Orion Substation Automation Platform

Multiple Functions, Minimal Headaches

The Orion Family of Automation Platforms – OrionLX, Orion5r (upgradable to Orion5rL), and Orion5 – are designed to perform a range of automation applications in electrical substations. A single Orion may be configured to replace multiple legacy boxes in a substation – reducing hardware, design, wiring, and panel costs while simplifying configuration.

Preconfigured "point pick lists" for most vendors' Intelligent Electronic Devices (IEDs), extensive diagnostic LEDs and a built-in communications analyzer reduce integration time and errors. In contrast to other automation processors, Orion software features and configurations are seamlessly transferable from one generation to the next.

Orion's balance of versatility and ease of use have made it the leading flexible substation automation platform* in North America and the choice of 130 new utility customers in the past five years.
 * Newton Evans 2011

Key Design Features

Rugged Like a Protective Relay
◆ Meets ANSI C37.90.1 2002 Fast Transient on I/O and power supplies and ANSI C37.90.2 1995 RFI to 35 volts per meter
◆ Direct fiber optic available on serial communication ports and Ethernet port
◆ Designed to operate over -40°C to 70°C, without heaters or fans
◆ Meet CE requirements for the world market

Flexible and Modular Like a PLC
◆ IEC 61131-3 logic suite for math, logic and control
◆ Modular and expandable I/O
◆ Modular and expandable ports
◆ Non-volatile memory

Utility-Specific
◆ Complete Cyber Security package
◆ Built-in breaker control, counter and accumulator functions
◆ Momentary-Change-Detect (MCD) function
◆ Full suite of utility protocols
◆ Support for bit synchronous communications
◆ Utility-grade I/O
◆ Support for IEC 61850

Standard "PC" Tools
◆ VGA Video Port and USB keyboard / mouse ports
◆ Web browser and web server technologies
◆ Open relational PostGRE SQL database

> **" Thanks again for a product that keeps the simple things virtually effortless and makes the hard things pretty easy too."**
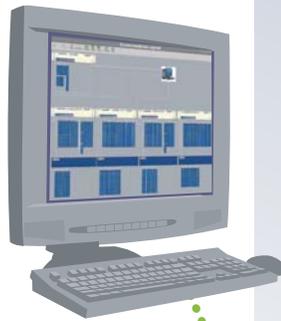> - Chris Nowakowski. Wisconsin Public Service Corporation, Green Bay, WI

> **"WOW! My data is going all the places I wanted it. I have been doing SI systems for nine years now and by far, bar none, [Orion] is the unit to have aboard. All I can say is 'GOOD JOB' "**
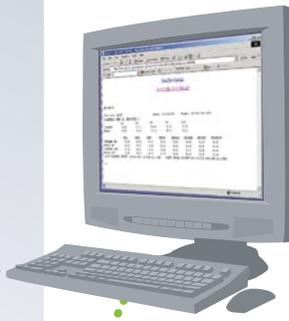> - Willie Willis. Lakeland Electric, Lakeland, FL

Web-Based Electric Utility SCADA

A low-cost, license-free, and secure SCADA system can be assembled from web pages served from Orion. Typical customized pages include one-line diagrams, IED zoom screens and breaker controls; typical standard Orion web pages include user privilege set-up, diagnostics, alarms, sequence of events and trending. For 2013, options will be added for data back-up and customized report generation.

Access Non-Operational Data Remotely and Securely

Protective relay settings, fault records, oscillography and apparatus health can be accessed through Orion. The engineering software for IEDs from Cooper, ABB, SEL® and Bitronics has been tested and documented for compatibility with Orion. Archived data in Orion can be accessed through file transfers and SQL queries.

Cyber Secure Connection

Packaging and Engineering Services

The NovaTech Systems and Services group works with customers to design, package and commission Orion and Bitronics® substation automation systems.

Areas of specialty include:
◆ RTU packaging and configuration
◆ Orion WEBserver configuration
◆ Installation and commissioning
◆ Distribution Automation systems engineering
◆ Orion configuration services for security settings and math and logic

I/O Systems for Orion RTUs

NovaTech produces two I/O systems, each designed to provide 1ms time-stamped discrete events, analog inputs and breaker control outputs in 48V dc and 125V dc substations. Both serial and Ethernet connections are supported.

The Orion Distributed I/O system provides combinations of up to 24 inputs and outputs in compact 19" rack mount, panel mount or DIN-rail mount designs.

19" Rack Mount Orion DDIO

Bitronics Distributed PRC-002 Recorders

Panel Mount Orion DCIO

Bitronics M650 SCADA Panel Meter

Cooper Recloser Controls

Bitronics 878 DIOD

Beckwith Regulators

SEL® Relays and Recloser Controls

The Bitronics 878 Distributed I/O Device (DIOD) provides combinations of up to 56 inputs and outputs in a dense 3RU design. IEC 61850 and CE certification are also available in the 878 DIOD.

PLCs

Typical IEDs Connected to Orion

Direct VGA Video

The substation HMI PC can be eliminated with the optional OrionLX Multimedia Board, which includes VGA port, USB ports for keyboard and mouse, and audio port. A third ethernet port is also provided. Any webpage served from the OrionLX can be viewed on a VGA monitor.

ETH2 VGA OUT KBD/MOUSE
AUDIO OUT

Modular Serial Communication Cards

Sixteen ports can be populated with a combination of any of eight different serial cards:

- ◆ RS-232 standard and isolated
- ◆ RS-485 w/ and w/o IRIG-B
- ◆ HDLC (special meter interface)
- ◆ Bit synchronous
- ◆ Fiber optic w/ and w/o IRIG-B

Fiber Optic   RS-232   RS-485

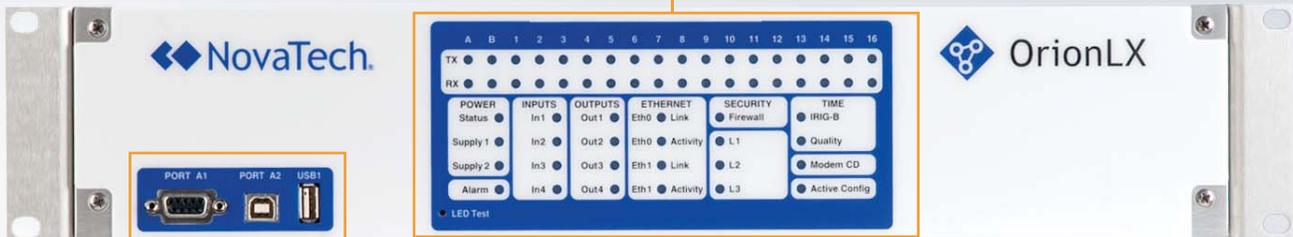Third Ethernet Port

Redundant Wide-Range Power Supplies

Built-In IRIG-B

Built-In Discrete I/O

Modem Port

Modular Redundant Ethernet – Copper or Fiber

Extensive Diagnostic LEDs

Front Serial and USB Connections

Extensive Protocol Library

Orion simplifies integration with other substation IEDs and SCADA via preconfigured "point pick lists" and an extensive protocol library, including:

- ◆ Allen Bradley DF1
- ◆ Areva KITZ
- ◆ Areva Optimho
- ◆ Basler DFPR
- ◆ Betac
- ◆ CDC Type I and II

- ◆ Conitel 300/2020
- ◆ DNP3 Serial and TCP
- ◆ GridSense PAC
- ◆ Harris 5000
- ◆ IEC 60870-5-101/103/104
- ◆ IEC 61850

- ◆ Landis and Gyr 8979
- ◆ Modbus Serial and TCP
- ◆ PG&E 2179
- ◆ PML Meter
- ◆ REDAC

- ◆ RFL
- ◆ SEL® Relay protocols
- ◆ SPA
- ◆ Tejas
- ◆ TransData DTO

NovaTech®

Bitronics ◆ D/3 ◆ Orion

One Box, Eight Applications

A single Orion Automation Processor can replace multiple traditional boxes in the substation, reducing costs for design, installation, training, and spares.
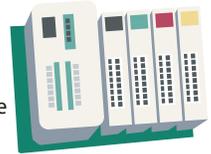
Orion Smart Substation RTU

Equipped with SCADA and IED communication protocols, modular communication cards and software features, Orion can handle all RTU functions in the substation.

Features include:

◆ Support of multiple SCADA Masters – up to six in one western installation – enabling one Orion to serve as multiple virtual RTUs

◆ Redundant DNP3 Ethernet/serial communications to Master for critical applications

◆ Primary/Backup IEDs to enable points to be alternately read from two sources without affecting SCADA

◆ Rugged utility-grade I/O, both discrete and analog

Orion Math and Logic Controller

Orion offers toolkits to logically and arithmetically manipulate any data point retrieved from any IED, adding intelligence to alarming schemes and reducing the need to process data downstream. The optional Orion LogicPak module provides five preconfigured logic operations: And, Or, Negate, Primary-Secondary, and LocalRemote. An Advanced Math and Logic toolkit (based on Lua) is now available to handle file I/O, arrays and SQL queries. Five new IEC 61131-3 editors provide a PLC-style programming environment for substation control and monitoring tasks.

Orion Relay Communication Processor

Orion offers "port switch" and "communication processing" features to enable engineers and asset managers to directly access critical data from protective relays, recorders and monitoring equipment, including: relay settings, fault records, oscillography records, and breaker and transformer health. Orion offers keystroke-by-keystroke emulation of SEL® communication processor plus automatic generation of new point pick lists for SEL® relays.

Orion Distribution Automation (DA) Controller

The Orion DA Logic option enables Orion to function as an independent DA Controller in a single or multi-feeder, single or multi-substation Distribution Automation (DA) System. Orion DA Logic polls substation IEDs and feeder-mounted IEDs for system information, analyzes the data, and initiates trip-close commands to isolate permanent faults and restore service to unfaulted feeder sections.

Orion Secure Substation Gateway

The OrionLX and Orion5rL models are equipped with powerful security features, including user password groups with varying privileges, firewall, secure protocols, key management and logging – all engineered to meet or exceed emerging NERC CIP requirements. This secure Orion front end can replace expensive secure routers and firewalls. Supported protocols include HTTPS, sFTP, SSH, LDAP, and syslog.

Orion WEBserver, HMI and SCADA

Orion WEBserver provides web-based visualization of substation data via a standard web browser, including one-line diagr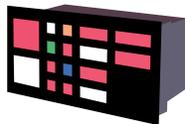ams, alarm summaries, sequence of events records and trends. Password-protected drill-down screens can also be set up to control breakers, apply tags, view IED data and pass through to IEDs. The new "Direct Video VGA" option makes it possible to view HMI images without a PC, reducing costs associated with NERC compliance.

Orion Sequence of Events Recorder and Alarm Annunciator

The Orion Alarm/Archive/Retentive option enables any IED point to be archived in a resident SQL database. Archive and alarm parameters can be configured for each point, creating a flexible Alarm Annunciator and Sequence of Event Recorder (SER). Alarm and SER points can be easily viewed with any browser, or users can directly access using SQL queries.

Data Archive Appliance

In substations without SCADA communication, the OrionLX can archive and store data from lines and apparatus. These data can be transferred to a secure thumb drive and loaded into enterprise systems for load analysis and planning. The large OrionLX memory, SQL database and built-in USB ports support this application.

◆◆ **NovaTech**®

Bitronics ◆ D/3 ◆ Orion

Other NovaTech Products and Services

Bitronics Electric Power Measurement and Recording Products

From traditional SCADA panel metering to distributed PRC-002 recording, Bitronics Power Measurement and Recording Products have set the gold standard for reliability in the electric utility substation for decades. 70 Series IEDs are IEC 61850-compliant and ideal for integrating solar and wind renewables.

Education and Training

NovaTech offers Utility Training Courses, Utility Webinars and Utility Technical Symposiums. Courses are designed to train engineers and technicians in the application of NovaTech products and technologies. Twenty courses currently available. Schedules posted on our website.

D/3® DCS

Open, configurable, and highly reliable, the D/3® Distributed Control System (DCS) provides continuous and batch process automation worldwide. The D/3 DCS combines state-of-the-art features like Online Upgrades with a guaranteed migration path unmatched by any other process automation supplier.

NCare Support Agreements

NCare is a comprehensive support program for NovaTech Utility products including the Orion Automation Platform, Distributed I/O, iPower SCADA for Orion, Distribution Automation and Cyber Security products. Flex Hours can be used for a variety of on-site or in-office engineering services.

How Can We Help?

For more detailed information on NovaTech products, services, or electric utility customer references, contact the NovaTech representative in your area, email **info@novatechweb.com** or call us at **800.253.3842**

CORPORATE HEADQUARTERS

NovaTech, LLC
1720 Molasses Way
Quakertown, PA 18951
T: 484.812.6000

DIVISION OFFICES

Bitronics Measurement and Recording
261 Brodhead Road
Bethlehem, PA 18017
T: 610.997.5100
E: bitronics@novatechweb.com

D/3 Process Control
11500 Cronridge Drive
Suite 110
Owings Mills, MD 21117
T: 410.753.8300
E: d3@novatechweb.com

Orion Utility Automation
13555 W. 107th Street
Lenexa, KS 66215
T: 913.451.1880
E: orion@novatechweb.com

UTILITY SALES OFFICES

Northwest/Southwest Region
1304 Monarch Court
Longmont, CO 80504
T: 303.485.6765
E: charles.englebrecht@novatechweb.com

Northeast Region
11500 Cronridge Drive
Suite 110
Owings Mills, MD 21117
T: 410.753.8300
E: mark.matassa@novatechweb.com

Midwest Region
13555 W. 107th Street
Lenexa, KS 66215
T: 913.451.1880
E: jim.siders@novatechweb.com

Southeast Region
12 Eastview Drive
Scott Township, PA 18411-7713
T:570.585.6970
E: kevin.johnson@novatechweb.com

PHILLIPPINES

95 D Bansalangin St. Veterans Village,
Project 7, Quezon City,
Philippines 1105
T: +632.412.9480
F: +632.358.8122
E: paul.reyes@novatechweb.com

NOVATECH EUROPE BVBA

Kontichsesteenweg 71
2630 Aartselaar, Belgium
T: +32.3.458.08.07
F: +32.3.458.18.17
E: info.europe@novatechweb.com

ASIA

Hanwha S&C Co., LTD
Seoul, Korea
T: +82.2.729.3174
F: +82.2.729.4763
E: lhstone@hanwha.co.kr

Advanced Control
& Systems, Inc.
Taipei, Taiwan, R.O.C.
T: +886.2.2785.3839
F: +886.2.2780.0180
E: chaseliu@acs.com.tw

Hung Viet Industrial
Engineering Joint
Stock Company (IEC)
Ha Noi, Vietnam
T: +84.4.8571192
F: +84.4.8571709
E: itec@hn.vnn.vn

www.novatechweb.com