

SATCOMS CONFERENCE REPORT AND COVER STORY

MAIN HEAD

Broström trials always on

DECK HEAD

Swedish shipping company Broström has been running a trial of Inmarsat Fleet MPDS and Telenor VSAT, to see how effective and economic both are at maintaining an always on connection between ship and shore

BODY

"We have this dream of always on, fixed price, low cost, ship shore communication," said Per-Erik Holmberg, group manager of information and communication technology, speaking at Digital Ship Scandinavia conference in Oslo in March.

Broström was keen to allow web surfing and intelligent web services onboard. "Is this viable, technically possible and affordable?" he wanted to know.

Broström has 1,000 employees, and sees itself principally as a commercial operator, rather than a ship manager. It uses several shipmanagers to run its fleets.

The shipboard computers have been completely locked down, so that seafarers are not able to install any programs at all. "They found it better not to be able to screw up things," he said.

The company wanted to understand how it uses satellite communications a lot better, and understand its communication pattern, in particular how it has changed over the past 2/3 years.

"There's a lot of information going to the vessels which didn't happen 2/3 years ago," he said. Analysis from the Commbbox showed that 39 per cent of e-mails were shore to ship, and 61 per cent were ship to shore; however the volume of data from shore to ship was greater.

"We do 15 connections ship-shore per day, an average of 500 KB of data," he said. Each vessel sends an average of 64 e-mails per day, of which 20 per cent are crew mail.

"We allow crew to send and receive private e-mails," he said. "Everyone has their own private e-mail address."

Most vessels have Inmarsat –B and GSM communications. Several vessels have Fleet 55 and 77, and 10 vessels have Globalstar terminals. It the Virtek Commbbox onboard its vessels, to send data through the most cost effective route.

"We thought that GSM [roaming] is the cheapest – it is not," he said. "You pay in increments of one minute. It's costly."

“One solution is Globalstar packet data, but as far as I know, no-one has tested it.”

“The cheapest way to communicate is ISDN – Fleet or Sat B high speed.”

In its quest to find out the most effective way of running an always-on connection with the ship, Broström made a trial to compare VSAT with Inmarsat Fleet.

“VSAT is always on, fixed price, certain amount of bandwidth,” he said. “Fleet with MPDS is always on. We wanted MPDS to be always on.”

By having an always-on connection, the ship can be part of the office infrastructure; Broström can provide remote support to the vessel computer installations, and have better control.

A Telenor Sealink VSAT system was fitted on its vessel Bro Atland, with 32 kbps from the ship and 256 kbps to the ship, always on.

There were two phone channels for business and two for crew use. There was a separate computer for internet access for crew, which went through a separate network to business communication.

The costs of the Ku band VSAT installation were Euro 2,600 per month, including installation costs, lease of the shipboard antenna, data, voice and crew internet communications, and the associated social benefits.

One problem with the VSAT was a “blind spot”; when the vessel was moving in a certain direction, the funnel of the ship was in the way of the shipboard antenna. The antenna would need to be rebooted when the funnel was out of the way of the satellite, he said.

The VSAT terminal also had a limited coverage area, under the Ku band. The vessel was sent on one voyage to Africa, which took it out of the satellite coverage area.

Meanwhile an Inmarsat Fleet 55 terminal was installed on vessel Bro Anton in July 2004. The crew were given scratch cards to pay for their phone calls.

Broström began an experiment with an always-on connection in November last year. The terminal was used for data only, so there was no interruption by incoming phone calls.

The costs of the Inmarsat Fleet 55 installation was Euro 9000, with data communications costing Euro 1,000 per month, voice communications a further Euro 500 per month, plus a further 1800 minutes per month paid by crew for crew calls. The company did not measure the costs of phoning the vessel from the office.

The total crew savings using the VSAT were SEK 7,000 per month (Euro 760).

Mr Holmberg found that doing remote support of shipboard computers, connecting over MPDS, did not work too well, because the software applications are designed for use on fast terrestrial networks, and not on satellite systems, where there is a longer delay between sending packets and receiving replies (“latency”).

When doing remote support, Broström would discontinue the MPDS and switch over to ISDN.

One particular challenge, encountered with both Inmarsat Fleet and VSAT (via Stratos and Telenor), is managing the virtual private network, ensuring that all data onboard the ship, web and e-mail, was channelled via the Broström office network, ensuring that it could control and monitor the data, and make sure nothing nasty was finding its way onboard.

A “virtual private network” (VPN) tunnel was made between the shipboard terminal and Broström’s computer system, via the Stratos land earth station or Telenor’s network.

“We didn’t succeed in getting internet surfing through our network,” he said. “For a LAN to LAN connection, you must be on speaking terms with your supplier. You have to know the right people in the right organisation. If they’re not there, it’s hard to get support.”

In the future, Broström will be testing news and remote messaging services to Bro Atland, the vessel using the VSAT installation.

SUBHEAD
Anders Utkilens

IMAGE Sigmund Tore-Grane Anders Utkilens

Sigmund Tore-Grane, IT manager, Anders Utkilens, talked at Digital Ship Scandinavia about his use of VSAT.

Utkilens is probably the only non-cruise ship operator in the world to have VSAT on its entire fleet. The company has 17 vessels of 2,500 to 17,000 dwt, operating principally in the North Sea, with some trips to Iceland and the Baltic Sea, occasionally to Italy, the US and South America.

Since 95 per cent of vessel movements were within the coverage area of Telenor Sealink’s Ku band VSAT satellite service, fitting the service on all vessels seemed like a sensible investment.

“We invested in VSAT for a predictable communication cost and a reduced workload onboard and in the office,” he said.

“We’re pretty scared about the [communication] prices,” he said. “Inmarsat –C is slow and expensive. GSM is very expensive if you’re not in Norway. Inmarsat has high prices.”

“We also tested Fleet,” he said. “We found out that using a virtual private network [VPN] over Fleet MPDS was not functioning.

Because it was unable to ensure that all data communications to the vessel was channelled via the shipping company network, Utkilens instead wanted to put heavy restrictions on who could send e-mails to the ship.

“We spent a lot of time on this, restricting mail systems,” he said. “It is complex for everybody. We wanted a very simple system.”

One of the principal challenges with the VSAT system was deciding where to place the antenna, to avoid blackspots, where parts of the ship (eg the funnel) will block out its connection to the satellite, when it is going in a certain direction.

“We wanted to put it on top of the wheelhouse so we didn’t get problems with vibration,” he said.

“The VSAT is online about 90 per cent of the time,” he said. “In harbours, you might have one day without being on the net.”

Utkilens has a leased line between the Telenor earth station at Eik and its own office in Bergen, so that all data communications and phone calls from the office could be handled reliably and at fixed annual cost. Every ship is given a local Bergen phone number.

Two multiplexer systems were installed on each ship, one for crew (with one PC and one crew telephone) and one for the office network. The crew and office PCs are kept in separate places.

The ships had television for crew use, delivered over the VSAT system. “Filippinos don’t care about TV but they love internet,” he said. “Norwegians complain about losing TV when they get to England. Latvians can look at TV but they don’t understand it.”

The seafarers are allowed to surf the internet on the office PC for professional use only.

One useful application is DNV Exchange, where the crew can log on to the DNV website to find out about class information about their ship (eg surveys due, past certificates).

All e-mail and file transfer is handled by maritime e-mail provider Dialog. “We decided to outsource,” he said.

One important reason for using Dialog is to enable important ship-shore e-mail to continue when the vessel loses its VSAT access. Important messages can be diverted through GSM or Inmarsat dialup services.

Utkilens still uses automatic file transfer for purchasing, spare parts, its quality assurance system, rather than having the ship log on directly to databases held on shore.

“That’s the old fashioned way of doing it, through replicating files,” he said. “It’s not that easy to have applications on shore. We want to have the technologies to get the databases onshore – so we can get out of the complexity.”

Utkilens has found itself so dependent on internet access, that it is asking Telenor for an antenna to provide backup internet access when the VSAT terminal is not available.

"The part I like most is having remote access to all computers onboard," he said. "We reduced administration onboard and onshore by 90 per cent. "

"We have reduced the administration cost, reduced the travel cost, and have a high fixed communication cost. The crew is extremely happy with this solution."

"My conclusion is that this is definitely the way ahead," he said. "But to be always on – you need a combination of communication systems."

SUBHEAD

Piers Cunningham, Inmarsat

IMAGE George and Piers q good.jpg
OR IMAGE Piers Cunningham. Jpg

Piers Cunningham, head of maritime market management, Inmarsat, said that there are currently "well over" 5,000 Inmarsat Fleet terminals activated, including over 100 Fleet terminals activated in the week prior to the conference.

Inmarsat is currently rolling out a SIM card functionality, which will enable different users to use the same Fleet terminal, all with their own personal accounts and their own telephone number. They can also store phone numbers and define a preferred service provider in their SIM card, and create passwords ensuring no-one unauthorised can use the phone on their account.

Services currently available over Inmarsat spot beams, which is mini-M, Inmarsat Fleet 128kbps and Inmarsat Fleet 33 and 55 fax and data, will be gradually made available globally, he said, following the launch of Inmarsat's first I4 satellite in March this year.

If everything goes well with the new satellites, spot beam services will become global from end of the 2nd quarter this year, over the Indian Ocean Region; spot beam services in Atlantic Ocean Region West will become global at the end of the 4th quarter, following the launch of the second I4 satellite.

"Inmarsat is investigating the capability, where existing Fleet users can move to BGAN utilising their existing antenna fits. However, the exact nature of this is currently being explored and defined. Maritime BGAN will provide performance up to 432 Kbps," he said.

Mr Cunningham warned Inmarsat –A users, that the service will be closed in December 31 2007.

SUBHEAD

Mary Ellen Kramer, Broadband Maritime

Mary Ellen Kramer, CEO of Broadband Maritime, talked about her service, which offers shipping companies fully global always on 64 kbps connectivity, for \$650 a month, plus a further \$1850 a month for lease of equipment (which you own after 3 years and has a ten year plus life expectancy).

The service uses 6 earth stations around the world, making it easy whichever satellite they are using.

Ms Kramer asked shipping companies to ask themselves how much their current dial-up data connectivity is costing them, in terms of slower response to operational changes onboard. Having an always-on option gives shipping companies more options, she said.

Some of the biggest benefits of an always on connection are keeping all of your data in a central online database; equipment monitoring; videoconferencing with the ship; accelerated port clearances due to better communications with the port in advance; improved route optimisation; and improved crew retention (since the crew can make much cheaper calls).

Broadband Maritime provides hardware, software and maintenance services. The antenna is a 2.4m military antenna, and it is connected to a small computer box mounted below the deck.

All shipboard data and e-mails can be routed via the shipping company's virtual private network, so it can control them and make sure nothing nasty gets onto the shipboard computer.

By the fourth quarter of this year, Broadband Maritime will be able to provide TV services through the satellite, so customers will be able to watch TV anywhere with no additional costs.

All the connectivity uses standard internet protocol (IP) – so a shipping company could change all of its shipboard computer hardware without having to change the terminal, she said.

SUBHEAD

Pal Jensen, Sealink

IMAGE Pal Jensen, Telenor

Pål Jensen, managing director, Telenor Satellite Services, said that the most important aspect of Telenor's maritime VSAT service is that it is well-proven, with over 350 vessels using the service.

"Last year we moved to supply, transport, fishing, coastguard vessel market segments," he said.

The service is fitted to 40-50 shuttle tankers operating in the North Sea between the UK and Norway.

Many of the early installations are relatively slow data speeds of 19.2 kbps. "I call this narrowband," Mr Jensen said.

However Stena Line has fitted a 2 mpbs system on 27 ferries in North West European operations.

Sealink recently took over the WaveCall VSAT communications business from SeaTel, which has a "market potential" of 600 yachts, he said. This uses iDirect's IP/TDMA technology to manage the communication with many vessels sharing the same satellite transponders.

Sealink offers a range of services with different contention ratios (number of users sharing the same piece of transponder power). The higher the contention ratio, the more users using the same satellite power, and the lower price they are charged.

"Leisure and yachts have a high contention ratio; commercial ships have a standard solution; then we have a professional network with a high service level agreement (SLA)," he said.

Shipping companies can provide crew and passengers with scratch cards, they can use to buy phone and e-mail connectivity paying in advance. "It helps justify it for a shipowner / operator," he said.

SUBHEAD

Connexion by Boeing -

IMAGE Sean Schwinn, Connexion

Connexion by Boeing made the first ever announcement of the pricing of its service at Digital Ship Scandinavia.

The standard service for the maritime industry, available by the fourth quarter this year, will cost \$2800 a month, including equipment lease.

For the \$2800 a month, shipping companies will be allocated 2000 minutes of data communications, at 128 kbps speeds; they can also have a further 100 minutes a month of voice and fax communications.

The company will not initially provide an always-on service for a fixed fee, although it will do in future. Instead, shipping companies will pay a certain amount per month, for a certain number of minutes.

"We just started with an on demand offering, since the vast majority of the market we're addressing is accustomed to buying it that way," says Sean Schwinn, maritime services director.

Also included in the fee will be television (four live channels you can watch as much as you want) and online tools to monitor how many minutes you are using, which can be accessed free of charge onboard the ship and on shore.

Installation of the shipboard equipment will be the customer's responsibility; Connexion says that the installation of the shipboard terminal in its trial with Teekay took "about a day." The equipment is about the size of an Inmarsat –A terminal. Maintenance of the terminal after the first year is also the customer's responsibility.

It will be possible for shipping companies to share the minutes between different ships on its fleet (for example, if one ship uses its allocation up, it can use another ship's allocation). Excess minutes above the allocation will be charged at \$1.25.

The satellites will actually provide 5+ Mbps shore to ship, and up to 256 kbps ship to shore; however the data rates will seem to be about 128 kbps onboard ship, taking into account how waits for packet acknowledgements via geostationary satellite can slow things down.

At 128 kbps (kilobits per second), 0.96 megabytes of data can be moved from ship to shore in one minute.

The coverage map will include most of the northern hemisphere and seas around Australia by the end of 2005, and much of the southern hemisphere, including seas around South Africa, the Indian Ocean and much of the Pacific, by the end of 2006.

Connexion by Boeing has analysed several months of 2004 ship movement data from Lloyds Maritime Information Service, to satisfy itself that by the end of 2006, 99 per cent of all shipping movements will be under its satellite coverage.

Connexion by Boeing was principally developed for aviation use; so far 500 aircraft are committed to using the service. Scandinavian airline SAS will fit it on all its long haul fleet by the end of March 2005.

Aircraft passengers pay just \$29.95 to access the internet for the whole of their flight on their own laptop computers, via an on flight wi-fi system; they can also buy the service for \$9.95 per half an hour.

Connexion is forming partnerships with companies which set up wi-fi systems in cities around the world, which users have accounts with. This would enable the users to use the same accounts on Connexion by Boeing, rather than having a separate bill.

The company expects to announce its TV partners in the 2nd quarter of 2005, which will provide the television channels to be broadcast through the satellites to all users.

Mr Schwinn said he did not anticipate Boeing would put Inmarsat out of the market, just operate a complementary service. "I can guarantee that Inmarsat will still be here in 16 years time," he said.

To give a comparison with Inmarsat, Digital Ship estimates that ships spend on average around \$1,000 a month on Inmarsat phone calls; at rates of around \$3 a minute, this equates to 330 minutes. They use communications terminals which cost around \$20,000, which last around 20 years, equating to a cost of \$1,000 a year, so spending around \$1100 a month.

To buy 2000 minutes of 128 kbps satellite communication time, at current rates of around \$9 a minute for 128 kbps Inmarsat Fleet, would cost \$18,000, when you can get it for \$2800 with Connexion by Boeing. Plus you also get the voice minutes, TV and equipment rental with Boeing, which Inmarsat doesn't give you.

In other words, Connexion by Boeing would cost more than many shipping companies are used to paying, but provide them with much more for their money than Inmarsat can provide.

It is also interesting to make a comparison with Broadband Maritime, currently offering global coverage and 64 kbps always on for \$2500 a month, including equipment lease and service.

With a straight choice between the two, many shipping companies might prefer to pay \$2500 a month for 64kbps always on, than pay \$1800 a month for 2000 minutes of 256 kbps.

SUBHEAD

Lars Brodje, Telemar

Lars Brodje, managing director of Swedish maritime satcom service Telemar Scandinavia, talked about Telemar's DVB service, with low cost, always on, fixed price, high speed receive only data services for ships over a limited coverage area.

For a monthly fee of Euro 440, shipping companies can receive data at speeds of up to 2 mpbs, within a limited coverage area (most of North West Europe and surrounding sea areas). For Euro 125, they get a 512 kbps service. There is a start up fee of Euro 100 per vessel.

If shipping companies want to install the service on their whole fleet, the start up fee is Euro 550; then they pay Euro 440 altogether, plus Euro 8 per vessel, for 500 mb a month data download; or Euro 715 plus 8 euros per month for 1 GB per month data download.

The cost includes any travel, labour and spare parts associated with fitting the antenna.

The cost of the hardware, including a stabilised TV-antenna, is between USD 15,000–25,000 depending on the ships' area of operation.

Users also get free television services. To help seafarers find out what is on TV, Telemar sends out a pdf of a what's on TV magazine. They can also receive newspapers and fishing business information in the same package. Seafarers often print this out onboard using A3 colour printers. 100 vessels are currently receiving newspapers.

The data is only available in one direction – users need another satcom service, for example Inmarsat Fleet or Globalstar, to request the web pages or send any data to shore.

“One shipowner said, a hole in the bottom of the ship is a pain – if the e-mail is down its catastrophic,” he said.

SUBHEAD

Dan Mercer, Iridium

Dan Mercer, regional vice president, Europe, Middle East, Africa and Russia, Iridium Satellite, said that although offices are increasingly dependent on broadband connectivity, this does not necessarily mean that vessels need broadband.

“Vessels send e-mails of typically 1-3 kb, compared to 25kb average e-mail size in the office,” he said. “About half of vessels download only 30 – 50 kb a day.”

“There are several e-mail services designed to optimise file transfer and make e-mail more efficient,” he said.

Iridium communications equipment costs around \$3,300, compared to \$25,000 list price for an Inmarsat Fleet 77, he said. Voice and data communications are \$1.30 per minute, or under \$1 for Iridium-to-Iridium communications; this compared with \$1.75 to \$2.65 per minute for voice calls over Inmarsat Fleet.

Iridium is currently signing up 2-3,000 new subscribers a month, he said, and 27 per cent of the total revenue is data.

Future developments from Iridium include a fax service, a lower cost data module, and a netted radio system enabling “hundreds” of users to speak to each other at once.

SUBHEAD

Ottar Bjåstad, Nera

Ottar Bjåstad, maritime business manager, Nera, said that Nera has already sold 3,000 Fleet terminals.

Nera is rolling out its broadband services developed on the land market for the maritime sector, using the DVB/RCS standard.

“We have completed our marine pilot test and have 3 installations so far,” he said. “We are moving ahead and ready to deliver.”

SUBHEAD

Rate of broadband adoption

When asked by the conference chairman about the expected rate of adoption of broadband maritime satcom, most conference delegates thought that 50 per cent of ships would have broadband within 10 years; a smaller group thought it would happen in 5 years.

Like all technology adoptions, broadband maritime satellite will probably follow an “S” shaped curve, with the rate of adoption gradually accelerating and then decelerating as the market matures. It seems clear that we are at the foot of the curve.

“We have a lot of work in front of us,” said Dr Panagiotis Nomikos, business development manager of Danaos Management Consultants. “How can we bring this forward in a controlled professional way, so it happens in 3-5 years, rather than 10 years?”

Nobody would underestimate the low speed some sectors of the maritime industry move; Inmarsat says there are still 6,000 vessels using Inmarsat –As, despite much higher communication costs and less reliable equipment.