Substation and Distribution

AUTOMATION play

What is the VALUE PROPOSITION for our customers?

Remotely monitor and control substation and distribution assets and networks in real time to ensure fast response to events with appropriate actions and maintain uninterrupted power services. Integrate legacy devices into a modern platform to monitor and control critical systems.

What are the CUSTOMER NEEDS?

Supervisory control and data acquisition (SCADA)
Distribution management system (DMS)
Outage management system (OMS)
Cyber-secure communications for critical infrastructure
Substation automation gateway and remote terminal units (RTUs)
Intelligent electronic devices (IEDs) and controls
Smart sensors
Automatic source transfer
Volt-VAR management and integrated volt-VAR compensation (IVVC)
Fault location, isolation and service restoration (FLIR/FLISR)

What are our SUBSTATION AND DISTRIBUTION AUTOMATION GOALS?

Company FY2017 Goal:
» $970,372
NW Region Goal: » $636,329
SW Region Goal: » $79,091
NE Region Goal: » $247,967
SC Region Goal: » $6,985

» Substation automation (SA) refers to the use of data from intelligent electronic devices (IED), control and automation capabilities within the substation and control commands from remote users to control power system devices.

» SA products must enable utilities to comply with the new IEC 61850 Standard for grid integration and automation. We are also watching Open Field Message Bus (OpenFMB) to see if it gains momentum as a new communication standard.

PROPRIETARY AND CONFIDENTIAL
» Distribution automation (DA) systems are a set of intelligent sensors, processors and communication technologies downstream from a substation that enables an electric power utility to remotely monitor and coordinate its distribution assets, and operate these assets in an optimal manner with or without manual intervention.

› DA is a Smart Grid technology that can be implemented on the electric grid’s distribution system of local power lines and neighborhood substations. It often offers the greatest bang for the buck. It improves reliability with real-time monitoring and intelligent control.

› DA represents the evolution of control technologies that has taken place as computing power becomes embedded in the individual products that make up the distribution system. DA allows individual devices to sense the operating conditions of the grid around them and make adjustments to improve the overall power flow and optimize performance.

› DA automation can be a critical component in outage prevention. One of the benefits is the “asset management” angle of DA. The sensors and communications associated with DA can provide early detection of the devices that might not be working properly, allowing the utility company to replace those devices before an outright failure occurs.

› In terms of service restoration, intelligent electrical devices with DA capabilities will not only immediately identify that an outage has occurred, but will also pinpoint the specific devices that are experiencing the fault. Given this information, grid operators—in concert with their outage management system—can route around the problem and automatically restore power to the greatest number of customers and important constituencies such as first responders.

» This is an active play for all regions.

» Branches authorized for Eaton Cooper Power Systems should, in general, market those product lines.

» Branches authorized for GE should, in general, market the GE product lines.

» All branches have access to SA products from OSI but should be cautious of agency and marketing commitments with Eaton and GE when choosing a supplier to work with.

» Ask for assistance from your Business Development Manager, Sales Manager or Utility Application Engineer. It may make sense to bring the vendor in for discussions with the customer if large and true opportunities are uncovered.

» Nurture relationships at all levels of your customer’s organization.
Supervisory control and data acquisition (SCADA) transmits and receives logic or data from intelligent electronic controls (IEDs) and sensors on electrical equipment and instrumentation devices in the utility and telecommunication on industrial applications. Power system elements ranging from pole-mounted switches to entire power plants can be controlled remotely over long distance communication links. Remote switching, telemetering of grids (showing voltage, current, power, direction, consumption in kWh, etc.), even automatic synchronization is used in some power systems.

A SCADA system usually consists of the following subsystems:

» Remote terminal units (RTUs) connect to sensors and convert sensor signals to digital data. They have telemetry hardware capable of sending digital data to the supervisory system as well as receiving digital commands from the supervisory system. RTUs often have embedded control capabilities such as ladder logic in order to accomplish Boolean logic operations.

» Programmable logic controller (PLCs) connect to sensors and convert sensor signals to digital data. PLCs have more sophisticated embedded control capabilities (typically one or more IEC 61131-3 programming languages) than RTUs. PLCs do not have telemetry hardware, although this functionality is typically installed alongside them. PLCs are sometimes used in place of RTUs as field devices because they are more economical, versatile, flexible and configurable.

» A telemetry system is typically used to connect PLCs and RTUs with control centers, data warehouses and the enterprise. Examples of wired telemetry media used in SCADA systems include leased telephone lines and WAN circuits. Examples of wireless telemetry media used in SCADA systems include satellite (VSAT), licensed and unlicensed radio, cellular and microwave.

» A data acquisition server is a software service which uses industrial protocols to connect software services via telemetry with field devices such as RTUs and PLCs. It allows clients to access data from these field devices using standard protocols.

» A human–machine interface or HMI is the apparatus or device which presents processed data to a human operator, and through this, the human operator monitors and interacts with the process. The HMI is a client that requests data from a data acquisition server or in most installations the HMI is the graphical user interface for the operator, collects all data from external devices, creates reports, performs alarming, sends notifications, etc.
SUPERVISORY CONTROL AND DATA ACQUISITION

What IT MEANS

» A Historian is a software service which accumulates time-stamped data and Boolean events and alarms in a database which can be queried or used to populate graphic trends in the HMI. The historian is a client that requests data from a data acquisition server.

» A supervisory (computer) system, gathering (acquiring) data on the process and sending commands (control) to the SCADA system.

» Communication infrastructure connecting the supervisory system to the RTUs.

» Various processes and analytical instrumentation.

What TO ASK

What is your company currently using for a SCADA system?

Considering a new SCADA system, how important is scalability?

What would you think about a hosted SCADA system so you can keep your staff count low?

What types of communications security have you implemented?

» Network isolation from external attacks?

» Distributed Network Protocol (DNP) security (Secure DNP, DNP firewall)?

» RS232 serial security (encryption, authentication)?

Have you implemented any NERC CIP 5 compatible hardware devices?

Have you put any effort into substation RTU security?

How would future proofing your systems benefit you so that your systems operate and remain relevant for a longer period of time?

What system-wide device automation and integration are you utilizing?

What protocol translation issues are you experiencing?

How would your utility benefit from millisecond time tagging and IEC 61850 data quality attributes?
CUSTOMER NEEDS

SUPERVISORY CONTROL AND DATA ACQUISITION

What TO ASK

Do you need compliance reports and auditable logs?

Would it be helpful to have secure remote access and password management?

How important is the ability to retrieve fault records, sequence of events (SOE) and oscillography be to your utility?

Would you like an easier way to manage intelligent electronic devices (IED) inventory, configuration settings and firmware updates?

What’s in it FOR THEM

» **Reduce operational costs** – From remote operation of devices that would previously require a crew in-substation to instant notification of device operation or failure, SCADA can help reduce costs in both terms of dollars and time. Remote notifications can also reduce costly night-time call outs for system failures.

» **Increase equipment lifespan** – Through historical tracking of device operations and conditions, it’s possible to proactively maintain devices that would otherwise only see service on a set timeline or at time of failure. This can save on expensive post-failure repair and replacement costs and increase the overall reliability of the system.

» **Regulatory compliance** – Even though not all utilities are subject to the same regulatory requirements from various federal and state organizations, nearly all utilities are feeling pressure to provide an ever-increasing amount of information regarding the operation of their systems. SCADA can enable automatic collection and generation of these reports, easing the burden on system engineers and management for meeting these demands.

» **Streamlining system operations** – Traditional work tracking for operations can be digitized automatically as part of normal SCADA operations, allowing operators to have an electric log of all remote actions and give field crews a digital and centralized book for tracking crew activity. Remote access to the system can be provided at substations or through mobile devices.
What’s in it FOR THEM

BENEFITS

» Enhanced operational capacity – By utilizing a modern SCADA system, previously unavailable capabilities can be implemented quickly and easily. This includes capabilities such as dynamic protection reconfiguration, dynamic and centralized volt/VAR optimization, automatic fault isolation and system restoration, automatic generation control, and what-if analysis, among others. These capabilities not only increase the reliability of the network, but can also reduce the cost of operations and power-purchasing.

» Increased customer satisfaction – With all the benefits of a modern SCADA system, reductions in outage time, increased quality of service, decreased cost passed onto customers and members, there is a natural increase in customer satisfaction and a decrease in service calls and complaints.

» Future proofing – Modern SCADA platforms can help future-proof utility operations by providing a centralized system to integrate and leverage data from disparate sources such as customer information systems, geographic information systems, outage management systems and work management systems. These connections can be used to create a utility-wide operations system benefitting all departments and customers.

» And much more – With all of these capabilities, there is no utility too small or too large to benefit from a modern SCADA implementation. Even a utility with no current capabilities for telemetry can benefit from the dynamism of the interactive mapping system and operations tracking contained in a modern platform, like monarch, and can leverage the system over time to add functionality as it becomes feasible.
Yukon Visual T&D is a smart monitoring and control alternative to traditional SCADA. Many utility customers want the benefits of a SCADA system, but do not have the resources to implement a complicated project or to staff a 24x7 control room. Visual T&D provides a scalable, preconfigured, easy-to-use alternative. Yukon Visual T&D was designed from the ground up to support electric generation, transmission and distribution monitoring and control.

SMP products are designed to simplify substation integration and automation while giving clients vendor independence for:

» Protocol translation.
» Data concentration.
» System-wide device automation and integration.
» Automatic event file retrieval and file pushing.
» Remote control and pass-through.
» Data distribution.
» Substation-hardened computing.
» Substation I/O monitoring and control.
» NERC CIP-compliant security.

Today’s substation automation projects require RTUs that feature seamless network integration and minimized cabling. The SMP I/O helps trim down costs and save time by reducing both required wiring and configuration.
EnterVista Powerlink Advantage (PLA) is a human-machine interface (HMI) solution for high point count requirements providing an up-to-date, live view of the substation in near real time. The system is designed to perform “Master” functionality to one or more field devices and provides a means to remotely control and obtain data from them. As a local substation HMI, PC-based Small Master Station, PLA aggregates and intelligently presents relevant real-time and historical data in easy to understand, customizable graphical format with features such as alarm and dynamic text displays to increase operator efficiency. Key benefits include:

» Fast, easy configuration and powerful tools decrease setup and configuration effort.
» Centralized monitoring, SCADA control and data collection provides greater resource efficiency and fault analysis.
» Highly scalable system implementation capabilities with real-time data acquisition and control.
» Full integration of data into the utility enterprise including plant archives and advanced data handling capabilities and analysis.
» Centralized on-site and remote access and viewing capabilities.
» User interface presentation in multiple languages.

Powerlink Connect is a powerful HMI for substation and control room operations. Key features include:

» Real-time, dynamic data collection and display.
» Remote and secure operator supervisory control.
» High availability architecture.
» Supports dynamic configuration without system restart.
» Consistent control interfaces for different types of equipment.
» Scalable – add more device monitoring points as needed.
» Manufacturer agnostic (nonGE) equipment integration supports a range of IEDs.
» Alarm and event management.
» Historical data storage, trending and reporting.
» Mobile/web-enablement.
Open Systems International (OSI)

monarch™ is state-of-the-art, real-time system architecture for supporting high performance and mission critical applications for the monitoring, control, scheduling and optimization of complex networked operations for the electric, oil and gas, transportation and water industries.

e-scada™ is a cloud-based SaaS (Software as a Service) model that delivers SCADA services via the internet. It’s perfect for small to midsized utilities with no existing SCADA system or technical maintenance staff wanting to out-source the maintenance of their SCADA system.

Indigo™ is a state-of-the-art SCADA and HMI software product based on open industry standards and supporting Windows and Linux operating systems and OPC, DNP or IEC RTU communications protocols. Indigo is a streamlined and optimized version of OSI’s monarch™ automation platform that is installed worldwide. Indigo is configured and packaged as a focused product for small SCADA and HMI applications, substation automation, campus automation, green energy automation and as a substation and plant HMI. In functionality and features, core Indigo applications are virtually identical to the monarch platform.

OpenView™ is the graphical user interface (GUI) for monarch-based automation systems including the OSI SCADA, Energy Management, Generation Management and Distribution Management Systems, and is a subproduct to the above offerings.
OSI specializes in software and hardware products that have flexibility to add features and meet custom needs.

Border States is authorized to market OSI to all electric utilities in our entire BSE footprint to customers that have 30,000 meters or less. Opportunities need to be registered to ensure OSI has not been working the opportunity with their own sales force.

Eaton’s Cooper Power™ series offers Yukon™ Visual T&D™ which is a smart monitoring and control alternative to traditional SCADA. Many utility customers want the benefits of a SCADA system, but do not have the resources to implement a complicated project or to staff a 24/7 control room. Visual T&D provides a scalable, pre-configured, easy-to-use alternative.

The SMP offering from Eaton’s Cooper Power™ series can be utilized for local SCADA, substation-based SCADA or web HMI.

**EnterVista PowerLink Advantage (PLA)** aggregates information from gateways and field devices and intelligently presents relevant near real-time and historical data in an easy to understand, customizable graphical format with features such as alarm and dynamic text displays to increase operator efficiency.

**PowerLink Connect** from GE Grid Solutions consolidates data from all of your facility’s electrical devices into a single platform and presents it as interactive information in intuitive, easy-to-use interfaces via secure clients and mobile applications.
A distribution management system (DMS) is a collection of applications designed to monitor and control the entire distribution network efficiently and reliably. It acts as a decision support system to assist the control room and field operating personnel with the monitoring and control of the electric distribution system. Improving the reliability and quality of service in terms of reducing outages, minimizing outage time, maintaining acceptable frequency and voltage levels are the key deliverables.

What are you currently using for a DMS?

How helpful would you find it to have more automatic decision making in the field to improve reliability and quality of service?

Do you need assistance with maintaining acceptable frequency and voltage levels?

How do you handle the phone traffic during an outage? Would an automated system help manage unexpected outages better than what you can do today?

- Reduce the duration of outages.
- Improve the speed and accuracy of outage predictions.
- Reduce crew patrol and drive times through improved outage locating.
- Improve operational efficiency.
- Determine the crew resources necessary to achieve restoration objectives.
- Effectively utilize resources between operating regions.
- Determine when best to schedule mutual aid crews.
- Increased customer satisfaction.
- Improved outage communications for customer calls.
- Provide customers with more accurate estimated restoration times.
- Improve service reliability by tracking all customers affected by an outage, determining electrical configurations of every device on every feeder and compiling details about each restoration process.
Eaton’s Cooper Power™ series

Yukon Feeder Automation Software is an advanced, dynamic self-healing software system that integrates real-time data from the distribution system to detect disturbances, automatically reconfigures the system to isolate the disturbance and minimizes the total number of customers impacted. These robust, scalable solutions empower utility engineers to easily change automation settings in hours rather than months, allowing utilities to incorporate the self-healing grid as a process rather than treating reconfiguration as projects.

GE Grid Solutions

PowerOn Advantage is an advanced distribution management system featuring integrated and streamlined operations, intuitive user experience and a simplified system and modular design. Other DMS products offered by GE Grid Solutions include:

» PowerOn Control.
» PowerOn Fusion.
» PowerOn Response.
» PowerOn Restore.

Open Systems International (OSI)

Spectra DMS suite enables distribution operators to monitor the performance of the distribution system, allowing them to anticipate and respond to potential overloading and voltage quality situations with the best solutions before they become critical. The Spectra DMS suite offers the following modular applications:

» Spectra DPF™ – Distribution power flow.
» Spectra DSE™ – Distribution state estimator.
» Spectra SOM™ – Switching order management.
» Spectra FLISR™ – Fault location, isolation and service restoration.
» Spectra FR™ – Feeder reconfiguration.
» Spectra VVC™ – Volt/VAR control with conservation voltage reduction.
» Spectra OTS™ – Operator training simulator.
DISTRIBUTION MANAGEMENT SYSTEM

OSI specializes in software and hardware products that have flexibility to add features and meet custom needs. Their capabilities are absolutely incredible. It is imperative that if you have a SCADA or DMS opportunity to get the folks from OSI in to visit with the customer on a joint call.

Border States is authorized to market OSI to all electric utilities in our entire BSE footprint that have 30,000 meters or less. Opportunities need to be registered to ensure OSI has not been working the opportunity with their own sales force.

Eaton’s Cooper Power™ series offers software and hardware solutions that are smaller compared to OSI and GE Grid Solutions, and may be a great fit for smaller utilities that are not interested in a full-blown SCADA or DMS system.

While Eaton’s Cooper Power™ series does not offer a full-blown DMS solution, they do offer pieces of DMS and stand-alone apps.

GE Grid Solutions offers a broad suit of software and hardware products that appeal to larger customers.

Border States is authorized to market GE Grid Solutions to all electric utilities in the TVA footprint.
An outage management system (OMS) is a computer system used by operators of electric distribution systems to assist in restoration of power.

**What are you utilizing for an OMS?**

**Are you looking for better ways to manage and integrate your fleet of smart sensors?**

**How do you know which crews to send to each outage? Overhead crews vs. URD crews?**

**How do you find fault locations? Would it be helpful if you had a system that would assist you in finding the actual fault location quicker?**

**Is there a need to post outage updates on social medial for your customers to remain better informed during an outage?**

» Become quickly aware of who has lost power.

» Pinpoint fault locations and quickly isolate the fault.

» Assign the right crew to the job and provide the crew with accurate information.

» Document each outage job as it is worked.

» Provide timely and reliable information to internal and external stakeholders.
GE Grid Solutions

PowerOn Restore Outage Management System (OMS) supports a utility's network management and restoration process, providing dispatchers with the situational intelligence required to quickly assess critical inputs and variables to determine the best course of action. GE’s OMS helps reduce the time and resources necessary to deal with service interruptions, which improves reliability, service levels and, most importantly, increasing customer satisfaction.

Open Systems International (OSI)

Electra OMS™ is a next-generation, state-of-the-art outage management solution that empowers utilities to better manage all areas of their outage response times; keep customers, management and regulators well informed about the scope, status and forecast of restoration efforts as well as improve overall system reliability. Electra OMS bolts onto monarch™ and equips utilities with a solution that enables them to efficiently and effectively assign work to field technicians and to improve field technician utilization and productivity.

OSI offers Contract Management, which is a full-function module of Electra OMS. In addition to call entry capabilities, Contract Management interfaces with CIS, IVR, web portal and social media, allowing customers to report power outages and learn about the status in their outage job and estimated time of restoration (ETR) using their desired channels of communication.

GE Grid Solutions’ PowerOn Restore OMS reduces costs by enabling more efficient outage response and order dispatch management, especially during high-volume storm conditions.

Eaton’s Cooper Power™ series does not have a formal OMS solution, but can send data to OMS via ICCP from Gateways/Yukon GridServer.
Cyber-secure communications for critical infrastructure means that all messages to and from the substation are genuine, sent from authorized sources and do not carry malware. The messages must be communicated securely and their integrity has to be properly reconfirmed. Protecting high-voltage IEDs from unauthorized access is a challenging task in order to protect the operation of the entire power grid.

What does your utility have for an operational network or communications from your substations back to the main office?

Are your communications systems secured? Do they meet or do they need to meet current NERC CIP requirements?

How would your current communications system stack up against a modern system that was less dependent on the telephone company?

Do you have enough bandwidth to handle your traffic demands?

Is your operational network running over packet or SONET?

» If SONET When are you planning to migrate to a packet-switched network?

» If packet Have you completed the transition to a fully packet-enabled network?

› What packet technology are you using in the access portion of the network?

› What packet technology are you using in the network core?

How are you handling your teleprotection needs?

» What type of teleprotection are you running? Distance? Differential?

» What type of latency requirements do you have for your teleprotection?
CUSTOMER NEEDS

» Ensure optimal quality of experience for your customers by maintaining a high quality network.

» Determine the best strategy to replace, repair or remodel your existing OT network.

» Meet your SLAs and avoid penalties by minimizing service outages and enabling fast recovery.

» Shorten time to market (TTM) by relying on RADcare to support your operations so you can turn up new services faster.

» Plan ahead to limit your spending on support and eliminate hardware repair costs related to old equipment.

» Ensure that your communications are cyber-secure and that your OT is NERC CIP compliant.

WHAT’S IN IT FOR THEM

Eaton’s Cooper Power™ series

Substation Modernization Platform (SMP™) is the solution that simplifies all maintenance, engineering and planning of operations across the enterprise. The SMP 16 Gateway is capable of protocol translation, data concentration and distribution. It also has the functionality of a port switch with added security to connect remote users to substation devices. It is the most versatile product for improved grid management. It is easy to use and field and operator-proven, offering a cyber-secure single point of access at substation and separate network inside substation. Here’s how SMP strengthens cybersecurity:

» Ensures uninterrupted access to substation data.

» Acts as a NERC CIP electronic perimeter for all managed devices.

» Protects data flows with the built-in firewall and secure maintenance connection (TLS, formerly known as Secure Sockets Layer or SSL).

» Protects the system with built-in firewall.

» Enforces authentication with X.509 certificates.

» Secures SCADA protocol and maintenance connection using TLS 1.2.
CUSTOMER NEEDS

CYBER-SECURE COMMUNICATIONS FOR CRITICAL INFRASTRUCTURE

Yukon IED Manager Suite provides utilities with the tools necessary to manage their fleet of intelligent devices in a secure and automated manner, allowing them to:

» Keeps track of IED inventory.
» Provides compliance reports and auditable logs.
» Provides secure remote access.
» Retrieves fault records, SOE and oscillography.
» Manages device configuration settings.
» Manages passwords.
» Manages firmware and settings updates.

Yukon IED Manager Suite is composed of the following software modules:

» Pass-through Manager.
» Password Manager.
» Configuration Manager.
» Event Manager.
» Update Manager.

GE Grid Solutions

Multilin D400 offers cybersecurity features for integration into NERC CIP environments through:

» Centralized user authentication.
» Role-based access control (RBAC).
» Full auditing including syslog.
» Secure access using SSH/SCP/HTTPS.
» Secure web server and built-in firewall.
» Logging and remote archiving of Syslog data.
Open Systems International (OSI)

OSI Terminus™ is a versatile security product designed to help electric power and communications industries secure serial and network communications. It provides the required protection needed between serial devices deployed in the field and critical cyber assets installed within an electronic security perimeter (ESP). OSI Terminus is an ideal solution for electric utilities looking to protect serial and Ethernet communications to Cyber Assets under the new NERC CIP Version 5 security requirements.

SLED™ (Serial Line Encryption Device) is a complete hardware-based serial security solution within OSI’s Security Shield suite of products. SLED secures and encrypts all serial-based communications to protect against system intrusion, in compliance with evolving NERC, NIST and other security standards for critical control systems used by the electric utility, gas utility, transportation, chemical processing and other industries.

OSIRIS™ (OSI Remote Information System) is a versatile and innovative secure remote information and metering unit designed for the electric power, oil and gas, communications and water industries. The industry’s first Linux-based remote terminal unit (RTU), OSIRIS is a low-cost, flexible and expandable next-generation RTU, with unsurpassed features and functionality.

NetSwitch is capable of isolating up to 16 individual Ethernet connections and supporting speeds of up to a gigabit per second. Each channel consists of an independent physical connection between two RJ45 jacks. When set to isolate, an air gap is created and network communications are physically severed.
CYBER-SECURE COMMUNICATIONS FOR CRITICAL INFRASTRUCTURE

RAD Data Communications

**Service Assured Networking** offers the best solutions for highly reliable and cyber-secure operational networks. It provides a wealth of tools that lead the migration to packet-switched networks and meet the key requirements of power utility communications networks.

**SecFlow-2** is a ruggedized Ethernet switch/router with a unique built-in packet processing SCADA-aware engine to fit the mission-critical industrial applications. SecFlow-2 features two gigabit Ethernet ports, up to 16 Fast Ethernet ports and serial ports for legacy services. The device is designed for installation under harsh environmental conditions.

**Power Utility Solution** includes products like the ETX-5, Megaplex-4, RADview and PacketLight. Overall benefits of this package include:

» Powerful cross-generation TDM and Ethernet capabilities including TDM DS0 cross-connect and SDH/SONET, Gigabit Carrier Ethernet with OAM and assured QoS, TDM pseudowire, Ethernet over NG-PDH/SDH/SONET and OTN/DWDM.

» Complete cyber-attack prevention suite including encryption, authentication, authorization and auditing.

» Easily configurable connectivity of all serial automation and teleprotection devices to either SDH/SONET network or to a packet network.

» Supports analog and digital data and voice devices as well as Ethernet IEDs with versatile rates from RS-232 up to STM-4/OC-12 or GbE.

» Guaranteed smooth migration to PSNs based on hybrid design for reduced latency and better resiliency.

» Future-ready with virtualization capabilities for adding new applications (security, router, SCADA) using RAD’s innovative x86 D-NFV module.
Electric utilities will typically have two or more networks. The main network, referred to as information technology (IT), will handle email, VOIP, etc. The operations network, called operational technology (OT), will be separate and typically handle the AMI and SCADA systems. When approaching a customer about networking and their network, seek out the OT folks. The IT folks are not likely to be the right group to assist with Cyber-Secure Communications for Critical Infrastructure.

Border States is authorized for RAD Data Communications for our entire U.S. footprint. While we are not exclusive, opportunities can be registered to lock out potential competition and add margin to the order by securing better costs. Work with your local RAD Data Communications factory rep or Director of Channel Sales to gain assistance with account registration.

Nearly all network equipment manufacturers, vendors and end-users are putting the bulk, if not the entirety, of their investments toward packet networks.

With RAD, we can modernize our customers’ networks without a full rip-and-replace strategy in many cases. RAD has a wide variety of products that allow for the conversion to packet network and other patches that help modernize what customers already have in place.

OSI has experience in the utility communications industry and understands the protocols and the performance, reliability and recoverability required by a utility.

OSI communications products can increase the time your customer spends deploying new helpful technology and reduce the time they spend filling out NERC CIP paperwork (Technical Feasibility Exceptions).

Communications security is a great way to improve system stability and integrity, even if your customer is not concerned about directed cyber-attacks or NERC CIP compliance.
Network isolation from cyber-attacks is a novel way to defend
from security breaches. OSI can help implement a plan that keeps
your customer’s intranet working while isolating it from the outside
world in the event of a cyber-attack. This applies to any network
not just utilities.

On an ongoing basis, packet networks are more efficient because
they carry lower CAPEX and OPEX requirements.

Packet networks are more flexible and agile for greater
responsiveness to changing organizational needs and priorities.

RAD follows NERC CIP closely to ensure their products provide
the “high water mark” features needed to enable NERC CIP
compliance, and they have the tools needed to meet future
requirements. **No other competitor offers the complete
suite of tools needed**—logging, encryption, authentication,
authorization, distributed firewalls, app aware, port based rules,
intrusion detection system (IDS)—in a single suite of products
managed by a common Network Management System.
A remote terminal unit (RTU) is a microprocessor-controlled electronic device that interfaces objects in the physical world to a distributed control system or SCADA (supervisory control and data acquisition) system by transmitting telemetry data to a master system and by using messages from the master supervisory system to control connected objects. Modern substation automation devices offer a seamless and scalable solution for automating and providing visibility to power system networks and replace the traditional single protocol RTU with a complete substation gateway controller.

What device has your utility decided to standardize on for a substation automation gateway or RTU?

How are you currently getting data from your IEDs in the substation back to the main office?

Is there a need to add intelligence to your substation equipment along the lines of automatic load shedding, feeder management and/or automatic breaker control?

Do you have any legacy GE D20 RTUs that need to be replaced? If so, what have you decided to replace them with?

» Protocol translation.
» Data concentration.
» System-wide device automation and integration.
» Automatic event file retrieval and file pushing.
» Remote control and pass-through.
» Data distribution.
» Substation-hardened computing.
» Substation I/O monitoring and control.
» NERC CIP-compliant security.
Eaton’s Cooper Power™ series

Substation Modernization Platform™ (SMP™) Gateway has been recognized as one of the most efficient and reliable substation gateways on the market. It has been used successfully in thousands of substations to perform data acquisition and distribution, protocol translation and to provide secure remote access to substation intelligent electronic devices (IEDs).

Substation Modernization Platform (SMP™) 4/DP Distribution Processor is a powerful and rugged platform providing utilities with secure and reliable data acquisition and management. Its versatile and compact shape makes the SMP 4/DP an ideal tool for both inside and outside the substation fence automation and integration applications. Installed directly in protective relay enclosures or in the switchyard, this SMP Gateway provides essential communication and data concentration features.

The SMP I/O is a scalable, distributed I/O module perfectly adapted to substation automation requirements with the following benefits:
» Field-upgradeable and scalable.
» The rack-mount format with compact enclosure fits in 1U of 19-inch relay racks.
» The wall-mount format can be fixed everywhere such as cabinet walls or inside switchyard cabinets.
» Minimized configuration time when used with the SMP Gateway.

GE Grid Solutions

Multilin DGCM is a versatile field RTU that can monitor and control a wide range of pole-top, pad-mount and underground distribution assets. This compact solution is designed for easy installation on new equipment and retrofit on installed assets, making distribution modernization a cost-effective endeavor. The Multilin DGCM supports most wired and wireless communication architectures along with multiple simultaneous industry standard communication protocols, resulting in a seamless and straightforward integration into DMS, OMS and SCADA systems.

Multilin™ D400 is a secure, substation-hardened gateway that collects metering, status, event and fault report data from serial or LAN-based intelligent substation devices.
Open Systems International (OSI)

**OSIRIS™** (OSI Remote Information System) is a versatile and innovative secure remote information and metering unit designed for the electric power, oil and gas, communications and water industries. The industry’s first Linux-based RTU, OSIRIS is a low-cost, flexible and expandable next-generation RTU with unsurpassed features and functionality.

Typically installed directly in protective relay enclosures or in the switchyard, the **SMP 4/DP Gateway** is perfect for space-sensitive applications. Its two Ethernet ports enable easy integration of complex and IEC-61850-based network architectures.

The **SMP 16/CP Gateway** is the ideal first step in a substation automation project. It supports redundancy, features advanced automation functions and delivers strong security features—all in the same box.

Leverage the **SMP SG-4250 Gateway** capabilities and also use it as a substation HMI. The **SMP SG-4250 Gateway** is suited well as a GE D20/Legacy RTU upgrade solution which keeps existing wiring to reduce upgrade costs.

The **Multilin D20/D200** substation controllers offer an industry-leading design embedded with high value substation automation applications that provide cost savings, increased reliability, and improved operational efficiencies in electric power substations.

The **Multilin D25** is a scalable, flexible, modular and upgradable automation controller suitable for both large and small substation automation projects in either new or retrofit situations.

The **Multilin D400** collects data from substation protection, control, monitoring, RTU, and intelligent devices; preprocesses the data; and moves it up to EMS and DMS SCADA systems providing centralized substation management.

Many utilities rely heavily on Schweitzer Engineering Labs relays and communications equipment. **OSI** does not compete head-to-head with SEL, but instead provides unique communications products for the SCADA master station and pole-top RTU market.

**OSIRIS** functionality is expandable with off-the-shelf components. Serial expansion can occur with standard terminal servers.
INTELLIGENT ELECTRONIC DEVICES AND CONTROLS

What it **MEANS**

Intelligent electronic devices (IEDs) is a term used in the electric power industry to describe microprocessor-based controllers of power system equipment such as reclosers, voltage regulators, circuit breakers, transformers and capacitor racks and banks.

What **TO ASK**

Do you need to upgrade older recloser, regulator and capacitor controls in order to communicate with or control them?

Would you find communications to your IEDs easier if they all matched or were from the same vendor?

How do you manage the IEDs or controls on your system? Do you need software to manage them?

Would you find value in combining controls such as utilizing the triple-control function of the Cooper CL-7 series regulator control, offering one point of communication?

What’s in it **FOR THEM**

» Single-point responsibility if apparatus and controls are matched.

» Interoperability of subsystems.

» Testing developed to industry standards.

» Integration engineered in a learning organization.

» Increased reliability through continuous innovation.
CUSTOMER NEEDS

INTELLIGENT ELECTRONIC DEVICES AND CONTROLS

Yukon IED Manager Suite provides utilities with the tools necessary to manage their fleet of intelligent devices in a secure and automated manner, allowing them to:

» Keep track of IED inventory.
» Provide compliance reports and auditable logs.
» Provide secure remote access.
» Retrieve fault records, SOE and oscillography.
» Manage device configuration settings.
» Manage passwords.
» Manage firmware and settings updates.

Eaton’s Cooper Power™ series offers a wide variety of IEDs for apparatus, many of which can be retrofitted to competitors’ equipment including:

» CBS-8000 capacitor control.
» CL-7 series voltage regulator controls.
» Form 4D recloser control.
» Form 6 series recloser control.

GE Grid Solutions

The Multilin DGCC capacitor bank controller enables a utility to optimize operational planning and asset tracking through 3-phase power quality monitoring and reduce system downtime. It’s compatible with most capacitor bank switches including Cooper, Joslyn and Trinetics. And, it offers powerful I/O and programmable FlexLogic™ options for advanced automation control, reducing the need for additional programmable controllers or discrete control relays.

The Multilin DGCS is an advanced switch controller for detection of faults and controlling overhead and pad-mounted switches. It’s compatible with most switches and provides a great degree of flexibility in integrating with FDIR systems.

The Multilin DGCV voltage regulator controller enables a utility to optimize operational planning, short- and long-term load for forecasting and asset tracking through power quality monitoring.
Open Systems International (OSI)

Using a small form factor, OSIRIS is an ideal electrical power distribution/pole-top telemetry unit for both retrofit and upgrade projects. Additional applications include secure DNP gateway, protocol conversion, data concentration, mailbox RTU, equipment health monitoring and acting as an automation platform. OSIRIS can even be set up to operate as a capacitor control.

OSIRIS functionality is expandable with off-the-shelf components. Serial expansion can occur with standard terminal servers. They offer a trial unit program.

Eaton’s Cooper Power™ series and GE Grid Solutions both offer retrofit controls to modernize dated equipment for today’s communication-heavy requirements.

Eaton’s Cooper Power™ series Yukon™ IED Manager Suite (IMS) provides power system operators with a complete suite of software applications to remotely manage all installed intelligent electronic devices (IEDs).

The CBC-8000 capacitor bank control (CBC) from Eaton’s Cooper Power™ series is specifically designed to operate utility distribution feeder capacitors. This highly flexible control can be deployed using site metrology, which include voltage, VARs, current, temperature and time control configurations.

Eaton’s Cooper Power™ series offers the Form 6 and Form 6TS as well as SEL controls to help upgrade your control fleet for modern communications and protocols.

GE Grid Solutions’ Multilin DGCC capacitor bank controller is more than a simple capacitor bank control. It also provides protection, automation, metering, monitoring, communications and security.

The Multilin DGCS is capable of monitoring 3 currents and up to 6 voltages allowing for 3-phase voltage measurement on each side of the switch. It supports traditional CTs and PTs sensors as well as line post sensors such as Lindsey and Fisher Pierce.

The Multilin DGCV is compatible with many voltage regulators and can be used for the control of new regulators or easily interfaced with existing regulators in retrofit applications.
SMART SENSORS

**What it MEANS**

Smart Sensors are analog or digital transducers or actuators combined with a processing unit and a communication interface.

**What TO ASK**

1. How do you gain visibility into your distribution network?
2. Does your utility utilize faulted circuit indicators (FCIs)? Are you aware that an FCI is really a smart sensor?
3. Would you find it helpful to have FCIs that can bring information back to the office rather than forcing you to drive around and look at or for them.
4. Is your utility running into system capacity issues where sensors could assist with bringing real-time loading data back?
5. What is your utility using to reduce outage duration?

**What’s in it FOR THEM**

- Reduce customer outage minutes, operating costs and maintenance costs.
- Increase network capacity.
- Deliver extended visibility into the distribution network with end-to-end solutions.
- Reduce cost of ownership because many sensors are designed for easy installation on live networks.
- Meet the challenges of capturing faults in both low and high impedance fault conditions.
- Receive time synchronized data with measured data (also available in DNP3 format).
- Enable further application development and compliance with regulatory and operational requirements with remote firmware upgrades.

**DETERMINE NEEDS**

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**SMART SENSORS**

**Eaton’s Cooper Power™ series**

GridAdvisor Series II smart sensors are simple yet sophisticated devices that can announce directional fault targeting, detect capacitor bank fuse failure and provide real time line monitoring at nearly any location via DNP3 protocol. These smart sensors save both operation and maintenance dollars by reducing drive time and maximizes energy dollars by keeping capacitors online, operating at peak efficiency.

Yukon GridServer Software can concentrate from a few to thousands of sensor connections that exist into a more manageable data connection for DMS/OMS/SCADA/Historian using DNP3 or inter-control center communications protocol (ICCP). The software also provides user administration tools allowing multiple working groups to leverage the same IT infrastructure.

**GE Grid Solutions**

Multilin Intelligent Line Monitoring System provides situational awareness along distribution feeders enabling distribution utilities to operate and respond based on prevailing conditions. The system provides utilities with high quality, time coherent data throughout their distribution networks, allowing them to improve performance, reliability and efficiency.

**Power Delivery Products (PDP)**

FCI DA solution can be broken down into three main components: Smart Navigator (faulted circuit indicator sensors), data receiver and a standard protocol.

Smart Navigator LM faulted circuit indicator (FCI) is designed and engineered for overhead Smart Grid distribution automation applications. It’s installed on overhead distribution circuits up to 46 kV and transmits event-based fault status information in addition to continuous circuit data. It can be integrated into an existing Smart Grid system and operate in different communication environments such as cellular, SCADA or radio.

DNP Receiver, which can be mounted on a pole or within other SCADA equipment (e.g. motor operated switches or RTUs), collects and manages all Smart Navigator LM data as an access point into a communication environment.
The Smart Navigator HV directional FCI can operate as a stand-alone device on network circuits up to 161 kV or be integrated into an existing Smart Grid system leveraging various communication environments for OMS and SCADA applications.

Underground FCI DA Smart Navigator solution is an innovative underground DA FCI solution. The Smart Load Tracker is designed to reduce customer outage minutes, operating cost and maintenance cost over many years of service. It also provides valuable information that can be used to improve the reliability and efficiency of the distribution network. Like the Smart Navigator overhead DA solution, the underground offering also integrates into existing utility systems via standard interfaces. The Smart Load Tracker solution provides the intelligent identification and reporting of faults as well as information to help with monitoring distribution lines.

The Smart Receiver DNP3 Configuration Program is a Windows-based tool to configure the DNP Receiver. The DNP Receiver is the interface between the Smart Navigator overhead and Smart Load Tracker underground faulted circuit indicators and the utility head-end system (e.g. SCADA, OMS, DMS). By providing full customization of the DNP Receiver, users can easily create a distribution automation application to monitor and alarm on faults and other DNP3 points measured by the faulted circuit indicators.
SMART SENSORS

What’s UNIQUE

Smart sensors help utilities improve the efficiency in which they operate their distribution systems by improving outage management and capacitor bank maintenance while providing critical system information not previously available.

Eaton’s Cooper Power™ series offers the GridAdvisor Series II smart sensors, which are an easy way to gain SCADA visibility across the power distribution network.

Multilin Intelligent Line Monitoring System can be used for enhanced network visibility, reduced outage duration and increased network capacity.

The PDP DNP3 Communicator has an extensive list of communication systems (i.e. Silver Spring Networks, Landis+Gyr, Flex Net, SpeedNet, cellular and many others) that have been utilized for data communication backhaul to a central application.

The DNP3 Mapping Test tool provides an easy method to verify end-to-end data flow from the DNP receiver to any headend system. Through the tool, every active DNP3 point in the receiver can be triggered and given a specific data value to ensure it is mapped correctly into other systems.
AUTOMATIC SOURCE TRANSFER

**What it MEANS**
Automatic source transfer is an electrical switch that switches a load between two sources. Some transfer switches are manual, in that an operator makes the transfer by throwing a switch, while others are automatic and switch when they sense one of the sources has lost or gained power. An automatic transfer switch (ATS) is often installed where a backup generator is located so that the generator may provide temporary electrical power if the utility source fails. The utility may also pick up temporary power from a designated feeder from a different substation or utility.

Hospitals, pumping stations, shopping malls, auditoriums and many other commercial, institutional and industrial power users require a high degree of service continuity for their critical loads. System reliability studies have shown that the power sources serving these facilities constitute the major cause of service interruptions as a result of their extensive exposure to lightning, wind, and ice as well as dig-ins and equipment failure.

**DEFINITION**

**What** TO **ASK**
Does your utility serve any hospitals, factories, retirement homes or other critical loads that would require automatic source transfer?

Does your utility have any looped feeders that would benefit from being back-fed during a planned or unplanned outage?

Are there areas where you utility could use assistance with system reliability?

**BENEFITS**

» Increased system reliability.
» Increased customer satisfaction.
» Provide power to the right businesses during times of emergency.
» Utilize looped feeders for the benefit of your members.

**DETERMINE NEEDS**

**What’s in it FOR THEM**

Increased system reliability.
Increased customer satisfaction.
Provide power to the right businesses during times of emergency.
Utilize looped feeders for the benefit of your members.
CUSTOMER NEEDS

AUTOMATIC SOURCE TRANSFER

Eaton’s Cooper Power™ series

Yukon™ Feeder Automation software includes a graphical user interface, object-oriented configuration, a simulator, communications dashboard and post-event traceability, allowing users to turn distribution automation into an integrated process. Standard functionality includes:

» Fault isolation and reconfiguration.
» Loss of source voltage reconfiguration and automatic return.
» Setting profile management for multiple system configurations.
» System miscoordination correction.
» Movable open points so the system can be activated in any configuration.
» Loss of voltage reconfiguration for open conductors.
» Manual/SCADA initiated return-to-normal.

PST switchgear with iST control is a compact, outdoor, self-contained system ideal for critical medium voltage loads including healthcare facilities, data centers, broadcast studios and production facilities that require highly dependable power for continuous, optimum operation.

Automatic Source Transfer (AST) application automatically transfers to an alternate source for critical loads when a loss of voltage event occurs. Form 6 controls communicate via PeerComm, the high-speed, peer-to-peer protocol from Eaton’s Cooper Power™ series. Multiple communications options are available, allowing reclosers to be several miles apart. Automatic source transfer allows Form 6 controls to retain their overcurrent protection capabilities.

Open Systems International (OSI)

Spectra FR, which is a component of OSI’s Spectra DMS suite, analyzes the impact that possible alternative switching steps may have on the equipment loading and system voltage levels at the time of switching and for a user-defined period of time into the future. This gives the operator the best alternative feeder configuration procedures and can be configured to automatically execute switching steps when field switching devices are remotely controlled.
Yukon Feeder Automation (YFA) software is the Smartest Grid solution for self-healing networks and is generations ahead of currently available peer-to-peer solutions.

Eaton’s Cooper Power™ series Automatic Source Transfer (AST) is ideally designed to protect critical loads that cannot tolerate a sustained loss of voltage event.

The PST system provides immediate action, in six cycles or less, for multiple functions including:

» Automatic transfer between the primary source and alternate utility source with preferred source selection.

» Automatic transfer between the primary source and backup generation with the ability to start up and shutdown a backup generator.

Utilizing power flow analysis and advanced analytics, Spectra FR determines an optimal switching solution that balances substation/feeder equipment loading, improves system voltage levels and reduces system losses. Spectra FR can be scheduled to run periodically, on demand by the operator or triggered to run whenever a reconfiguration of the system occurs or when an unacceptable overload situation is detected. Additionally, Spectra FR can be run to determine the best configuration of the distribution system to reduce losses for a user-specified period of time.
VOLT-VAR MANAGEMENT AND INTEGRATED VOLT-VAR COMPENSATION

**Definition**

Volt-VAR management refers to the process of managing voltage levels and reactive power (VAR) throughout the power distribution systems. These two quantities are related because as reactive power flows over an inductive line (and all lines have some inductance), that line sees a voltage drop. VVC encompasses devices that purposely inject reactive power into the grid to alter the size of that voltage drop in addition to equipment that more directly controls voltage.

Integrated Volt-VAR compensation (IVVC) is an advanced function that determines the best set of control actions for all voltage regulating devices and VAR control devices to achieve a one or more specified operating objectives without violating any of the fundamental operating constraints (high/low voltage limits, load limits, etc.). IVVC operating objectives may include:

- Minimal electrical losses.
- Minimal electrical demand.
- Reduced energy consumption.
- Weighted combination of the above.
- Verify and validate optimization model by comparing actual and estimated values.

What it Means

**Determine Needs**

What are you doing along the lines of conservation voltage reduction (CVR)?

Does your utility need any type of Volt/VAR management solution?

Are you looking for a more robust, integrated volt-VAR compensation platform?

Does your utility have capacitors installed? Do you know if they are online or helping your system in any way?

Would your utility benefit from software and systems that could manage all of your capacitors and voltage regulators?
VOLT-VAR MANAGEMENT AND INTEGRATED VOLT-VAR COMPENSATION

CUSTOMER NEEDS

What’s in it FOR THEM

» The operational benefits are improvements in energy efficiency and system voltages in the distribution system.

» The business benefits are a greater percentage of energy is delivered to paying customers, deferment in investment in peaking generation plants and charges, and a reduction in the environmental impact of energy delivery.

» Managing distribution system voltages reduces demand and energy consumption, providing significant energy savings at system peaks.

WHICH VENDORS to use

Eaton’s Cooper Power™ series

Eaton’s Cooper Power™ series offers a full suite of power quality software and apparatus to support a Volt/VAR management solution, including:

- Single and multiphase voltage regulators.
- CL-7 voltage regulator controls.
- Capacitor banks.
- CBC-8000 capacitor bank control.
- Yukon™ Volt/VAR Management Automation Software.
- CYME™ power engineering software.

Yukon Volt-VAR Control (VVC) application minimizes system VAR flow to eliminate system losses. The net result is improved energy efficiency and feeder voltage profiles.

Yukon IVVC application has built in conservation voltage reduction (CVR) features that can be implemented on demand by system operators to avoid peak demand charges or the operation of peaking generators. The Yukon IVVC application monitors real-time voltages, watts and VARs from LTCs, regulators, capacitors, medium voltage sensors and additional monitoring points such as customer meters.
CUSTOMER NEEDS

VOLT-VAR MANAGEMENT AND INTEGRATED VOLT-VAR COMPENSATION

GE Grid Solutions

The IVVC application within PowerOn Control recommends optimal control of shunt capacitor banks on feeders and in the substation, transformer and line regulator tap positions and/or their automatic voltage regulator set points. IVVC’s main objectives are the following:

» Conservation voltage reduction, which uses voltage reduction to minimize total energy consumption or to shave off the load peaks during periods of high demand. This minimization is achieved via feeder voltage reduction without violating customer voltage limits and other constraints such as maximum number of device operations per day. The application automatically takes into account abnormal network topologies.

» Loss minimization minimizes technical losses by switching capacitors to minimize VAR flows on feeders and respecting power factor limits set by transmission operations.

» IVVC recommendations can be issued automatically and directly to control field equipment.

Open Systems International (OSI)

Spectra VVC empowers utilities to reduce system losses, release system capacity, improve voltage levels and implement conservation voltage reduction (CVR) with intelligent and optimum management of reactive resources. Spectra VVC monitors distribution system voltage profiles and power flows and controls capacitor banks, voltage regulators and distribution substation transformer LTCs to achieve the objective of the desired Volt/VAR control strategy. Control strategies supported by Spectra VVC include:

» Management of reactive power flows.
» Management of system power-factor.
» Management of voltage levels.
» Minimization of system losses.
» Conservation voltage reduction (for demand reduction).
VOLT-VAR MANAGEMENT AND INTEGRATED VOLT-VAR COMPENSATION

**What’s UNIQUE**

**Yukon Integrated Volt/VAR Control software** is a standalone “best in class” application for IVVC/VVO/CVR.

**Spectra VVC** from OSI enables utilities to best levelize feeder voltage profiles, provide reactive power support and reduce system load while ensuring that adequate voltage levels are maintained at the end-of-line customers.

Utilities have in the past and are currently deploying field apparatus, controls, software and communications products to manage distribution system VAR flow to minimize technical losses and exposure to VAR support charges from generation and transmission providers. Increasingly, utilities are also looking at products to manage distribution system voltages to reduce demand and energy consumption and achieve significant energy savings.

Conservation voltage reduction (CVR) strategies reduce demand and energy consumption while maintaining customer voltage power quality per established standards. The operational benefits are improvements in energy efficiency and system voltages in the distribution system. The business benefits are a greater percentage of energy delivered to paying customers, deferment in investment in peaking generation plants and charges, and a reduction in the environmental impact of energy delivery.
Fault location, isolation and service restoration (FLIR/FLISR) technologies and systems involve automated feeder switches and reclosers, line monitors, communication networks, distribution management systems (DMS), outage management systems (OMS), supervisory control and data acquisition (SCADA) systems, grid analytics, models and data processing tools. These technologies work in tandem to automate power restoration, reducing both the impact and length of power interruptions.

**What it MEANS**

- Fewer customers are impacted by a fault because the trouble area is automatically isolated.
- The associated customer minutes of interruption are reduced because they are transferred to adjacent circuits.
- Crews are able to locate the trouble spots more quickly, resulting in shorter outage durations for the customers impacted by the faulted section.

**What TO ASK**

- What are you doing to actively reduce the number of customers affected by outages?
- What are you doing to actively reduce the impact felt by customers affected by outages?

**DETERMINE NEEDS**

**DEFINITION**

Fault location, isolation and service restoration (FLIR/FLISR) technologies and systems involve automated feeder switches and reclosers, line monitors, communication networks, distribution management systems (DMS), outage management systems (OMS), supervisory control and data acquisition (SCADA) systems, grid analytics, models and data processing tools. These technologies work in tandem to automate power restoration, reducing both the impact and length of power interruptions.

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**Eaton’s Cooper Power™ series**

Form 6-LS microprocessor-based, pole-mount recloser control is designed for use in distribution feeder loop sectionalizing schemes, providing the reliable automation tools needed for substation and line applications.

Form 6-LS pole-mount recloser control provides extensive system protection functionality including phase, ground and negative sequence overcurrent protection; over/under frequency protection; voltage protection and sync check.

**GE Grid Solutions**

Multilin D400-DA is a substation-based FDIR/FLSIR unit that features:

- Automatic control and operator-assisted reconfiguration modes of operation.
- Integrates control into SCADA or DMS systems, or operates as a complete standalone solution.
- Email notification to operations and field crew notifying of fault location, reconfiguration actions taken and KW of customers still without power.
- Supports advanced D400-DA Gateway functionality for integrating substation and distribution field equipment.

**Open Systems International (OSI)**

Spectra FLISR, which is a component of OSI’s Spectra DMS suite, enables utilities to reduce outage durations and avoid accidental overloading of the damage to distribution system assets and unacceptable voltage levels. Spectra FLISR utilizes fault data and the real-time distribution system model to locate faults and determine the switching steps required to isolate damaged or faulted distribution system equipment and alternative switching procedures to restore service to unfaulted sections of the system.

This module analyzes the impacts that potential alternative switching steps may have on the equipment loading and system voltage levels at the time of switching and for a user-defined period of time in the future, presenting the operator with the best alternative restoration procedures.
FLISR implementation involves greater automation and integration than traditional technologies and systems—making resources, time, and corporate commitment key elements of success. Automated devices typically need more frequent firmware and software upgrades than traditional utility equipment. Standard templates from vendors typically require customization to meet each utility's unique distribution system configurations and integrate effectively with existing SCADA systems, OMS and DMS.

An essential component for successful FLISR operations is the communications network for remote monitoring and control of technologies and systems. FLISR communication networks require increased resilience because they must operate under conditions where the grid itself is damaged or not functioning properly. The two-way communications network must have sufficient coverage and capacity to interface and interoperate with a wide variety of technologies and systems including various field devices and DMS, OMS and SCADA systems.

**Spectra FLISR** can be configured to automatically execute the isolation and restoration switching steps when telemetered fault location data is available and field switching devices are remotely controlled.

GE Grid Solutions' **Multilin D400-DA** monitors and controls breakers, protection relays reclosers, recloser controllers, switches and switch controllers as well as faulted circuit indicators.

The **Multilin DGCS** is an advanced switch controller for detection of faults and controlling overhead and pad-mounted switches. The **DGCS** is compatible with most switches and provides a great degree of flexibility in integrating with FDIR systems.
APPLICABLE FOR ALL CUSTOMER NEEDS

Blog posts
Substation and Distribution Automation
Educate customers about the advantages of automating substation and distribution systems.

Sales tool
Quick Start Guide to Smart Grid Success
Learn about systems that will transform our aging electric infrastructure into a modern, intelligent grid. Internal only.

Sales tool
Rural Smart Grid Report Presentation
Review smart grid survey results of U.S. rural electric cooperatives regarding challenges for smart grid initiatives. Internal only.

CYBER-SECURE COMMUNICATIONS FOR CRITICAL INFRASTRUCTURE

Sales tool
RAD's Offering for Electric Utilities Presentation
The file is internal, but you can use the slides to build a sales presentation in a Border States PowerPoint template.

Sales tool
RAD Training Presentations
Learn about RAD's product offerings to prepare for sales calls. Internal only.

Video
RAD's Cybersecurity by Design Solutions Training Presentation
View this video to prepare for a sales call. Internal only.
SMART SENSORS

Sales tool
GridAdvisor™ Series II Smart Sensor Training Presentation

View this presentation to prepare for a sales call. Internal only.

FAULT LOCATION, ISOLATION and SERVICE RESTORATION

White paper
Fault Location, Isolation and Service Restoration Technologies Reduce Outage Impact and Duration

Learn about FLISR technologies and systems with this U.S. Department of Energy report.
## VENDORS

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### When to **USE RESOURCES**

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<td>Share software that supports our value proposition.</td>
<td>Present our value proposition and gain a sale.</td>
<td>Introduce your customer to services we provide.</td>
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<th><strong>Customer profile persona</strong></th>
<th><strong>Service flier</strong></th>
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<td>Share messages that address your customers’ needs.</td>
<td>Plan who to approach and how you should approach them. Internal only.</td>
<td>Demonstrate the value of services we provide.</td>
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<th><strong>Case study</strong></th>
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<td>Validate how the service can save your customer money.</td>
<td>Demonstrate the value of products we carry.</td>
<td>Share messages that address your customers’ needs.</td>
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<tr>
<td>Help close the sale by providing a catalog of the products your customer needs.</td>
<td>Introduce your customer to products we carry.</td>
<td>Share information from the vendor.</td>
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<td>Review to ensure you’re prepared and ready for a sale. Internal only.</td>
<td>Identify customer needs and prepare for sales calls. Internal only.</td>
<td>Explain how your customer can overcome challenges with the right solution.</td>
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