



Summary of Offerings April 2011 - March 2012



Utility Product Courses	Page	Duration	Required Pre-requisite Course or Experience
Orion5/Orion5r Automation Platform	3	1 1/2 days	None
OrionLX Automation Platform (Full Course)	3	1 1/2 days	None
OrionLX (Short Course)	4	4 hours	Orion5/Orion5r Full Course or equivalent experience.
Distributed Discrete I/O (DDIO) and Combination I/O (DCIO) Module	4	4 hours	None
ADAM 4017+ Analog Input Module	5	4 hours	None

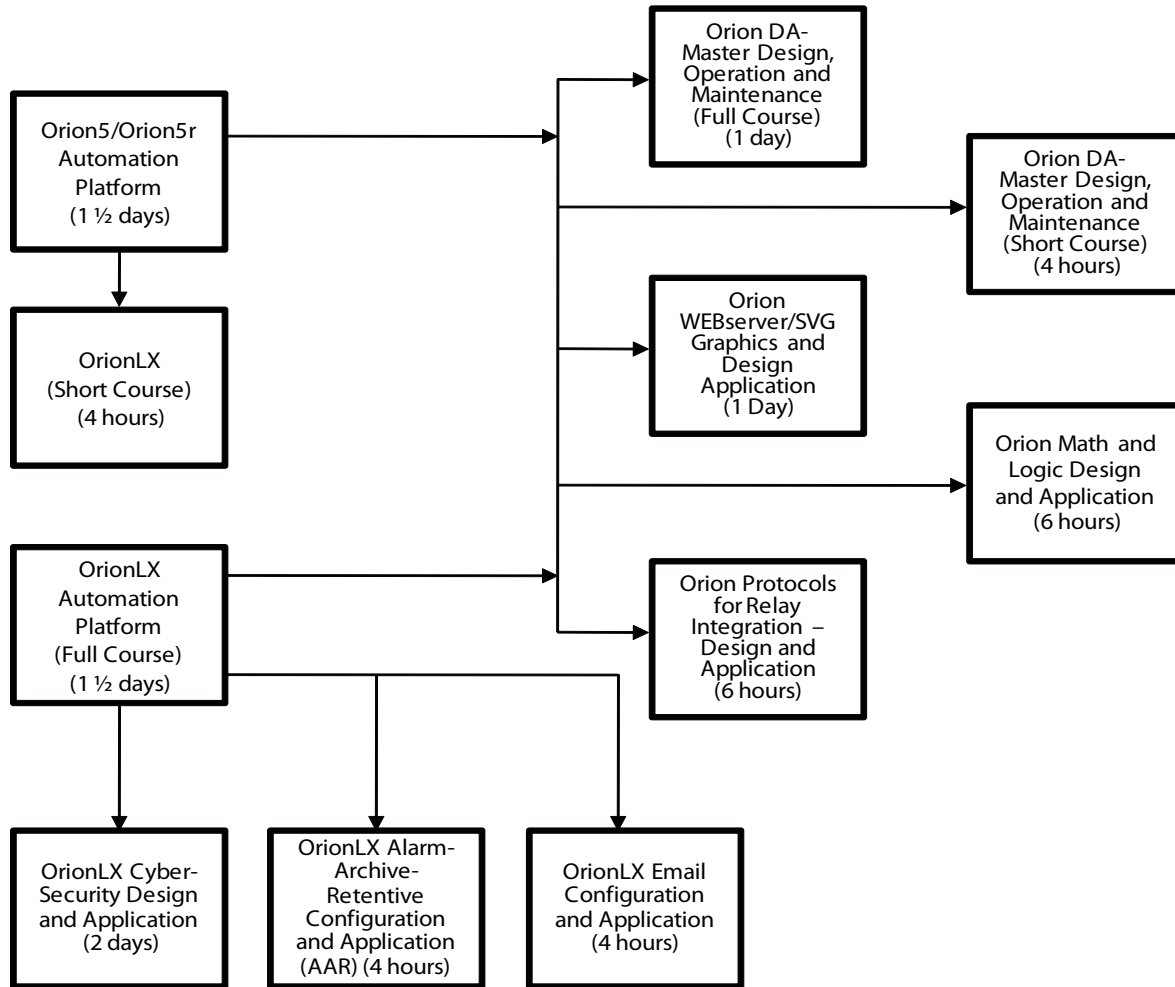
Utility Application Operation Courses	Page	Duration	Required Pre-requisite Course or Experience
Orion DA-Master Design, Operation and Maintenance (Full Course)	5	1 day	Orion Full Course, or equivalent experience.
Orion DA-Master Design, Operation and Maintenance (Short Course)	6	4 hours	Orion Full Course, or equivalent experience.
Orion WEBserver/SVG Graphics and Design Application	6	1 day	Orion Full Course, or equivalent experience.
Orion Math and Logic Design and Application	7	6 hours	Orion Full Course, or equivalent experience.
Orion Protocols for Relay Integration - Design and Application	7	6 hours	Orion Full Course, or equivalent experience.
OrionLX Cyber-Security Design and Application	8	2 days	OrionLX Full Course, or equivalent experience.
OrionLX Alarm-Archive-Retentive Configuration and Application (AAR)	8	4 hours	OrionLX Full Course, or equivalent experience.
OrionLX Email Configuration and Application	9	4 hours	OrionLX Full Course, or equivalent experience.

Utility Technology Courses	Page	Duration	Required Pre-requisite Course or Experience
DNP3.0 Protocol Application, including Serial Communication Basics	9	1 1/2 days	None
Ethernet for the Utility Professional	10	1 day	None
Orion Network Support (Microsoft Operating System)	10	5 days	For maximum benefit of this course, completion of the Windows 2000 or Windows XP/2003 class or equivalent.
Orion Network Enterprise (Microsoft Operating System)	11	3 days	For maximum benefit of this course, completion of the Windows XP/2003 and Orion Network Support class or equivalent.

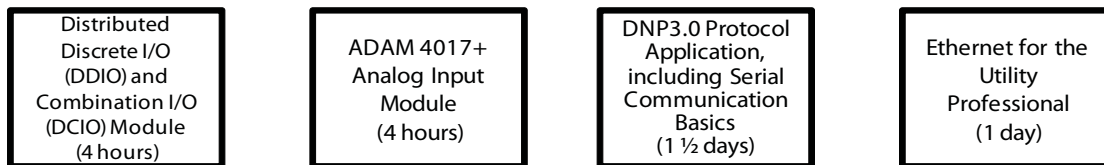
Bitronics® Courses	Page	Duration	Required Pre-requisite Course or Experience
Utilities Power Specialist	11	2 days	Electrical substation knowledge and basic knowledge of disturbance records and power quality principles.
Utilities Communication Specialist	12	1 day	Utilities Power Specials is optional.

SEL is a registered trademark of Schweitzer Engineering Laboratories, Inc.
Bitronics is a registered trademark of Bitronics, LLC.

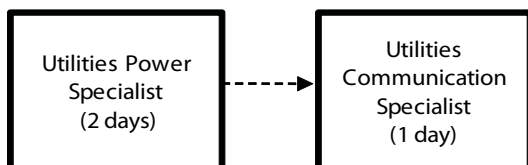
RECOMMENDED SEQUENCE OF COURSES



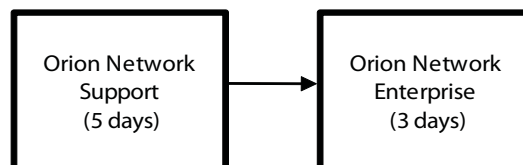
Standalone Modules



Bitronics®



Microsoft® Operating System



UTILITY PRODUCT COURSES

Orion5/Orion5r Automation Platform

Objective

Train students on how to specify Orion hardware and firmware configurations and create Orion5/Orion5r configurations for typical RTU and Communication Processor applications, using NovaTech Communications Director (NCD) software. Review Orion online operations to transfer files and diagnose Orion operation and communications. Review Orion physical connections and hardware modules.

Prerequisites

Exposure to or experience with RTUs and IEDs is preferred.
Understanding of the data required from substations is preferred.
Understanding of SCADA controls is preferred.

Description

A one and a half-day course to provide instruction in the specification, configuration, application, and real-time monitoring of the Orion family of automation processors. Students will be introduced to various hardware platforms and hardware and firmware options in the Orion family and their various uses and applications. NCD will be discussed and utilized throughout the course to familiarize the student with the options and applications that the Orion family can serve. Laboratory exercises will compliment the lecture material, allowing each student to build an Orion configuration file, transfer it to an Orion, make the configuration active, and then monitor the functionality of the Orion running their configuration.

Topic Outline

- Orion5 Hardware
- Orion5r Hardware
- Orion Operating System and Protocol Firmware Architecture
- NovaTech Communications Director (NCD) Installation
- NCD Usage - Configuring Communications Ports
- NCD Usage - Logic
- Using, Modifying, and Creating Default Files
- Transferring Files Between PC and Orion
- Monitoring Orion Operation in Real-Time
- Summary of Basic and Advanced Applications for Orion

Course Number	Location	Price (per person)
M481	Owings Mills, MD August 24, February 1	\$1,350
S481	Aiken, SC	\$1,350
L481	Denham Springs, LA	\$1,350
K481	Lenexa, KS May 4, November 2	\$1,350

OrionLX Automation Platform (Full Course)

Objective

Train students on how to specify OrionLX hardware and firmware configurations and to create OrionLX configurations for typical RTU and Communication Processor applications, using NovaTech Communications Director (NCD) software. Review OrionLX web-based online operations to transfer files and diagnose Orion operation and communications. Review OrionLX physical connections and hardware modules.

Prerequisites

Exposure to or experience with RTUs and IEDs is preferred.
Understanding of the data required from substations is preferred.
Understanding of SCADA controls is preferred.

Description

A one and a half-day course to provide instruction in the specification, configuration, application, and real-time monitoring of the OrionLX automation processor. Students will be introduced to OrionLX hardware and firmware options and their various uses and applications. NCD will be discussed and utilized throughout the course to familiarize the student with the options and applications that the OrionLX family can serve. Laboratory exercises will compliment the lecture material, allowing each student to build an OrionLX configuration file, transfer it to an OrionLX, make the configuration active, and then monitor the functionality of the OrionLX running their configuration. Utilization of basic security functions available in the OrionLX is also summarized.

Topic Outline

- OrionLX Hardware
- OrionLX Operating System and Protocol Firmware Architecture
- NovaTech Communications Director (NCD) Installation
- NCD Usage - Configuring Communications Ports
- NCD Usage - Logic
- Using, Modifying, and Creating Default Files
- Transferring Files Between PC and OrionLX
- Monitoring OrionLX Operation in Real-Time
- Summary of Basic and Advanced Applications for OrionLX

Course Number	Location	Price (per person)
M700	Owings Mills, MD August 24, February 1	\$1,350
S700	Aiken, SC	\$1,350
L700	Denham Springs, LA	\$1,350
K700	Lenexa, KS May 4, November 2	\$1,350

OrionLX (Short Course)

Objective

Enable users of the Orion5/Orion5r to quickly come up to speed on use of the OrionLX Automation Platform by highlighting and focusing training on the hardware and software differences.

Prerequisites

Experience and familiarity in the use of the Orion5/Orion5r Automation Platform.

Description

A half-day course to provide instruction on the differences between the Orion5/Orion5r and the OrionLX, including: USB ports, expanded/redundant power supply, open database, web-based online operations, security front end, expanded diagnostics and other new options. NCD will be discussed and utilized throughout the course. Laboratory exercises will compliment the lecture material, allowing each student to build an OrionLX configuration file, transfer it to an Orion, make the configuration active, and then monitor the functionality of the Orion running their configuration.

Topic Outline

- Review of New OrionLX Hardware and Diagnostics
 - Wide-range Power Supplies
 - Redundant Power Supply Option with Diagnostics
 - Fiber-optic Ethernet Port Option
 - Expanded Memory for Data Archiving
 - Diagnostic LEDs for Firewall and Communications
 - USB Ports
- Review of New OrionLX Web-Based Online Operations
 - Web-based online operations
 - Online Configuration Requirements
 - Transferring Files Between PC and OrionLX
 - Monitoring OrionLX Operation in Real-Time
 - Orion Security Overview
 - Multiple Users with Levels of Access
 - Remote Authentication Support
 - Firewall Support
 - VPN and Encryption Protocol Support
 - Key Management
 - Logging
- Review of New OrionLX Software and Options
 - "Cascaded Orion" Software
 - Email Remote Reporting Option
 - Point Aliasing
 - Open Source SQL-Compliant Database

Course Number	Location	Price (per person)
701	ALL	\$450

Distributed Discrete I/O (DDIO) and Combination I/O (DCIO) Module

Objective

Learn how to configure the Distributed Discrete I/O (DDIO) module and the Combination I/O (DCIO) module in simple and advanced applications. Learn how to make power, I/O, and communication connections to the DDIO/DCIO.

Prerequisites

- Understanding of substation operations and apparatus.
- Understanding of the data provided by substation apparatus.
- Understanding of IRIG-B and time stamping preferred.
- Familiar with using a PC - setting IP addresses, use of terminal emulators, browsers, etc.

Description

A half-day course to provide instruction on the simple and advanced configuration of the DDIO/DCIO module and the various hardware connections. The web-based online DDIO/DCIO module configuration tool will be discussed and used throughout the course. Laboratory exercises will compliment the lecture material, allowing each student to modify a DDIO/DCIO configuration, transfer it from the DDIO/DCIO module (for documentation and replication purposes), make the configuration active, and then monitor the functionality of the DDIO/DCIO module running the configuration.

Topic Outline

- Physical Features, Wiring, Available I/O Versions, DIN-rail, Panel, 19" Rack-mount
 - Available Serial Communication Cards
 - Type A, B, C, E, G, and J
 - Simple Mode DIP Switch Configuration
 - Advanced Mode Configuration
 - Techniques for Setting DDIO/DCIO Time
 - Hard-wired IRIG-B, IRIG-B Over Comms, NTP and DNP3.0
 - Using Input Filter, Debounce, and Chatter Parameters
 - Analog Ranges and Channel Selection
 - Analog Scaling Configuration
 - Maintaining 1mS Accuracy in SOE Systems
 - Diagnostics - LEDs, Serial and Ethernet Comms

Course Number	Location	Price (per person)
702	ALL	\$450

ADAM 4017+ Analog Input Module

Objective

Learn how to configure the ADAM 4017+ Analog Input module in NCD and by using the ADAM ASCII configuration s/w. Learn how to make power, I/O and communication connections to the ADAM I/O module.

Prerequisites

- Understanding of substation operations and apparatus.
- Understanding of the data provided by substations apparatus.
- Understanding of Modbus® protocol desirable.

Description

A half-day course to provide instruction on the configuration of the ADAM 4017+ Analog Input module in NCD and using the ADAM ASCII configuration s/w, as well as the power, I/O and communications connections. Laboratory exercises will compliment the lecture material, allowing each student to modify the communication and data parameters of the ADAM module and to configure Orion, using NCD, to read from/write to the module.

Topic Outline

- Physical Features, Wiring, DIN-Rail and Stack Mounting
- Modbus® RS485 Wiring
- Factory Configuration Settings
- Advanced Configuration Using Advantech Software Utility
- Application Guidelines

Course Number	Location	Price (per person)
703	ALL	\$450

UTILITY APPLICATION AND OPERATION COURSES

Orion DA-Master Design, Operation and Maintenance (Full Course)

Objective

Train engineers to configure and simulate automatic feeder isolation and restoration schemes using the DA-Master option on the Orion Automation Platform.

Prerequisites

- Completion of Orion5/Orion5r/OrionLX Automation Platform course, or equivalent experience.
- Familiarity with distribution feeder topologies and apparatus.
- Understanding of feeder isolation and restoration control scenarios.
- Familiarity with typical use of a PC – setting IP addresses, using spreadsheets, terminal emulators, browsers, etc.

Description

A one-day course to provide instruction on the operation, troubleshooting, and application configuration of the DA-Master firmware module for Orion Automation Platforms. NCD will be discussed and utilized throughout the course. Laboratory exercises will compliment the lecture material, allowing each student to view online operations of the DA-Master, including the event file for identifying the sequence of events for an automated DA operation, build simple DA configurations, make the configurations active, and then monitor the functionality of the Orion running the configuration.

Topic Outline

- Understand Basic Application of DA-Master
 - Isolation
 - Sectionalization
 - Restoration
 - Safety Interlocks and DA Zone Statuses
 - Local/Remote Switches
 - Auto/Manual Switches
 - Zone Normal Mode
 - Zone Limited Mode
 - Zone Lockout Mode
- Connect to Orion Diagnostics with Serial or Ethernet Connection
- View Communications and System Info
- View DA Log for Sequence of Events
- Discuss and Understand Basic DA Application and Configuration Concepts
 - DA Devices
 - Zones or Pods
 - Zone Steps for Isolation/Restoration
- Addition of Free-form Logic for Advanced Applications
- Testing Techniques

Course Number	Location	Price (per person)
704	ALL	\$895

Orion DA-Master Design, Operation and Maintenance (Short Course)

Objective

Train operators and technicians to operate and troubleshoot Orion when applied in DA-Master schemes.

Prerequisites

Completion of Orion5/Orion5r/OrionLX Automation Platform course, or equivalent experience.

Familiarity with distribution feeder topologies and apparatus.

Understanding of feeder isolation and restoration control scenarios.

Familiarity with typical use of a PC – setting IP addresses, using spreadsheets, terminal emulators, browsers, etc.

Description

A half-day course to provide instruction on the operation and troubleshooting configuration for Orion Automation Platforms. NCD will be discussed and utilized throughout the course. Laboratory exercises will compliment the lecture material, allowing each student to view online operations of the DA-Master, including the event file for identifying the sequence of events for an automated DA operation, build simple DA configurations, make the configurations active, and then monitor the functionality of the Orion running the configuration.

Topic Outline

- Understand Basic Application of DA-Master
 - Isolation
 - Sectionalization
 - Restoration
 - Safety Interlocks and DA Zone Statuses
 - Local/Remote Switches
 - Auto/Manual Switches
 - Zone Normal Mode
 - Zone Limited Mode
 - Zone Lockout Mode
- Connect to Orion Diagnostics with Serial or Ethernet Connection
- View Communications and System Info
- View DA Log for Sequence of Events

Course Number	Location	Price (per person)
705	ALL	\$450

Orion WEBserver / SVG Graphics Design and Application

Objective

Learn how to develop customized Scalable Vector Graphic (SVG) HMI screens and serve them out from Orion to a standard browser, using WEBserver and the Inkscape graphics development package. Also learn how to set up the pre-configured Orion web pages for Archived Sequence of Events (SOE) and Alarm Annunciation.

Prerequisites

Completion of Orion5/Orion5r/OrionLX Automation Platform course, or equivalent experience.

Understanding of substation apparatus and operation.

Understanding of need for and use of substation HMI.

Familiarity with use of a PC – setting IP addresses, use of browsers, etc.

Description

A one-day course to provide instruction to develop SVG HMI screens and serve them out from Orion. The course includes configuration of WEBserver protocols (HTTP and XML) and the Inkscape graphics development package. A library of sample screen elements and sample screens will be provided to students. The course also covers the set up of two pre-configured Orion web pages: one to display Archived Orion data (including sequence of events data and load profile data) and the other to display real-time alarms: Alarm Annunciation. Laboratory exercises will compliment the lecture material, allowing each student to develop a one-line diagram with real-time data displayed and with breaker control, and to load screens into Orion and to serve the screen out to browser. Web pages for SOE and Alarm Annunciation will also be developed and served out.

Topic Outline

- Description of Required Software Modules
 - OCXs, Base Template File and Docs in NCD
- Documentation
 - FTP and Inkscape Third-Party S/W
- Obtain and Load Inkscape Graphical Development Package
- Set up XML Server and HTTP Server in Orion
- Develop Customized Web Pages
- Link Pages with Real-Time Data in Orion
- Set Up Preconfigured SOE and Alarms Web Pages

Course Number	Location	Price (per person)
706	ALL	\$895

Orion Math and Logic Design and Application

Objective

Learn how to develop customized math and logic in the Orion Automation Platform. Learn how to diagnose problems using Logic Simulator and other printing and logging tools.

Prerequisites

Completion of Orion5/Orion5r/OrionLX Automation Platform course, or equivalent experience.

Experience in writing logic in PLCs, relays or other automation devices.

Some Basic or Visual Basic experience is preferred.

Understanding of substation operations is preferred.

Understanding of data flow in substation automation.

Description

A six-hour course to provide instruction to develop customized math and logic in Orion. Examples of working code running in substations will be provided to students. Laboratory exercises will compliment the lecture material, allowing each student to develop logic routines to add, average, and compare data and to turn on outputs in response to changing real-time inputs. Logic routines will be loaded into Orion simulators and exercised with real inputs and outputs. The preconfigured "OR" and "Primary-Backup IED" functions in LogicPak will also be covered.

Topic Outline

- Review of Syntax
 - Visual Basic - based
- Math and Logic "Events"
 - Data Change Event
 - Load Event ("Default Start-up Event")
 - Timer Event
- Review of Commands
- Database Read and Write Functions
- Diagnostics
 - Check Syntax Button
 - Print Statement
 - PrintLog Statement
- Development Guidelines
- Math and Logic Examples
- Math and Logic Simulator
- Available LogicPak Modules
 - "OR" Function
 - "Primary-Backup IEDs" Function

Course Number	Location	Price (per person)
707	ALL	\$675

Orion Protocols for Relay Integration - Design and Application

Objective

Learn how to retrieve real-time SCADA data and non-operational data from SEL® relays using the suite of SEL® protocols available in the Orion Automation Platform. Learn how to configure Orion to emulate the SEL20xx Communication Processor. Learn how to retrieve and display Event data from SEL® relays.

Prerequisites

Completion of Orion5/Orion5r/OrionLX Automation Platform course, or equivalent experience.

Experience configuring, installing or maintaining SEL® relays in substations.

Some experience in retrieving and interpreting SEL® Event Reports is preferred.

Familiarity with use of a PC – setting IP addresses, using spreadsheets, terminal emulators, browsers, etc.

Description

A six-hour course to provide instruction to configure Orion to retrieve operational and non-operational data from SEL® relays, including real-time SCADA data (analog and discrete data), breaker wear, fault distance, History and Short and Long Events. The I-Dial software option will be set up in Orion to emulate the SEL20xx Communications Processor in Ethernet and dial-up applications. The I-Log and NT-FTP options will be set up in Orion and in a PC to retrieve, parse and disseminate SEL® Full-Length Event Reports. The ASCII IED Web option will be set up in Orion to serve out web pages containing SEL® Event Report data. Laboratory exercises will compliment the lecture material, allowing each student to connect Orion to an SEL® relay to try out all of the retrieval and access mechanisms described above.

Topic Outline

- Overview of Protocols used with SEL® Relays
 - SEL® Master
 - Fast Messaging
 - Fast Operate
 - ASCII
 - FastSER
 - DNP3.0
 - Data Logger (I-Log)
 - I-Dial
- Physical Connections to SEL® Relays
 - RS232, RS485
- Configuration and Application of SEL® Master Protocols
- Configuration and Application of I-Dial
- Description Techniques for SEL® Event Record Retrieval
 - Pass-Through Orion with SEL® s/w tools
 - Use of NT-FTP, SEL® Master and I-Log
 - Use of WEB IED Data Server

Course Number	Location	Price (per person)
708	ALL	\$675

OrionLX Cyber Security Design and Application

Objective

Review the latest cyber security guidelines for critical utility infrastructure (including NERC CIP), review threats to the Utility infrastructure, review current approaches to making IT infrastructures secure and train the utility engineer on how to configure the security features in the OrionLX.

Prerequisites

Experience or training in the use of the OrionLX Automation Platform.
Some knowledge of and experience with security hardware and software desirable.

Description

A two-day course to provide instruction on a range of security technologies and practices impacting the Utility industry, including: impending NERC and IEEE guidelines and standards for infrastructure protection, nature of Utility security threats, current IT security practices and configuration of the OrionLX Automation Platform security features. Laboratory exercises will compliment the lecture material, allowing each student to build a secure OrionLX front end.

Topic Outline

- Review of NERC CIP Guidelines
- Review of IEEE P1686/D1 Draft Standard for Substation IED Cyber Security Standards
- Nature of Security Threats to the Critical Utility Infrastructure
- Remote Authentication Theory and Practice
- Firewall Theory and Practice
- VPN and Encryption Theory and Practice
- Public Key Cryptography Theory and Practice
- Security Log Files Review
- Laboratory Exercise: Configuration of OrionLX Security Features, including:
 - Setting Passwords for Multiple User Groups with Varying Privileges
 - Defining Password Strength
 - Configuring OrionLX to as Client to Remote RADIUS and LDAP Authentication Servers
 - Configuring Firewall Rules
 - Configuring VPN and Encryption Protocols
 - Managing Public and Private Keys
 - Viewing and Sorting Logs
 - Transferring Secure Configurations

Course Number	Location	Price (per person)
M700	Owings Mills, MD July 22, February 17	\$1,500
S700	Aiken, SC	\$1,500
L700	Denham Springs, LA	\$1,500
K700	Lenexa, KS	\$1,500

OrionLX Alarm-Archive-Retentive Configuration and Application (AAR)

Objective

Learn how to archive data in Orion memory, setup the Orion SQL database, create web pages to serve out 1mS Sequence of Events Tables, create web pages to serve out Alarm Annunciation Tables and create and transfer .csv files containing archived data.

Prerequisites

Completion of OrionLX Automation Platform course, or equivalent experience. Understanding of the application high resolution sequence of event and alarm annunciation; where it is used, why it is used, how utilities use the data.

Description

A half day course to learn how to configure and apply the OrionLX AAR software module. Laboratory exercises include creation of Sequence of Events web pages, Alarm Annunciation web pages, Trending pages retrieval of .csv SER records and making SQL queries.

Topic Outline

- NCD Setup of Alarm-Archive-Retentive Module
 - General Tab
 - Set Capabilities and Intervals
 - Inputs Tab
 - Add Points
 - Configure Archive Parameters
 - Configure Alarm Parameters
 - Min/Max Values
 - Alarm Messages
 - Outputs Tab
- Implementation of the PostgreSQL Database
 - Tables
 - Archive
 - Archive Partitioning
 - Retentive
 - Alarm Archive
 - Retentive Alarm
 - SQL Queries
 - Windows and Interactive Terminal Interface
 - Data Storage Requirements
- Web Page Viewing and Online Menus
 - Enabling the Database
 - Alarms
 - Alarm Archive
 - Archive
 - Trending
 - Filter Options

Course Number	Location	Price (per person)
713	ALL	\$450

OrionLX Email Configuration and Application

Objective

Learn how to configure and send out email alarm messages, configure and send emails with attached SEL* Event Reports, and create email groups.

Prerequisites

Completion of OrionLX Automation Platform course, or equivalent experience.

Description

A half day course to learn how to configure and apply the OrionLX Email software module. Laboratory exercises include creation and sending of emails with alarm messages, and with SEL event reports (as attachments and in the body of email).

Topic Outline

- NCD Setup of Email Module
 - General Tab
 - Sender/Server Parameters
 - Encryption and Security Parameters
 - Recipients Tab
 - Email Groups Tab
 - Inputs Tab
 - Outputs Tab
- Attachment of SEL Events
 - Full Length Event Reports
 - Histories
- Integration with Orion Alarm-Archive-Retentive, Alias, Text Capabilities and SEL Master

Course Number	Location	Price (per person)
714	ALL	\$450

800.253.3842

UTILITY TECHNOLOGY COURSES

DNP3.0 Protocol and Application including Serial Communications Basics

Objective

Learn how the DNP3.0 protocol is structured and applied in electrical substations between IEDs, and between substations and control centers. Also learn the basics of serial and Ethernet communications in substations.

Prerequisites

Experience configuring, installing or maintaining substations IEDs.

Understanding of how protocols and networks are used in substations to access data from IEDs.

Description

A one and a half-day course to provide instruction on how the DNP3.0 protocol is structured, how DNP3.0 Master and Slave devices exchange messages and return responses, how to optimize the design of a serial or Ethernet-based DNP3.0 network and how to diagnose communications and problems. Serial communications basics covering RS232, RS485 and serial fiber optic, and Ethernet communications basics covering hubs, routers, switches, network design and diagnostics, are also provided. Laboratory exercises will compliment the lecture material, allowing each student to set up both serial and Ethernet DNP3.0 communication between a Master Orion and Slave IEDs, and then monitor and diagnose communications with test set software.

Topic Outline

- Introduction
- History of DNP3.0
- Device Identification
- Physical Interface Attachment
- Device Configuration
- Device Profile / Data Link Layer
- Transport Layer
- Application Layer
- Object Header
- Binary Objects
- Word-based Objects
- Class Data
- Ethernet and the Future

Course Number	Location	Price (per person)
709	ALL	\$1,350

Ethernet for the Utility Professional

Objective

Train the utility professional on the theory, application and troubleshooting of Ethernet and associated application layer payloads transported within utility substations and between substations and control / engineering centers. The achievement of commissioning goals, through use of available tool sets, is the foundational objective of this course.

Prerequisites

Familiarity with PCs, computer numbering systems and Windows operating systems.

No prior knowledge of Ethernet is required as the course is appropriate for the engineer or technician-level professional.

Description

A one-day course to provide instruction on the theory, application and troubleshooting of Ethernet installations in the utility infrastructure, concentrating on the typical hardware and software offerings in utility substations. Common off-the-shelf hardware, such as the Orion Automation Platform and DDIO, and off the shelf software tools and utilities such as Mozilla Firefox, HyperTerminal and NCD, are utilized in this course and found within utility SCADA automation systems. This course presents basic TCP/IP theory, explores freeware tools, examines Windows operating system utilities and relates the theory to real hands-on practical field applications an implementer would encounter while commissioning a typical Ethernet-based project.

Topic Outline

- Ethernet History
- ISO Models
- Topologies - LAN - WAN
- Component Identification (Hub, Switch, Managed Switch, Bridge, Server)
- Physical Interface Theory and Relation to Models
- Additional Information Resources - IETF, Modbus®, IEEE, IEC.T
- The Layers - An Explanation
- IP Addressing and Why - IPV6 vs IPV4
- Hands on Exercises
 - Subnetting
 - Configuration of IP Address and Utilization of Windows Utilities
 - TCP/IP and UDP
 - Establishment of an Ethernet Session, Connection and Connection-less
 - Well Known Ports IP and UDP (RFC 3232)
 - Sniffers
 - Introduction to Wireshark
 - Datagram Sniffing Example
 - Utility Protocols
 - Orion Utilities, ASE Utilities

Course Number	Location	Price (per person)
710	ALL	\$895

Orion Network Support (Microsoft Operating System)

Objective

Learn Network Essentials, proper configuration, and troubleshooting with network monitoring and troubleshooting tools in order to support an Orion environment.

Prerequisites

For maximum benefit of this course, completion of the Windows XP / 2003 class or equivalent.

Description

A five-day course providing foundation skills necessary to configure, customize, integrate, troubleshoot, and support a Microsoft Windows network in an Orion environment. This course employs Orion, Microsoft and WireShark network tools to analyze and determine proper network operation. Laboratory exercises are provided for hands-on experience.

Who Should Attend

- Orion support personnel.
- Personnel desiring to learn network basics.
- Network professionals.
- Personnel who use or support Microsoft Windows.
- Candidates for MCSE certification.

Topic Outline

- Network Essentials
- TCP/IP Configuration
- Network Monitoring your Orion
- Architectural Overview of TCP/IP
- IP Addressing and your Orion
- Sub Netting and Routing
- Optional Networking Components
- NetBIOS over TCP/IP for Orion
- Network Support Tools - WINS & DHCP
- Host Name Resolution
- Domain Name Service (DNS)
- Internet Access to Orion
- Other Tools and Utilities for Troubleshooting TCP/IP

Course Number	Location	Price (per person)
M434	Owings Mills, MD June 7, March 14	\$2,695
S434	Aiken, SC	\$2,695
L434	Denham Springs, LA	\$2,695
K434	Lenexa, KS October 11	\$2,695

Orion Network Enterprise (Microsoft Operating System)

Objective

Learn the necessary skills to evaluate, select and install the network support hardware and software to maximize your plant's network communication to your Orion. Changing out an existing network structure or implementing a new network environment.

Prerequisites

For maximum benefit of this course, completion of the Windows XP / 2003 and Orion Network Support or equivalent.

Description

A three-day course designed especially for the Orion users. This industrial networking environment course presents modules on industrial hubs, KVM(s), switches, routers, VPN(s) and firewalls with a focus on MTBF (mean time between failure). In addition, this course presents modules on Foundation Fieldbus, Industrial Protocol OPC Servers.

Who Should Attend

- Orion support personnel.
- Personnel desiring to learn **beyond** network basics.
- Networking professionals using Microsoft Windows.
- Personnel who use or support Industrial Networks.

Topic Outline

- Industrial Ethernet Hubs & Switches
- Cabling and KVM(s)
- Fiber Transceivers
- Protocol Conversion
- Industrial Routers and Firewall Appliances
- Wireless IP/Ethernet
- Fieldbus and Fieldbus Gateways
- Industrial Protocol OPC Servers
- Industrial Ethernet Network Management

Not currently on schedule - contact Educational Services to set up a class.

Course Number	Location	Price (per person)
M441	Owings Mills, MD	\$1,995
S441	Aiken, SC	\$1,995
L441	Denham Springs, LA	\$1,995
K441	Lenexa, KS	\$1,995

BITRONICS® COURSES

Utilities Power Specialist

Objective

Learn how to operate, use and read data logged by the Bitronics® Utility Industry Meters and IED(s) (Intelligent Electronic Devices).

Prerequisites

Electrical substation knowledge and a basic knowledge of disturbance records and power quality principles.

Description

A two-day course designed to enable a Utility Power Specialist to use Bitronics® Meters and IED(s) for utility power analysis and monitoring. Laboratory exercises are provided for hands-on experience.

Topic Outline

- 70 Series Hardware Overview
- Application Software Overview
- Fundamental Application of WaveWin as a Comtrade Viewer
- Fundamentals of Oscillography Recording on the M871/M571
- Fundamentals of Disturbance Recording on the M871/M571
- Fundamentals of Trend Recording on the M871/M571
- Fundamentals of Sequence of Events Logging on the M871/M571
- Breaker Monitor
- Transformer Monitor
- Cap bank Monitor
- Remote Synchronization of Generator
- Distributed Recording

Course Number	Location	Price (per person)
M711	Owings Mills, MD August 3, November 9, March 22	\$1,080

Utilities Communication Specialist

Objective

Learn how to install, configure, operate and perform operation verification of Bitronics® Utility Industry Meters and IED(s) (Intelligent Electronic Devices).

Prerequisites

Utilities Power Specialist course is optional.

Description

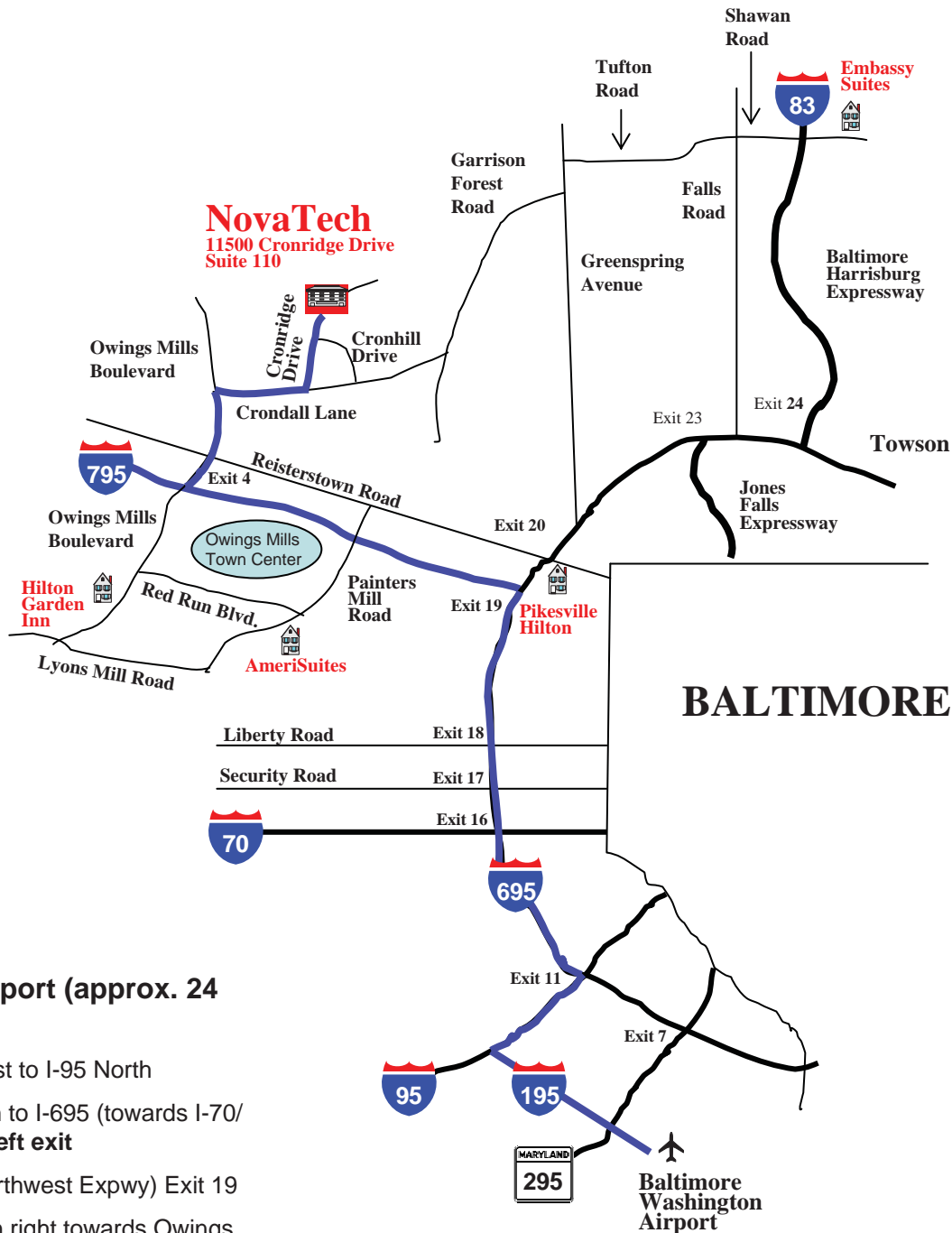
A one-day course designed to enable a Utilities Communication Specialist to install, configure and verify readiness of Bitronics® Meters and IED(s) for utility power analysis and monitoring. Laboratory exercises are provided for hands-on experience.

Topic Outline

- Application of BiView v2 SW to Real-Time Data
- Application of BiView v2 SW to File Transfer
- Configurator Overview
- Application of Mdbus as a Modbus Client and a Basic HMI
- Applications of Terminal Emulation Software to the use of M871/M571
- Fundamentals of Serial Interfacing with the M871/M571
- Fundamentals of Ethernet Interfacing to the M871/M571
- Configuration of Scaling Factors to Maximize Resolution in Modbus and DNP
- Application of the Digital I/O Option to Accomplish Remote Status and Control
- Modbus Register Mapping
- DNP Register Mapping
- Remote Displays: M870D and M570D
- Analog Outputs to Interface with Legacy Monitoring Equipment (Optional)
- Modems & Port Switches to Facilitate Remote Access to Data (Optional)
- PPP to Facilitate Dial-up Access via TCP/IP
- Time Synchronization in the M871/M571

Course Number	Location	Price (per person)
M712	Owings Mills, MD August 5, November 11, March 24	\$1,620

DIRECTIONS TO NOVATECH, LLC
 EDUCATIONAL SERVICES
 11500 CRONRIDGE ROAD; SUITE 110
 OWINGS MILLS, MD 21117

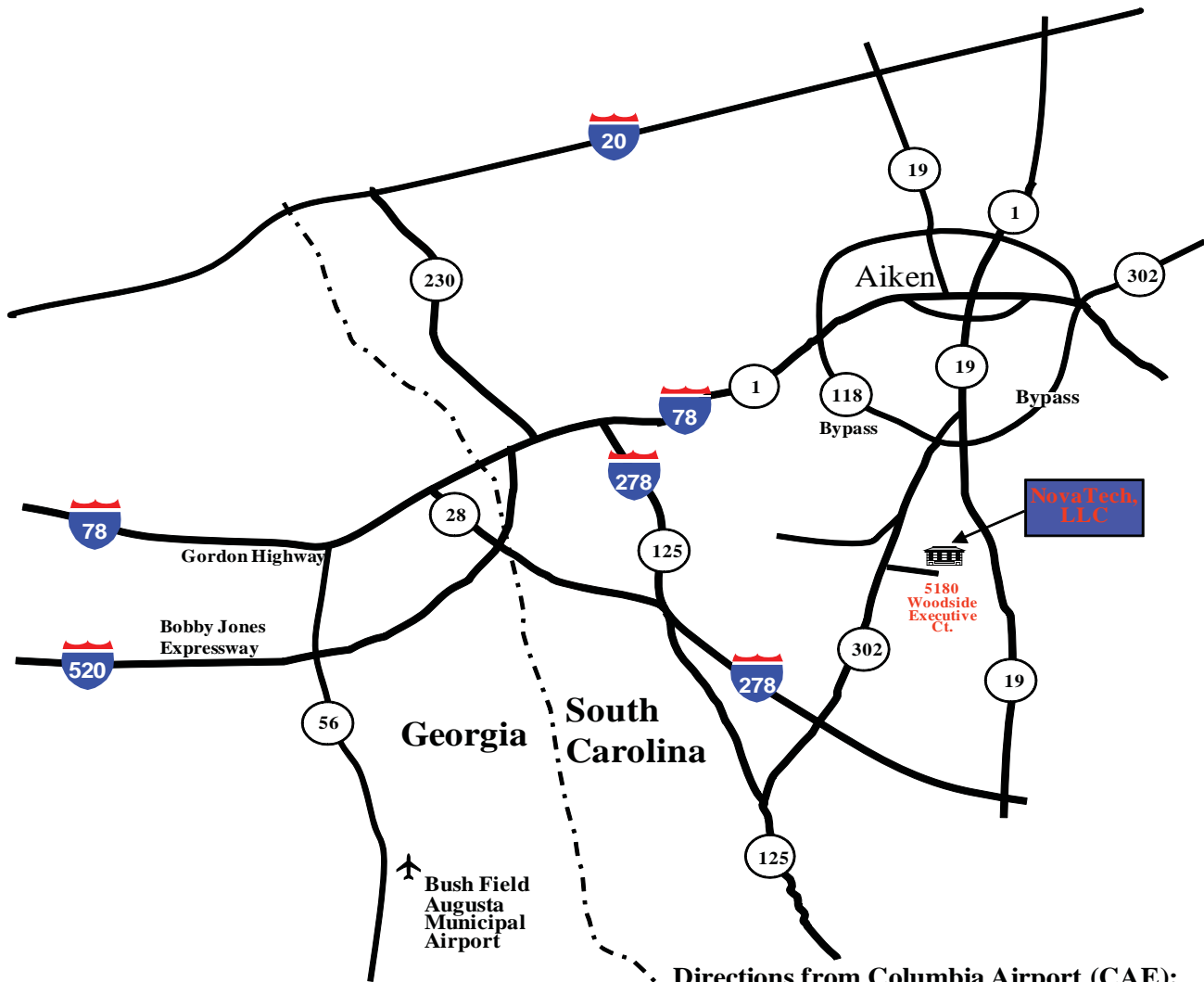


From BWI Airport (approx. 24 miles):

- Take I-195 West to I-95 North
- Take I-95 North to I-695 (towards I-70/ I-83/Towson) **left exit**
- Take I-795 (Northwest Expwy) Exit 19
- Take Exit 4 turn right towards Owings Mills Blvd.
- Take the Ramp (right) onto Owings Mills Blvd. North
- Turn right onto Crondall Lane
- Turn left onto Cronridge Drive
- NovaTech will be on the left hand side of the road.

This map is not to scale.

DIRECTIONS TO NOVATECH, LLC
 EDUCATIONAL SERVICES
 WOODSIDE EXECUTIVE PARK
 5180 WOODSIDE EXECUTIVE COURT
 AIKEN, SC 29803



Directions from Bush Field Airport (AGS):

Turn right at Doug Barnard Pkwy
 Turn left to merge onto I-520 E
 Take exit 17 for US-1 toward Aiken/N Augusta
 Turn right at US-1 N/US-278 E/US-78 E/Jefferson Davis Hwy
 Turn right at S Carolina 118/S Carolina 19 Truck/Hitchcock Pkwy
 Turn right at S Carolina 302/S Carolina 87/Silver Bluff Rd
 Turn left at Woodside Executive Ct
 NovaTech is the last building on the left

Directions from Columbia Airport (CAE):

Slight right at Cap Wing Drive
 Keep left at the fork
 Continue straight onto Ermine Rd
 Turn left at US-1 S/Augusta Rd
 Turn right to merge onto I-20 W toward Augusta
 Take exit 22 for US-1 toward Aiken
 Keep left at fork, follow signs for Hopeland Gardens/U.S.C.
 Aiken/Aiken Tech. Col.
 Turn left at US-1 S/Columbia Hwy N - Continue to follow US-1 S
 Turn right at Augusta Aiken Rd/Richland Ave E
 Take the 1st left onto Chesterfield St S
 Slight left at Whiskey Rd
 Turn right at Silver Bluff Rd
 Turn left at Woodside Executive Ct

This map is not to scale.

**DIRECTIONS TO NOVATECH, LLC
EDUCATIONAL SERVICES
138 ASPEN SQUARE
SUITE A
DENHAM SPRINGS, LA 70726**

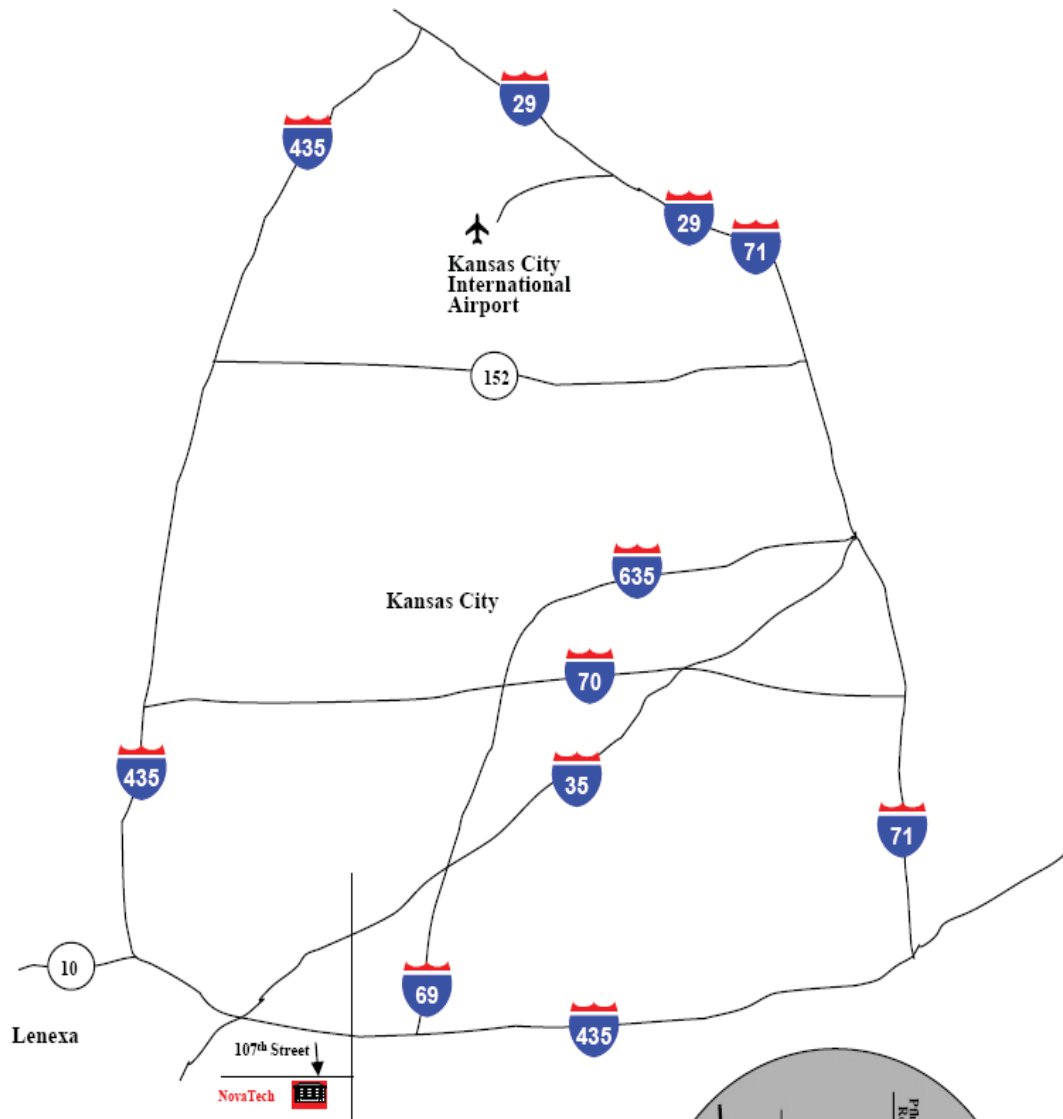


Directions to NovaTech, LLC (Denham Springs, Louisiana):

- Depart Jackie Cochran Drive going North toward Sally Ride Drive
- Turn slight right onto Sally Ride Drive
- Turn left onto Veterans Memorial Blvd
- Turn right onto LA-408 West / Harding Blvd
- Merge onto I-110 South toward Baton Rouge
- Merge onto I-10 East via Exit 11 on the LEFT toward New Orleans
- Merge onto I-12 East via Exit 159 on the LEFT toward Hammond
- Take the Range Avenue exit - Exit 10
- Turn left onto Range Avenue
- Turn right onto Aspen Square
- Arrive at 138 Aspen Square, Suite A

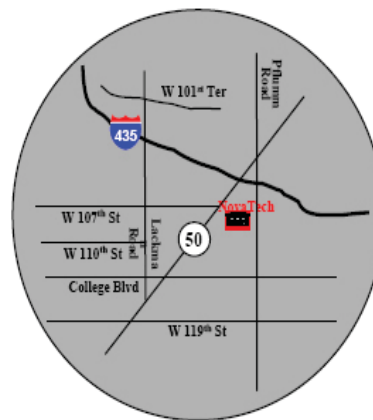
This map is not to scale.

**DIRECTIONS TO NOVATECH, LLC
EDUCATIONAL SERVICES
13555 W. 107TH STREET
LENEXA, KS 66215**



Directions to NovaTech, LLC (Lenexa, Kansas):

- Start out going South on International Circle toward Terminal A
- Stay straight to go onto LP Cookingham Drive
- Merge onto US-71 S/I-29 South toward Kansas City
- Merge onto I-635 South via exit number 3B toward Kansas
- Merge onto I-35 South via exit number 1A toward Wichita
- Merge onto I-495 East
- Take exit for Quivira Road exit number 32
- Turn right onto Quivira Road
- Turn right onto College Blvd
- Turn right onto Pflumm Road
- Turn left onto 107th Street



This map is not to scale.

Educational Services Training Courses April 2011 - March 2012

Utility	Date	Location	Course Number
Orion5/Orion5r Automation Platform	May 3-4, 2011	Lenexa, KS.....	K481
	August 23-24, 2011	Owings Mills, MD	M481
	November 8-9, 2011.....	Lenexa, KS.....	K481
	January 31 - February 1, 2012.....	Owings Mills, MD	M481
OrionLX Automation Platform	May 3-4, 2011	Lenexa, KS.....	K700
	August 23-24, 2011	Owings Mills, MD	M700
	November 8-9, 2011.....	Lenexa, KS.....	K700
	January 31 - February 1, 2012.....	Owings Mills, MD	M700
Orion Network Support (Microsoft Operating System).....	June 6-10, 2011	Owings Mills, MD	M434
	October 10-14, 2011	Lenexa, KS.....	K434
	March 12-16, 2012.....	Owings Mills, MD	M434
OrionLX Cyber Security Design and Application	July 21-22, 2011	Owings Mills, MD	M713
	February 16-17, 2012.....	Owings Mills, MD	M713

Bitronics [®]	Date	Location	Course Number
Utilities Power Specialist.....	August 2-3, 2011	Owings Mills, MD	M711
	March 20-21, 2012.....	Owings Mills, MD	M711
Utilities Communication Specialist.....	August 4, 2011.....	Owings Mills, MD	M712
	March 22, 2012	Owings Mills, MD	M712

* Refer to pages 4 through 9 for options which may be added to your standard Orion class.

Educational Services reserves the right to cancel courses that do not meet minimum enrollment standards. Additional courses can be scheduled with a minimum enrollment at NovaTech, LLC training centers or at your facility. Contact Educational Services at 800.253.3842 x8326 or training@novatechps.com

* **Contact Debbie Schott @ 800.253.3842 x 8326 to schedule a class upon request.**