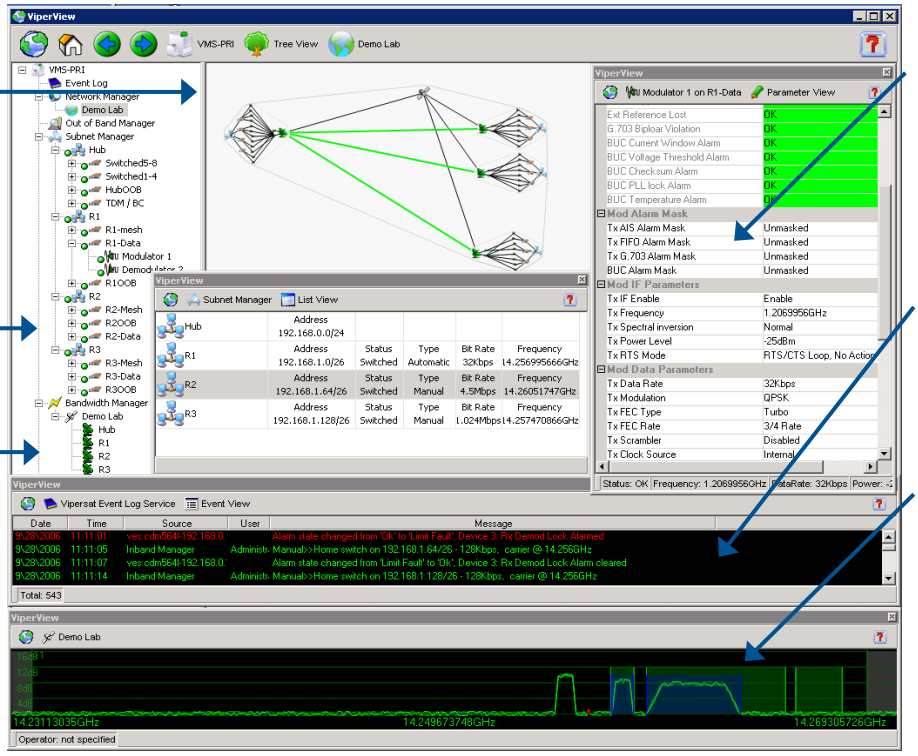
Vipersat Management System (VMS)

Network Map displays the satellite network hardware and IP subnets. Use the scroll mouse to hover over a network element and view its configuration.

Tree View allows the operator to quickly verify element status

Subnet Manager displays the bandwidth configuration of each remote in the network.



Parameter View provides traditional monitor and control functions such as viewing unit status and configuration changes.

Event log displays all network activity and can be sorted, filtered and exported to an external database.

Bandwidth manager displays dSCPC carriers across all transponders in both frequency and Eb/No.

INTRODUCTION

Whether you're a satellite service provider seeking methods to enhance offerings, or a user of satellite links striving to achieve improved space segment efficiencies, Comtech EF Data understands that you are dedicated to serving your customers with the most efficient, cost-effective, reliable network available. And, you likely require a scalable platform that is capable of growing with your organization. The Vipersat Management System (VMS) integrates with our satellite modems to provide a seamless IP-based infrastructure for satellite networking. This solution is based on dynamically managed Single Carrier Per Channel *(dSCPC)* and automatic application switching technologies. All aspects of the satellite network can be configured, controlled and monitored by VMS. Comtech EF Data network solutions increase satellite efficiency and provide real-time, interactive connectivity that improves customer service.

KEY FEATURES

- Centralized network and capacity management
- Dynamic SCPC (*dSCPC*) carrier allocation and true bandwidth on-demand
- Automation of space segment capacity efficiencies
- User-defined policies for upstream carrier switching
- Star and full mesh capabilities using Demand Mesh Connectivity
- Redundancy configurations with multiple backups for hub and remote hardware
- Advanced Switching takes advantage of using other modulation/forward error correction (FEC) combinations
- Site distribution list in multi-point automatic policy-based switching for IP multicast and mesh topologies
- Switching protocol enables external messaging to switch carriers to multi-point destinations
- Operates over multiple transponders and satellites
- Scalable from small to large networks
- Auto detection of new nodes
- Detailed event logs can be filtered and exported
- SNMP traps can be forwarded to hierarchal NMS management platforms
- Complete IP-based digital services over satellite

Bandwidth & Capacity Management

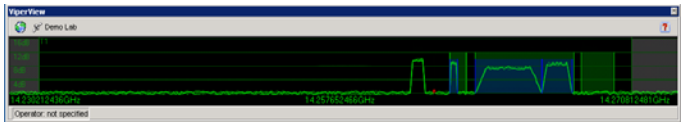
Vipersat Management System (VMS)

DYNAMIC SINGLE CARRIER PER CHANNEL (*dSCPC*)

VMS automates bandwidth utilization while optimizing space segment efficiency. Comtech EF Data's state-of-the-art network management software allows intelligent management of satellite networks through system configuration and alarm management of the network. The graphical user interface of VMS enables centralized network configuration and management. It provides auto-detection of satellite modems, configuration and monitoring of the modems, real-time views of network health and transmission quality, and allows operators to easily modify these devices. More than a traditional network manager, VMS manages satellite transmission bandwidth and topology changes based on traffic types.

VMS is the engine that provides dynamic SCPC (*dSCPC*) bandwidth management of space segment. When a node in the network has an application to transport over the satellite link, *dSCPC* technology provides the mechanism to automatically establish the SCPC carrier for that transmission. *dSCPC* resizes the carrier based on the increase or decrease in applications being sent over the link, and finally *dSCPC* technology returns the remote to its home state once the application is completed. *dSCPC* yields true bandwidth-on-demand, providing the low-latency, low-jitter dedicated SCPC connection needed for real-time applications such as VoIP, video conference, broadcasts, as well as applications such as large file or image transfers.

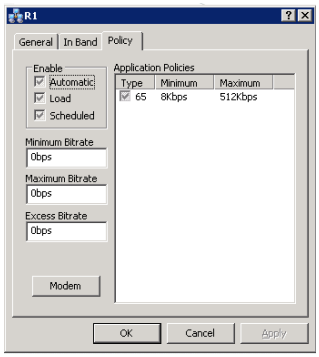
Through protocol classification in the remote terminals, the IP-based modem initiates automatic switching to achieve reduced latency and increased throughput. Switches can be initiated in several ways: via an application, via data load, via pre-determined schedule, via a Quality of Service (QoS) rule, or manually via the console.



ViperView Bandwidth Manager showing dSCPC carriers established in bandwidth pools.

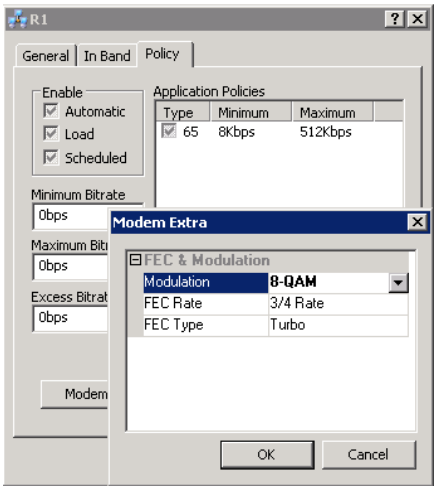
UPSTREAM SWITCHING

VMS establishes *dSCPC* bandwidth based on policies that can be individually enabled on a per-remote basis, or globally enabled. Policies can be configured for a variety of applications such as Voice over IP (VoIP), video teleconferencing, or based on a load, or via a schedule. Additionally, policies can be set based on a type of service (ToS), or QoS rules such as IP port or IP address and protocol type. Operators are able to set minimum and maximum data rates for each remote, as well as excess data rates for an initial upstream switch.



ADVANCED UPSTREAM SITE SWITCH

Traditional shared platforms such as TDM/TDMA networks provide a single type modulation/FEC scheme for their infrastructure. VMS, in conjunction with our highly efficient satellite modems provide flexibility in setting modulation and FEC rates when establishing SCPC carriers. This allows users to not only take advantage of bandwidth on-demand, but to also take advantage of higher order modulation/FEC combinations, further optimizing their satellite links. For example, a remote can be switched out of its home state of QPSK modulation, into 8-PSK or 16-QAM automatically.



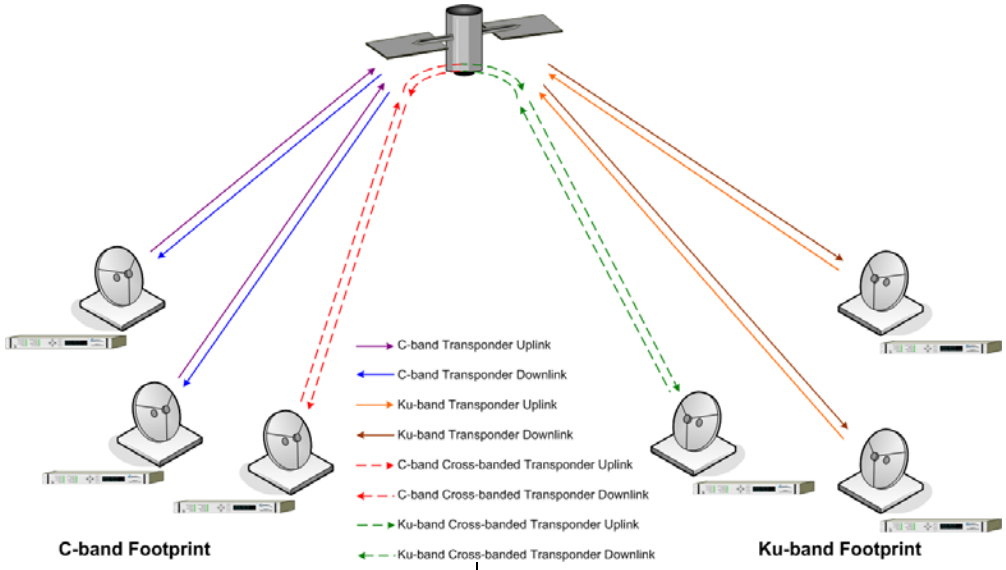
DEMAND MESH CONNECTION

Until now, flexible and dynamic switching systems such as DAMA or multiple transmission link switches were bandwidth and equipment resource intensive. This was due to the constraints of traditional private serial modem interfaces. Switching multiple transmission links via satellite meant reducing flexibility for the benefit of lower latency circuit switches.

Demand Mesh Connection technology offers mesh connectivity based on switching at the application level. Demand Mesh Connection provides significant and dynamic connectivity between remotes without suffering the high costs associated with multiple carriers and/or 1-to-1 multi-receiver links.

MULTI-TRANSPONDER MODE (MTM)

MTM allows a satellite operator or service provider to allocate unused, but fragmented, portions of space segment across the entire satellite to a network. The allocated space segment can then be used for on-demand SCPC links. Due to the greater bandwidth, MTM functions only with L-band satellite modems.



SATELLITE CROSSBANDING

VMS provides the capability for applications involving satellite cross banding (cross strapping). VMS is able to recognize, manage, and control satellite circuits which utilize more than one frequency. VMS is capable of cross band/strap operation over C-, X-, Ku-, and Ka-band satellites.

CONTROL OF HIGH SPEED & NON-IP MODEMS

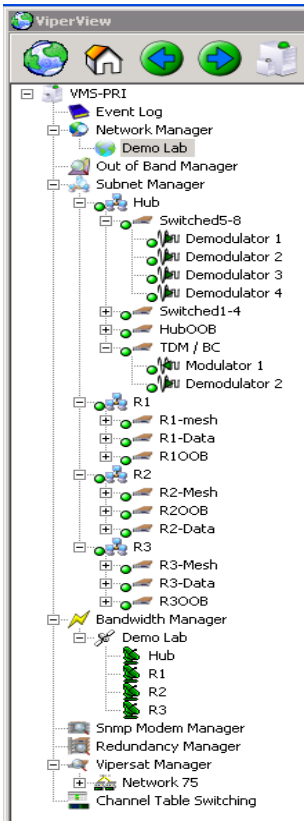
We offer the widest range of bandwidth efficient modems available in the satellite industry. When using our satellite modems configured with the IP Module, VMS offers complete IP-based network control. And, a network powered with VMS also provides the switch up control of our non-IP modems that are used in high speed and/or secure transmission environments, such as military/government or native broadcast format applications (G.703, ASI, HSSI, V.35, RS-232/449, etc.).
VMS easily establishes duplex connectivity for high speed applications up to 155 Mbps.

VMS ARCHITECTURE

VMS is based on a client/server architectural model in which a central hub communicates with remote nodes in a star or mesh topology. The client/server model provides a number of advantages. The server maintains all databases in a centralized location accessible to all clients. Thus, updates and changes can be made in a single location and distributed globally to all clients.

Through its client/server architecture, VMS supports centralized management, control, and distribution of data, alarms, and events. It also supports multiple clients and network management user applications and access to all system features simultaneously. The network management system provides complete visibility over the network. All information regarding network status and performance is processed and stored on the server. Any and all logged client workstations retrieve information from the primary server database.

IP BASED NETWORK CONTROL



All management operations and controls are accomplished using standard IP communications protocols. VMS uses a proprietary interface to communicate with an IP Router Interface Board (IPIB) internal to the satellite modem. The IPIB is a powerful microprocessor based input/output (I/O) controller supporting a variety of I/O types and containing embedded software that supports Vipersat functionality. This proprietary IP interface between the VMS and the IPIB results in dramatically lower M&C overhead compared to SNMP management interfaces. The benefit is less bandwidth required and faster response to control and status messages.

REDUNDANCY

VMS redundancy provides for N:1 redundant VMS server(s) co-located at the hub alongside the active VMS server. This configuration provides for the automatic switchover to a standby server in the event of a failure of the active server. Hub modem redundancy provides for the operation of N:M multiple primary and multiple secondary modems installed at the Hub. If a protected device fails, its output is automatically removed from the satellite network. A replacement device, loaded with the failed device's configuration, is booted into service and its output is switched into the satellite network, replacing that of the failed device.

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SITE DISTRIBUTION LIST

Distribution Lists provide the means to define multiple target subnets for point-to-multipoint distribution on an in-band service connection whenever an upstream switch to a specific destination IP address occurs, such as to a multicast address.

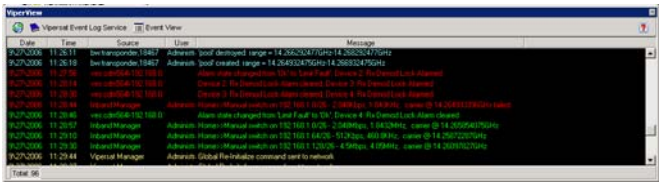
AUTO DISCOVERY

As new nodes are added, VMS automatically detects these remotes and inserts them into the network, eliminating the requirement for the operator to manually configure new remotes.

INTEGRATION INTO HEIRARCHAL SYSTEMS

VMS supports sending SNMP (v1 & v2) traps to any upper level NMS in the northbound direction. Traps are triggered when VMS detects a change in the subnet's alarm state. Only events identified by the VMS MIB are sent as SNMP traps, reducing the requirement to have each device transmit a trap, reducing the network overhead bandwidth.

EVENT LOGS



Managing a network means you have to know what happened, and when it happened. VMS provides detailed event logs that can be filtered and sorted by source and date/time. Status and alarm messages are easily discerned through the use of colored messages for ease of troubleshooting. Additionally, the event log can be exported as an XML file for importation into another database.

TOTAL COST OF OWNERSHIP

Service providers are continually facing the problem of how to increase the value of their networks, while driving down costs to stay competitive. Similarly, enterprise users look for ways to decrease the space segment cost, and continue to enable reliable, high-quality transmission links to their facilities. The demands of the marketplace for increased service quality, increased capacity at a lower cost, and competition, are driving the need to solve problems and improve system performance faster than ever before. Both CAPEX (capital expenditure) and OPEX (operating expenditure) budgets are in need of a system that yields an initial low-cost solution, while providing a method for keeping space segment costs to a minimum. At the same time, these low-cost solutions must be capable of scaling to higher capacities and support the changing needs of the network.

Comtech EF Data's *dSCPC* technology, combined with our high-performance bandwidth-efficient satellite modems, yields a cost effective, reliable, and high-quality transmission system for virtually any satellite application. This network solution offers innovative features, scalability, flexibility, and high performance, to provide not simply an alternative, but a long-term solution for addressing changing network requirements.

SYSTEM REQUIREMENTS

VMS can be supplied in either non-redundant (one server required) or redundant (two servers required) configurations.

CPU	Pentium IV, 3.0 GHz or higher
RAM	1 GB
Bus Speed	400 MHz FSB
CD-ROM	24x, Internal
Hard Disk Space	80 GB
Video	PCI or AGP, 1280 x 1024, 65,536 colors*
Network Interface	Ethernet 10/100 BaseT, RJ-45
Serial Port	One available USB port
Operating System	Windows 2003 Server, SP1, Standard Edition, English only

*** Two video output ports recommended for split screen viewing*

Modem, Modulator, Demondulator	Data Rate	In Band	Out-of-Band	Mesh	*dSCPC* Switching Methods					
					Scheduled	Manual	Load	Application	QoS	ToS
CDM-570 & CDM-570L Satellite Modems	Up to 9.98 Mbps*	●	●	●	●	●	●	●	●	●
CDD-562L Dual IP Demodulator	Up to 9.98 Mbps*	●		●	●	●	●	●	●	●
CDD-564 & CDD-564L Quad IP Demodulators	Up to 9.98 Mbps*	●		●	●	●	●	●	●	●
SLM-5650A Satellite Modem	Up to 155 Mbps	●	●	●	●	●	●			●
CDM-600 & CDM-600L Satellite Modems	Up to 20 Mbps		●	●	●	●				
CDM-700 High Speed Satellite Modem	Up to 155 Mbps		●	●	●	●				

* Depending on Modulation/FEC combination. Consult user's manual for details.

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