



Newton-Evans Research Company's

Market Trends Digest

March 2014



- 2 World Market for Substation Automation & Integration 2014-2016
- 7 Three Important 2014 Acquisitions: ACS, Reason Technologia, Industrial Defender
- 13 Distributech 2014: Review of Mega Panel Session 5
- 14 U.S. Market Overview Series: 2014-2016
- 15 New York ISO to Host EMMOS Event

World Market for Substation Automation & Integration 2014-2016

In the first week of March Newton-Evans Research Company completed its final research efforts leading to the publication of its 4-volume global market study, "Worldwide Market for Substation Automation and Integration Programs in Electric Utilities: 2014-2016."

North America survey

The Newton-Evans 2014 sample of 77 North American electric utilities for this study represents a total of at least 32,594,000 end-use customers, 2,019 transmission substations and 7,649 distribution substations in the United States and Canada. The sample distribution of North American utilities in this study is similar to previous year studies. About one-fifth of the responding utilities are U.S. Investor-owned, 36% are public power utilities, 32% are cooperatives and 12% of the respondents in the sample are Canadian provincials and municipals.

International survey

Thirty-two electric power utilities from outside the U.S. and Canada participated in the international five-page survey, which was conducted in 4th quarter of 2013 and 1st quarter 2014. Accompanying the information gathered in this survey are key findings from 5 other Newton-Evans studies on substation-related topics. Overall, a total of 96 unique utilities located in 57 countries around the world participated in one or more sections of the substation modernization study.

Here are some more excerpts from the report series.

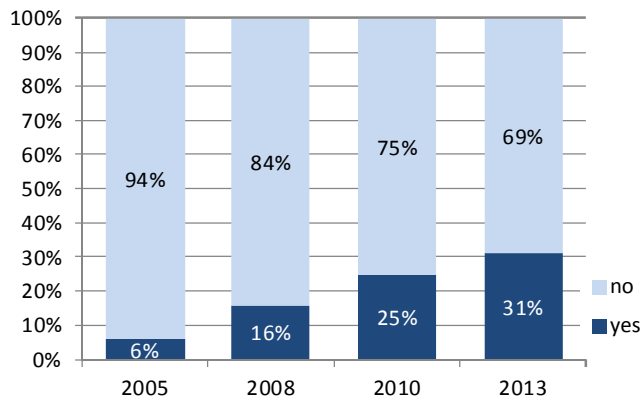
Encryption of Substation Communication Protocols On The Rise in North American Electric Utilities

There is an increasing trend in North America of encrypting substation communication protocols. Here are a few observations:

1) Out of 59 North American electric utilities responding to the survey question, "What protocols do you use within the substation, between substations, and from the substation to the external host or network?" forty-five said they currently use DNP3 (serial) and 28 said they use DNP3 LAN (TCP or UDP) within the substation. For communication from substation to substation, 16 said they use SEL protocols and 21 said they use a version of DNP3. For communication from substations to the external host or network most respondents use a version of DNP3.

2) When asked the follow up question, “Are these protocols encrypted?” sixty-nine percent (41 out of 59) said “No.” This is still very high, but the Newton-Evans survey has found that every few years more and more North American utilities are using encryption.

Encryption of Substation Protocols (North American Utilities)



The reports provide further details on where encryption is used.

Outside the U.S. and Canada: IEC 61850 cited as main choice of protocol within the substation

Within the substation, international utility respondents cited use of IEC 61850 as well as the variants for IEC 60870-5. Followed by Modbus (serial, LAN and Plus) versions. For the minority of utilities performing any peer-to-peer substations communications, IEC 60870-5 -101 and -104, led in mentions. These were closely followed by SEL mirrored bits, and by DNP 3. Growth in use of IEC 61850 for peer-to-peer communications is planned by this group of respondents. IEC 60870 variants were also the most widely used protocols for substation-to-control center communications internationally. Some DNP and common legacy protocols were also being used for substation-to-control center communications.

Potential obstacles to implementing substation automation and integration for both new and retrofit substations through year-end 2016

Similar to findings reported in the 2011 study, very few utilities ranked any of the listed “potential obstacles” as a “5.” Of all the listed challenged, the two that least stand in the way are “Lack of appropriate communications technology inside the fence” and “Lack of appropriate communications technology substation to master.” Over 60% of respondents ranked these a “1” (“doesn’t stand in our way.”)

For new substations, “security concerns” was rated a “4” by 4 out of 31 respondents, as were “Not enough skilled internal staff” and “Substation

equipment vendor community will not have required “open” products and equipment by year end 2016.”

North America: Please rank the significance from 1 to 5 for all of the following listed “potential obstacles” to implementing substation automation and integration for both new and retrofit substations through year-end 2016.

Use: “1 = doesn’t stand in our way” to “5 = formidable obstacle.”

Rank→	New Substations					Retrofitted Substations				
	1	2	3	4	5	1	2	3	4	5
Lack of appropriate communications technology inside the fence	69%	20%	5%	3%	3%	48%	23%	14%	8%	6%
Lack of appropriate communications technology substation to substation	52%	23%	8%	7%	11%	47%	17%	17%	6%	13%
Lack of appropriate communications technology substation to master	53%	25%	11%	4%	7%	44%	27%	17%	6%	5%
Not enough skilled internal staff	28%	29%	24%	15%	4%	27%	31%	26%	13%	3%
Benefits do not outweigh the costs	31%	32%	17%	11%	9%	26%	31%	17%	12%	12%
Uncertain management philosophy concerning substation automation at this time	39%	23%	23%	11%	5%	34%	25%	22%	12%	8%
Substation equipment vendor community will not have required "open" products and equipment by year end 2016	51%	31%	16%	0%	3%	44%	30%	21%	0%	4%
Economic and business justification case has not been made on behalf of substation automation programs here	37%	20%	21%	15%	7%	31%	22%	23%	17%	6%
Lack of funding	29%	27%	23%	15%	7%	25%	25%	25%	14%	12%
Lack of standard products	36%	41%	15%	7%	1%	35%	36%	17%	8%	4%
Security concerns	27%	25%	27%	12%	8%	27%	26%	23%	16%	8%
Waiting for clarity of standards& regulatory documents	40%	31%	20%	5%	3%	38%	30%	19%	8%	4%
Ability to integrate SA products w/ existing corporate infrastructure	29%	27%	20%	15%	7%	27%	32%	16%	14%	9%

Just as in 2011, North American utilities seem to be least concerned with “lack of appropriate communications technology inside the fence.” For new substations, 69% of respondents said this “doesn’t stand in our way,” and for retrofitted substations, 48% said the same. “Lack of funding” for retrofitted substations remains as a potential obstacle, with 51% rating it a 3 or higher. This was also the chief obstacle in 2011, although “security concerns” was rated a 4 or higher by 33% of the same group. The current survey shows only 20%-24% of utilities in the sample rating “security concerns” a 4 or higher.

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Smart grid? Get market smart.

Since 1978, NEWTON-EVANS RESEARCH COMPANY, INC. has been conducting business-to-business market research focused on energy industry automation, information technology, and infrastructure topics such as Smart Grid. We also provide business consulting services for clients in the computer, communications, control systems and engineered products areas. Newton-Evans is recognized as a world leader in research of the electric power delivery industry's use of computers, communications, control systems, and technical equipment and products.

Newton-Evans Research Company is a member of the American Marketing Association (AMA), The Council of American Survey Research Organization (CASRO), the Institute of Electrical and Electronics Engineers (IEEE), CIGRE, and the Utilities Telecom Council (UTC). Newton-Evans Research is an associate member of the National Electrical Manufacturers Association (NEMA).

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Our Take on Three Important Early 2014 Acquisitions: DMS/SCADA Business (Advanced Control Systems), Protection and Control (Reason Tecnologia), Cyber Security for Industrial Control Systems (Industrial Defender)

By Chuck Newton

This article focuses on three first quarter 2014 acquisitions of leading mid-sized companies (each with about 100-150 employees and similar revenue levels) serving three somewhat different but certainly overlapping segments of the electric power T&D modernization business and addressing three different but overlapping regional markets. One is a capable developer of complex operational control systems with very good manufacturing capabilities; the second is primarily a capable manufacturer of complex products (substation IEDs and specialty meters), having some systems capabilities. The third is a provider of both SCADA via its RTAP business unit and is a leader in cyber security products and solutions for electric power and other industrial control systems.

These companies are:

- 1) Advanced Control Systems in Norcross, Georgia, USA
- 2) Reason Tecnologia in Florianopolis, Brazil
- 3) Industrial Defender in Foxborough, Massachusetts, USA

All three firms are involved to some degree in substation automation and/or SCADA and cyber-security activities, the theme of this edition of Market Trends Digest. ACS and Industrial Defender are providers of ruggedized SCADA/DMS systems to electric power utilities and other industrial SCADA user segments. Reason Tecnologia is a provider of recording, monitoring and protection-related instruments and devices.

Let's take a closer look at the impact these acquisitions may have for the electric power and related industrial control systems community.

ADVANCED CONTROL SYSTEMS: Earlier in March, 2014, Falfurrias Capital Partners, a Charlotte-based private equity firm, acquired Advanced Control Systems (ACS), a major supplier of utility automation systems primarily addressing the U.S. community of mid-size electric power utilities. For the most

recent six years or so, ACS had been part of the EFACEC Group, after having been sold by the company's retiring founder. ACS now joins Instrument Transformer Equipment Corporation (ITEC) as part of North American T&D Group, formed by Falfurrias in 2013 to acquire and grow U.S. companies that support mission-critical elements of the electric utility grid.

Established in 1975, Advanced Control Systems manufactures and delivers products and systems that control key functions relating to the transmission and distribution of electric power, including supervisory control and data acquisition (SCADA) systems, energy management systems, distribution management systems, outage management systems, and feeder automation solutions. ACS had been one of Newton-Evans' most valued clients since the early 1980's.

Founded by John Muench, one of the pioneering developers of distribution management systems technology for electric utilities, ACS became the leading provider of mid-range control systems to hundreds of North American utilities, as well as to several dozen international sites. From the outset, the company also continues as a leading manufacturer and supplier of advanced remote terminal units. In fact, some of the company's success in recent years has been due to its awards for aftermarket upgrades to older RTU installations as well as to first-time purchasers of ACS' new line of substation automation offerings.

I believe that a great deal of ACS' success can be found in two key factors: First has been in the company's ability to retain key individuals, both in management and staff positions, in sales, marketing, HR, product R&D, software development and in its efficient manufacturing operations. There continues to be a collaborative approach to new product development and the company is right-sized to avoid a lot of the "office politics" that often takes place in larger companies. Second is the company's excellent relationships with its customers. ACS has been able to retain the majority of its customer base over the years, growing right alongside the utilities it serves, which by and large, represents America's better performing utilities based on load growth and increases in customers served. ACS first offered 24/7 support to its large customer base before many of its larger competitors, going back at least a quarter century. Taking a page from SEL's highly regarded customer services operations, ACS also flew personnel and backup software or replacement field equipment to sites as the need arose. The company had been sponsoring and supporting annual customer meetings and training sessions well before user groups became ubiquitous.

According to Dave Pacyna *“The addition of Advanced Control Systems, like our initial investment in ITEC last year, is a significant step toward our goal of making North American T&D Group a leading supplier of the technology needed to help utilities maintain a modern, safe, and reliable electric power infrastructure.”* Mr. Pacyna, the CEO of North American T&D Group, had been the highly regarded CEO of Siemens Energy T&D for several years before joining Falfurrias Capital Partners, and starting up the North American T&D Group. He goes on to state *“Advanced Control Systems is well positioned to capitalize on the increasing adoption of grid automation solutions, and we look forward to working with the company’s outstanding management team to leverage this and other growth opportunities.”*

Importantly, ACS is the second company acquired by NATD Group, following on to the company’s acquisition of ITEC, which had been a leading independent supplier of instrument transformers to the North American marketplace.

REASON TECNOLOGIA: Alstom Grid announced in January 2014 that it had acquired Reason Tecnologia S.A. - a Florianopolis-based provider of measurement and substation automation network products for transmission and distribution (T&D) customers. This acquisition will help Alstom Grid gain a larger share of Brazilian and Latin American business for its complementary line of high voltage transmission equipment, as well as related substation automation systems, protection and control products and related services.

According to the company’s news release on the acquisition,

With this move, Alstom Grid will reinforce its presence in the Latin American substation automation market and strengthen its digital substation offer worldwide, accelerating the innovation path towards building a fully digital substation.

Reason employs 100 highly-skilled engineers and serves large contractor companies as well as Brazil and Latin America’s main transmission and distribution utilities. Alstom Grid’s worldwide commercial reach and the companies’ combined market leadership will fast track Reason’s expansion across international markets.

“This acquisition is yet another pivotal step in our ongoing journey to market-leading excellence in the substation automation business,” said Hervé Amossé, Vice-President Substation Automation Solutions for Alstom Grid. “It follows on from the recent acquisition of ASAT in Canada – where we have strengthened our expertise in smart grid technologies - and the recent

inaugurations of two new digital substation automation centres of excellence, in both India and France.”

Guilherme Bernard, President Reason Tecnologia S.A, said: “We are proud to be recognised for excellence in innovation and quality and we are delighted to pursue new developments within the Alstom Group. Reason looks forward to the synergies in technical expertise which will ultimately provide the most innovative products possible to our customers.”

<http://www.alstom.com/press-centre/2014/1/alstom-further-develops-its-measurement-and-digital-substation-portfolio-with-the-purchase-of-reason-tecnologia-sa>

INDUSTRIAL DEFENDER: The Massachusetts-based company had originally been founded as Verano back in the mid-1990s. Its founder and CEO, Brian Ahearn, didn't have to move far from his former offices and duties with Invensys, as the company is now based just down the road from his former employer. While the company was still named Verano, the cyber products already carried the Industrial Defender name. Newton-Evans had conducted a series of market research studies during 2004-2006 for the company and could see early on that this pioneering effort was going to be a market leader and a successful business given its focus on cyber-security by the mid-1990s. The only stumbling block keeping the company from even faster growth had been the seeming lack of interest in cyber-security investments by a large portion of the ICS community, at least until September 11, 2001. However, Newton-Evans' studies continue even now to see insufficient levels of commitment to investments in cyber security related defense-in-depth.

Acquiring the RTAP SCADA business unit shortly after start-up was a help in providing an ongoing revenue stream to help fund research and development of the initial versions of Industrial Defender. By late 2005 and the introduction of V2 of the Industrial Defender product suite, the company had about 240 customer sites, and now, in early 2014, that client base has reached well over 400 customers, many being electric utilities located in as many as 25 nations.

Now that the company has been acquired by Lockheed Martin, we expect that the Foxborough business unit will remain unified, autonomous in some respects, and allowed to continue to develop products in concert with some of the world's most astute thinking on defense topics, moving now more rapidly into cyber-related defenses. Lockheed Martin is already a participant in non-defense industry cyber-security offerings. LM has taken an approach of integrating cyber-

security into the entire chain of systems engineering activities as required for much of its defense and aerospace related businesses and transferring this knowledge to the commercial marketplace offerings. Industrial Defender will become a component of LM's Information Systems and Global Solutions (IS&GS) sector, an \$8.4 Billion business in its own right. The cyber offerings include a full range of services from risk assessments to penetration testing, vulnerability scans; threat modeling and compliance reviews (look for such reviews to soon include NERC CIP V5 capabilities).

What is especially important to note about Industrial Defender is the group of key industry OEM partners whose clients themselves make use of Industrial Defender solutions in their offerings. This group includes market leaders like Schneider Electric (Telvent OASyS), ABB (800xA and Network Manager) and GE (XA21 and Reliance) as well as two metering industry AMI leaders (Elster and Itron).

Over the course of the last 10 years I have been privileged to serve as a keynote speaker at the annual User Group meetings of ACS, Alstom Grid (parent company of Reason Technologia), and Industrial Defender. Each of these newly acquired companies brings a basketful of quality grid modernization products, systems and services, excellent market presence and very good customer service reputations to their new owners.

Each of these three 2014 acquisitions discussed here come on the heels of similar acquisitions of recent years, including these:

- In the control systems business arena, Telvent was acquired by Schneider Electric, and QEI was acquired by CG Global.
- In the cyber security segment, Raytheon Corporation recently acquired the cyber security related specialist firm Trusted Computer Systems, a leader in cross-domain solutions allowing organizations to share information securely (i.e. IT/OT convergence for utilities).
- In the substation modernization business, a mid-size international relay and meter manufacturer (the Spanish company ZIV) was acquired by the India-based firm, CG Global.

Early 2014 Acquisitions by Type

Acquisition Market Focus	First Quarter 2014 Acquisitions	2011-2013 Similar Acquisitions
<i>Substation Automation and SCADA/DMS</i>	ACS by NAT&D	QEI acquired by CG Global; Telvent acquired by Schneider Electric
<i>Substation IEDs</i>	Reason Tecnologia by Alstom Grid	ZIV by CG Global
<i>Cyber Security for ICS and Substations</i>	Industrial Defender by Lockheed Martin	Trusted Computer Solutions by Raytheon

Similarities among the 2014 Acquisitions:

- Mid-size companies with from about 100-150 employees
- Privately held companies
- Each with a few hundred customers – high quality offerings/services/support
- Acquiring parent organizations are multi-billion dollar corporations

For more news on mergers and acquisitions this year visit our website:

www.newton-evans.com



Distributech 2014: Review of Mega Panel Session 5

Distributech 2014 took place Tuesday through Thursday, January 28-30, 2014 in San Antonio, TX at the Henry B. Gonzalez Convention Center. Newton-Evans Research Company President Charles Newton was a panelist on Wednesday's "Mega Session 5" to discuss the future of Smart Grid and Grid Modernization as the related technology is implemented around the globe.

Marco C. Janssen, CEO, UTInnovation, served as the Panel Moderator. Panel members included: Albert Cheung, Head of Energy Smart Technologies for Bloomberg New Energy Finance; Heiko Staubitz, Senior Manager, Germany Trade and Invest GmbH; Willem de Beer, Specialist Electricity Industry Consultant; and Chuck Newton, President, Newton-Evans Research Company.

Each speaker delivered a timely and well-received presentation and/or discussion on the topic of grid modernization from either a global or regional perspective. The audience also provided a significant number of questions to the panel members, with each providing responses based on their own extensive knowledge, research findings and/or field experience.

Chuck's talk was entitled: A Look at Smart Grid's Progress and Future -An Industry Researcher's Perspective. The presentation was centered on the T&D Modernization Trends Affected by DoE's Investments Program for Smart Grid

From the 2009-2012 ARRA Smart Grid Investment Program, (SGIP), there have been some important and continuing developments and trends in the modernization efforts for Transmission and Distribution Operations and Field Engineering:

Chuck's talk reviewed the significant progress made (thanks in large part to the DoE funding) in the following fields: Transmission Dynamic Line Rating; Synchrophasor Deployments, T&D Control and Monitoring Systems, Distribution Automation Equipment and Platforms, Energy Storage Applications and Key Aspects of Metering Modernization (AMI, MDMS, HAN)

U.S. Market Overview Series: 2014-2016

In 2014 Newton-Evans plans to update its U.S. T&D Equipment Market Overview report series of more than 85 equipment system & services categories to reflect market observations from 2013 and estimates for 2014-2016. This series of 2-3 page “top line” summaries will present the 2013 market shares for major participants in dollars and % of U.S. total. Each report will also present U.S. market segmentation in \$MUSD, and a forecast out to 2016. Vendor and IEEE equipment definitions are also provided.

Make sure to email info@newton-evans.com and sign up for our newsletter and report availability notifications for this series.

Each report will be available for \$150 each, with special discounted pricing for ordering a complete set. Report categories are: High Voltage Equipment; Power and Distribution Transformers; Control Systems and Services; Protection and Control; Distribution Automation; Substation Automation; Medium Voltage Equipment.

For more information and to see some samples or a complete listing of topics, visit our website at www.newton-evans.com



New York ISO to Host EMMOS Event during September 8-10, 2014

Energy Management And Market Operations Systems (EMMOS) users group solidifies plans for 2014 annual meeting & training sessions; tours are planned for NYISO control center and GE Durathon battery plant.

The 21st annual three day conference of the Energy Management and Market Operations Systems (EMMOS) Users Group will be held at the Hilton Albany Hotel located in downtown Albany, New York, on September 8-10, 2014, starting with a welcoming reception on the evening of Sunday, September 7th.

The 2014 conference will include tours of the New York ISO (NYISO) control center and the new General Electric Durathon Energy Storage Battery production facility in nearby Schenectady.

The conference agenda will feature topical speakers and roundtable sessions, vendor exhibitions and two technical training classes.

Featured conference topics at the 2014 gathering of North American and international control systems operations management and staff include: What's coming next? A preview of next generation EMS and SCADA control systems technology; building grid resiliency; securing linkages to external systems; OT/IT integration; regulatory change and its impact on control systems; data communications trends & standards; cyber-security topics; situational awareness; renewables integration, and other topics.

The annual EMMOS conference attendees typically include electric power operations officials involved with transmission, distribution and generation, as well as IT managers, planning engineers, consultants, ISO staffs, and related systems personnel involved with substation modernization, distribution automation, outage management and geographic information systems.

Further information on the upcoming 2014 EMMOS conference, including registration information and hotel booking arrangements, as well as sponsorship opportunities can be found on the EMMOS website at www.emmos.org or email chuck@emmos.org

