

NovaTech Substation Automation Application Note

Customer and Project Scope:

Nebraska City, NE. New SCADA master and new replacement RTUs in nine automated substations and two reclosers. Three subs include generation. Voltages of 69kV, 24kV, 14.4kV and 4.16kV.

Dates of Implementation: 2002

Type of Substation Automation Project:

- SCADA Master
- Smart RTU (connected to IEDs)
- Remote engineering interface to protective relays
- High Resolution SER
- Distribution Automation (with reclosers)

NovaTech Hardware, Software and Service Products:

- NovaView Plus SCADA Master (redundant, hot-swap)
- (11) Orion5 Substation Automation Platforms. Features include: DNP3.0 Ethernet TCP slave (at radio sites) and DNP3.0 serial slave (at non-radio sites) for connections to SCADA Master, DNP3.0 master and Modbus master protocols to IEDs
- Systems Engineering
- Training

Responsibilities of NovaTech, Other Vendors and Utility:

NovaTech engineered and installed the complete system, including the SCADA master, RTUs and communications system.

Substation Local Area Network(s):

DNP3.0 LAN to SEL, Cooper and Bitronics IEDs, Modbus LAN to PLCs and Monaghan ProTime SER

SCADA Network and Protocol:

Wireless Ethernet with DNP3.0 protocol and Serial DNP3.0 over leased lines

Other System Functions:

- Redundant NovaView SCADA Masters with auto throw-over and preservation of data
- Pass-through engineering access to SEL protective relays
- Oscillographic file retrieval and dissemination

IED Interface Details:

IED (connected to Orion)	Number	Interface Protocol	Data Retrieved	Control through IED?	Other
SEL311C	Two in three substations	DNP3.0	Metering values and front faceplate data	No	
SEL351R	One in one substation	DNP3.0	Metering values and front faceplate data	Yes, for breaker trip/close	
Cooper Form 5	Two in system	DNP3.0	Metering values and front faceplate data	Yes, for recloser trip/close	
Bitronics Instruments	Three in one substation	DNP3.0	Metering values and front faceplate data	N/A	
Modicon PLCs	One in each substation	Modbus	Analog data (where not available from IEDs), less critical breaker status and alarms	Yes, through the PLC for breaker trip/close	
Monaghan ProTime SER	One in each substation	Modbus	Time stamps on more critical breaker status, alarms and various points from E/M relays	N/A	GPS at Master station, transmitted to Orions. Orion transmits time to Monaghan SER

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NovaView SCADA Master Details:

- Data Acquisition; relays, meters, PLCs, SER
- LTC Raise/Lower
- Sequence of Events archive and report generation (per device)
- Device and Group Tagging
- Visual and Audible Alarms (flash, then horn)
- System and Station One-Line Diagrams
- On-line and Historical Trending
- Load Forecasting (uses 90 days of data plus weather biasing and predicting)
- Outage Management (archive and report generation)
- Customized Reports (above reports plus KVar, KW, KVA, daily total system load, generation report)
- Breaker Trip/Close; Select Before Operate
- Reclose Enable/Disable
- Alarm/Event Reporting and Logging (including "alarm trees" to identify initiating event)
- Report by Exception (in DNP3.0)
- Pseudo-Point Processing
- Multiple Drill-Down Levels
- Dial-up Remote Access (to NovaView and to Orions on wireless LAN)
- IED Specific Displays

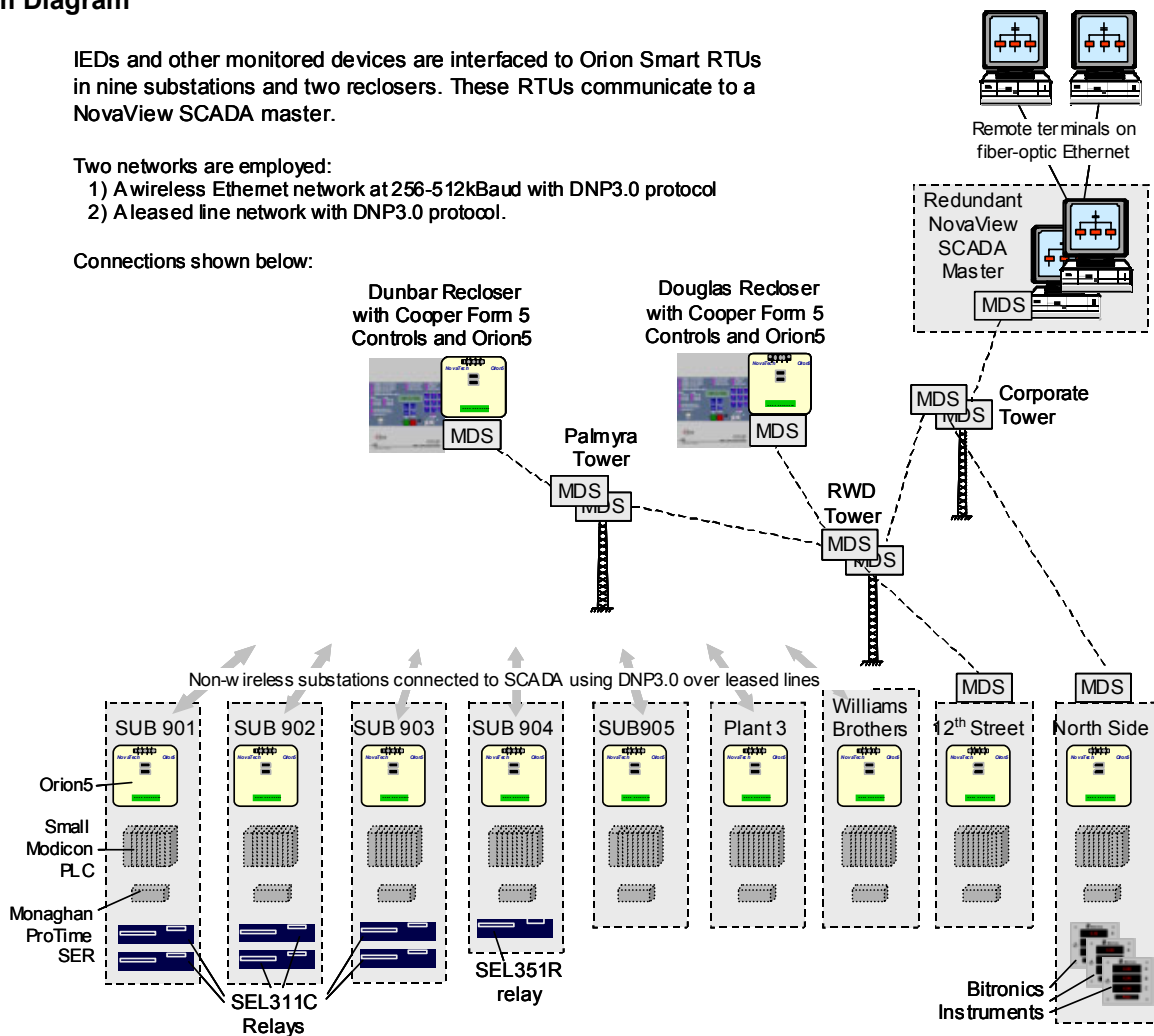
System Diagram

IEDs and other monitored devices are interfaced to Orion Smart RTUs in nine substations and two reclosers. These RTUs communicate to a NovaView SCADA master.

Two networks are employed:

- 1) A wireless Ethernet network at 256-512kbaud with DNP3.0 protocol
- 2) A leased line network with DNP3.0 protocol.

Connections shown below:



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