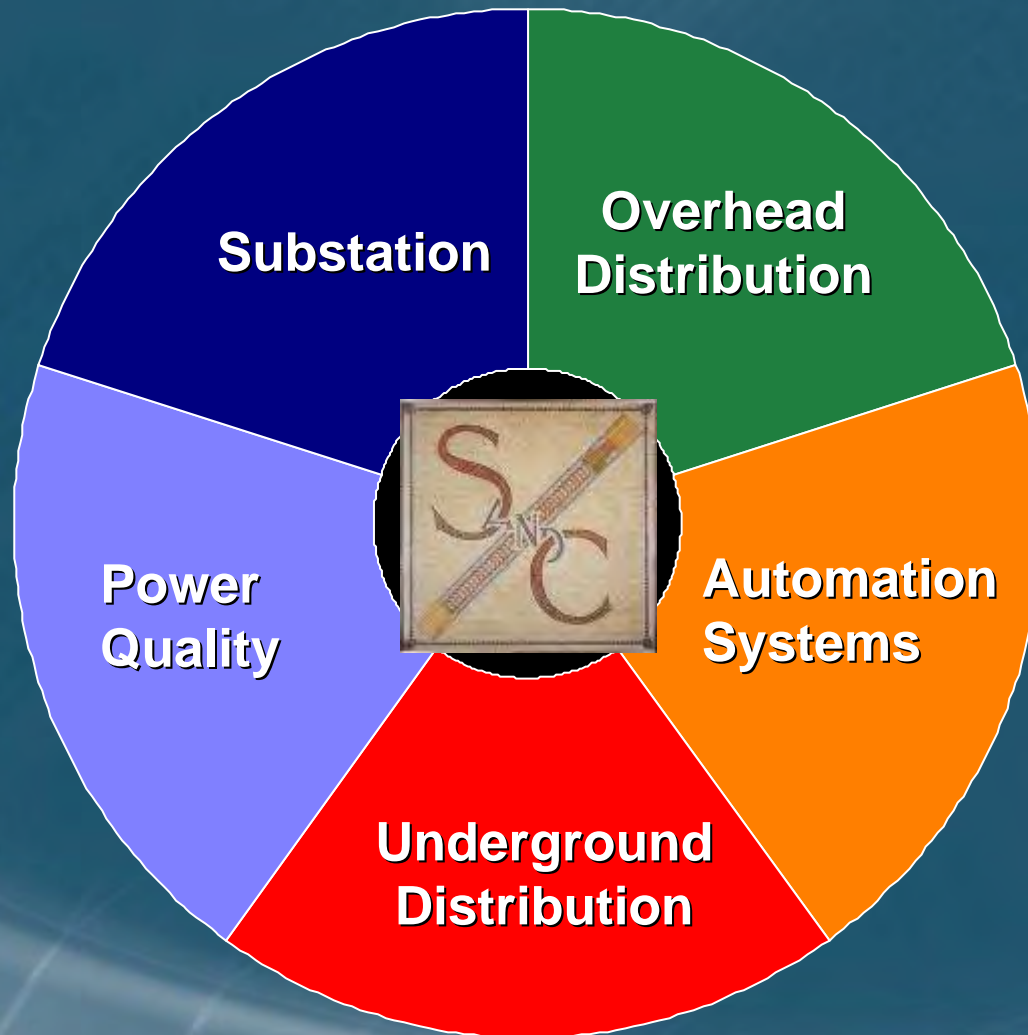


S&C's Advanced Technology Center

- Two 850 megawatt electrical short circuit test generators
- Can test up to 100 kA and up to 230,000 volts.

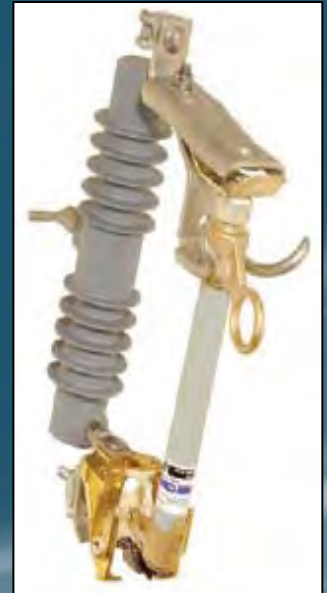


Major Product Offerings



Overhead Distribution

- TripSaver Dropout Recloser
- Power Fuses
- XS Fuse Cutouts
- Positrol® Fuse Links
- Fault Tamer Fuse Limiter
- Loadbuster Tool
- Alduti-Rupter Switches
- Omni-Rupter Switches



Underground Distribution

- Pad-Mounted Gear (live-front and elbow-connected)
- Vista Underground Distribution Switchgear



Underground Distribution

- Metal-Enclosed Switchgear
- Source-Transfer and Remote Supervisory Pad-Mounted Gear, Vista UDS, and Metal-Enclosed Switchgear



Substation

- SMD Power Fuses
- Mark V Circuit-Switcher
- Mark VI Circuit-Switcher
- Series 2000 Circuit-Switcher
- Trans-Rupter II Transformer Protector
- Circuit-Isolator II Disconnect



Automation Systems

- IntelliRupter PulseCloser
- IntelliTEAM II
- IntelliCAP and IntelliCAP PLUS Capacitor Controls
- Scada-Mate Switching System
- Scada-Mate CX Switching System
- 5800 Switch Controls
- Remote Supervisory Vista Switchgear
- Remote Supervisory Pad-Mounted Gear



Power Quality

- The broadest offering in the industry
 - PureWave UPS System
 - PureWave AVC
Adaptive VAR Compensator
 - PureWave
DSTATCOM
Distributed Static Compensator
 - PureWave Smart
Storage System



S&C Innovations Shaped Electric Delivery Systems of the Last Century



**Liquid Power
Fuse 1909**



**Circuit-Switcher
1959**



**Fault Fiter®
Electronic Power
Fuse 1982**



**Trans-Rupter® II
2000**

**Load Interrupter
Switch 1940**



**Pad-Mounted
Gear 1960**



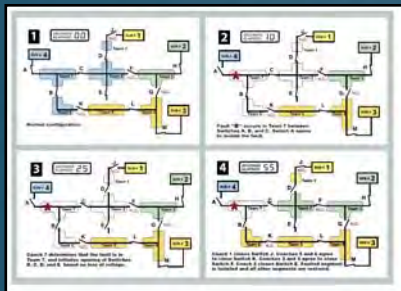
**Vista®
Switchgear 1996**



New S&C Innovations Shape Electric Delivery Systems of the Smart Grid



**IntelliRupter®
PulseCloser
2008**



**IntelliTEAM SG™
2010**



**Community
Energy Storage
(AEP) 2011**

**SpeedNet™
Radio 2009**



**Advanced
Technology
Center 2010**



Vision for Electric Delivery System

The Past: Centralized, Carbon-Emitting Sources . . .



The Future: Distributed, renewable electricity resources, and greater focus on reliability and efficiency



The Electricity Delivery System Will be More Important Than Ever in the New Era

The Problem:

Importance of reliability increasing as threats to reliability also increase

The Solution:

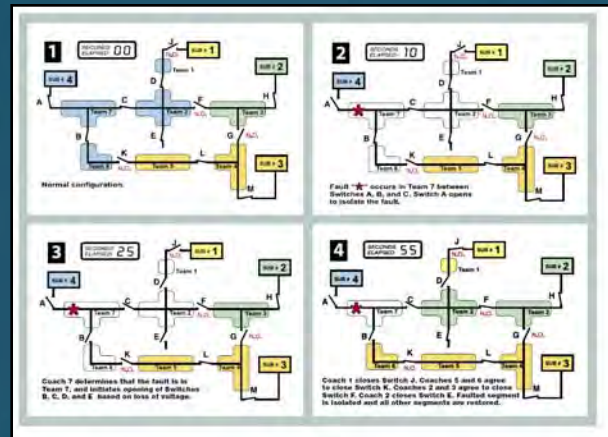
A flexible, intelligent distribution grid

S&C is Leading Implementation of Smart Distribution Grids

- Identified by DOE as one of the 7 key characteristics of the modern grid
- A self-healing grid needs three main building blocks



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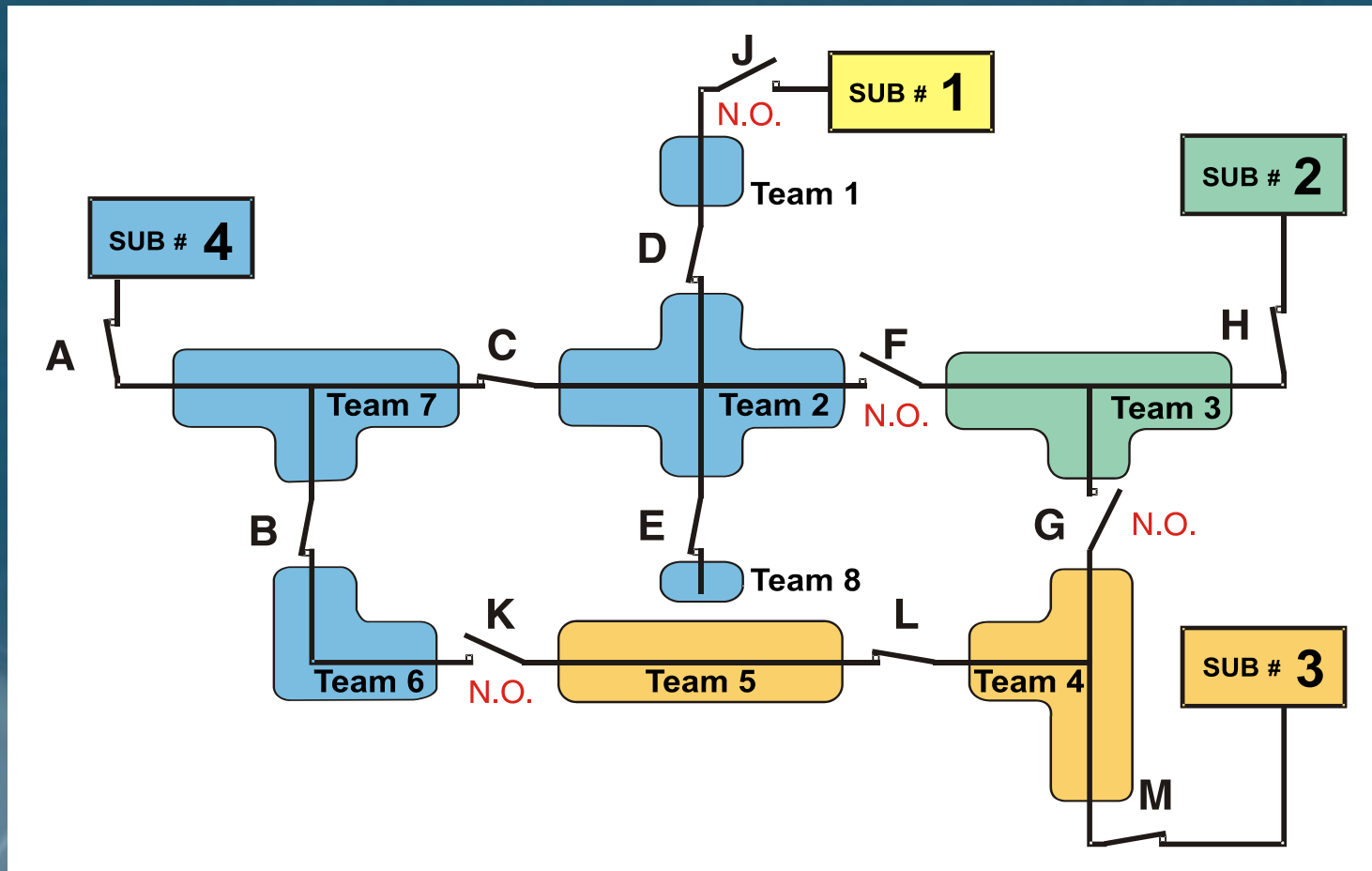


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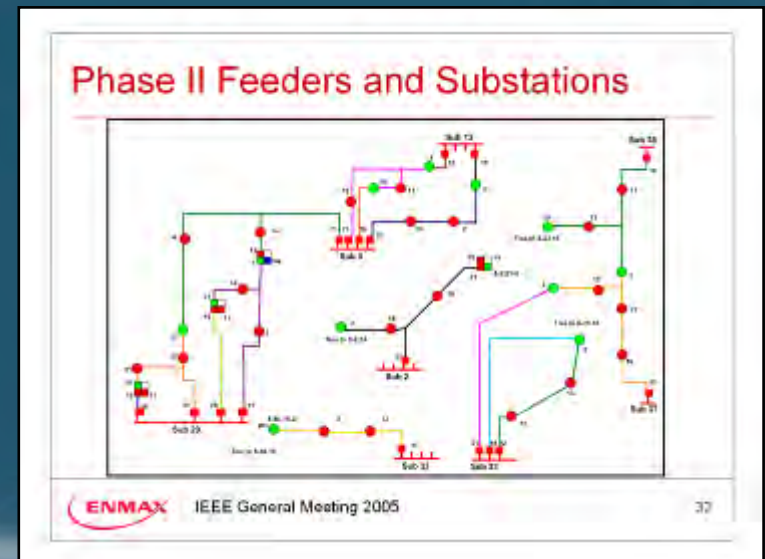
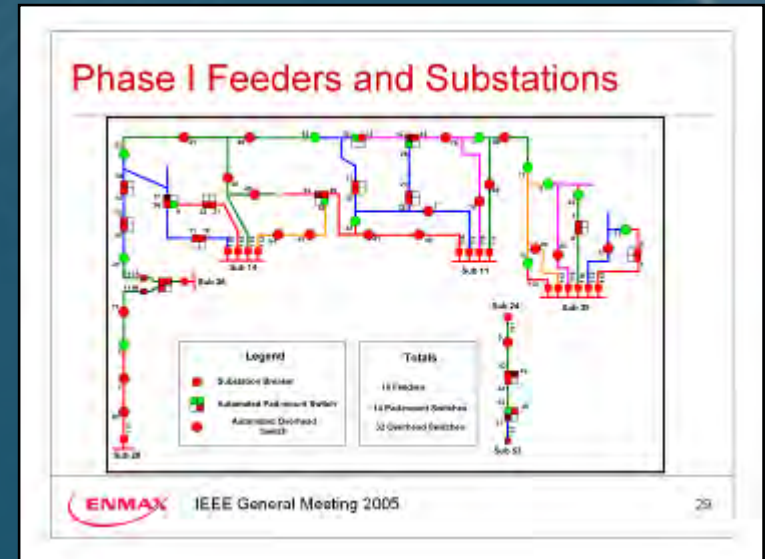
S&C is deploying complete self-healing systems
with best-in-class components

IntelliTEAM II®: The Leading Solution for the Self-Healing Grid



IntelliTEAM II Case Study: Enmax

- Multi-phase project
 - automated 66 feeders with IntelliTEAM II from 2004-2007
- Results
 - prevented an estimated 101,000 customer outages
 - saved an estimated 7,300,000 customer minutes of interruption



Unique Features Drive Unmatched Benefits

Features	Benefits
Decentralized intelligence	<ul style="list-style-type: none">• Restores electrical service faster than any other solution• Extremely reliable – no single point of failure
Works with any source	<ul style="list-style-type: none">• Integrates renewable, stored energy
Scalable	<ul style="list-style-type: none">• Easily accommodates system growth
Interoperable	<ul style="list-style-type: none">• Works with devices already on system—minimizes investment
No custom programming	<ul style="list-style-type: none">• Cost effective to deploy and maintain

Proven Automated Switching Devices

- A market leader in automated switches
 - first switch designed specifically for distribution automation:
Scada-Mate® Switching Systems
- Complete portfolio of products needed to automate distribution switching points

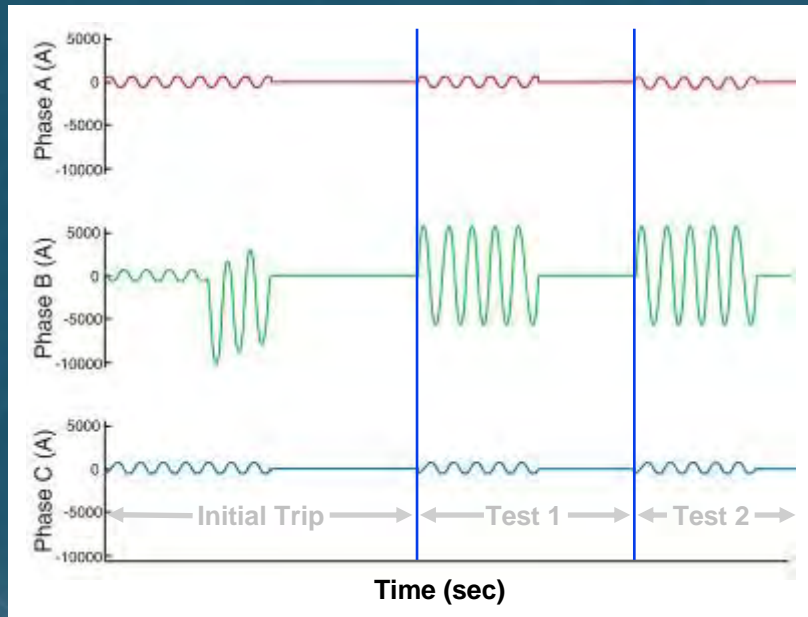


IntelliRupter[®]: A Breakthrough in Automated Switching and Protection

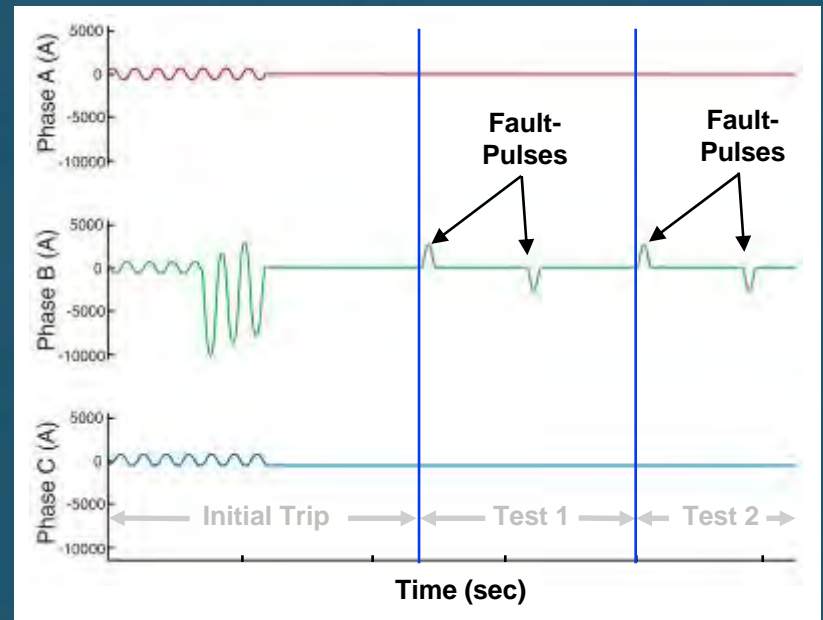


Smart Switching Device for the Smart Grid

Conventional Reclosing Versus Pulseclosing Permanent Fault on B Phase



Conventional Recloser



IntelliRupter

IntelliRupter significantly reduces impact of closing into damaging fault currents, unlike conventional reclosers

Pulseclosing Versus Reclosing

Video Demonstration at

http://www.sandc.com/products/intellirupter/intellirupter_videos.asp



Conventional recloser
testing for a fault



Using Pulseclosing to
test for a fault

Rapid Industry Acceptance

Typical Market Penetration	IntelliRupter Market Acceptance
<ul style="list-style-type: none">• Utilities purchase trial units• A few years before utilities purchase units in volume	<ul style="list-style-type: none">• Utilities purchasing IntelliRupter by the 100s . . . on their <i>first</i> order• Recently received order for 500+ IntelliRupters – largest order in S&C history• IntelliRupter a major component in plans of utilities awarded stimulus Smart Grid Investment Grants



R&D 100 Award Winner

Robust Communications a Critical Component of Self-Healing Networks

Myth:

One-size-can-fit-all for utility communications (DA, AMI, SCADA, etc.)

Fact:

Special communication requirements for self-healing applications

SpeedNet™ Radios: A Leading Solution for Self-Healing Applications

Features	Benefits
Self healing—peer-to-peer mesh network	Reliable performance even if a communication point is lost
Multi-level security	Improved performance, less susceptible to interference
Low latency	High speed communications—shorter restoration times
Assignable messaging priority	Effectively serves both AMI backhaul and DA applications

S&C Leading Integration of Stored Energy to the Grid

- Significant experience
 - leader in integrating NaS batteries
- Complete solutions
 - Smart Grid Storage Management System™
 - services including engineering studies, installation, and maintenance



S&C's Power Systems Services Ensures Optimal System Performance

Studies

- Reliability studies
- Load-flow studies
- Voltage support studies
- Short circuit studies



Projects

- Project management
- Turnkey E-P-C services
- Communication system design
- SCADA integration
- Factory acceptance testing

Field Service

- Radio site surveys
- Commissioning
- Training
- Maintenance services
- Monitoring services

S&C delivers the best total value in electric switching and protection

Visit us online at www.sandc.com



Questions?

