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1 INTRODUCTION

Why Satlink Maritime Vsat Services:

Times have changed. Satellites can now link up any ship in any ocean to any port. A ship can become a mobile business centre even when isolated thousands of miles from Head Office. Satlink Ltd offers internet, e-mail, phone, fax, video streaming and distance learning through fixed subscriptions. Seamless switching provides global coverage - wherever you are at sea.



Why you should move to satellite:

- **Create an office at sea**

Your company network can be connected to your ship or several ships - retaining contact with your business partners and customers. In your 'office at sea', you can make plans, take important decisions and involve top management. Satlink Ltd maritime customers have shifted from 80% use of the internet for email and surfing to 80% operational use. With 24 hour availability, you can handle your administration, place your orders and sell directly from your ship. And take advantage of safety data from shore to ship, remote training, surveillance and video conferencing.

- **Save time with one platform for all applications**

No matter where you are, Comtech's VIPERSAT platform offers fully automated seamless switching from one satellite to another as vessels move round the globe. Operating expenses are kept low by minimizing and matching bandwidth and power. With no extra costs, as this is programmed into your contract.

- **Look after your crew**

One of shipping's greatest challenges is retention of skilled personnel - as crew members demand more home comforts while at sea. Satellite links now allow crew members to phone their loved ones at home - for the cost of a landline call.

With wireless access in cabin, they can enjoy call privacy, and use the internet for entertainment, e-learning and updated training. You can also linkup a doctor from onshore for all your vessels. These benefits will attract skilled personnel who will join a crew who no longer feel isolated. Return on investment will be fast - improving staff retention and reducing expensive recruitment and training.

- fixed subscription price for internet and e-mail
- call tariffs similar to landline tariffs
- your vessel connected to the office network and applications
- social calls and internet services guarantee a satisfied crew
- worldwide coverage
- 24 hour and 7 day a week availability

• Technology Partners

Whether you sail regional or international routes, you benefit from several overlapping satellites. Fully automatic seamless switching will be provided from one satellite to another.

Our Teleport has developed new communication solutions with the two biggest players within the satellite technology sector. iDirect and Comtech Vipersat are the leading manufacturers both in terms of the high standard of their technology and their long-term experience.

iDirect is a market leader because of its shared technology and therefore provides quality satellite communications at the most affordable price.

Comtech Vipersat is known for its constant innovation. For the maritime market, Comtech has developed revolutionary and unique applications. One of these is fully automated switching from one satellite to another.

2 WE OFFER

2.1 HARDWARE

Antenna



Sea Tel 2406/4006

- 60cm Ku-band Vsat antenna/ 1M Vsat antenna
- Ideal for ships which need 24/7 connection
- Internet, e-mail, video conferencing, VPN and database back up

Hardware - iDirect

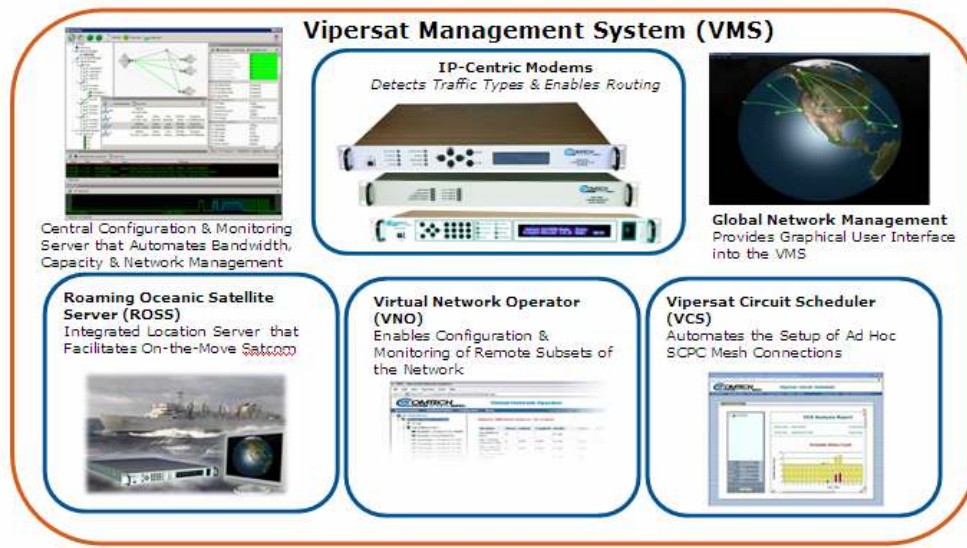
iDirect 3000 modem



VoIP Ata Box



Hardware - Vipersat Network Solution Components IP-Centric Modems + Vipersat Network Products



Satlink Maritime

Above deck equipment		Price
Above Deck	Seatel 2406 (incl 4Watt BUC)	\$ 37,500
	Standard 4Watt BUC	\$ 480
	Seatel 4006 (incl 4Watt BUC)	\$ 50,000
	Seatel 4006 (incl 8Watt BUC)	\$ 50,500
	Regional LNB	\$ 480
	Multi Regional LNB	\$ 2,500
Below deck equipment		
Below Deck	Comtech Vipersat CDM-570 Modem	\$ 7,710
	ROSS Box	\$ 3,300
	Tellnet Server Consol Switch 8 prt	\$ 800
	Cisco 2801 Router incl HWIC Module	\$ 1,952
Installation		
	Activation Fee	\$ 2,500
	Manpower per Person/per day	\$ 1,250
	Travelling & Lodging	Actual costs + 10%

2.2 BANDWIDTH SPECIFICATION

Especially for the maritime market we worked out a structure that gives the same price levels regardless of the beam a vessel is operating on.

We measure the overall bandwidth utilization on each beam continuously. Apart from known new activations and known vessel movements in a certain region we prepare satellite capacity expansions with enough time ahead to ensure the overall availability of the sold committed information rate at any beam at any time.

For this project, based on existing available capacity over the entire offered global route we propose a bandwidth subscription of 128/128 or 128/256 both with a contention to burst ratio of 1:2. In other words, always a committed data rate of 50% will be available.

The optimum plan

As a customer, you select your minimum bandwidth in advance by choosing one of our subscription plans: Platinum, Gold, Silver or Bronze.

With Platinum, you share a connection with one other customer; because Platinum has a contention ratio of 1:2

Gold – contention ratio 1:5; you share with four others.

Silver - contention ratio 1:10; you share with nine others.

Bronze - contention ratio 1:15; you share with fourteen others.

2.3 BANDWIDTH PRICES

Maritime Global Service Levels(Monthly)

Transmit TX (Kbps)	Receive RX (Kbps)	1-Plat	2-Gold	4-Silver	8-Bronze
64	64	\$ 1.875	\$ 938	\$ 469	\$ 234
64	256	\$ 4.219	\$ 2.344	\$ 1.172	\$ 586
64	512	\$ 7.172	\$ 3.797	\$ 2.109	\$ 1.055
128	128	\$ 3.375	\$ 1.875	\$ 938	\$ 469
128	256	\$ 5.063	\$ 2.813	\$ 1.406	\$ 703
128	512	\$ 7.969	\$ 4.219	\$ 2.344	\$ 1.172
128	1024	\$ 13.500	\$ 7.172	\$ 3.797	\$ 2.109
256	256	\$ 6.375	\$ 3.375	\$ 1.875	\$ 938
256	512	\$ 9.563	\$ 5.063	\$ 2.813	\$ 1.406
256	1024	\$ 15.000	\$ 7.969	\$ 4.219	\$ 2.344
256	2048	\$ 27.000	\$ 13.500	\$ 7.172	\$ 3.797
512	512	\$ 12.000	\$ 6.375	\$ 3.375	\$ 1.875
512	1048	\$ 18.281	\$ 9.712	\$ 5.142	\$ 2.856
512	2048	\$ 30.000	\$ 15.000	\$ 7.969	\$ 4.219
512	4096	\$ 54.000	\$ 27.000	\$ 13.500	\$ 7.172

2.4 YOUR COVERAGE



2.5 TELEPORT

The teleport not only covers a wide range of satellites, but does so using any one of its state-of-art communications platforms all supported by robust, redundant terrestrial interconnectivity to the world and by its advanced network management capabilities.

Terrestrial communications infrastructure

Fibre & Microwave Network with microwave interconnection for switchboard voice. 4 x resilient fibre (each 1 Gbps) linking Rugby with London Telehouse and London Telecitey. A dark fibre ring links London City and docklands areas currently terminating into London Telehouse, London Telecitey and London Brahams Street.

Multiple TIER 1 backbone access in London over Cisco routing equipment with minimum 1 Gbps capacity allows fully redundant BGPv4 level support.



3 HOW DOES IT WORK

The solutions offered are on two different platforms, both developed in house:

SpaceWeb-iDirect(DVB-S2 ACM) and FlexIP-Vipersat(SCPC). Our platforms are

supported and monitored 24-7 by the Network Operations Centre. So direct verbal assistance is provided. SpaceWeb is the ideal solution for companies wanting high quality at an economical price. The best platform for your "economical" request is the SpaceWeb platform using iDirect latest proven technology for "pooled" bandwidth or alternatively the FlexIp platform using state of the art comprehensive "belt & braces" Comtech Vipersat SCPC technology-for your OWN bandwidth.

3.1 SPACEWEB IDIRECT PLATFORM

Shared connection

SpaceWeb is for customers seeking cost-effectiveness, reliability and flexibility. It is particularly suitable for small and medium-sized businesses which want a reliable alternative to voice and data communications. SpaceWeb gives them a shared solution with guaranteed bandwidth. (Guaranteed minimum shared bandwidth levels OR guaranteed throughput referred to as "dedicated")



Advantages

SpaceWeb is unique not only for its competitive price and fast connections, but also because it offers guaranteed bandwidth, an advanced online monitoring system and support for multiple simultaneous telephone lines. The platform can be operational within 48 hours.

Quality of service

SpaceWeb gives customers guaranteed bandwidth as defined in their service level agreement.

Subscription

As a customer, you select your minimum bandwidth in advance by choosing one of our subscription plans: Dedicated, Platinum, Gold, Silver or Bronze. With Platinum, you share a connection with one other customer. With Gold you share with four others, with Silver nine and with Bronze fourteen. Available additional bandwidth is allocated dynamically to the connection's users.

3.2 VIPERSAT PLATFORM

Based on the customer's requirements we offer a complete solution on Vipersat enabled platform. Vipersat Networks today have a fully owned subsidiary of Comtech EFData, an excellent integration between new network functionality and their IP based satellite modems is ensured.

Comtech CDM-570 Satellite Modem



At the remote site a Comtech CDM-570 satellite modem with IP Module and Vipersat enabled software features is used. A 70 Mhz as well as a L-band version is available.

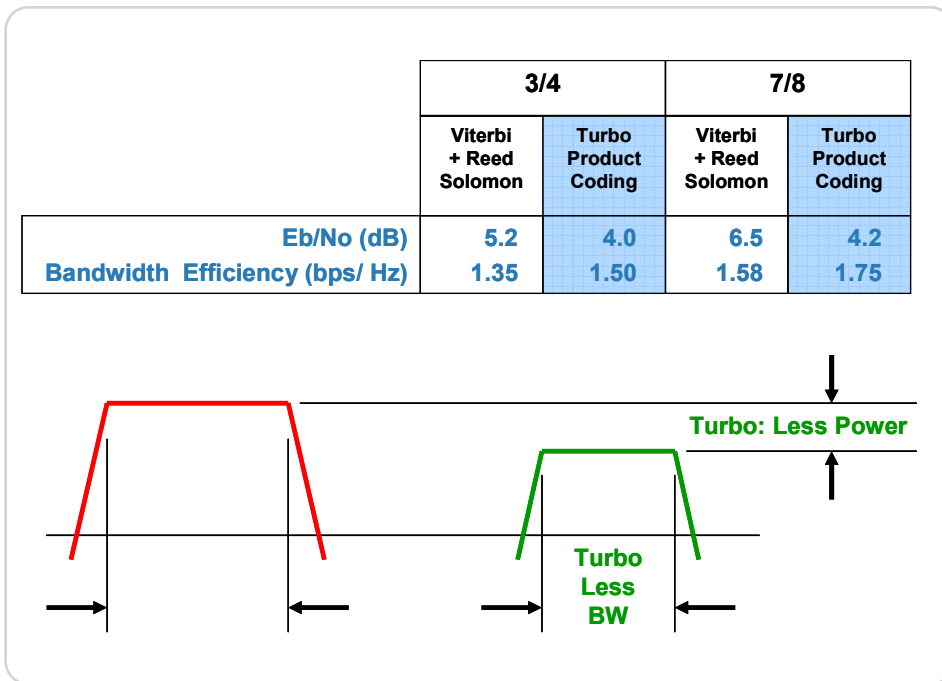
Cost effective performance

- Data Rates of 2.4 kbps to 5 Mbps
- Fast Acquisition Demodulation
- 2nd Generation Turbo Product Coding
- BPSK, QPSK, 8-PSK and 16-QAM Modulation
- 10/100 Mbps Ethernet Port for Management

IP Networking Module

- Enables advanced features for maximizing satellite link efficiency
- Payload Compression
- Header Compression
- Quality of Service
- (Optional) 3XDES

All remotes are using Turbo Product coding by default. This results in a higher efficiency that uses less bandwidth but most importantly while using it maritime; the lower supported eb/no values require less power at the remote sites.

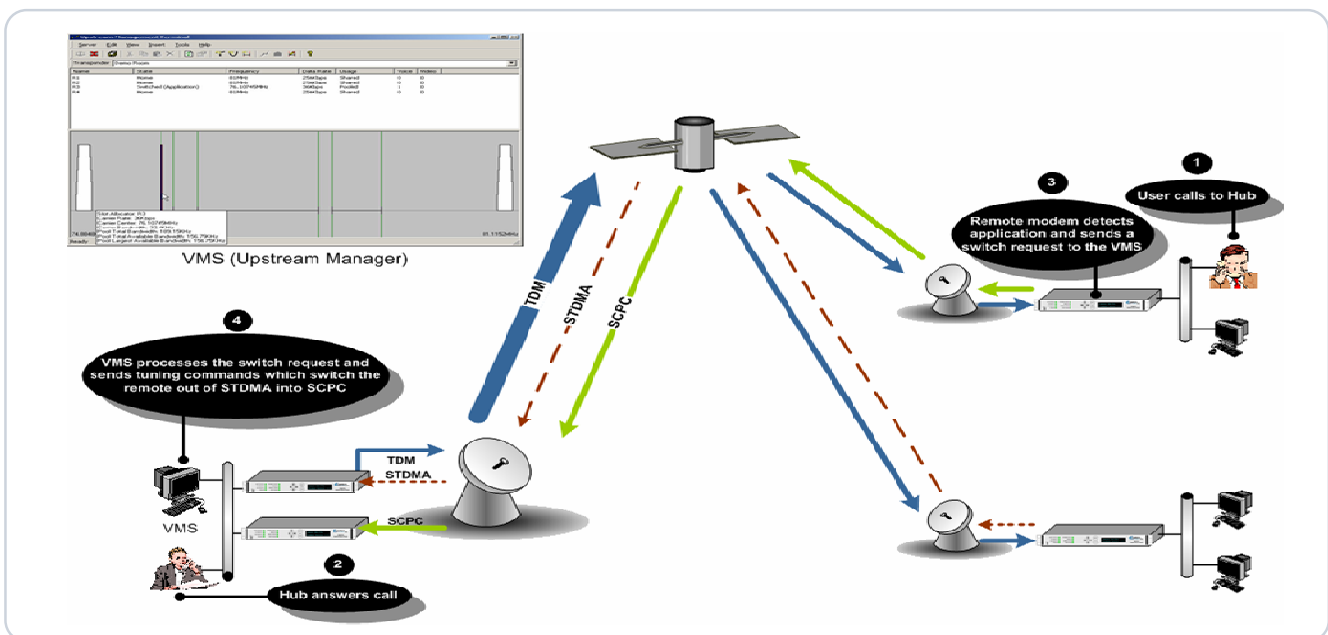


Additionally the Vipersat enabled 570 modem comes default with IP Header & Payload compression enabled. This feature is configurable on a per route bases. IP header compression can reduce Voip bandwidth by 60% for example. (A G.729 (8kbps) codec will be compressed from 32 Kbps to 10,4 Kbps.)

Dynamic SCPC

Apart from a manual carrier switch done by one of the platform operators each remote can be configured to support automatic load and/or application switching. While using load switching the buffer status of the remote is monitored and based on pre-set values the remote can switch automatically to a higher SCPC carrier rate.

By application switching the protocol detection occurs also in the remote. A switch command can be triggered on any type of application and Cisco's Type of Service (TOS) is fully supported.



Single Hop on Demand

Full meshed, point to point connectivity between remotes is fully supported by the Vipersat platform but the remote needs an additional demodulator in that case for each concurrent receive carrier. As the demodulator site of the CDM-570 will always be used to receive the teleport carrier an additional free demodulator is required for each concurrent receive carrier. To support this technique Comtech offers the CDM-562 (1U Duo demodulator) and CDM-564 (1U Quad demodulator). Both those demodulator versions are fully supported by the Vipersat platform.

Meshing Technique That Avoids Double Hop Latency

- Offer Voice/Video 540ms RTT between remote terminals
- Improved quality for VoIP & IPVC applications
- SHOD connections are automatically setup based on detected applications
- Avoids requirement of expensive DAMA carriers & associated equipment

Added Security

- Automatic frequency & data rate fall back
- Prevents unauthorised (idle state) terminals from "listening" to active links

Automatic Fire Walling

- Voice traffic is automatically fire walled at the hub during call setup
- Allows continued internet access to remote users
- Prevents application traffic from double hopping

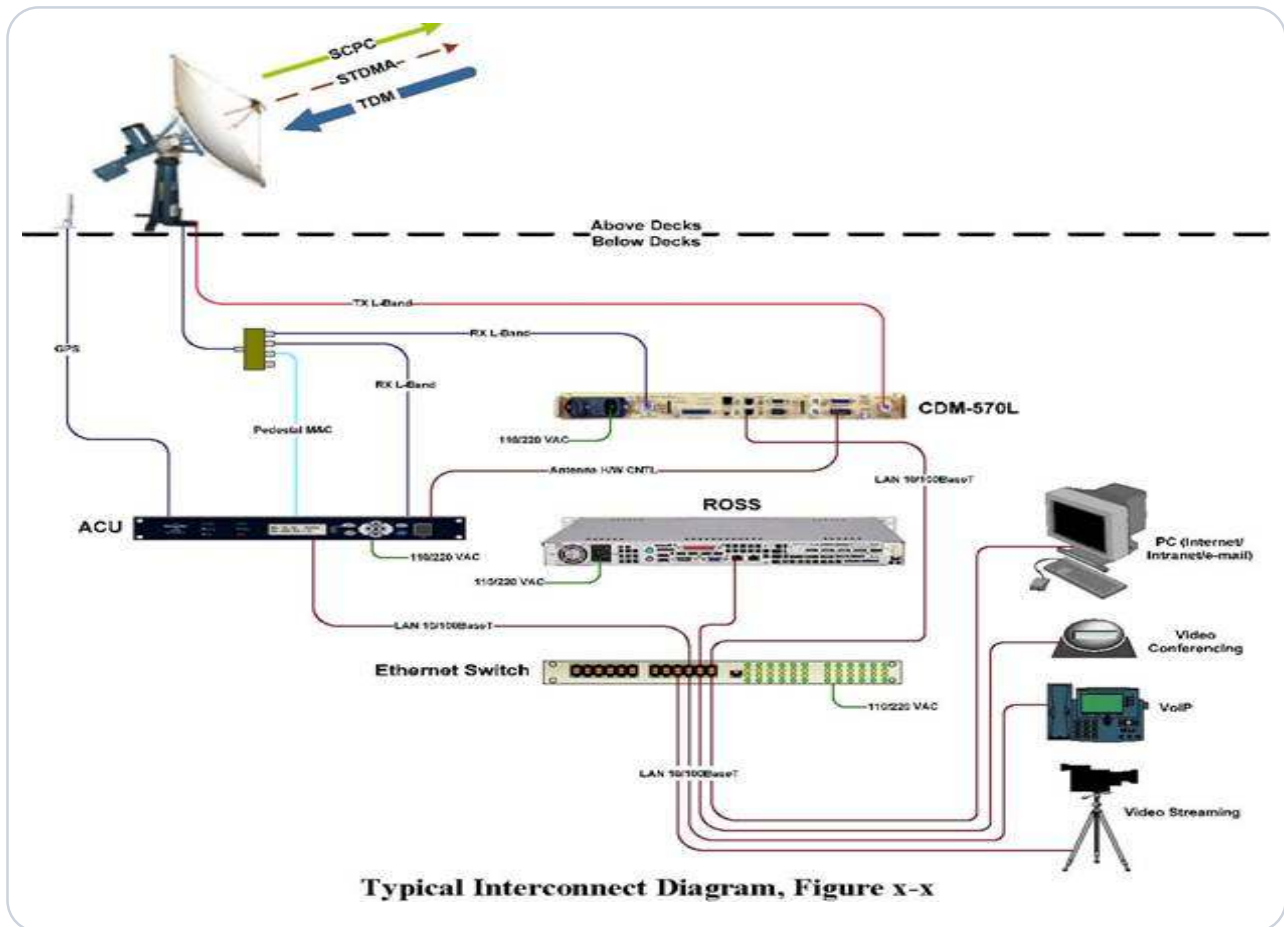
Please note that Single Hop on Demand technology is only supported between remotes located in the same satellite beam coverage.

ROSSBOX

Comtech EF Data has developed Satellite On The Move (SOTM) technology that provides a global coverage method of dynamic satellite hopping to maintain communications and extend the advantages of dynamic single channel per carrier (dSCPC) within a Vipersat network. This method allows a mobile remote satellite station on-board a roaming oceanic vessel to transition between satellite or hub coverage connections with minimal service interruption. The key components to this technology are hub and remote satellite modems, a stabilized mobile antenna system for tracking GEO satellites, a central management system maintaining the alliance of the remote satellite network communication links, and a mobility controller with the location codes within a satellite service area.

The Vipersat Roaming Oceanic Satellite Server (ROSS) fills the role of the satellite mobility controller. In conjunction with an Antenna Control Unit (ACU), the ROSS performs satellite antenna re-point and information gathering. When a transition requirement is identified, the ROSS will push new pointing information to the ACU and provide the new transmission parameters to the CDM-570 modem that are required for service area handoff.

The ROSS is one of the key components in the mobile satellite solution system that provides the capability to 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.



Security

For security reasons a VPN connection between the customers HQ and main Teleport facility can be created. In case the customer decides that encryption over the actual satellite link is also mandatory 3DEC encryption on the CDM 570 modem is available as an additional software option. This option is available as a FAST upgrade, meaning that it can also be activated at a later stage by inputting an activation code for it via the front panel of the modem locally.

4 INSTALLATION PROCEDURES

4.1 COST OF INSTALLATION

For each separate location a certified engineer will be send to do the installation. Apart from the hardware to be installed, there is a possibility extra installation material is needed according to the site survey. Please note that the customer has to take care of the pole to install the antenna on. The site survey will be provided separately. For maintenance on broken parts with warranty a RMA procedure is valid. All broken parts need to come back before replacements are sent.

5 SERVICE AND SUPPORT

There is a 24/7 basic support. We make a distinction between regular support hours and the provision of support during off-working hours. Regular support hours are:

Monday to Friday : 07.00 to 19.00 hours CET
Saturday : 09.00 to 17.00 hours CET

During regular support hours the NOC is available for all questions concerning the support of your satellite connections such as:

- Signal loss
- Questions about the speed and Quality of Service settings
- Software problems
- Hardware problems

The NOC also carries out new installations and location changes and supports service demonstrations during the regular support hours.

- After the regular support hours, the NOC automatically switches to off-working hours support.
- On official public holidays the NOC also works according to the off-working hours support schedule.
- Installations are only made from Monday to Friday between 08:00 and 17:00 hours CET. Providing support on Saturdays is therefore the same as regular support with the exception of installations.

STANDARD SUPPORT

FREE OF CHARGE

Support is offered through the NOC by E-mail, MSN and Telephone.

Regular support hours are:

Monday to Friday : 07.00 – 19.00 hours CET

Saturday : 09.00 – 17.00 hours CET

PREMIER SUPPORT

€ 500,-

Support is offered through the NOC by E-mail, MSN and Telephone.

Certified engineers get preferential treatment for support during regular support hours. There will be a SLA code for support outside regular support hours. Start of support within 4 hours after initial request. The price is per month.

PREMIER SUPPORT PLUS

€ 2000,-

Support is offered through the NOC by E-mail, MSN and Telephone.

Certified engineers get preferential treatment over all others for support during regular support hours. There will be a SLA code for support outside regular support hours. At the start of a support request, contact is established directly with a NOC engineer, who will handle the support request appropriately and immediately. The price is per month.

6 PRICING AND PAYMENT TERMS

Complete price schedule is described below.

All pricing will be in Euro and based on a standard 1 Year contract per project.

Initial installation/equipment costs will be invoiced directly to Satlinker and this cost will be paid up front upon signing order confirmation/contract.

Recurring monthly operational charges will be invoiced to Satlinker.

Payment terms for recurring monthly service will be 8 days after invoice date. Warranty on all hardware products is 1 year.

7 DELIVERY TERMS

Between 9-12 weeks ARO for some of the equipment – but delivery times will be confirmed at agreed set-up for each project. All equipment will have freight fees.

8 OPTIONS FOR VARIOUS APPLICATIONS

Applications and functionality range from the very basic to the highly advanced and can be implemented gradually as demand grows or when new business procedures makes it relevant. The basic infrastructure however, remains the same.

FlexIP applications can include (depending on the capacity used):

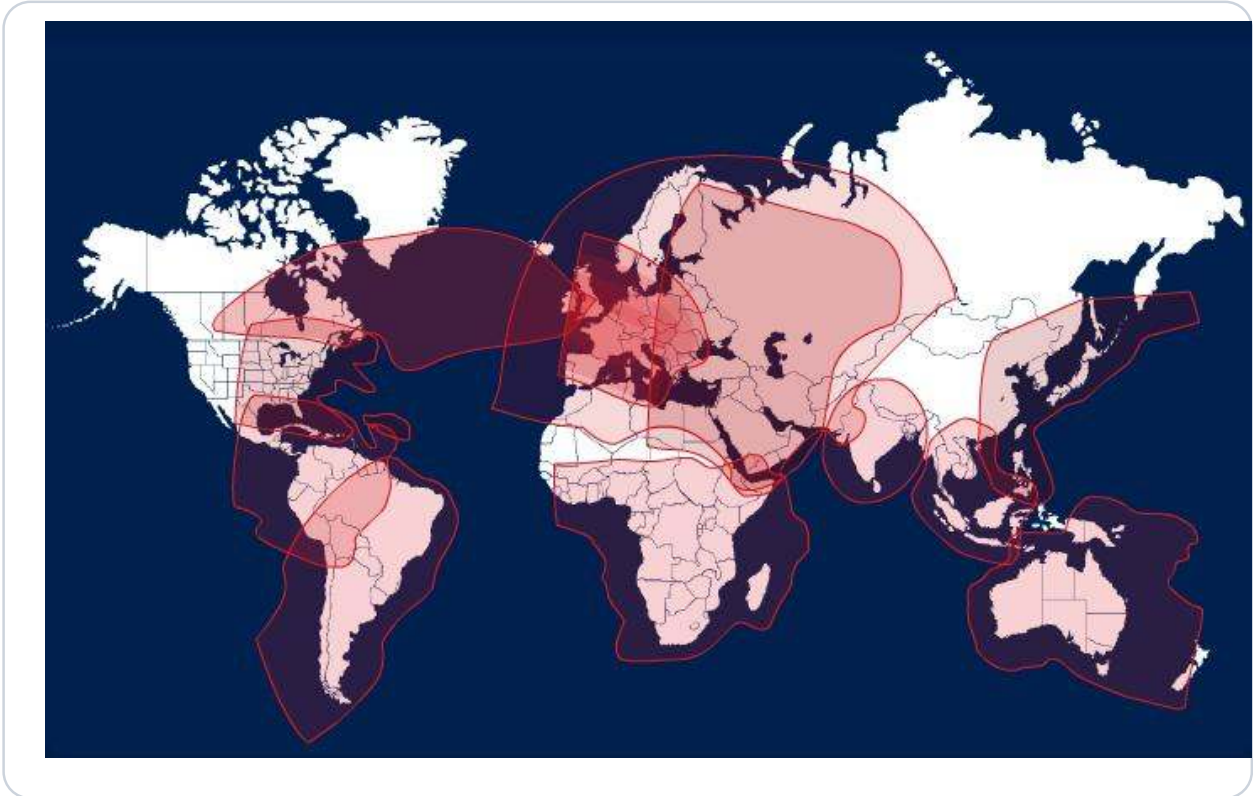
- Internet, e-mail
- Voice and Fax
- ERP
- Intranet
- Streaming Media – Web Casting (LIVE demands min. 256 Kbps)
- Video conferencing and Video Presentations (LIVE demands min. 128 Kbps)
- Interactive Distance Learning (LIVE demands min. 256 Kbps)
- Server Replication
- Software Distribution
- Print-on-Demand

And the list goes on. More important is the fact that we can help you create the business case and implementation plan for the applications most likely to match your current and future requirements.

3 GLOBAL COVERAGE

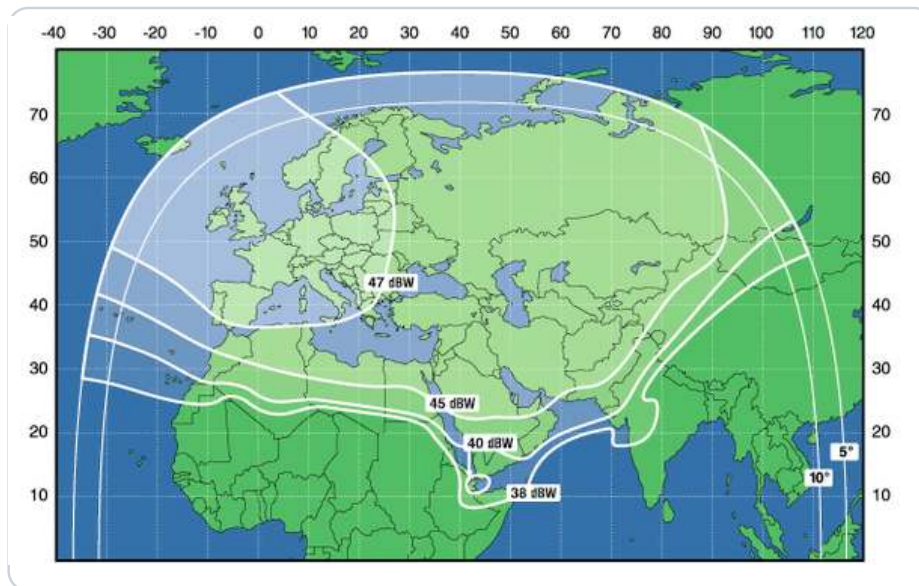
For the maritime market the goal was to achieve a global Ku band coverage for the Vipersat platform. The focus while building this network was initially more on the best connectivity alternatives for each individual region. By adding new beams to the platform, to interconnect the different regions, the global connectivity started to take shape.

Current Vipersat Enabled Coverage Area's

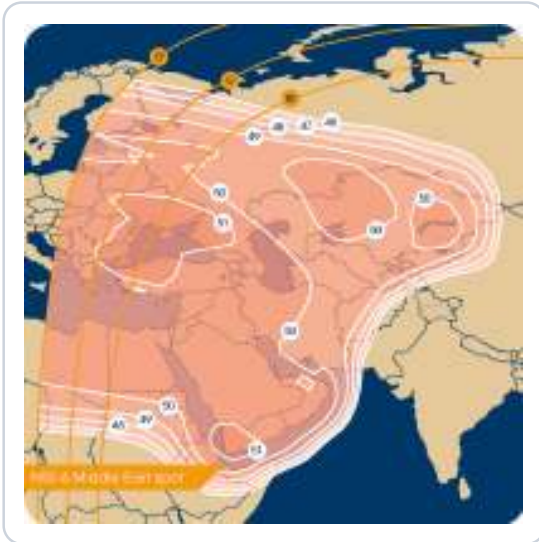


3.1 INDIVIDUAL VIPERSAT ENABLED COVERAGE AREA'S

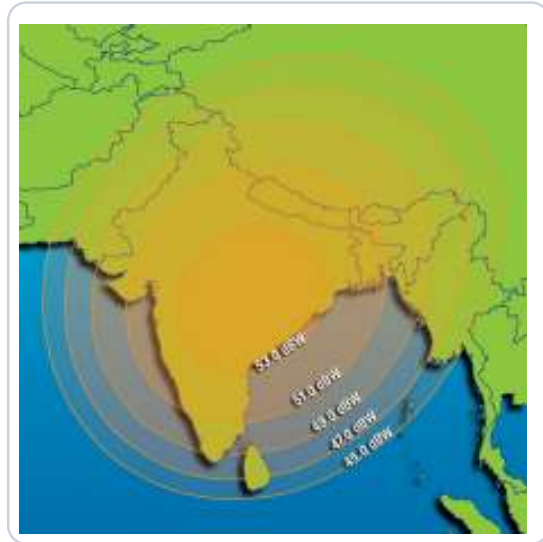
AM1 widebeam



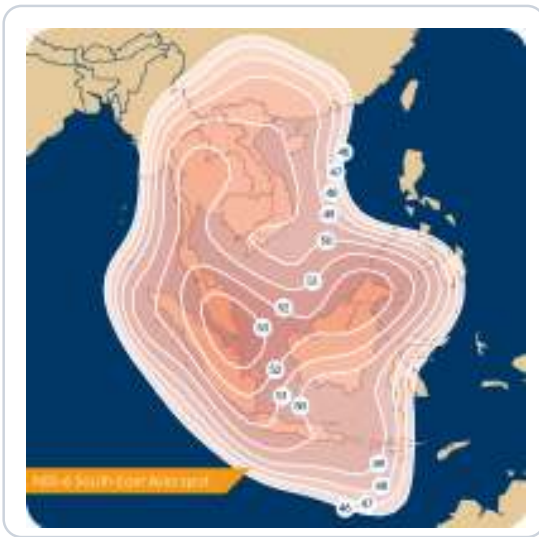
NSS6 Middle East beam



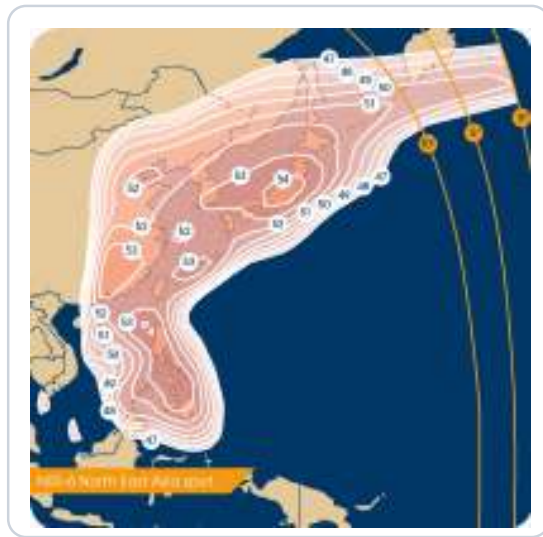
IS906 India beam



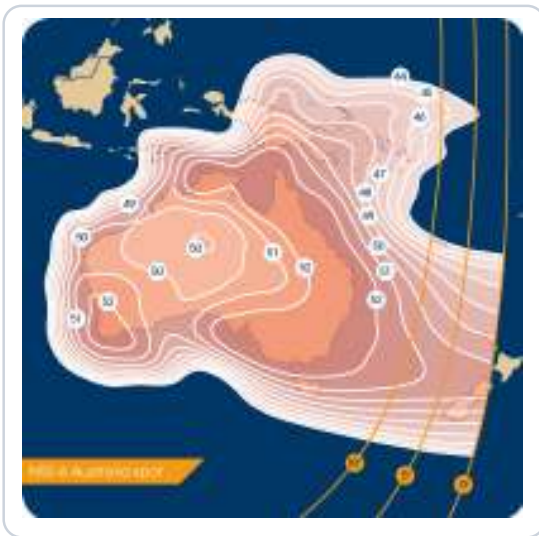
NSS6 South East Asia



NSS6 North East Asia



NSS6 Australia



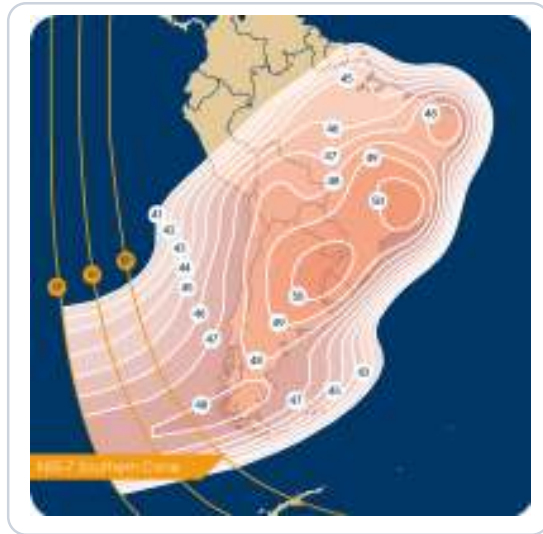
NSS7 North America



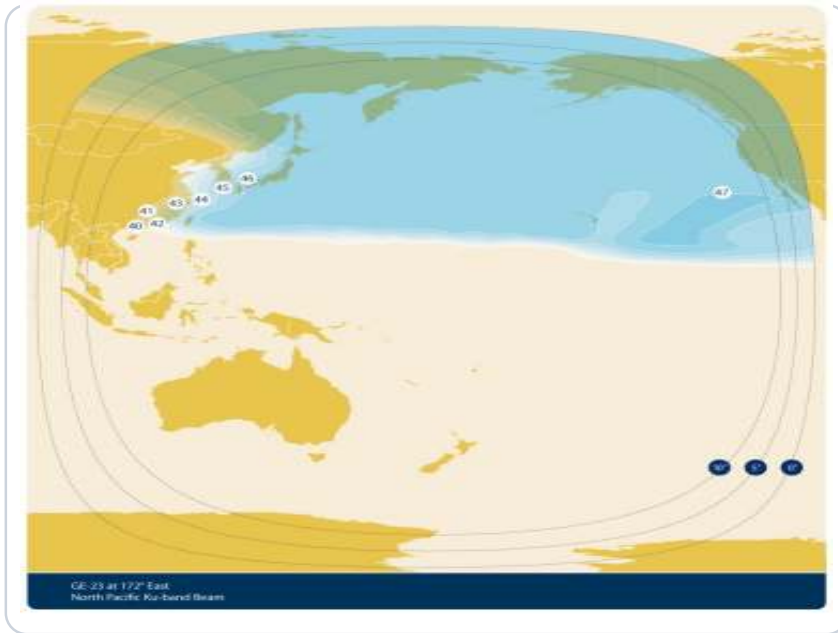
NSS7 Caribbean & Andes



NSS7 South Cone



GE23 NORTH PACIFIC



Telstar14 (NAOR Beam Only)

