V-COMM
Engineering for **High Performance**

Founded in 1995, **V-COMM** quickly became a telecom engineering leader with our innovative **Virtual Engineering Program**. This unique project management product provides clients with a custom strategy for the design, execution and maintenance of high performance communications networks.

Our engineers' diverse expertise with personal communications services, cellular, specialized mobile radio, enhanced SMR, public safety protocols, paging, wireless data, microwave, fiber optic cable systems, SS7 and local exchange switching networks enables **V-COMM** to provide clients with a virtual engineering staff that manages network projects in their entirety or in discrete phases.

V-COMM's executive staff is led by Dominic Villecco, President; David Stern, Vice President and co-founder; and Don Coover, Vice President, all seasoned veterans in telecom engineering. Under their leadership, **V-COMM** expanded to include a full range of RF and network engineering support services.

We understand that design and engineering are but one aspect of network development. **V-COMM** also provides business planning, zoning hearing support, expert witness testimony and FCC/FAA regulatory advisory assistance to offer total project management capability.

V-COMM's clients include such telecom leaders as Verizon, Cingular, AT&T, Comcast, Sprint PCS, Nextel, and T-Mobile. Public safety service clients include the City of New York, City of Philadelphia, the US Department of Justice, the FCC and numerous counties and towns. Corporate clients include such luminaries as Trump Resorts and Barthco International.

V-COMM Recent Accomplishments

TELECOMMUNICATIONS

» Developed and implemented the plan that reduced wireless network congestion in New York, Philadelphia, Boston and Washington, DC.

» Optimized performance and did growth plan engineering for a wireless data operator in its Washington, DC and New York markets.

» Executed project management for a highly successful PCS network launched in the New York City MTA.

» Developed and executed a system optimization plan which reduced dropped calls to 0.5% for a nationwide PCS operator.

» Designed and implemented nationwide SS7 networks for major wireless carriers.

» Assisted in the design and building of thousands of sites for PCS and cellular carriers using all major technologies.

» Performed engineering and project management and executive support assistance for a nationwide cable/CLEC VoIP network.

» Created and executed switching and backhaul transport networks for 4,000 wireless sites nationally.

PUBLIC SAFETY

» Providing analysis, field testing, expansion and long-term, strategic plans for a 500 MHz Motorola SmartNet™ Public Safety trunking simulcast system.

» Performing project management, design, system analysis, field testing and recommendations for municipal public land mobile systems.

» Gave presentations on CAS vs. NCAS signaling, wireless 911 Phase I/II implementation and advanced messaging services to VA-APCO and wireless users groups.

» Providing engineering support and FCC filings for a major 700 MHz licensee.

» Performed traffic engineering analysis and network recommendations for a UHF multi-site trunking system.

» Developed the waiver request for new frequency acquisitions identified by **V-COMM** that mitigate DTV interference.

» Provided subject matter and project management support for a dedicated broadband municipal pilot system in New York City.

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Dominic Villecco President and Founder

Mr. Villecco is an engineering visionary with numerous accomplishments in the telecom industry. As V-COMM's founder, he expanded the company's reach to also service the public safety and corporate enterprise sectors, opened multiple corporate offices and now employs over 50 engineers.

Mr. Villecco has testified as an expert witness on behalf of the FCC and the Department of Justice. His testimony has helped telecoms and public safety groups on local and federal levels. Dominic serves as the Vice Chairman on the Advisory Board for the Electrical and Computer Engineering Department of Drexel University and is a member of the IEEE and APCO. He was instrumental in the first regional cellular network design with proprietary automatic call delivery among U.S. independent carriers. Prior to founding V-COMM, Mr. Villecco was Vice President of Wireless Engineering for Comcast International Holdings, Inc.

David Stern Vice-President and Co-Founder

A telecom engineering pioneer, Mr. Stern has a formidable background in wireless technologies including CDMA, EVDO, GSM, EDGE, 3G, TDMA, Project 25, and WiFi. As an expert witness, David has represented major wireless carriers, which aided in the expansion of their networks. One of his major accomplishments at V-COMM was the design and project management for Madison, NJ's Public Safety Communication Center. David was also key in New York City's first PCS network launch. He is a member of Region 8 and Region 28 RPCs, IEEE, and is dedicated to creating standards for 700 MHz deployments. A University of Illinois graduate, Mr. Stern began at Motorola and swiftly advanced to Project Manager. He then became the Director of Engineering at Comcast Cellular Communications where he managed a large technical staff prior to joining V-COMM.

Donald Coover Vice-President

Mr. Coover is a recognized expert in all aspects of network engineering and major media, including voice, video, data, broadband, transmissions, microwave radio, switching systems, VoIP and SS7 networks. Donald developed a cutting edge app used exclusively by V-COMM that reduces analysis time and creates "growth scenarios" for network design. Prior to joining V-COMM, Mr. Coover was the leader of the engineering team for Comcast Cellular Communications. While there, he engineered and coordinated a network redesign cutover which resulted in savings of more than $3M using the network efficiencies he implemented.

High Performance
Network Engineering Consultants

V-COMM is a leading consultant for integrated network engineering services to telecom operators, municipalities and corporate enterprises throughout the U.S. We are recognized for our **custom engineering design solutions** and **vendor neutral status** in developing high performance wired and wireless networks.

Our Job:
Make Yours Easier

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TELECOM RF ENGINEERING

V–COMM expands your network's reach and performance capability enabling you to be a dominant force in the competitive telecom marketplace. We are well acquainted with the planning, building and maintenance of any radio system and conquering the increasingly complex issues facing today's RF systems—in-building penetration, 2.5 and 3G migration, spectrum management, fundamental coverage, capacity solutions, and more.

Your Job: Deliver High Performance Wireless Communications

Our Job: Make Yours Easier

System Design

The design of a wireless network must meet the parameters set forth by the strategic business plan while remaining within economic realities. **V-COMM** strives to find the right combination of coverage, capacity, and quality using our extensive experience gained from designing wireless voice, data, and video networks across the U.S.

RF Testing Measurement

V-COMM utilizes a full set of drive test and field data collection tools and services to help optimize your network design and system performance.

FCC/FAA Filings and Compliance

One of the most difficult obstacles involved in building, operating, and enhancing RF systems are the communications with the FCC, the FAA, and local municipalities. Our familiarity with every aspect of these compliance processes, including paperwork filings, expert witness testimony and zoning support, saves you time and money.

Integration and Optimization

Your network must operate at peak performance for you to successfully compete in the telecom market. **V-COMM** uses a custom suite of tools to create a detailed analysis of your system's performance and has the experience to improve its overall quality. We identify and eliminate inefficiencies caused by hardware, software, frequency allocation, network parameters, and/or base station locations.

Implementation

Your system design is only as good as its execution. At **V-COMM**, we pay strict attention to detail. We have a hands-on record of accomplishments with all infrastructure vendors, giving us the insight to determine how each component of your system will interact with others. We save you time and money by eliminating the conflicts that cause delays.

Tower Siting

Whether for a tower infrastructure provider or for a wireless carrier, the proper siting of a new tower to meet coverage objectives while meeting local governance requirements is a **V-COMM** specialty. **V-COMM** uses the appropriate blend of engineering and demographics analysis to ensure the ROI of your capital expenditure is achieved.

RF Safety Compliance

RF safety compliance became the law in September 2000. The **V-COMM** team has a complete suite of tools and services to ensure that yours and neighboring radio transmitter sites meet all FCC maximum permissible exposure (MPE) limits. We can assist in establishing company policies and procedures and provide training to your personnel in order to meet the FCC regulatory requirements.

Additional RF Services

There is more to a network than just an established grid of connections. Building and optimizing a network requires coordination on many levels. **V-COMM** offers complete solutions to manage your project from start to finish and beyond with maintenance, special application testing, evaluation, and on-going growth analysis that ensures your network continues to perform at a high level.

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TELECOM NETWORK ENGINEERING

V-COMM helps you connect and optimize your networks for maximum performance. Your network must be capable of communicating with a multitude of software and hardware configurations. We build, enhance and maintain your system to ensure compatibility with today's most popular networks—mobile, fixed and broadband—while preparing you to effectively implement next generation technology when you're ready.

Your Job: Deliver High Performance Communications

Our Job: Make Yours Easier

Regulatory and Interconnect
Planning, executing, and maintaining your network requires navigating a maze of regulatory proceedings and contract negotiations. **V-COMM** can help protect your company's interests by assisting with tariff audits, regulatory actions, and agreements, saving you time and money.

Backhaul and Transmission
The transmission must go through in order for a telecom business to be successful. We design carrier grade backhaul and transmission solutions that are versatile, reliable, and serviceable.

Switch and Traffic Engineering
We have a strong track record of success in installing and upgrading advanced switching hardware from all of the top manufacturers—Lucent, Nortel, Nokia, Ericsson, and Cisco. To keep your network running at peak performance, **V-COMM** employs the latest tools and techniques to maximize capacity and increase revenues.

SS7/SIP Network and Messaging Protocol Design
V-COMM is a leader in SS7/SIP system and signaling network design, offering solutions for today's most popular signaling technologies. The key to our success is a commitment to build and maintain networks that are reliable, efficient, and flexible to meet and exceed your network demands.

Proprietary Design and Modeling Tool
V-COMM has developed a proprietary network modeling tool enabling its engineers to efficiently assess your network interconnect, backhaul and signaling design requirements. This tool utilizes the latest software applications combined with our extensive network engineering competency to provide efficient and reliable solutions that keep your network operating smoothly.

E911 Implementation
V-COMM will assist you in developing, and implementing the right E911 interconnect design to support your network. We help minimize or eliminate your exposure to risks involved in E911 network design to meet both the FCC and PSAP requirements.

Vertical Systems Engineering
Integral to the successful operation of your network are billing and translations test plans, peripheral platform integration, platform interoperability studies, systems integration and optimization, and OSS/Provisioning. **V-COMM** industry expertise includes numerous vendor platforms and technologies to ensure solutions and architectures that are compatible with your network.

Additional Network Services
There is more to your system than just an established grid of connections. Building and optimizing performance on a network requires coordination on many levels. This is why **V-COMM** offers a full range of Network Engineering support services—specialized application testing, traffic modeling, feasibility studies, and training—to help manage your project from start to finish and beyond.

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We'll make your job easier.
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Call us to ask any questions
or to set up a consultation.

Strategic Planning Services

Your platform for profitable growth in the future is supported by **V-COMM**'s key outsourcing capabilities: **Virtual Engineering Program** and **Strategic Planning Services**.

Our **Virtual Engineering Program** enables us to assemble a team of experts to manage any one or all aspects of your engineering project. Our experience crosses all engineering disciplines from planning to construction of system enhancement. We engineer your networks for maximum performance, which translates to higher revenue growth. In addition, we provide **Strategic Planning Services** to help you maintain the balance of your business and your ROI.

Project Management

You need an expert to help you build and manage your network for optimum performance. We apply our knowledge, skills, and techniques to a broad range of activities to meet all the necessary requirements. Our project management team provides you with complete customized management programs to tackle your challenges in all phases of planning, executing, controlling, and closing processes both internal and external. With a focus on your specific project cost, objectives, and deadlines, **V-COMM** delivers.

Systems Evaluation

As a complete business solutions provider for the telecom industry, **V-COMM** is prepared to assist you in evaluating new and existing business systems for complete functionality of billing, credit and collections, accounting and fraud detection services.

Prepare and Review RFPs

V-COMM is in a unique position to help formulate your requests for RFPs and review the responses you receive from other vendors. This is an opportunity for you to utilize the combination of our expertise in telecom engineering and our first-hand knowledge of your system to ensure that you request and receive products and services that fulfill your needs and are compatible with your existing architecture.

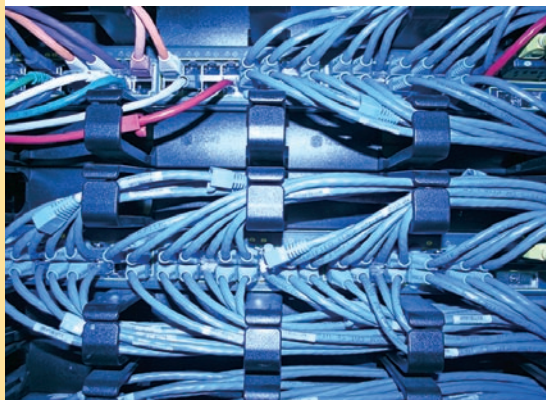## Customized Testing Services

V-COMM's engineers have extensive experience developing and executing customized testing services. Whether you need to find and resolve performance issues, test equipment against specifications, or explore various impacts of your deployment decisions, **V-COMM** can design, plan and execute a testing program customized for your requirements.

Comprehensive Network of Partners

In order to provide you with the most complete services, **V-COMM** identifies the best resources in related business segments and forges long-term partner relationships, giving you access to the expertise of site acquisition firms, construction management, and architectural and engineering site development.

Due Diligence Review

It is imperative to have a complete understanding of the product before entering into any merger, acquisition, investment or refinancing transaction. **V–COMM** performs due diligence for all major financial interactions as a representative for the buyer, seller or investor.

Develop and Review Business Plans and Operating Forecasts

Each member of the **V–COMM** management team has extensive experience with business plans and forecasts. We can help you assemble and evaluate these documents to ensure accuracy and identify opportunities.

Strategic Network Initiatives and Spectrum Studies

Integral to the deployment, operation and success of your wireless network, V-COMM's wireless engineering services includes significant technical expertise addressing the needs of Wireless Operator's strategic network initiatives and advanced spectrum studies. By directly working with recognized organizations like the FCC and its Office of Engineering and Technology (OET), CTIA, NTIA and WAEA, we are able to help you develop the long term strategic plans that will grow your network and subscriber base for years to come.

Our studies and experiences include:

- FCC proceedings and spectrum projects for
  – AirCell, Cellular Airborne, Interference Temperature, Cognitive Radio, Software Defined Radio, Spectrum Policy Task Force
- Unlicensed Ultra Wide-Band (UWB) Operations
- PCS H-Block Interference Issues
- AWS-3 Band Interference Issues
- 700 MHz Spectrum Studies
- FCC Waivers for high power DVB-H broadcast operations
- Spectrum Clearing and License Savers
- Interference & Noise Studies for Analog and Digital 1G/2G/3G/4G Wireless Systems
- In-building, in-vehicle, in-train and in-airplane wireless engineering studies

PUBLIC SAFETY

Networks Need Experts

The public relies on your expertise for the safety of their community. Your communications network is the backbone of your organization and when it doesn't perform, lives are at risk. **V-COMM** understands your many responsibilities and concerns. We'll help you create the high performance public safety network you need.

Your Job: Maintain Public Safety
Our Job: Make Yours Easier

Why Use V-COMM?

Our expertise alleviates the burden of analyzing the intricacies of your communications network. Together we can make informed decisions to achieve your objectives.

V-COMM designs custom solutions to meet your specific requirements. With our wide range of experience and innovative approaches, you'll receive a blueprint to realistically plan for the future. Our project managers give you individual attention on every aspect of development, design and implementation.

V-COMM System Design and Evaluation

A high performance communications system for your public safety network is crucial. As independent consultants, we do not represent any vendors. **V-COMM** assures that you will receive an unbiased evaluation of your situation.

We pinpoint current problems, uncover potential trouble areas and develop recommendations based on your existing and future needs that meet your budget. Our focused, personal attention to your objectives is what distinguishes **V-COMM**'s unparalleled engineering consulting services.

V-COMM Engineering Services

A communications system is only the beginning; **V-COMM** can manage your upgrade and expansion project from inception through implementation.

- Our engineers have extensive field experience to expertly integrate diverse systems and applications.
- We work with your current vendors and recommend new suppliers as necessary.
- System equipment is optimized for maximum performance.
- We perform comprehensive tests to support future technology upgrades.

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PUBLIC SAFETY

Networks Need Experts

Evaluation and Analysis

Drive Tests and Propagation Maps
V-COMM's drive tests collect data including signal strength and information about other radio signals that allows us to geographically delineate system coverage area, identify poor or no coverage regions and identify possible areas of interference. Using this information, **V-COMM** can identify additional antenna requirements or other solutions to improve your radio network's performance.

Site Evaluation
Site evaluations determine the effectiveness of individual communication tower sites. **V-COMM**'s evaluation gives you a comprehensive report on each site's coverage area, antenna system and equipment deficiencies, estimated equipment replacement schedule as well as discovering and resolving current service problems.

E911 Phase I/II Implementation
V-COMM ensures that your E911 Phase I/II implementation will work flawlessly and comply with federal mandates. We make sure that your PSAP has the latest technology to locate wireless callers and is equipped to handle increased call volume. **V-COMM** also facilitates the resolution of interconnection issues with your area's wireless providers.

FCC/FAA Compliance
Your network must comply with current FCC/FAA safety regulations, a time-consuming and frustrating task. The FCC mandates that frequency licenses must be updated and renewed on a regular basis. Your towers must meet FAA Air Hazard navigation requirements. Your network must also adhere to the FCC's RF safety compliance laws for maximum permissible exposure (MPE). **V-COMM** expertly guides you through these processes.

- We test your system to verify compliance with current regulations.
- Establish formal policies and procedures for your organization to follow.
- Make sure that your personnel receive training from authorized providers.
- We prepare and support your application for a new tower or modifications to your existing towers through the FAA Air Hazard evaluation process.

System and Facility Design

PSAP Consolidation
Consolidating a municipality's PSAPs into a single PSAP effectively reduces operating costs, capital equipment and fixed costs. It also helps provide a higher level of public safety and emergency response. **V-COMM** manages every aspect of PSAP consolidation including an intial analysis to determine your overall cost savings.

A single PSAP makes it easier to:
- Comply with federal standards
- Improve staffing efficiencies
- Reduce operations cost

LAN/WAN Design
An optimized LAN/WAN increases emloyee productivity and reduces operating expenses. **V-COMM** reviews your existing network diagrams and then redesigns your LAN/WAN to improve communications, increase security and efficiently transfer data and voice messages.

Dispatch Center Design
Whether you need a simple reorganization or are planning a new facility, **V-COMM** will help you design an effective dispatch center that creates an efficient, comfortable workspace for employees and complies with both OSHA and federal standards.

Studies and Planning

Feasibility Study

A feasibility study examines current problems to determine what considerations are needed for your network's enhancement or expansion. **V-COMM** inspects your network's functionality and develops recommendations based on your requirements. Additionally, our project management team can oversee the implementation of any changes the study uncovers.

Interoperability Study

Interoperability is a vital element of daily public safety service and emergency response. Weather disasters, chemical hazards, fires, Amber Alerts or vehicular accidents require a multi-agency task force response which typically uses incompatible radio systems. **V-COMM** will:

- Audit existing radio systems and base line system requirements
- Identify usable and available frequencies
- Develop recommendations

Telecommunications Master Plans

Developing a Telecommunications Master Plan allows municipalities to have control over where wireless carriers place their towers and antennas, provide needed services and create a more reliable E911 system. Municipalities can utilize properties they own or other locations. This process allows them to decrease the number of towers needed to serve their community.

Additionally, significant rental income for the municipality can be generated when the antennas are placed on its property. This is also an opportunity to place public safety antennas to meet all of the municipality's wireless needs.

Strategic Planning

V-COMM's strategic planning study shows how to best position a municipality's system for maximum operating efficiency. We evaluate the entire infrastructure, measure how effectively it's implemented, and incorporate key concepts from operational planning, quality improvement and total effectiveness. **V-COMM** helps:

- Develop short and long-term objectives
- Individualize each strategy
- Execute a high performance communications network

Capacity Planning

As your community grows, the demand on your emergency communications services increases. **V-COMM** compiles detailed studies and then creates expansion plans for the entire infrastructure including radio network and dispatch operations. We plan out the increased capacity of back-office applications and peripherals which provide improved functionality, reliability and system availability.

V-COMM will design a capacity plan to handle daily communcations system demands and manage network scalability requirements for future services, ensuring efficient spectrum sharing, interoperability, dispatch center and system resource management.

Project Management

V-COMM assigns a manager as your key contact who personally oversees your project. Each manager assists the municipality from inception to completion and keeps key contacts updated. After the project is completed, you can rely on your **V-COMM** project manager for continued support.

Proposals and Testing

Prepare RFPs and RFIs

V-COMM carefully crafts an RFP or RFI so vendors will respond more accurately. Based on our evaluation, we will help you to:

- Correctly specify RFPs and RFIs
- Review and respond to vendor submissions
- Negotiate secure contracts

Implementation and Test Approvals

V-COMM oversees all vendor equipment and software installations to ensure they are correctly implemented. Using our custom suite of data collection and testing tools, we verify that your network is fully operational throughout all checkpoints.

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Additional Engineering Services

V-COMM is a leading engineering consultant for all sectors of the telecommunications industry. Listed below are other engineering services we provide.

IP/VoIP

The use of IP technology for data and VoIP for voice can result in better data throughput at a significantly lower cost. **V-COMM**'s experience and expertise with integrated communications can assist in leveraging your network to its fullest potential while providing high quality, reliable voice and data services.

E911 Design and Deployment

Implementing an E911 system requires a complex analysis of technical, financial and risk factors which can be riddled with errors, delays and cost overruns. Maintaining a fully compliant E911 network has become increasingly more complex. Every network change, update or adjustment can impact the overall performance, response time and system functionality.

From the dispatch center to the radio network, to deploying enhanced mobile services, **V-COMM** helps ensure that your E911 system is properly designed. Whether you need a new dispatch center or to verify that your vendors and network are performing as required, we'll help you stay on track.

WiFi/Mesh Networks

V-COMM is in the forefront of WiFi/mesh network technology. Our engineers have the expertise to aid muncipalities in the development of WiFi/mesh networks by surveying your municipality's infrastructure and identifying the best locations.

Interconnect

Data center computer systems, dispatch centers and the radio network need a reliable, sustainable interconnect plan; one that is well-designed for a solidly performing emergency network. **V-COMM**'s expertise in designing and deploying cost efficient LAN/WAN and all types of radio interconnect networks helps to establish a network with optimal interconnectivity when it really counts.

Messaging Protocol Design

Data and voice protocol designs aren't always compatible. **V-COMM** evaluates and optimizes protocol designs for efficient, accurate message transmissions.

Vertical Systems Engineering

V-COMM can perform a top to bottom engineering investigation of your network. We pinpoint major discovery issues, advise you on resolutions and how to maintain an optimized network.