

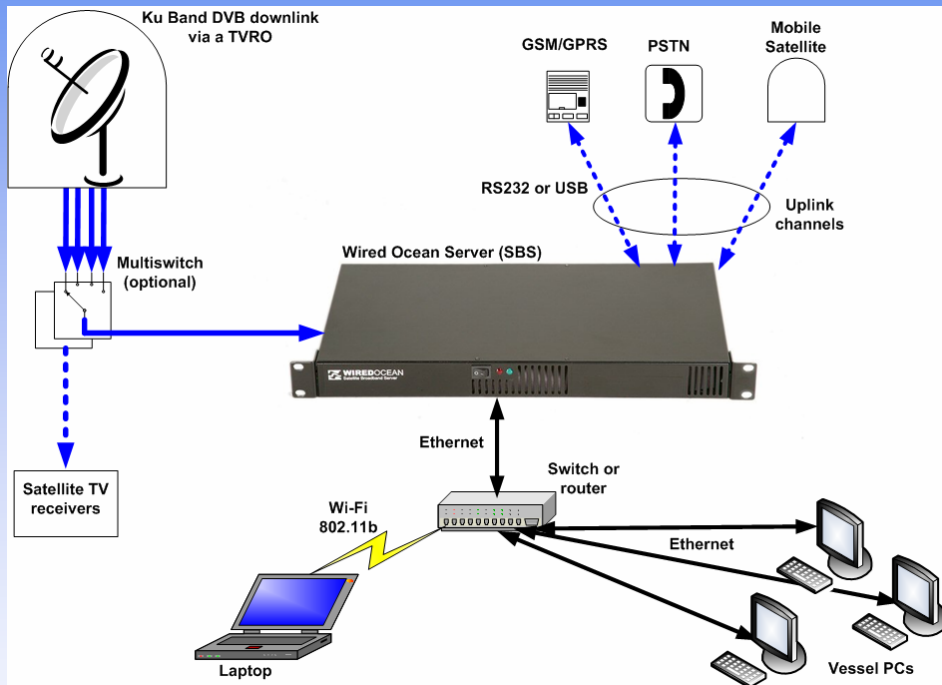
Maritime Broadband via SAT-TV



Overview

- ◆ Hybrid Maritime Broadband Technology
- ◆ System Overview
- ◆ Shipowner Benefits
- ◆ Wired Ocean History

Hybrid Maritime Broadband



- ✦ Ships receive high speed internet access, email and file downloads through the ship's satellite television antenna (TVRO)
- ✦ Ship-to-shore data can be sent using one or more of a range of communications services including mobile satellite, cellular and landline

Hybrid is Compelling from a Technology Perspective

- ✓ Many ships have a TV antenna for broadcast television, Inmarsat for voice and symmetrical data – hybrid provides internet access to complete the triple play
- ✓ Ku-band transponders have massive bandwidth at relatively low cost
- ✓ Internet traffic is highly asymmetric
- ✓ Ku-band transponders provide greater downlink throughput than uplink throughput for a given capacity (at least 2:1)
- ✓ Wide area coverage is well suited to broadcast/multicast data services
- ✓ DVB-IP hubs are plentiful
- ✓ Capacity can be added incrementally
- ✗ Coverage is regional
- ✗ Not suitable for voice or VOIP

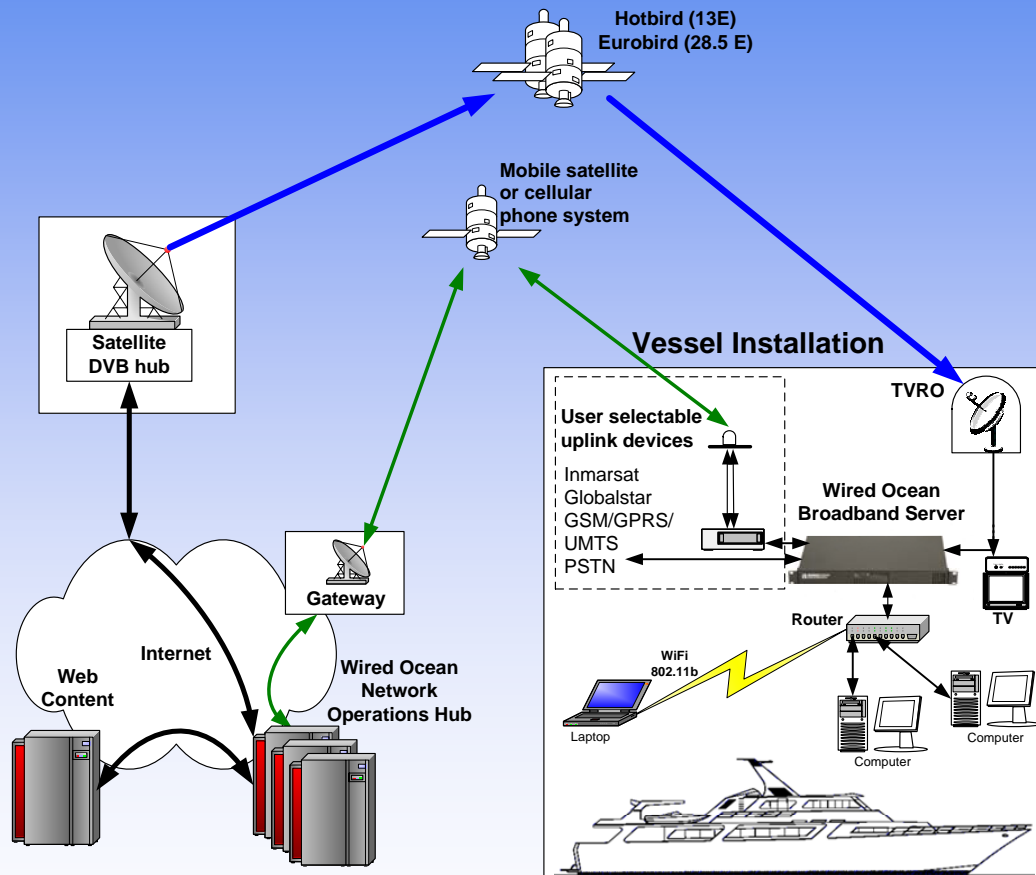
Key Equipment and Service Requirements

- ✦ Responsiveness similar to 512kbps ADSL
- ✦ Simple and easy to use
- ✦ Compatible with ship computers and browsers
- ✦ No software installed on ship computers
- ✦ Low equipment and installation costs
- ✦ Relatively inexpensive to use
- ✦ Support for commonly used uplink channels
- ✦ Remote monitoring and diagnostics

But Implementation Needs Care

- ✦ Its been tried before by some major players
- ✦ Requires an integrated end-to-end system
- ✦ Requires attention to engineering detail
- ✦ Requires a complimentary business model

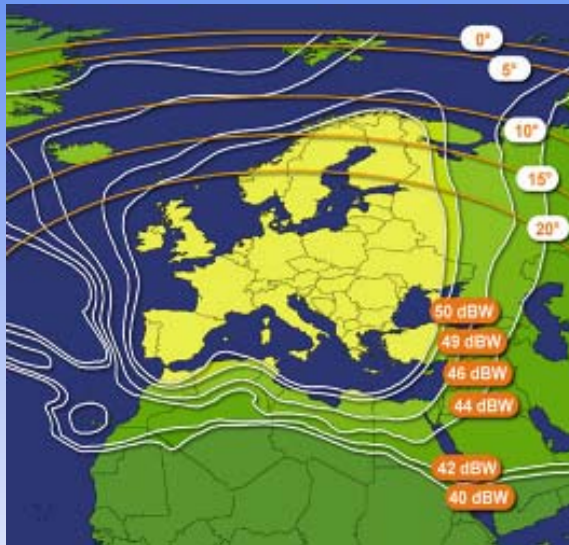
Hybrid System Architecture



Hybrid System Components

- ✦ Satellites
- ✦ Ground Facilities
- ✦ Shipboard Server
- ✦ Service Enhancement Systems
- ✦ Operations Support Systems

Satellites



Hotbird @13°E



Eurobird @ 28°E

- ✦ Capacity at the two most viewed European television locations allows customers to simultaneously access the internet and watch popular programming
- ✦ Thor 2 for Scandinavian markets
- ✦ Potential for geographical expansion

Ground Facilities

✦ Master hub in North London

- System control and monitoring
- Authentication, accounting and support systems
- Service enhancement systems
- Excellent connectivity to London Internet Exchange (LINX)
- 8 servers
- Eurobird uplink

✦ Remote hubs

- Integrated into the Wired Ocean network and managed from the master hub
- Connected to the master hub via tunnelling protocol
- Telemar Scandinavia (Stockholm) operational - Hotbird 4, Thor 2, 2 routers

✦ Features

- Full hardware redundancy at all hubs (auto-failover)
- Automatic SMS & email alerting on fault identification
- Scalable for geographic expansion

Shipboard Server

The SBS (satellite broadband server) connects the ship's computers or network to the Wired Ocean service and seamlessly initiates, manages and terminates the connections involved.

- ✦ Easy to install and use
- ✦ No software on ship computers
- ✦ Advanced software for enhanced performance
- ✦ Robust Linux operating system
- ✦ Transparent to mail systems such as AMOS



SBS Interface

The SBS is managed through a web page interface accessed from any connected computer.



Service Enhancement Systems

- ✦ Negative Acknowledgement
- ✦ Lossless Compression
- ✦ Web Prefetching
- ✦ Web Caching
- ✦ Domain Name (DNS) Caching

Operations Support Systems

- ✦ Over the air upgrade system for SBS software and user's service profile
- ✦ Remote SBS monitoring for enhanced customer support
- ✦ Detailed service performance diagnostic data within each SBS
- ✦ Capability to tunnel into SBSs for detailed real time diagnostics
- ✦ Usual back office functions

Remote Monitoring

Wired Ocean Intranet

Traffic stats

Example Vessel

SUMMARY:	
total time connected	4301 minutes
total connections	737
average time online	6 minutes
total outgoing return channel	71.92 megabytes
total incoming return channel	19.71 megabytes
total dialup	91.63 megabytes
total dvb	1.32 gigabytes

[Show details for last 20 connections](#)

ID	START	STOP	DURATION	RC IN	RC OUT	DVB IN	DIALUP	DVB	RC TYPE
633	2006-05-16 09:36:21	-	11 mins	75,129	265,338	5,093,016	1	1	Inmarsat MPDS
632	2006-05-15 23:08:26	2006-05-15 23:18:09	10 mins	80,029	358,642	4,274,574	1	1	Inmarsat MPDS
631	2006-05-15 07:38:35	2006-05-15 07:49:29	11 mins	112,602	492,871	7,908,300	1	1	Inmarsat MPDS
630	2006-05-14 18:40:14	2006-05-14 18:46:32	7 mins	61,570	180,106	2,608,597	1	1	Inmarsat MPDS
629	2006-05-14 09:32:01	2006-05-14 09:50:09	19 mins	85,048	391,621	4,894,711	1	1	Inmarsat MPDS
628	2006-05-14 09:07:15	2006-05-14 09:08:04	1 mins	6,294	4,888	0	1	1	Inmarsat MPDS
627	2006-05-13 20:09:14	2006-05-13 20:18:47	10 mins	74,132	248,254	5,064,144	1	1	Inmarsat MPDS
626	2006-05-13 11:11:44	2006-05-13 11:19:54	9 mins	46,312	184,109	3,568,233	1	1	Inmarsat MPDS
625	2006-05-13 11:10:43	2006-05-13 11:10:45	1 mins	70	140	0	1	1	Inmarsat MPDS
624	2006-05-13 05:52:48	2006-05-13 06:13:45	21 mins	134,502	699,542	20,356,865	1	1	Inmarsat MPDS

Shipowner Benefits - Summary

Fast Service

- ✓ Typical in 'feel' to a 512kbps ADSL service
- ✓ Download speed is 10 to 50 times faster than Inmarsat Fleet, Globalstar or GPRS

Low Installation Costs

- ✓ Use existing TVRO for shore-to-ship link and existing communications equipment for ship-to-shore link
- ✓ Easy to install

Economical to Use

- ✓ Pay only for what you use
- ✓ Approximately €1 per Mbyte
- ✓ Service enhancements such as SBS caching to save money

Flexible Operation

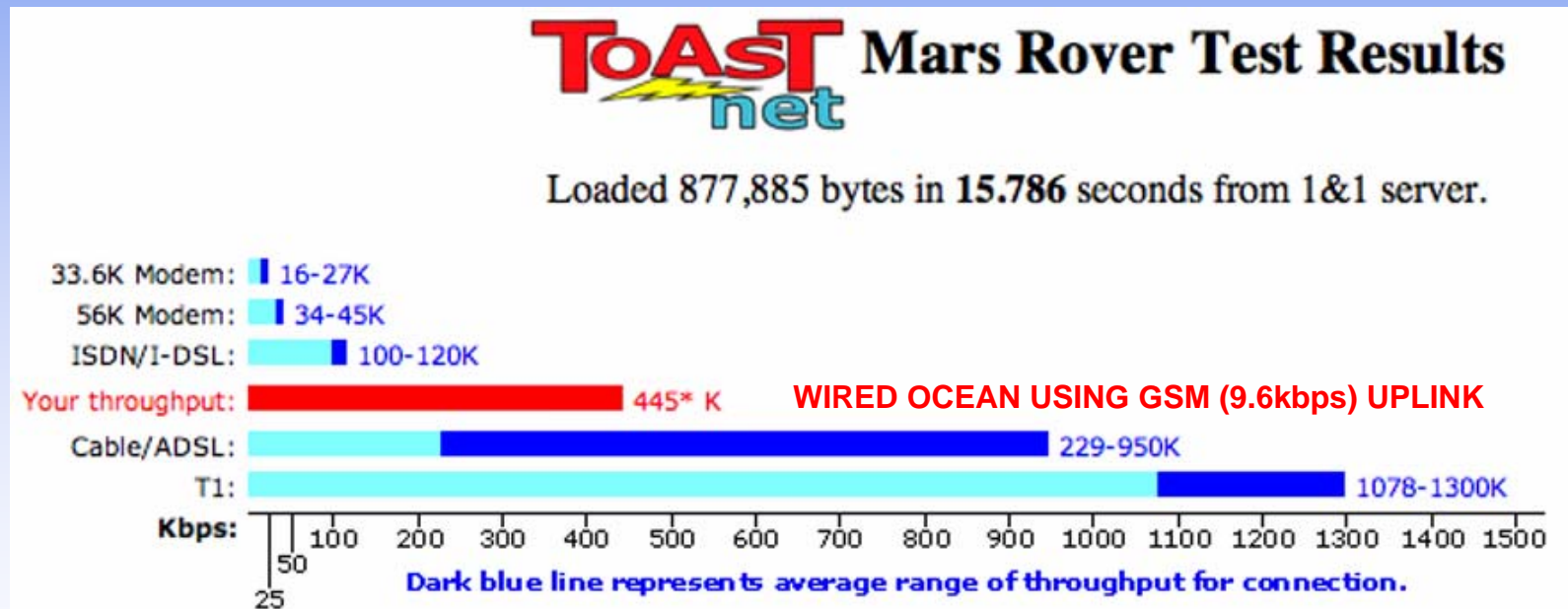
- ✓ Compatible with most uplink and TVRO equipment
- ✓ Configuration options for coverage and satellite location
- ✓ Use existing service provider for uplink use

Designed For Sea

- ✓ Robust hardware and service
- ✓ Easy to use
- ✓ Remote diagnostics provide advanced customer support

Service Performance

The service compares well with lower end maritime VSAT services



Service Cost

Application	Inmarsat MPDS ²	Wired Ocean with MPDS Uplink
One Hour Internet Access ¹	€115	€13.80
1 Mbyte File Download	€23	€1

1. 5 Mbytes – 4.6 Mbytes on the downlink and .4 Mbytes on the uplink
2. Inmarsat MPDS €23 per Mbyte

Wired Ocean History

- ✦ The leader in hybrid broadband maritime communications

- ✦ Development history

 - 2003 Technical and commercial feasibility studies including service trial with the French Navy

 - 2003/4 System development

 - 2004/5 System development and land-based testing

 - 2005 Sea trials on 10 vessels

 - 2006 Commercial service launch

- ✦ Two contracts successfully completed with the European Space Agency

- ✦ In service with customers ranging from fishing vessels to small cruise vessels

Wired Ocean



ADD ON

TURN ON

LOG ON