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## **Introduction to Vados Systems & The Connection with Comtech EF Data**

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## Introduction

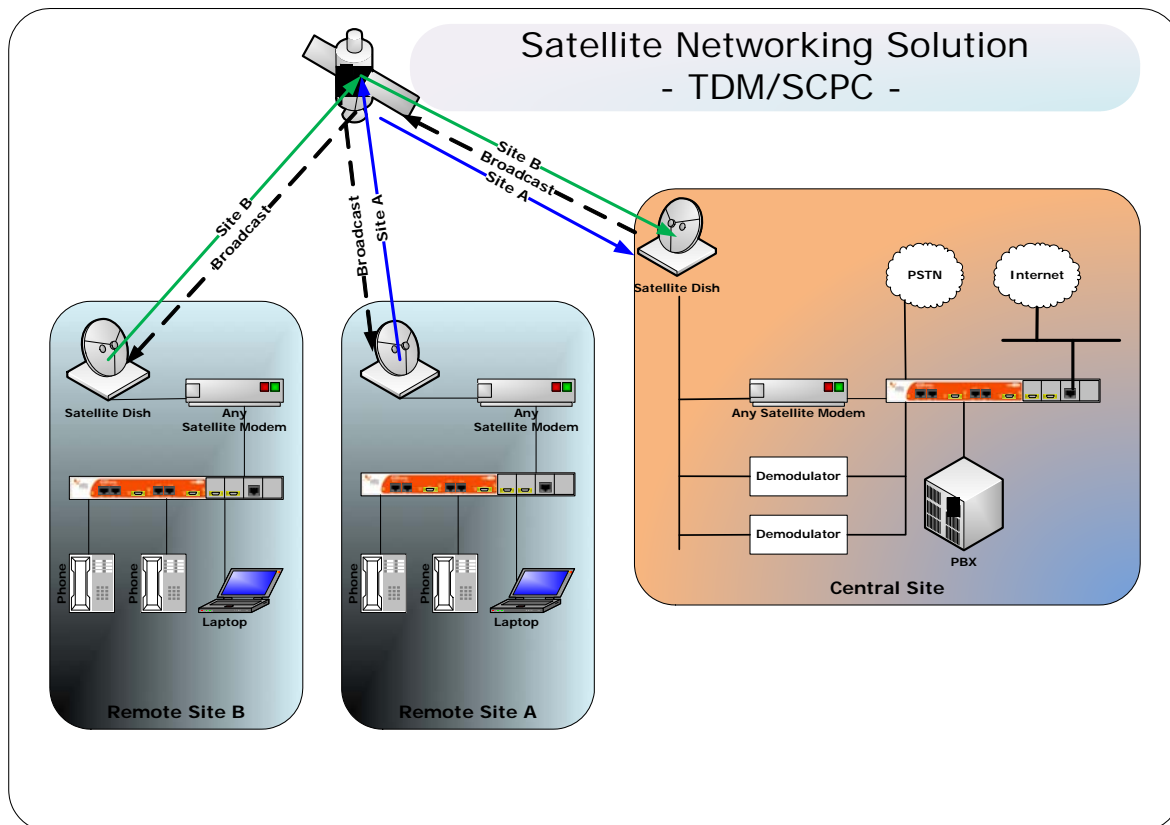
Vados Systems was launched in 2004, having established worldwide success over 15 years as part of Satelcom UK for providing voice and data communications for commercial business, pioneering battlefield and ship-to-shore communications, as well as voice and data communications in the developing world with the megaPAC range of products.

Today their platform and solutions are deployed with many prestigious blue chip customers in over 60 countries in Europe, Africa and Asia Pacific, primarily in the defense, maritime, government and enterprise markets.

Vados Systems' success in these markets has been built upon their willingness to work with customers through every phase of the development process and beyond. Vados Systems controls all aspects of the platform production from inception, design and development to ensure that they confirm to rigorous quality ISO standards.

Their single platform product range, adaptable and resilient operating system, allow them to integrate into any network topology protocol and interface, enabling them to manage and control network elements simply and efficiently.

Today, the British Army deploys Vados Systems' solutions to provide logistical, home based services to personnel while on military operations. And, approximately 800 VSAT equipped vessels, primarily in the cruise and ferry segments, have Vados technology at the core of their communications infrastructure. Vados' products integrate many disparate voice and data streams, such as Internet connectivity, point of sale applications, real-time video, shipboard GSM base-station traffic, etc.



**Figure 1 vadEDGE satellite remote terminal equipment**

The key selling points of Vados Systems' solutions are:

- Toll quality voice at a maximum of 7 kbps, including packet overheads
- Support of multiple applications on narrow bandwidth with Quality of Service (QoS)
- Bandwidth management and QoS on a per application/port basis
- CIR's and max burst rates can be set for all remote nodes
- Single box solution (Voice/DATA/Video, Encryption, Compression TCP Acceleration, Protocol Spoofing)
- Support for all satellite architectures (SCPC, TDM/SCPC, TDMA, BGAN)

Comtech EF Data's interest is in the benefits of using the Vados Systems' single platform vadEDGE product range, incorporating their proprietary VSAT Throughput Enhancement Solution (V-TES) operating system, in an SCPC or TDM/SCPC Vipersat managed network. However, the vadEDGE platform is very capable, and can operate alone with the CDM-600 Satellite Modem, the CDM-625 Advanced Satellite Modem or our other capable satellite modems without the necessity of using the Vipersat functionality.

Vados and Comtech EF Data also share target markets, and from our perspective, the vadEDGE platform provides very attractive features and solutions.

## Vados Systems vadEDGE Platform Versions

There are currently ten versions in the vadEDGE product range, five that are data only, and five that support data and voice. These may be rack mountable or desktop platforms. All of the range support V-TES. The key features and interfaces of this product line are:

- Up to six software selectable Wide Area Network (WAN) interfaces
- Two dual-port 10/100 Mbps Ethernet switches or four separate Ethernets
- ISDN PRI-30
- 10 digital voice channels
- FXS, FXO, E&M analog ports
- Fractional E1/T1 services
- BRI ISDN (up to 4 x 2B+D)
- GSM GPRS
- Optional compression/encryption modules

Figure 2 on the next page summarizes the range of products and features of each vadEDGE product.

Model	Data Only Units					Data and Voice Units				
	4100	4150*	4160	4202	4206	4102	4158*	4204a	4208a	4210d
<b>PORTS</b>										
Ethernet 10/100 (fixed)	1	-	1	2x2(max)	4	1	-	2x2(max)	2x2(max)	2x2(max)
WAN (fixed)	2	-	-	2	6	1	-	2	2	2
Serial (fixed)	1	-	-	-	-	1	-	-	-	-
Ethernet 10/100	-	2x2(max)	-	-	-	-	2x2(max)	-	-	-
WAN	-	4(max)	-	4 <sup>1</sup>	-	-	4(max)	-	4 <sup>1</sup>	-
G703 unstructured	-	-	-	-	-	-	-	-	-	-
G703 structured	-	-	-	1 <sup>4</sup>	-	-	-	-	1 <sup>4</sup>	-
ISDN PRI <sup>3</sup>	-	-	-	1	-	-	-	-	1	1
ISDN BRI <sup>3</sup>	-	1	-	1	-	-	1	-	1	-
USB	-	-	4	-	-	-	-	-	-	-
3G	-	-	1	-	-	-	-	-	-	-
GPRS	-	4(max)	-	-	-	-	4(max)	-	-	-
Analog Modem	-	1 <sup>5</sup>	-	-	-	-	1 <sup>5</sup>	-	-	-
Compression/Encryption	N	Y	N	Y	Y	N	Y	Y	Y	Y
<b>VOICE</b>										
Digital Voice	-	-	-	-	-	-	-	-	-	10
FXS	-	-	-	-	-	2	8 <sup>2</sup>	4	8 <sup>2</sup>	-
FXO	-	-	-	-	-	-	8 <sup>2</sup>	-	8 <sup>2</sup>	-
E&M	-	-	-	-	-	-	8 <sup>2</sup>	-	8 <sup>2</sup>	-
<b>CONFIGURATION</b>										
Desktop	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Rackmounted	N	N	N	Y	Y	N	N	Y	Y	Y
<b>DIMENSIONS</b>										
Width (mm)	275	280	150	435	435	275	280	435	435	435
Height (mm)	45	45	42	45	45	42	65	45	45	45
Depth (mm)	140	245	110	270	270	140	245	270	270	270

**Notes:**

1. Max 4 WAN or G703 ports
2. Max 8 ports
3. Either PRI or BRI may be fitted
4. Uses PRI expander – only 1 may be fitted
5. Fixed use analogue modem, only available when slot 4 not in use.

**Figure 2 Vados Systems vadEDGE product line**

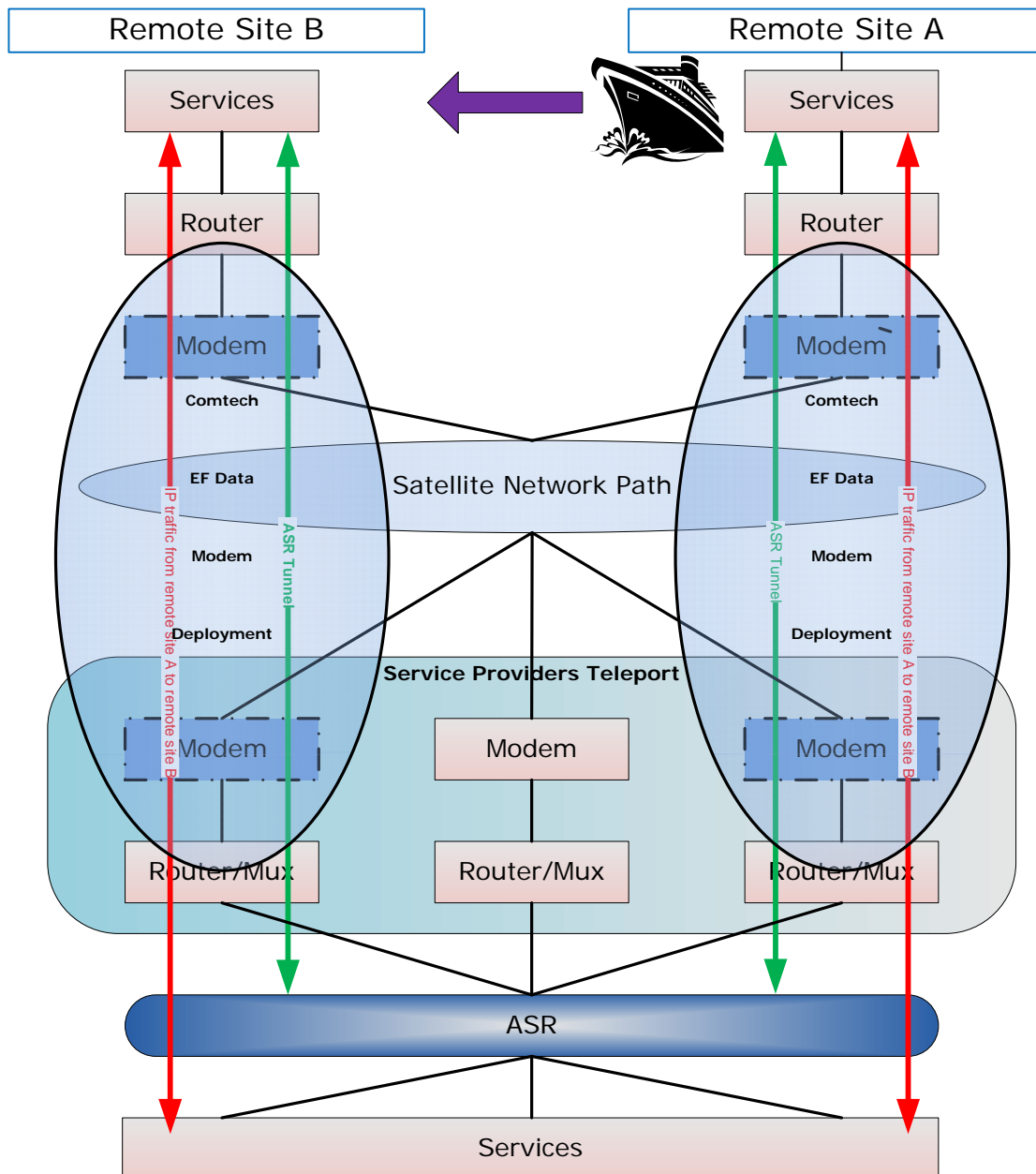
## Auto Sky Roaming

Another key feature provided by Vados Systems is their Auto Sky Roaming (ASR) capability, incorporated into the V-TES operating systems, and available as an option in all the vadEDGE products.

In a customer network environment where the remote communications platform can move, support of the same IP addressing scheme and telephone numbers is desirable. The current Vipersat Network Products' roaming feature provides a solution using Fixed Service Satellite (FSS) (C- or Ku-band) satellites. For some users, service diversity is required, which could be the use of an FSS and an Inmarsat service, or an FSS and a terrestrial service. In fact, within the FSS services (all technologies), the FCC imposes strict frequency coordination of shipboard C-band services near the United States coasts. The Vados Systems solution allows a switchover to Inmarsat for the near shore communications in these instances. It allows for centralized network control, and frees up network engineers to focus on running the core, not the edge of the network.

ASR works by building a virtual tunnel between the IRC (Intelligent Routing Centre) server and the remote router. Traffic is carried over this tunnel. The server could be located at the hub ground station, which can be anywhere in the world. When the remote equipment (antenna, modem, vadEDGE) is roaming, the virtual tunnel keeps moving, as well. There are no network configuration changes required to implement ASR, reducing the network operator skill set requirement, and simplifying the network implementation.

Figure 3 illustrates the Auto Sky Roaming built tunnel within a network (in this example a satellite network)



**Figure 3 Vados Systems Auto Sky Roaming Tunneling**

In this figure, the green path shows the ASR tunnel set up, while the red path shows the IP traffic from remote site A to remote site B. The blue ovals identify where the Comtech EF Data modems would be deployed.

ASR has been used by the United Kingdom's Army in every operation and deployment since 1999. It has also been contracted for use in the maritime market on more than 800 ships, with over 100 migrated to the full ASR solution since January, 2008.

## Comtech EF Data's Vipersat Roaming

Comtech EF Data's approach to roaming is through the use of the Roaming Oceanic Satellite Server (ROSS). The ROSS is connected to an Antenna Control Unit (ACU) and to the Comtech EF Data CDM-570 Satellite Modem, to perform antenna satellite re-point and information gathering. The ROSS is a key component in the Comtech EF Data mobile satellite solution system that provides the capability to automatically transfer remote sites from one satellite connection to another as the mobile vessel moves between multiple satellite coverage areas. In addition, the ROSS provides alternate configuration files for the modem that can be mapped to specific regions of a satellite's coverage area. This allows communications link parameters, such as data rate and modulation, to be optimized for the satellite reception in that region.

When a transponder beam transition change is identified, ROSS pushes new pointing information and transmission configurations, and then initiates a wait state until the new system registration processing commences. This new configuration includes satellite antenna pointing parameters, an updated modem home state and the satellite ID for the next satellite transponder beam. When the central (hub) management system, Vipersat Management System (VMS), detects this change in the remote satellite ID, it initiates a satellite beam switchover. Once the appropriate changes have been made, the VMS will re-register the remote and grant transmission to dynamic SCPC switching operations.

## Comtech EF Data Vipersat & Vados Systems' Auto Sky Roaming

The two approaches to networks with roaming terminals are completely compatible. For each satellite transponder, there will be supporting modems at the service provider's hub location. Vipersat will provide the route for the traffic between the remote site and the appropriate hub modem(s). The Auto Sky Roaming feature will provide the IP tunnel that will pass IP traffic across this route.

Additionally, the Vados Systems solution can interface to the VMS through the adaptation of the Vipersat External Switching Protocol (VESP) of Comtech EF Data's product enhancement technologies. The combined solution provides user-controlled bandwidth on request with automatic assignments for upstream and downstream traffic. This enables bandwidth allocation by application and superior QoS, while maximizing bandwidth and cost efficiencies for users. Leveraging the joint experience of Vados Systems and Comtech EF Data, the combined offering will allow traditional high quality VSAT services to be deployed over an easily manageable IP backbone.

## Case Study – Vizada (formerly Telenor Sealink)

Vizada is the largest managed VSAT service provider in the maritime industry, using its Sealink brand. Some of their customers include Color Line (ferries/cruise), Silversea (cruise), Silja Line (ferries), DOF (shipping), DFDS Seaways (ferries), Cunard (cruise), P&O Ferries, Stena (ferries), etc.

Vados Systems has been working with Telenor Satellite Services since 1997. Their equipment is operational on 800 of their vessels. The satellite communications technology that Vizada uses is SCPC.

Telenor's business requirement was to migrate their multi-year contracts from margin-sensitive bandwidth sales to service solution contracts. Their goal was to achieve economies of scale, while offering scalable, manageable and differentiated service with high profit margin.

The application requirements that Telenor had were fourfold:

- Provide for regulatory compliance – passenger manifest, health & safety.
- Enterprise connectivity – back & front office systems, service provision for concessions, video surveillance.
- Enhanced passenger services – Internet connectivity, voice/fax, GSM/GPRS, ATMs.
- Enhanced crew services – TV, crew calls, Internet

Vados Systems with their vadEDGE product provided the functionality to enable these application requirements with passenger payphones and Internet cafes, back-office systems for the ship, point of sale services for duty free shops and ATM machines, GSM/GPRS phone roaming aboard ships, and enabling a crew media server, which uses times of idle bandwidth for downloading.

The Vados solution reduced costs for Telenor by providing:

- Bandwidth efficient toll-quality voice (7 kbps including overheads)
- Broadcast filtering at the communications port, not at the processor
- Providing for multiple services on a single link with high link efficiency using dynamic interleaving
- Payload and link compression for selected data services
- Application triggered QoS
- 7 kbps per call and local cell switching ABIS GSM backhaul
- IP packet chaining (reduce IP overheads on satellite link)
- IP/UDP & IP/UDP/RTP header compression

In addition, the vadEDGE provided a seamless and fully automated satellite roaming solution. With a slight delay in the satellite change, from the physical motion of the shipboard antenna, the switch is seamless between satellite spot beams. There are no dropped calls, and the IP addresses and the phone numbers remain the same.