

Solving automation challenges for the evolving power grid

NovaTech Automation produces the easiest to use and best supported automation products and solutions for electric utilities. All of our products—the Orion family of automation platforms, Bitronics® instrumentation for power measurement and display, and Kronos™ satellite clocks for precise time synchronization—are made in the USA and backed by a 10-year warranty.

These products are at the core of our engineered systems that can be found in the substation, on pole tops, in the enterprise, and at the grid edge.

Our mission to accelerate the evolution and decarbonization of the power grid is reflected in our commitment to achieving Net Zero operation by 2050.

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10-year No Hassle Warranty



Always Made in the USA



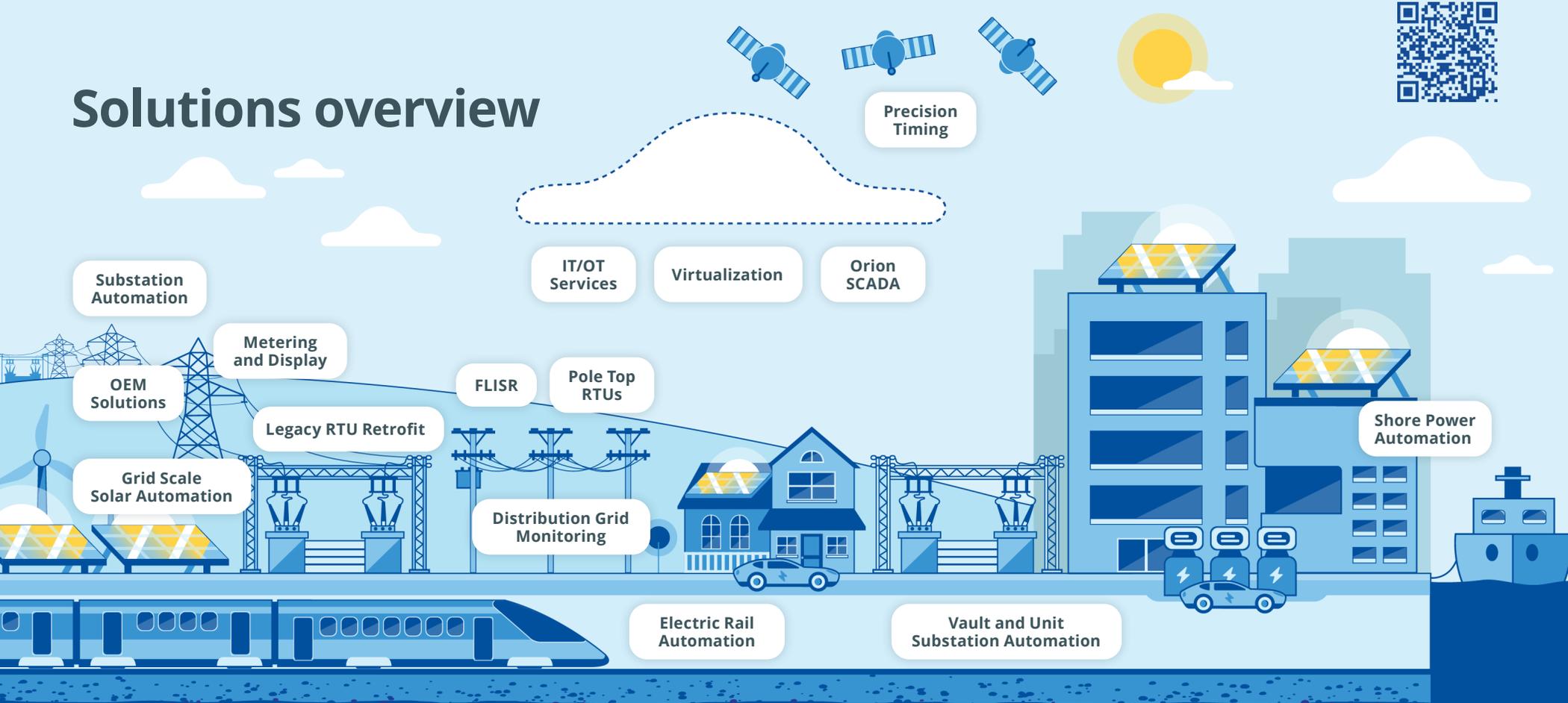
Net Zero Committed

98.7%

Of our clients would recommend us to a colleague



Solutions overview



“

Orion lets us deploy a faster and more effective communication scheme with little or no problems compared to other modern communications processors.

- Substation Engineer, Southeast US Municipal

Substation Automation

The Orion family supports all substation automation applications—RTU, HMI, Math & Logic, Tile Annunciation, SOE Recording, FLISR, and more—in a rugged platform that can be redundant.

Metering and Display

Bitronics instrumentation is the industry standard where accuracy, reliability and durability are required. Solutions include panel metering, display, and trend recording.

Grid Scale Solar Automation

Orion serves as the RTU and controller in grid scale solar plants, receiving AGC commands and sending them to inverters.

Electric Rail Automation

Orion is applied in snow melting, track energization, and RTU applications, notably when modernizing legacy electric rail substations.

FLISR

NovaTech provides the Fault Location and Service Restoration (FLISR) algorithm, pole-mounted fault detection, and systems engineering to enable users to minimize duration of outages.

Distribution Grid Monitoring (DGM)

Increasing renewable penetration is creating the need for more real time monitoring of the distribution grid. The Bitronics DGM is a simple, cost-effective way to add power and fault measurements to Volt-VAR Optimization (VVO), Conservation Voltage Reduction (CVR), and FLISR schemes.

Shore Power Automation

NovaTech has partnered with Watts Marine to provide a clean dockside electric power solution—an alternative to dirty onboard diesel-generated electric power for ships in harbor.

Vault and Unit Substation Automation

Smaller Orions can provide remote control and monitoring of the switches and other apparatus in unit and vault substations.

Orion SCADA

Orion SCADA is a unique, license-free SCADA solution with one-line diagrams, IED zoom screens, alarm annunciation, historical data, and email notification.

Pole Top RTUs

Small size and mounting flexibility make the OrionMX ideal for remote monitoring and controlling of pole top switches.

Virtualization

NovaTech is partnering with Intel® and VMware® to virtualize the OrionOS™ to be hardware agnostic. Orion processes—Math & Logic, Alarming, HMI, protocols, etc.—will run in a VMware virtual machine on a standard industrial server or embedded within partner products.

Precision Timing

The family of Kronos satellite clocks provide precise timing solutions for grid automation applications.

Legacy RTU Retrofit

NovaTech provides retrofit solutions for most common legacy substation RTUs, including D20/200, Telegyr, Telvent, SNW, and ACS. We also provide solutions to replace legacy Modicon® and Allen Bradley® PLCs.

IT/OT Services

Our expanding engineering services can assist your staff when interfacing NovaTech products with your IT infrastructure.

OEM Solutions

You'll find NovaTech products embedded in solutions offered by S&C®, ABB®, Caterpillar®, and other partners.

Orion Automation

The easiest way to automate the power grid

Orion Automation Platforms combine unparalleled flexibility and ease-of-use in a variety of form factors and hardware options.

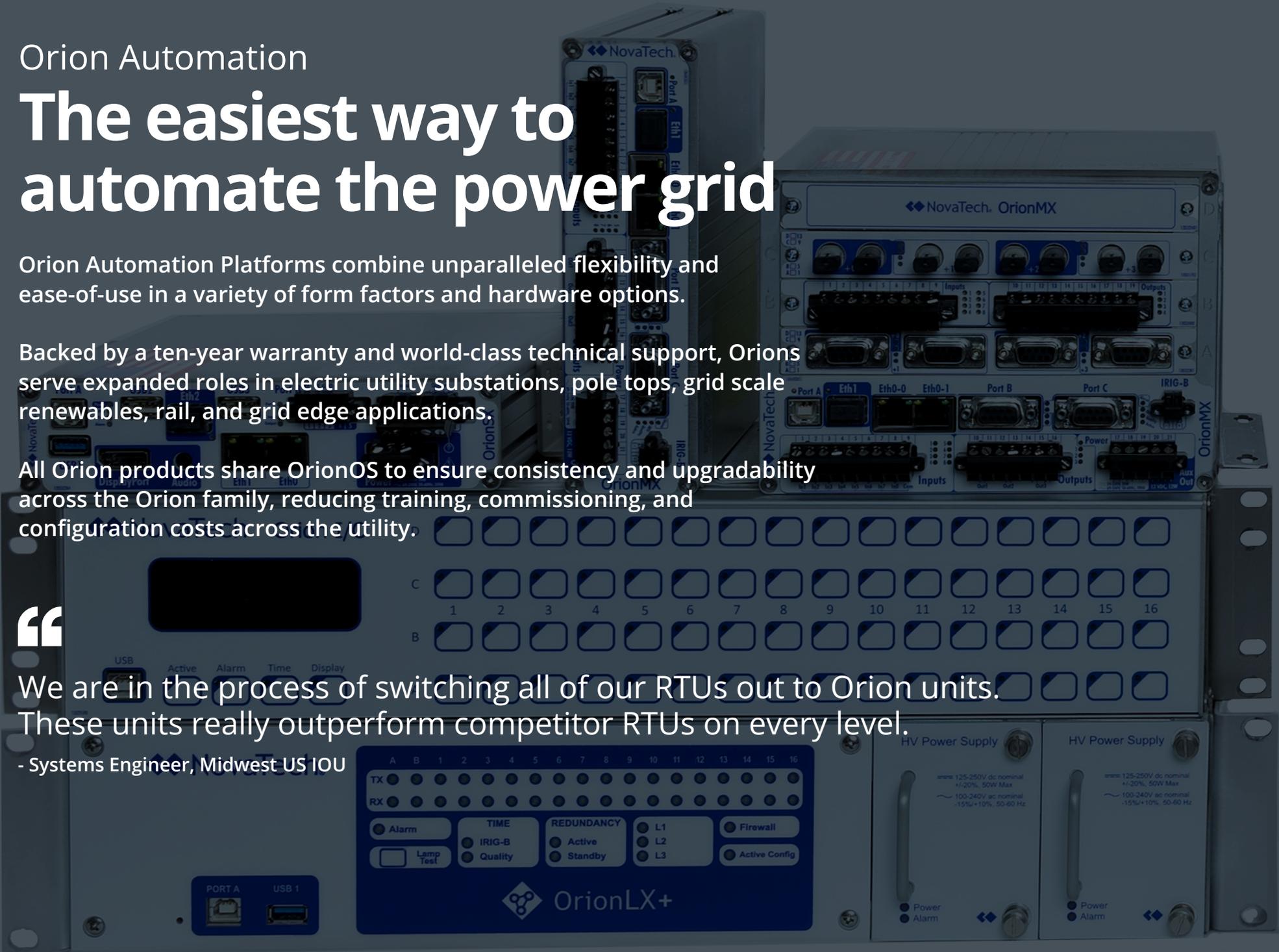
Backed by a ten-year warranty and world-class technical support, Orions serve expanded roles in electric utility substations, pole tops, grid scale renewables, rail, and grid edge applications.

All Orion products share OrionOS to ensure consistency and upgradability across the Orion family, reducing training, commissioning, and configuration costs across the utility.



We are in the process of switching all of our RTUs out to Orion units. These units really outperform competitor RTUs on every level.

- Systems Engineer, Midwest US IOU





An Orion for any grid application

Orion makes it simple to access and distribute SCADA, protection and other operational data so you can solve more problems, more quickly.



Models by Feature Introduced	OrionLX+ 2019	OrionMX 2020	OrionSX 2022	Orion I/O 2017
Size and Enclosure Style	19"W x 3.5"H x 13.5"D Connectors and LEDs on front and back	7"W x 2"H x 6"D Connectors and LEDs on front face only	7"W x 1.75"H x 6"D Connectors and LEDs on front face only	19"W x 3.5"H x 7"D Connectors and LEDs on front and back
Mounting	19" Rack	Surface, Panel, 19" rack, or DIN Rail	Surface, Panel, 19" rack, or DIN Rail	Surface or 19" rack
WR Power Supply	125-250V dc/120-240V ac	24-250V dc/69-240V ac	48-250V dc/120-240V ac	48-250V dc/120-240V ac
LV Power Supply	24-48V dc	12-24V dc		12-24V dc
Power Supply Redundancy	Yes, hot swappable	No	No	No
Ethernet Ports	2 copper ports Optional NovaCards: <i>NC0: 1 copper port</i> <i>NC1: 1 copper and 2 SFP slots</i> <i>NC2: 12-port copper switch</i> <i>NC3: 1 pair of PRP/HSR ports, 1 copper port, 1 SFP slot</i>	2 copper ports / 1 SFP slot	2 copper ports / 1 SFP slot	1 copper port and 1 SFP slot <i>1 copper port and a 3-port copper switch</i> <i>1 SFP slot and a pair of copper PRP/HSR ports</i>
Serial Ports	<i>Up to 17 RS-232/485, ST Fiber, V-Pin Fiber, or bit synchronous</i>	2 RS-232/485 <i>Up to 18 RS-232/485</i>	1 RS-232 (RX, TX, and GND)	2 RS-232/485
Direct Video Ports	<i>1 DisplayPort</i>	None	<i>1 DisplayPort</i>	None
Discrete I/O	<i>NC0: 4 DI / 4 DO, NC1: 4 DI / 4 DO, NC3: 4 DI / 2 DO, NC4: 16 DI</i>	8 DI / 3 DO <i>Up to 40 DI / 19 DO</i>	1 DI / 1 DO	Up to 64
Analog I/O	None	None	None	Up to 32
SCADA Points	Up to 40,000	Up to 600; <i>10,000 or 20,000 optional</i>	Up to 40,000	Up to 600

Options are italicized



OrionOS

Uncommon power in a common platform

OrionOS provides common software, firmware, and configuration tools for all Orions, and for all grid automation applications.

Reduce learning curves

You can configure any software option or protocol on one Orion and you'll know how to configure them on any Orion.

Speed up implementation

Reuse configurations by migrating applications from one Orion model to another.

Simplify security and compliance issues

Maintain your entire grid automation fleet on one Orion firmware version.

All Orions share the same security and software tools.



OrionOS



NERC CIP Cybersecure

All Orions share the same security features. These include Linux OS, support for Integrity Measurement Architecture (IMA), a stateful firewall, secure protocols (HTTPS, SSH, SFTP), strong passwords and password rules, RADIUS and LDAP authentication, tiered access user groups, and syslog.



Extensive Protocol Library

50+ protocols, including IEC 61850, DNP3, SEL®, IEC 60870-5-101/103/104, Modbus, and legacy protocols. SEL Protocol enables engineering access, IRIG-B support, and automatic retrieval of SEL Event Reports. SNMP Manager monitors switches, routers, servers, and other network equipment.



Redundancy

Orions can be configured as a hot-standby redundant pair to support applications as a SCADA RTU, Alarm Annunciator, substation HMI, SOE Recorder, and substation controller. Both Orions run identical NCD configurations, logic and webpage configurations, and configurations are auto-replicated between the two.



Tile Alarm Annunciator

A pre-engineered alarm tile webpage is available for replacing hard-wired annunciators. This annunciator provides full software configurability for rows, columns, and tile names.



SEL Relay Integration

Data and records in SEL relays can be accessed by Orion and delivered to relay engineers and to SCADA. Engineers can also pass through Orion to access SEL relays using ACSELERATOR® and Blueframe®.



Math & Logic

A calculator is available enabling users to easily create equations using common Excel-style operators and notation including * / () + - ^ SQRT() ABS() and ROUND(). IEC 61131-3 and Lua are also available.



OrionVX

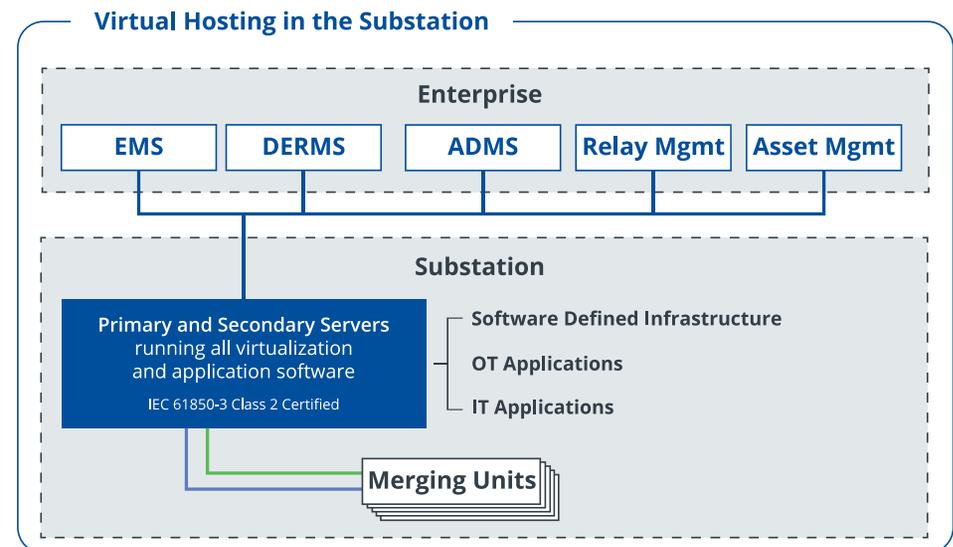
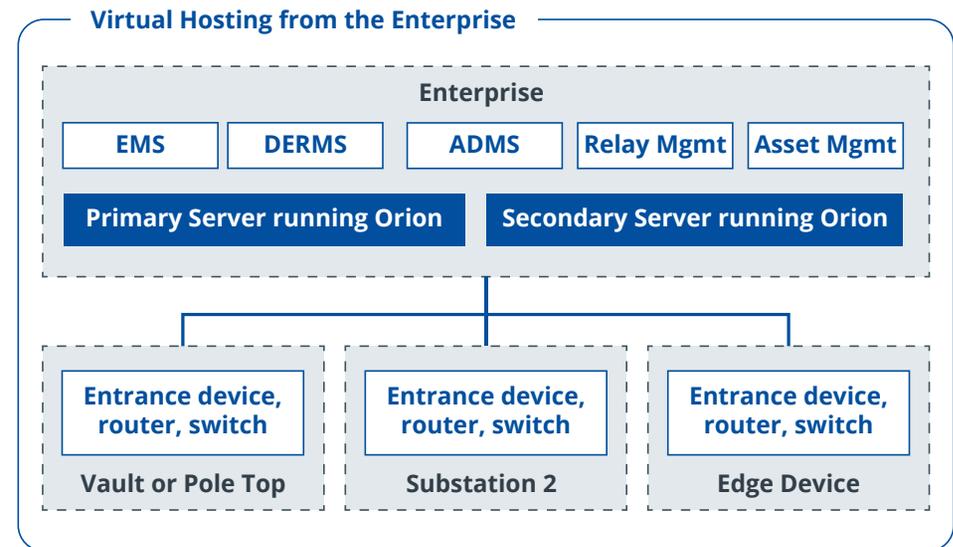
Out of the box and into the server

Virtualizing utility automation equipment on rugged servers reduces hardware, wiring, security, and compliance costs. OrionVX, the first virtualized Orion RTU, runs in VMware ESXi on Intel Xeon based servers. It is compatible with the NovaTech NCD configuration package and runs on the same firmware as the hardware-based Orion RTUs.

As a member of vPAC Alliance, NovaTech joins other world-class vendors in defining new, virtual applications in the substation and at the enterprise. We are also working with other members to ensure OrionVX runs properly on standard server hardware.

The diagrams to the right summarize how OrionVX may be applied.

- In the enterprise, the power of IT-grade servers can expand the capability of Orion, enabling it to take on large front-end processing applications. A virtual Orion can also be added to the user EMS, ADMS, or DERMS, adding the full power of Orion protocols and software.
- In the substation, Orion can be part of a complete digitized and "software virtualized" architecture with all applications removed from proprietary hardware.





OrionLX+

For larger substations and the most complex applications

The most powerful member of the Orion family, the OrionLX+ takes on all automation applications in T&D substations. Modular serial cards and network options enable the OrionLX+ hardware to leverage existing equipment and minimize upgrade effort. The OrionLX+ has been tested with very large configurations and verified to be suitable for the largest substations: 40,000 points, 256 IEDs, redundancy, and IEC 61850.



NovaCard #0 (NC0): Adds one 10/100/1000BaseT Ethernet port and 4 DI / 4 DO



NovaCard #1 (NC1): Adds one 10/100/1000BaseT Ethernet port, two SFP ports, and 4 DI / 4 DO



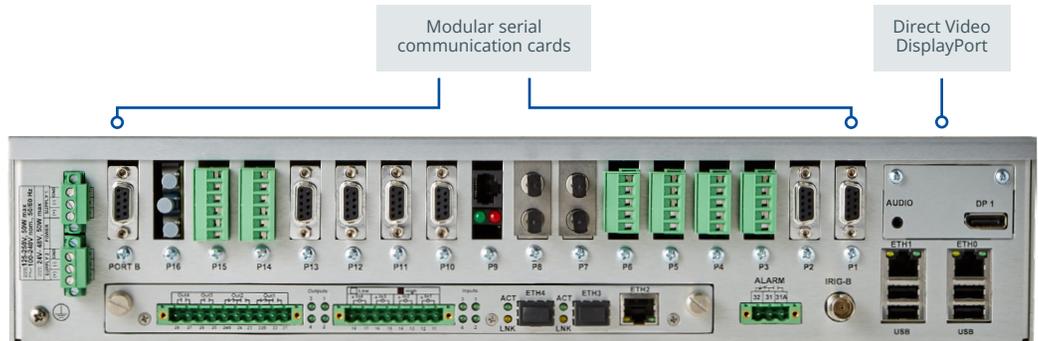
NovaCard #2 (NC2): Adds 12 10/100/1000BaseT Ethernet ports



NovaCard #3 (NC3): Adds PRP/HSR ports for LAN A / LAN B (10/100/1000BaseT and SFP) plus one 10/100/1000BaseT Ethernet port and one SFP port. Also adds 4 DI / 2 DO



NovaCard #4 (NC4): Adds 16 DI



Five optional NovaCards available. NovaCard #1 shown with 4 DI / 4 DO and three Ethernet ports. PRP/HSR Redundancy, 12-port switch, and others available.

Built-in IRIG-B

Two copper Ethernet ports standard

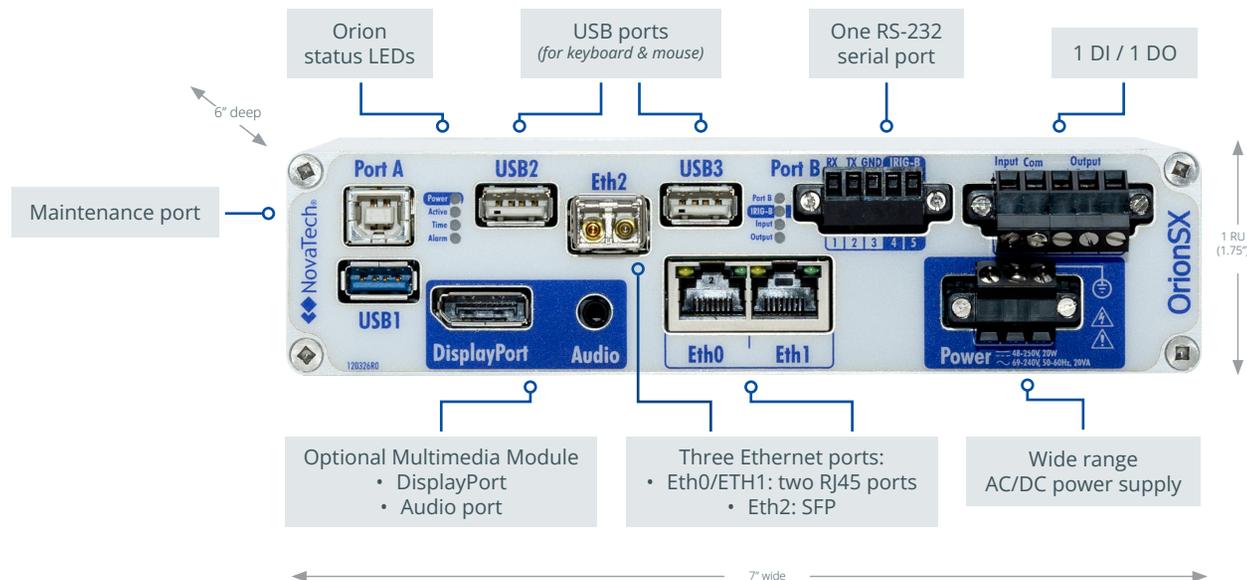


OrionSX

Data and HMI server

Offering a combination of power and small size, the OrionSX provides a compact solution for four utility automation applications:

- Data acquisition front end in the utility enterprise.
- Distributed Direct Video HMI in larger transmission substations.
- More compact Orion SCADA Master, further reducing the cost of Orion SCADA.
- Smaller transmission substation RTU where serial communication is not required.



The OrionSX is ideal as a distributed HMI server, easily mounted with a monitor in multiple locations in large transmission substations. The OrionSX browser can be pointed to the substation RTU to view the same pages; no points configuration or page configuration required.



Orion I/O

The most complete substation I/O solution

Orion I/O provides the most comprehensive solution for substation automation, featuring high density, I/O card flexibility, and unique local display for point names and status. Available cards:

- 16 DI Card
- 16 DI Wetted
- 16 DO Card (NO or NC)
- 16 DO High Power Card
- 8 DI / 8 DO High Power Combination Card
- 8 AI Card
- 8 AI Flex Card with HV Input

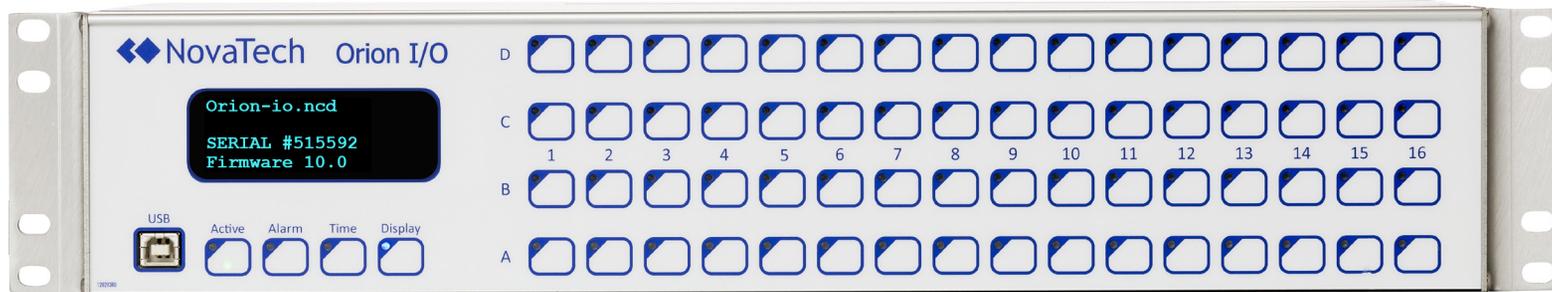
Other examples of the Orion I/O 4-line x 20-character display:

Custom user display,
4x20 lines

```
CARD D: 8 AI
CARD C: 16 DO
Card B: 16 DI Wetted
Card A: 16 DI Wetted
```

```
Trans Top Oil Temp
175 degrees F
.642mA
```

```
CB #23 Bakersfield
17.59.08.960
Breaker Open
```



Front USB
Maintenance port

Diagnostic, Status, and
Display buttons with LEDs

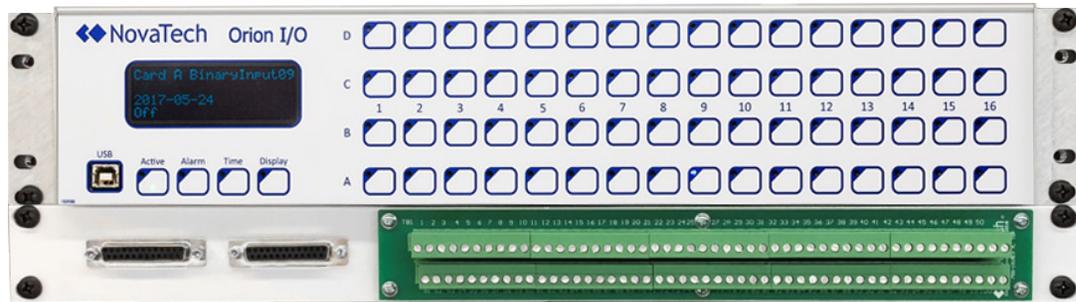
Capacitive touch front interface
provides easy field access to all points status



Upgrade legacy substation RTUs easily

Tens of thousands of legacy RTUs are reaching the end of their service life and need to be replaced. NovaTech Automation offers standard and custom retrofit solutions for most of the common legacy RTUs: D20/D200, Telvent, Landis & Gyr, ACS, and Systems Northwest. Many of our retrofit solutions do not require lifting of field wiring.

Two retrofit solutions are offered: one for the D20/D200 using an expanded Orion I/O assembly to replace D20/D200 modules (below), and one for the other legacy RTUs using Adapter Boards. An Adapter Board solution for a Telvent Input Card is shown to the right.

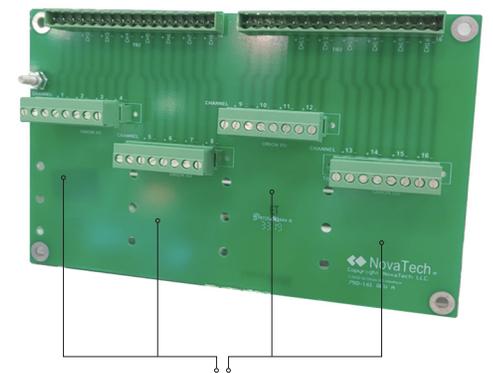


D20 retrofit module

Legacy Telvent Input Card



NovaTech Adapter Board



Four connectors attach to harnesses back to Orion I/O.



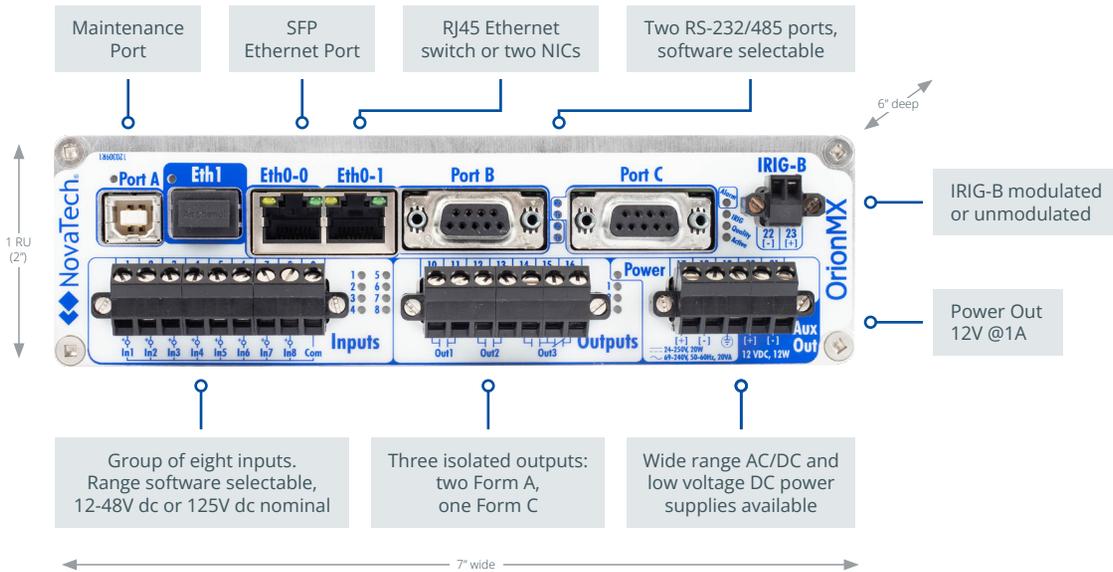
OrionMX

Optimized for smaller spaces

The compact OrionMX takes on automation applications in smaller distribution substations, on pole tops, and in vaults and unit substations. All connections are on the front face to simplify mounting, auxiliary output powers radios and other accessories, and it can be expanded to add ports and I/O for any application.



OrionMX is available with expansion slots



Serial Fiber Expansion Card (F1): Four ST fiber serial ports



Serial Expansion Card (S1): Four RS-232/485 ports



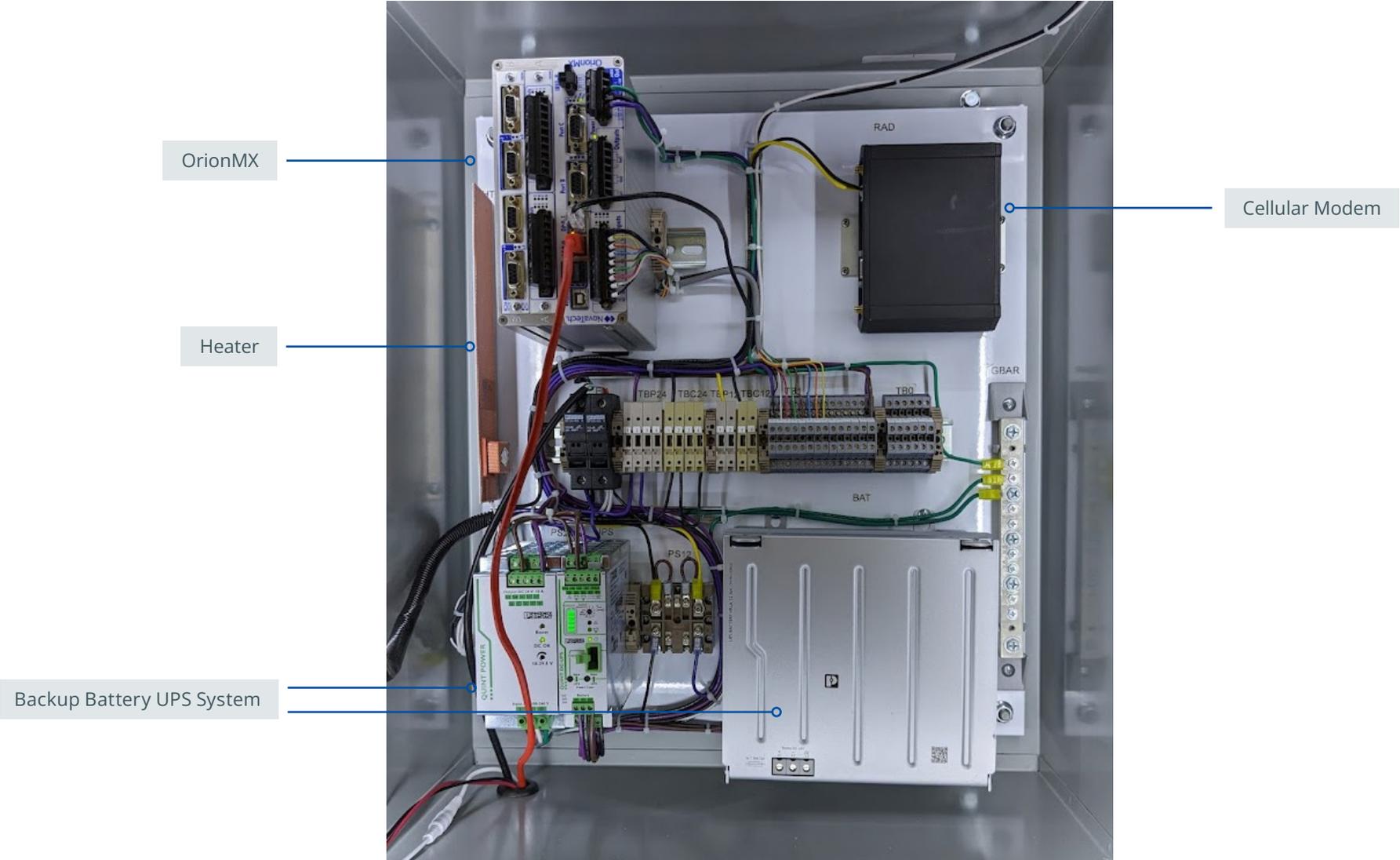
I/O Expansion Card (D1): 8 DI / 4 DO



Meter Card (M1): Current and voltage inputs



Aux Meter Expansion Card (C1): Additional measurements from line 2



NovaTech produces fully configured and tested substation and pole top RTU panels, customized per user specification. We also can provide services for installation, commissioning, and training.

Bitronics power measurement

Dependable precision from the pioneers of digital substation meters

Bitronics was the first to digitize power metering in 1982, and today our meters, digital transducers, distributed recorders, and Distribution Grid/Line Voltage Monitors are used worldwide.

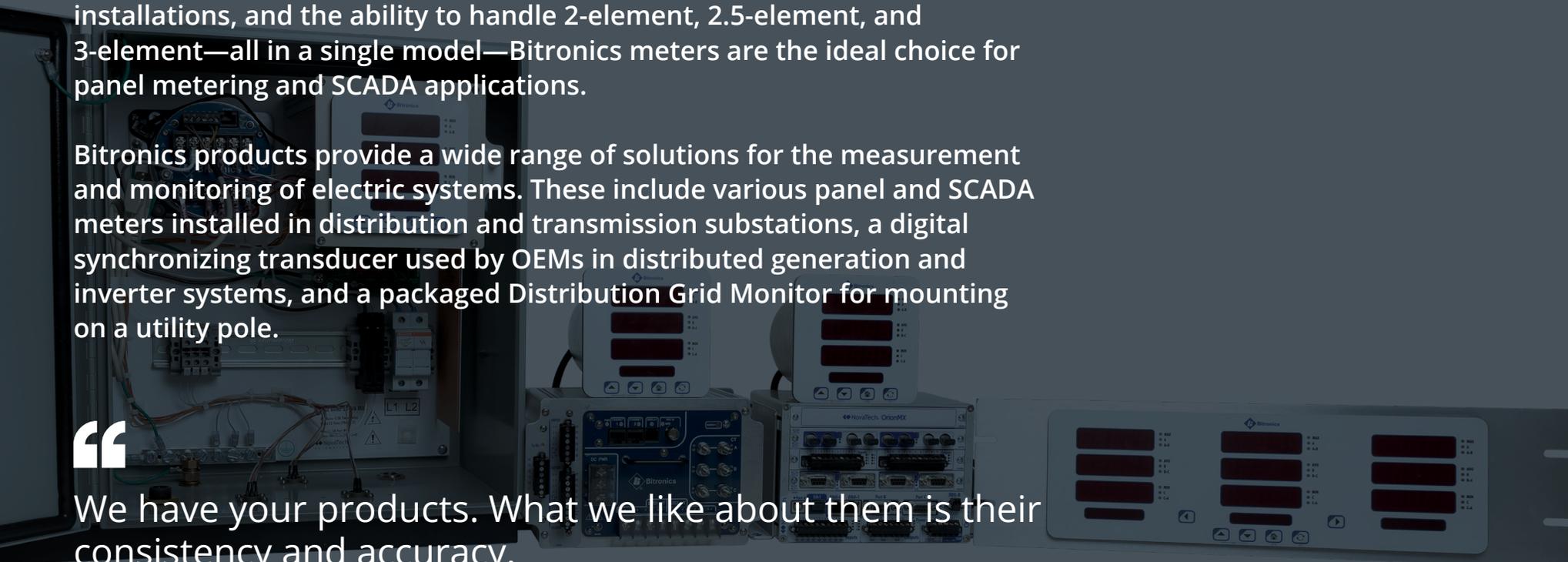
With web-based configuration, flexible connections for serial and Ethernet, universal power supplies, bright 3-line/5-digit displays, split-core installations, and the ability to handle 2-element, 2.5-element, and 3-element—all in a single model—Bitronics meters are the ideal choice for panel metering and SCADA applications.

Bitronics products provide a wide range of solutions for the measurement and monitoring of electric systems. These include various panel and SCADA meters installed in distribution and transmission substations, a digital synchronizing transducer used by OEMs in distributed generation and inverter systems, and a packaged Distribution Grid Monitor for mounting on a utility pole.



We have your products. What we like about them is their consistency and accuracy.

- Engineer, Western US Testing Lab





Panel metering simplified

Bitronics 50 and 60 Series meters are designed to simplify ordering, configuration, installation and spares. 50 and 60 Series meters can serve as the digital front end to SCADA Remote Terminal Units (RTUs), provide line monitoring and local indication in substation and industrial plant equipment monitoring applications.

M350 / M650 / M660

M350 measures and displays Amps with Demand, or Voltage with Min/Max. M650 and M660 offer a wider range of three-phase measurements and communication options (including IEC 61850). Single three-line plus alphanumeric display.

M651 / M661

"Transducer mount" with no display, and all the measurement features of M650 / M660 meters.

M653 / M663

Offers everything in the M650 / M660 with a triple display.

D650 Universal Display

Connects easily to any substation IED via DNP3 or Modbus TCP Client (Serial or Ethernet) to display measurement values residing in those IEDs. Requires no CT or PT connections.

PowerPlex II (PPX II)

An automation transducer with two sets of 3-phase voltages and 1-cycle measurement update speeds for use in high-speed control, sync-check, and auto-sync applications. Supports Modbus TCP/IP and utility protocols, as well as the Rockwell/Allen Bradley EtherNet/IP industrial protocol. Redundancy support through Device Level Ring (DLR).



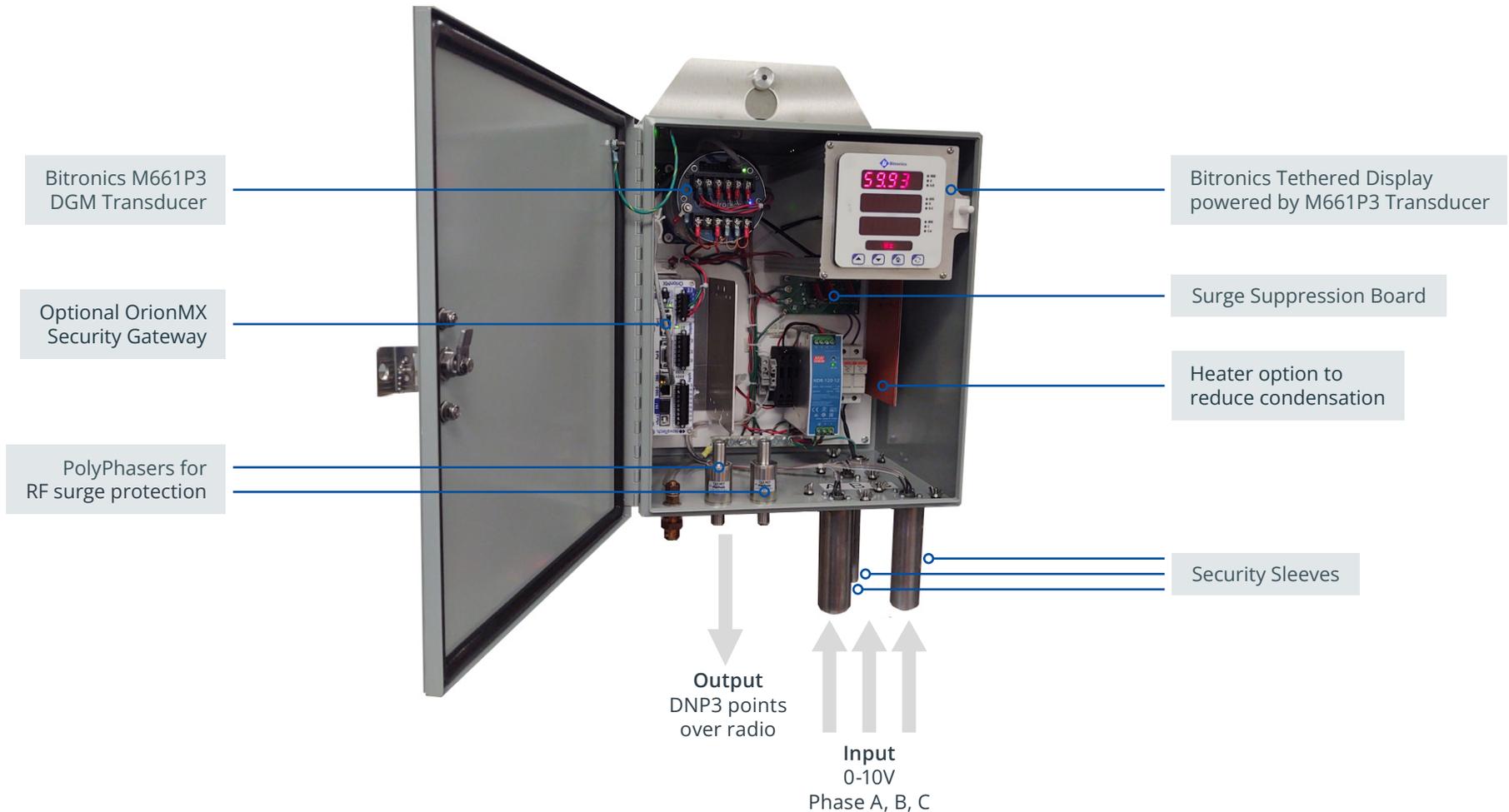
	M660, M661, M663	M650, M651, M653	M350	PowerPlex II
Full Set of 3-phase Power Measurement	Yes	Yes	Amp/Demand (A3); Volt/Min/Max (V3)	Yes
0.2% Revenue Accuracy	Yes	Yes	N/A	Yes
.001Hz Accuracy	Yes	Yes	N/A	Yes
Current Input Range	1A, 5A, 20A	1A, 5A	1A, 5A (M350A3)	1A, 5A
Split Core CT Option	1A, 5A	1A, 5A		
Voltage Input Range	120V ac	120V ac	120V ac (M350V3)	600V ac
DNP3/Modbus Serial and TCP (Server)	Yes	Yes	Yes	Yes
No of 3-Line, 5-Digit Displays	1, 0, or 3	1, 0, or 3	1	1-Detached
IEC 61850 or EtherNet/IP	Yes	No	No	Yes
Data Trending	Yes	No	No	Yes
Definite Time Overcurrent Relay Element	Yes, M661P3 for DGM	No	No	No
Update Rate	1ms	100ms	100ms	1ms



Distribution Grid Monitor (DGM)

Down the line monitoring for voltage optimization

The DGM is a power monitoring solution—also known as a “primary in a box”—that consists of a Bitronics M661 meter, matched Lindsey LEA (low energy analog) sensors, and cabling, plus an optional OrionMX RTU for cybersecurity, I/O, and automation functions.



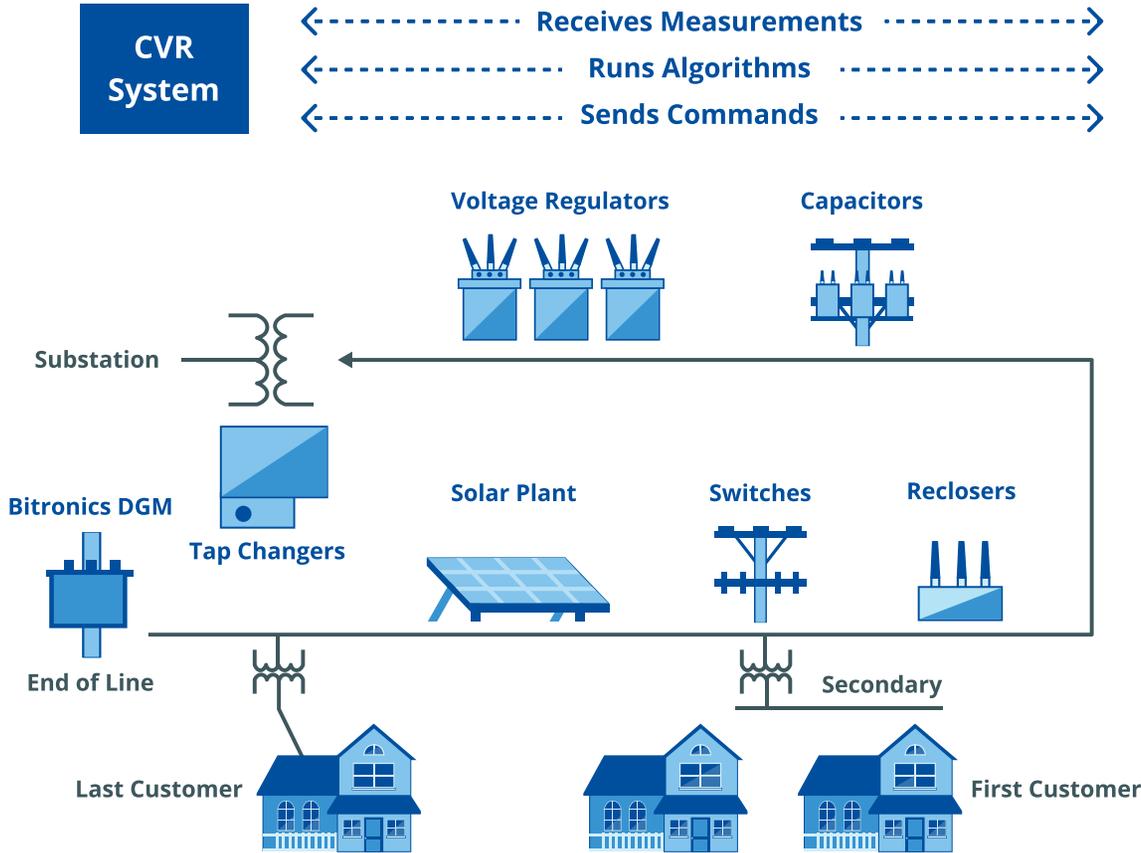
The DGM can also provide accurate end-of-line voltages to Conservation Voltage Reduction (CVR) and Volt-VAR Optimization (VVO) schemes. When equipped with current inputs, the DGM can provide complete SCADA data from unmonitored rural substations and step-down sites. In FLISR schemes, the DGM can provide indication of overcurrent fault and can provide peak fault currents.

Advantages of the Bitronics DGM:

- Complete with packaged meter, sensors and cables.
- Easily installed without taking an outage. (Two installs/day/truck.)
- High accuracy: better than 0.5%
- Voltage measurements not affected by load.
- “SCADA ready” with 120V-scaled DNP3 points.

Measurements available from the DGM:

- 3-phase voltages and currents
- Real and reactive power, power factor
- Frequency
- Fault pickup and peak fault currents



The Bitronics DGM is a critical component in CVR systems that deliver energy savings of 3% or more.

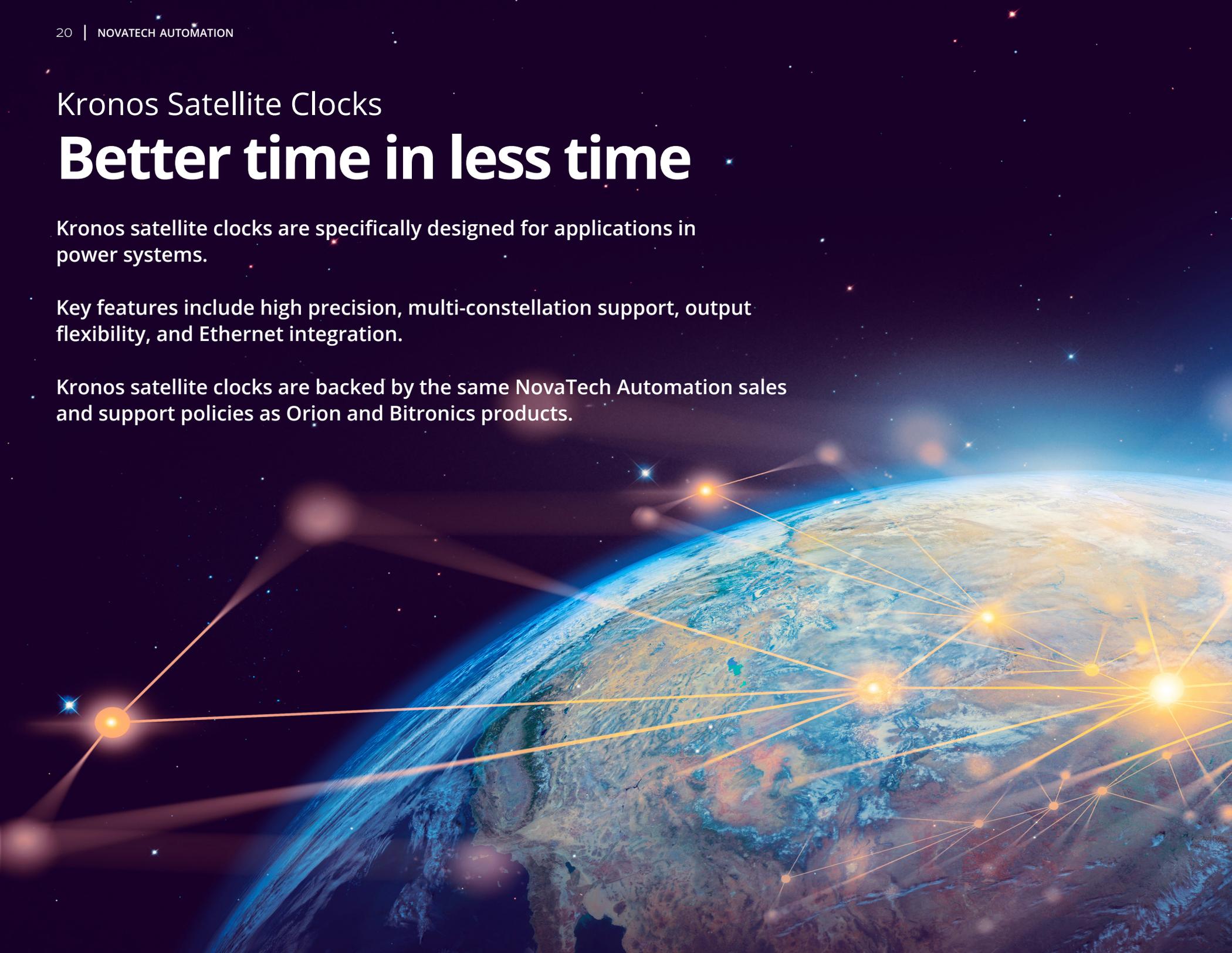
Kronos Satellite Clocks

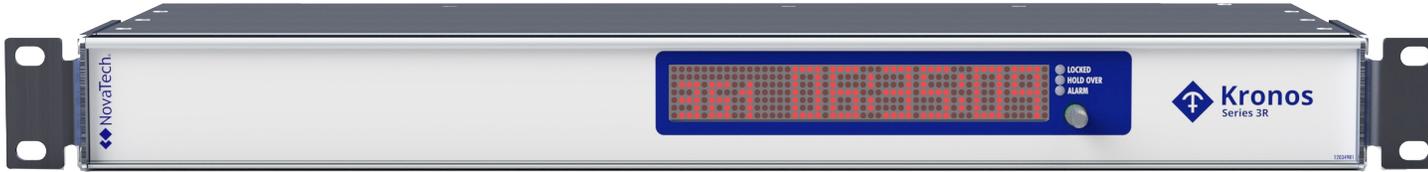
Better time in less time

Kronos satellite clocks are specifically designed for applications in power systems.

Key features include high precision, multi-constellation support, output flexibility, and Ethernet integration.

Kronos satellite clocks are backed by the same NovaTech Automation sales and support policies as Orion and Bitronics products.





Multi-constellation support

Kronos is more than just a GPS clock. It can also be configured to lock onto other GNSS constellations: BeiDou, GLONASS, and Galileo. This means more assurance of a fast lock, and less time in holdover.

More flexibility

Kronos clocks are available in panel mount and rack mount enclosures with functionality tailored to your requirements.

Series 3 Master Clock

- Standard temperature controlled crystal oscillator (TCXO) or optional oven controlled crystal oscillator (OCXO)
- Supports PRP/HSR
- IEEE 1588-2008v.2 grandmaster functionality
- Supports multiple PTP profiles
- 20ns accuracy

Common Kronos features

- Unmodulated IRIG-B over twisted pair, coax, or fiber
- Modulated IRIG-B over coax
- Powerful 200mA per output
- Antenna cable-delay compensation
- Out-of-bound alarm
- Open/Short antenna alarm
- Web-based configuration
- NTP/SNTP
- SNMP

	Series 2P	Series 2R	Series 3R
Mounting	Panel	19" rack	19" rack
Front Panel Height	1RU	1RU	1RU
Accuracy	60ns	60ns	20ns
Oscillator	DTCXO	DTCXO	TCXO or OCXO
Ethernet Ports	1 copper port	1 or 2 copper ports	4 SFP slots, 1 copper port
PRP/HSR Support	No	No	Yes
PTP (IEEE 1588) Support	No	No	Yes
NTP Support	Yes	Yes	Yes
Outputs (isolated unmodulated, amplitude-modulated, optical fiber)	Up to 2	Up to 12	Up to 12
Redundant Power Supply	No	Yes	Yes



Orion SCADA

Flexible, web-based, cost-effective SCADA

We leverage the open standards, security, and flexibility of our WEBserver HMI software to provide license-free SCADA functionality at a fraction of the cost of PC-based SCADA. For users with basic SCADA requirements for system visualization, alarm management, remote breaker control, and data archiving and trending, NovaTech Automation can provide a SCADA system requiring only browser access from user PCs. In these systems, a local or remote OrionLX+ serves out standard and customized webpages. This browser-only design eliminates software maintenance and load issues on user PCs. NovaTech Automation engineers can also design and commission a secure communication link between the host OrionLX+ SCADA system and Orion-based substation RTUs.



Installing our web-based SCADA was very easy for us despite the fact that we are a small IT team. Even without a dedicated SCADA team, we can easily maintain the product. It does not require a big department.

- VP of IT, Midwest US Electric Utility Coop



OVERVIEW CASS CENTRAL SOUTH ZION LANARK POST ALARMS TRENDING ADMIN

SYSTEM TOTAL MW 34.55
SYSTEM TOTAL MVAR 10.04
SYSTEM TOTAL PF 0.96

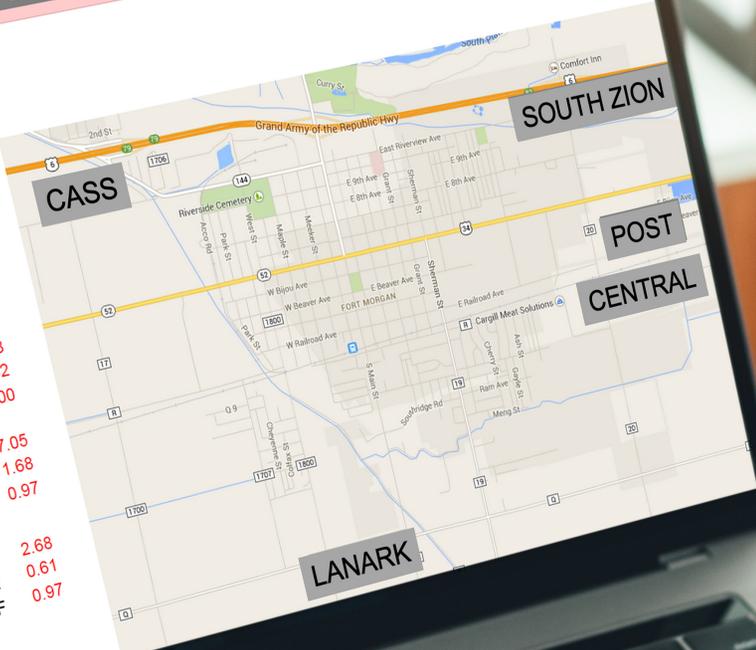
POST MW 9.12
POST MVAR 2.50
POST PF 0.96

CENTRAL MW 9.32
CENTRAL MVAR 4.73
CENTRAL PF 0.89

LANARK MW 6.38
LANARK MVAR 0.52
LANARK PF 1.00

CASS MW 7.05
CASS MVAR 1.68
CASS PF 0.97

SOUTH ZION MW 2.68
SOUTH ZION MVAR 0.61
SOUTH ZION PF 0.97



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< Inbox

From: eleccsada@yourutility.com

Hide

301 Trip @LogicPak (LogicPak_301 Trip)

Main Breaker 301 to Lenexa Sub TRIPPED
Value: 1
Date/Time: 2023 08 14 08:48:47:385 UTC



RTU panels and cabinets

Orion RTU panels are custom-designed to meet specific customer requirements, and typically include Orion-based automation, third-party IEDs, HMI, communication gear, power supply, terminal strips, and optional battery monitor. NovaTech Automation will take full responsibility for configuration of all equipment and testing prior to shipment.



Services & support

IT/OT services

NovaTech offers design, configuration, and installation services for network and security devices within your SCADA and SCADA DMZ environments. With a vendor-agnostic approach, our engineers can audit your system, set up event monitoring systems, assess your security posture, suggest enhancements, and add redundancy and backup systems.

Learn more: novatechautomation.com/solutions/it-ot-services

Training

Training services include customized on-site training and quarterly scheduled courses at our Lenexa, KS facility. We also host monthly, no-charge Power Hour webinars that detail how to apply our products and features to greatest benefit.

Learn more: novatechautomation.com/training-and-events

Customer community and support portal

NovaTech users can easily access manuals, review Power Hour recordings, open support cases, and download software in our integrated customer community and product support websites.

Learn more: novatechautomation.com/community

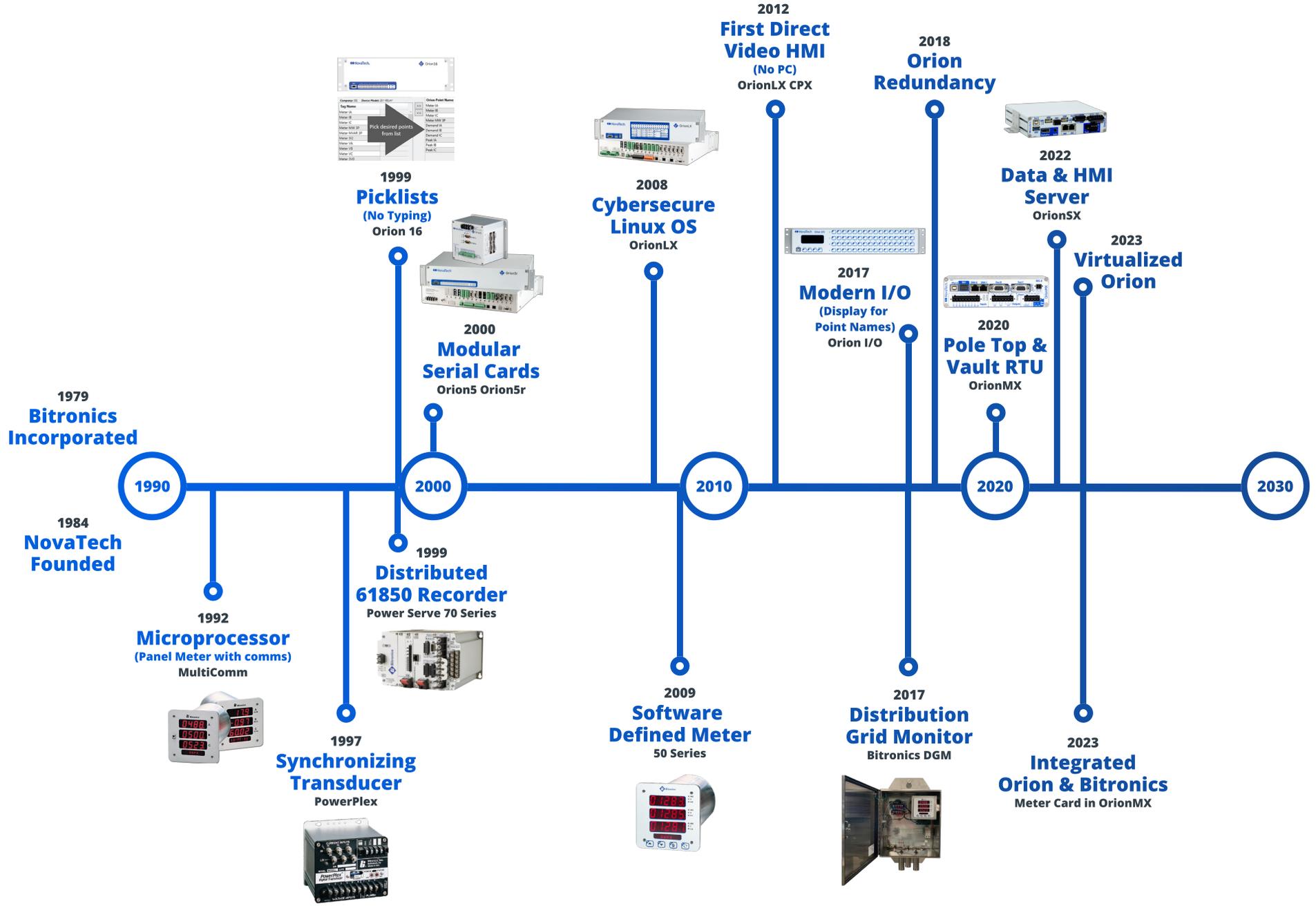


As both a business owner/manager and occasional field support individual, I find the Power Hour webinars very useful. They are presented with good organization and simple clarity, and I find the experience an excellent use of my valuable time. Great job, guys!

- Manager, FL Systems Integrator



A legacy of innovation



Committed to our customers and the future



NovaTech Automation is a US-based, medium-sized, family-owned business. Our core values of Service, Integrity, Innovation, and Teamwork are at the heart of our continued growth and success in grid automation.

As current and future stewards of the most complex machine ever built, we have both a rare business opportunity and a moral obligation to accelerate the decarbonization of the power grid. We have therefore committed to achieve Net Zero carbon/GHG operations by 2050.

Conrad Oakey, CEO
Volker Oakey, Chairman

Contact us today at [844-NOVATECH](tel:844-NOVATECH) | sales@novatechautomation.com



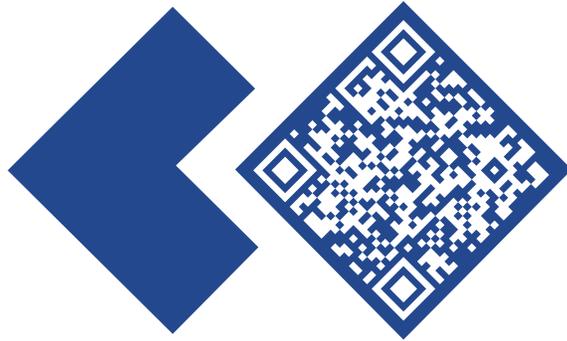
10-year No Hassle Warranty



Always Made in the USA



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