



Vermont Electric Power Company (VELCO) Microwave Upgrade



Location:
State of Vermont



Business Needs:
The ability to communicate with the multiple substations throughout VELCO's vast area of service and miles of transmission lines.

Customer Profile

Headquartered in Rutland, Vermont, Vermont Electric Power Company (VELCO) operates a high-voltage transmission system consisting of more than 730 miles of transmission lines, 55 substations, and 13,000 acres of rights-of-way to provide electric energy throughout the state. With their vast infrastructure, VELCO needed a system to communicate and transmit data, quickly and accurately, while maintaining constant reliability.



Customer Challenge

Management of the vast transmission network maintained, controlled, and monitored by VELCO is done via an extensive, hybrid, fiber optic/radio communications network. This network is tailored to provide robust, high throughput communications from endpoint to endpoint with low latency in order to support critical communications within the electric energy system. VELCO required a three hop Microwave Radio System constructed to interconnect several fiber fed locations over mountainous terrain. This microwave system was to support a year round availability of 99.999% with a minimum throughput of 100 megabits per second. In addition, VELCO required each end of each microwave hop to support 4 x DS-1 and one 10 Mbps Ethernet connection.

CommDEX Solution

- Full turnkey microwave system
- Performed detailed site walks and developed topographical system maps
- Lead all technical engineering, equipment sourcing, construction scheduling, system installation and testing.



2400 Herodian Way, Suite
360
Smyrna, GA 30080



sales@commdex.com
www.commdex.com

CommDEX Roles

CommDEX served as the microwave engineering and construction management lead for the VELCO microwave broadband radio system project. CommDEX performed all site walks, technical calculations, equipment ordering, construction scheduling, installation, and testing for the system. CommDEX began the process of deploying the microwave system by performing detailed site walks and developing topographical system maps. Path surveys were performed with a full tower climb for the proposed paths and a detailed path survey report was generated per path. Given the rough terrain of the New England region, it was noted one path in particular required the use of a passive reflector to achieve the desired connectivity between two endpoints.

Taking the path survey information into account, CommDEX performed detailed path calculation in order to achieve availability required for this project. In addition, terrain, average clutter, average path clearance, Crane rain region, multipath outage factors were taken into consideration and the best frequency, radio transmitter, and microwave antenna equipment solution was developed for each path. Passive reflector calculations (expected RSL, reflector angle) were performed for the path requiring a repeater to achieve connectivity. At this point CommDEX used the detailed equipment information to complete a detailed structural analysis on each vertical asset. Once the structural analysis passed, CommDEX developed a detailed bill of materials and began equipment procurement. Concurrently, FCC frequency coordination and licensing was completed for these paths. CommDEX then installed the antennas, radios, lines, and inside plant equipment utilizing specialized field teams to achieve timely and efficient deployment of the microwave radio system. For each path, installation of tower equipment was performed to factory specifications, guaranteeing a reliable install despite environmental exposure. Coaxial cable lines were thoroughly tested for compliance. Each path was aligned to within 1.5 dB of calculated target Receive Signal Level. Each transmitter was configured and fully tested for functionality, throughput, and latency, guaranteeing uptime of 99.999%. A final acceptance testing procedure was completed and delivered to VELCO.



99.999%

*Guaranteed Uptime
Reliability*

About CommDEX:

CommDEX provides network solutions to telecommunications service providers and manufacturers for the deployment of telecom networks, facilities and supporting systems. CommDEX specializes in designing and implementing mission critical voice and data networks over Wi-Fi, microwave, land mobile radio and other technologies. CommDEX offers a broad, rich portfolio of proven telecom solutions. Its solutions, services and methodologies have been tested and proven in hundreds of customer environments. Its customer base ranges from state, local and federal customers, to large enterprises and equipment manufacturers.

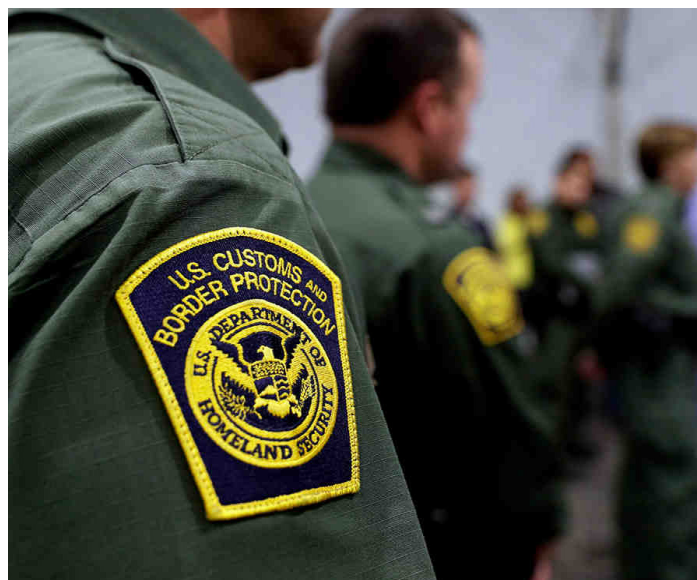
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Smyrna, GA 30080

P:770.349.0400
www.commdex.com

CommDEX Roles



Facilities Planning and Deployment

Services included design of the 160' tower to be constructed at the new site and a new 12'x38' concrete communications shelter. Improvements were also made to the new RVSS control room. By reviewing supplied specification documents and visiting the site, CommDEX developed a plan that incorporated current design needs as well as addressing future growth.

MICROWAVE PATH STUDIES AND SYSTEM DESIGN

CommDEX worked with the equipment manufacturers to ensure the microwave path studies and path designs incorporated the requirements of CBP for operations, interoperability and survivability, using state-of-the-art design applications. The microwave network was designed to ensure that all new paths were designed to "5-nines" (99.999%) reliability criteria, and sustained network reliability during changes in propagation. An additional path was designed to allow for connectivity between the existing and the new facility to ease the transition of the RVSS equipment and minimize downtime to the users.

RVSS SYSTEM IMPROVEMENTS

CommDEX included all equipment and services to upgrade the existing RVSS camera network to an IPbased solution including a Digital Video Recorder (DVR) that would capture the IP video streams for all camera locations. New IP video encoders were included for all camera sites as well as upgrades to the existing transport network to accommodate the IP traffic. This coupled with a new RVSS control center including video wall and operator equipment provides a modern and efficient operation that enhances CBP's mission.

COMMISSIONING AND TESTING OF EQUIPMENT

As the final phase of the project, engineering oversight of the commissioning and operational testing of the system was included to bring all new systems online and manage the transition from the existing facility. This process was engineered to minimize downtime and operational impact to the users.

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