

Marine Communication

(Speech held by Leon at Open House, Ellös, 23 August 2003)

Mobile Telephones

Remember my distinction between Marine Safety Equipment and Mobile Telephones? We have just gone through the Marine Safety Communication following the GMDSS standard divided into **Coastal Area** (=A1) and **Offshore** (=A2 and A3).

It is now time to do the same for the Mobile Telephones, where I also distinguish between sailing in **Coastal Areas** and sailing **Offshore**. When sailing Offshore, the question is whether your needs are **Voice + E-mail** or if you need to extend this to **Voice + E-mail plus Surfing the Internet** and sending/receiving data with **High Speed** (more than 10 kbps).

Before we dive into the Coastal Area, let's just first quickly look at the applications, because they are all the same for the Mobile Telephones, except for Fleet77, which is GMDSS approved.



Mobile Phones	Safety and Distress	No, (only Fleet77)
	Social calls	Yes
	Business Calls	Yes
	E-mail	Yes
	Surfing	Yes, in various speed
	Weather by Voice	Yes, by calling weather info numbers
	Weather by Text	Yes, via the Internet
	Weather by Pictures	Yes, via the Internet
	GRIB-files	Yes

Mobile phones can thus do most of the applications, except for Safety and Distress (exception: Fleet77). They vary in Speed, Price and Coverage. That is why I now will continue to present the various possibilities looking at their Data Speeds, whether you pay by time or data rate, their prices both for the initial hardware investment, but also the running cost (air time) and finally their global coverages.

Let's start with the coastal area.

Mobile Telephones - Coastal Area

If you mainly are sailing close to shore, or if you can wait to communicate by e-mail and surfing the Internet until you are in port, the Cell Phone (GSM) is the natural answer.



GSM/Cell Phone	Hardware Cost	< \$ 300	Often subsidized by the airtime provider
	Airtime Cost	\$ 0.1 - 1.0 / min	Roaming costs are often expensive
	Data Cost	\$ 2.0 - 10.0 / MB	via GPRS, roaming costs are often expensive

Speed	9.6 kbps - 44 kbps	9.6 standard, GPRS up to 44
Coverage	<10 nm from shore	in 120 countries, thus almost "Global"

There is not much to say about today's Cell Phones which has become just as natural for most of us as the phone at home.

Still not all use the data facility, which really is a shame, since it is very easily connected to the PC via cable, IR or Bluetooth. By this, sending E-mails and surfing the internet becomes as easy as from home, even though not quite as fast and definitely not as inexpensive.

There are two ways of connecting to the Internet: Either by directly connecting via the built in modem or by GPRS, which becomes available in more and more countries. By GPRS, the speed is increased significantly. How much depends on how many "channels" you can use at the same time, which, in turns, is dependent on how many other cell phones are active at the same time near by. According to my experience, it is a maximum of approx 44 kbps, which is comparable with a analogue modem from home. Further, you pay by the amount of data only and not by time, so you can surf the internet checking weather sites as long as you wish, before downloading the next page. Another advantage is that you are "always online" meaning that you receive E-mails shortly after they have been sent to you.

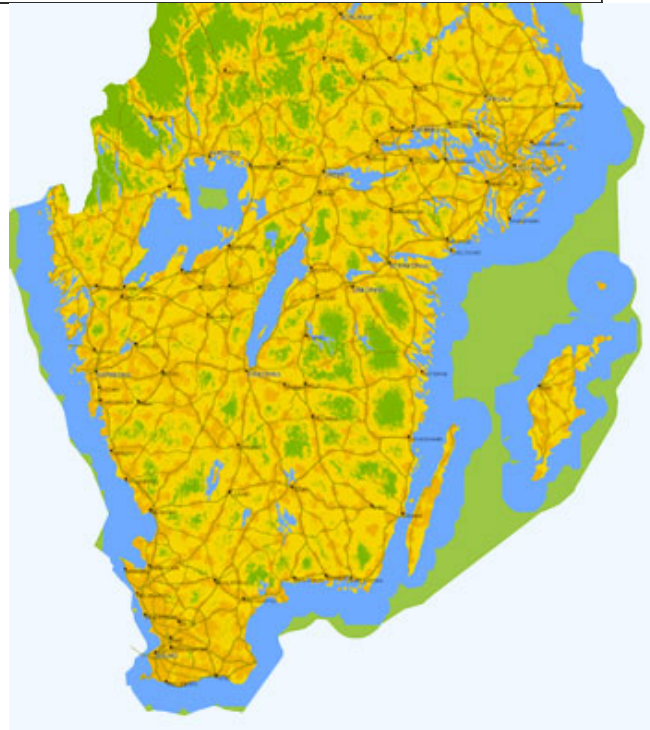
So, all in all, GPRS has its advantages over standard GSM, but since GPRS is just a new service within the GSM-net, you can use both, i.e. GPRS when available and else standard GSM. The phone is the same, as long as your phone includes the GPRS facility and your provider offers the GPRS-service.

The installation is not complicated, but, for many, it helps to get some friend who has done it before to give you a hand.

Cost is fine as long as you are within the coverage of your own airtime provider, in other words your country. As soon as you leave this it becomes very costly, due to the fact the airtime providers have a habit in charging considerably more expensive airtime for "guests" in their nets. Your airtime prvider at home probably has roaming agreements with most providers abroad, so most often it is just to continue calling and sending e-mails in the new country, just as from home. But, as I said, it becomes expensive as a "guest" in the new net.

The real bargain you get, if you purchase a new GSM SIM card in the country you are visiting. The draw-back is that you get a new telephone number in each country you do this, but the airtime cost is decreased considerably compared to roaming to your own airtime prvider at home. Calling voice-calls with your new SIM-card works out of the box, but if you wish to send and receive e-mails via your GSM-phone with the new SIM card, you also need to make sure that this SIM card allows for data-calls, which is not always the case. Last, but not least, you need an Internet provider in that specific country as well, who gives you a telephone number to dial into the Internet. Also, you need to amend your SMTP-server (the server you send your E-mails from) in your E-mail programme (such as Microsoft Outlook). The SMTP server shall be changed from your home server to the one of the new Internet provider, so make sure your new Internet provider can also provide you with an SMTP server. The POP3-server (the server you get your E-mails from), however, is always the same, so you don't have to make any amendments here

The GSM-coverage is impressive. More than 120 countries are connected to the



system, but not all are as well built as we are used to in (Northern) Europe. Above, you find the coverage chart of Swedish GSM, which covers a lot of water. Sweden, just as the other Scandinavian countries, have understood that boats are a big customer group and built antennas far out along the coastline, on the last island or light house. This is not always the case in other countries, where GSM is considered to be a rural phone system and along many coastlines the coverage is therefore poor.

When Karolina sailed on Mahina Tiare III from Tromsø in Northernmost Norway to Gothenburg (see story [here](#)), she had GSM coverage the entire way.

What really pays off, I think, is the installation of a fixed marine antenna for the GSM-phone. You can sit at the nav-table working with your PC and the telephone while the antenna is some 3 m up on our radar pole. Many say that their Bluetooth phone can be placed on deck or under the sprayhood while working, but every meter is worth gold when it comes to transmission. Very often, we have none or one "antenna-plopp" on our GSM phone, increasing to two when lifting the head out of the hatch, while we have a full five with the external antenna.

Mobile Telephones - Offshore

How about leaving the bespoke 10 nm from shore and still wish to use a mobile telephone with full duplex and direct dial-up to shore-based telephones? And wouldn't it be great to have data access with sending and receiving E-mails with attachment and even surfing the internet?

To obtain some structure, I wish to distinguish between the following:

1. You need to have **voice** access with **e-mail** facility (with small attachments)
2. You need to have **voice**, **e-mail**, as well as being able to **surf the Internet** and send and receive data in **High Speed** (up to 64 kbps).

Let's start with the first requirement, i.e. you wish call and talk as well as sending and receiving e-mail by a mobile phones.

Mobile Telephones

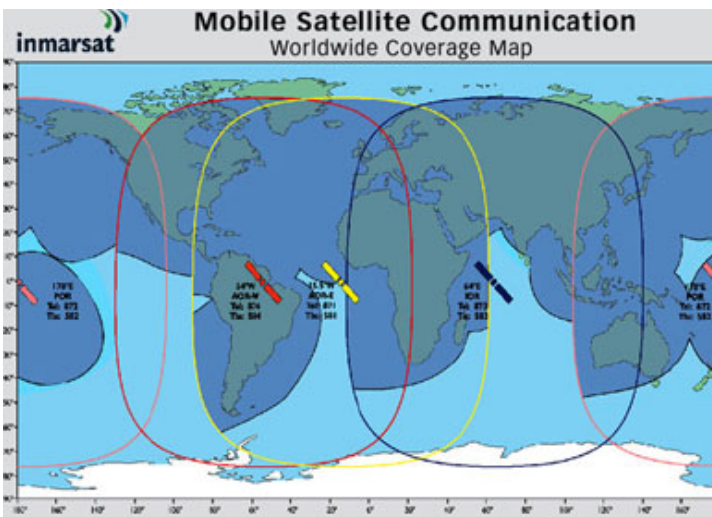
Offshore (Voice + E-mails)

Mini-M Iridium Globalstar Thuraya

Hardware \$	2500	1500-3000	2000-2500	1500
\$/min	2.00	0.80-1.50	1.00-2.50	1.00-1.50
Speed kbps	2.4	2.4	9.6	9.6
Coverage	Spot	Global	Land	Arab. Med.

Some comments on the Mini-M

Mini-M system is an established and very reliable service from Inmarsat, following the larger Inmarsat A (analogue), Inmarsat B (digital an with High Speed) and the Inmarsat M. While the bigger brothers have a global coverage, the Mini-M is using Inmarsat's Spot Beams on their geostationary satellites. To see what Spot-Beam is, look at the chart below.



The dark blue areas are covered by Inmarsat Spot Beam, i.e. Mini-M. Voice and data is thus not covered over the whole world, but well within many cruising grounds.

While Mini-M still sells, it is clearly being replaced by other services. By Inmarsat, this is the new Fleet33, which can be considered as the next version of Mini-M by Inmarsat (see below). I would not recommend to purchase Mini-M today, while already installed systems work very well.

Of interest is that Inmarsat is planning to launch new satellites at the End of 2004 covering the Indian Ocean as well as the South Pacific with Spot Beam. This results in the fact that Spot Beam (especially for Fleet33 and Fleet55, see below) will become more or less global.

Prime Manufacturers of Mini-M equipment are Thrane&Thrane and Nera.

Some comments on Iridium

When Iridium initially was launched, it was marketed as the new hot mobile phone for jet-setters. What was totally overseen was the huge implementation of GSM and other cell-phone systems and the Iridium cell-phones looked bulky and old fashioned and did not work indoors. The real market, such as the marine market, was neglected, initially. Iridium went bankrupt, with all the wonderful 66 satellites which had taken years and years to build still circling the earth. Today, a new Iridium company has formed taking over all assets for a fraction of originally invested cost. This, together with the fact that American Pentagon is their biggest customer, makes Iridium a very stable company today.



Iridium equipment comes in two versions, the cell-phone like hand-held by Motorola and the marine, fixed, rugged version from Skanti and Sailor. Which one you take is a question of taste, but remember that Iridium always needs to "see" the satellites and thus an external antenna is required if you wish to use it from under deck, which you do, if you want to send and receive E-mails.

Personally, I am a big friend of fixed equipment, built for the harsh marine environment with the transceiver hidden away and only the handset at the Nav-Station.

There are others, who say they wish to be able to take the handheld Iridium phone when they go ashore, but I personally can't see the need to take a satellite phone anywhere you go. One idea would be to take it into your life raft, calling CNN and giving a life interview on how it feels being rocked on the ocean waiting for rescue. With CNN on the other line, rescue will be almost certain. But don't forget to take the batteries when leaving the ship, as well as the loose antenna, which you probably have stowed away in favor for an installed a fixed antenna!



Iridium's coverage is truly global with Low Orbit Satellites circling the world from South to North. The best coverage is actually at the North- and South Pole, if you wish to go there.

Airtime price are fixed at 80 cent a minute calling from one Iridium phone to another, and \$ 1.50 from Iridium to any place on the earth into the fixed telephone system, including logging into the Internet.

Some comments on the Globalstar

Globalstar only comes in one version, the hand-held. But you can buy a marine docking station with external antenna to make it "fixed".

Despite the name, Globalstar is not global. Actually quite far from it. While Iridium hands over the signals from satellite to satellite until your voice reaches the earth station in Arizona, USA, Globalstar's Satellites are "mirrors" from your boat via a satellite to

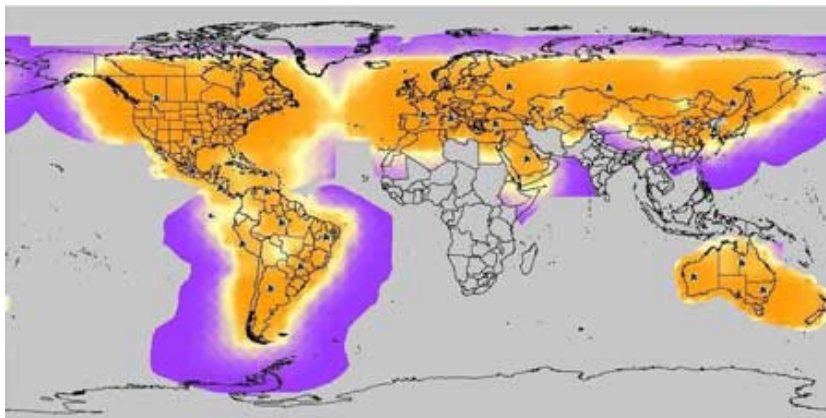
its earth station.

There are two Globalstar "divisions", one European and one American. With a European Globalstar phone you pay one (lower) fee to call within your area and another fee to call into another area. When then sailing to the "American Satellites" you pay a roaming fee, i.e. it becomes very costly to use a European phone in America and vice versa. Very cheap is to use an American Globalstar phone calling within America. What I'm trying to say is that it is not very easy to know what a phone call costs by Globalstar. On their internet site, you can enter "calling from" and "calling to" and it gives you the rate, but personally I prefer Iridium's flat rate.

To its advantage it is worth mentioning that it works with GSM, i.e. when GSM is available it uses that, and if not, the satellites are being used.

Data Speed is impressive for a satellite system, 9.6 kbps.

Globalstar mainly covers land and looks as follows.



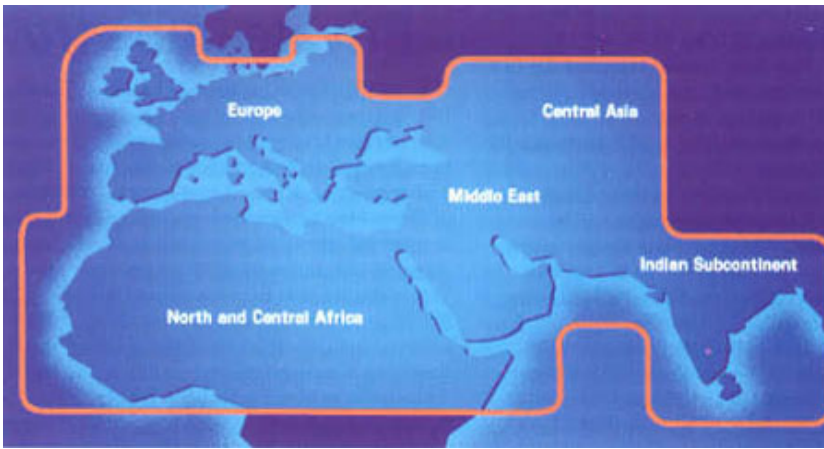
Some comments on Thuraya

Thuraya is the smallest handheld satellite phone, very similar to a GSM phone. There is no "marine" version, but its data speed of 9.6 kbps (same as for GSM) and its low cost makes it very attractive. As with Globalstar, it works as a GSM cell phone if GSM is available and if not, it automatically uses the Thuraya satellites.

Being an Arabic system, its biggest drawback for us sailors is that its coverage today is by one satellite only covering the Arabian countries and the Mediterranean.

The below coverage map showing that it also covers areas up to England should be regarded as a bit optimistic, but for the Mediterranean, it is suitable.





Above, we have now looked at the telephones allowing you to talk and send & receive E-mails from offshore and various corners of the world using satellite systems.

Now let's look at the possibilities if your need extend voice and E-mail and you also wish to be able to browse the Internet and send and receive big files by High Speed Data (HSD = up to 64 kbps).

The answer to this is the exciting new Inmarsat Fleet System, consisting of Fleet77, Fleet55 and Fleet33.



Mobile Telephones

Voice+E-mail+Surfing+HSD



	<u>Fleet 77</u>	<u>Fleet 55</u>	<u>Fleet 33</u>
Voice	Global	Global	Global
Data	Global	Spotb.	Spotb.
Data Speed	64 kbps	64 kbps	9.6 kbps in 2004
MPDS	YES	YES	

- Always Online
- You pay per MB, not time

With MPDS: 28 - 64 kbps

The new Fleet Family by Inmarsat gives you the possibility to always be online, receiving e-mail by the minute and no need for logging onto the Internet each time. This is called Mobile Packed Data System (MPDS), and here, you only pay by the amount of data and not by the time online.

Fleet77 is sold by Thrane&Thrane, Sailor, Skanti, Furuno, Nera to mention the major players. Fleet55 is sold by Thrane&Thrane and EMS and Fleet33 is today only sold by Nera, but Thrane&Thrane launches their Fleet33 on 23 September 2003.

Looking at the figures above, they look tempting, right?! Especially impressive is that even the smallest Fleet33 has global voice (while data only on spot-beam, see Inmarsat's spot beam coverage under Inmarsat Mini-M above).

Apart from the fact that Fleet77 is GMDSS compliant, Fleet77 and Fleet55 have the same services. They only differ in the coverage, where Fleet55 has full ISDN data speed only on Spot Beam. Fleet 33 has the same coverage as the Fleet55, but a more "compact" data facility. Data speed by dial up is 9.6 kbps but the MPDS service launched in 2004 for Fleet33 gives considerable higher data speed. How high depends on the current engagement at that time, since Fleet33 share one channel allowing up to 8 simultaneous users of Fleet33 on the same channel. This, in turns, decreases data speed. Ideally, when only one user can use the full channel for himself, the maximum data speed is 28 kbps upstream (sending data into the Internet or the company's intranet) and 64 kbps downstream (downloading images from the Internet or receiving data). More realistic, 44 kbps can be expected as an average.

Fleet77 and Fleet55 have very similar transceiver units and differ mainly in the size of their antennas from "large" to "very large" (while Inmarsat A and B are "extremely large"). The Fleet77 antenna weighs 27 kg and has a diameter of 84 cm. The Fleet55 antenna weighs 18 kg and has a diameter of 57 cm. The Fleet33 is thus more suitable on a yacht, weighing 8 kg only with a diameter of 40 cm.

Still tempting, the Fleet33, right?!

Then, now let's talk cost, while bearing in mind that all these products have just been launched and we can all hope for a reduction in price eventually. But building the transceivers with the antennas constantly moving to find the satellites is a complicated and costly task, so I don't think we can trust in a dramatical price fall, unfortunately.

	<u>Fleet 77</u>	<u>Fleet 55</u>	<u>Fleet 33</u>
Hardware	\$ 20 000	\$ 17 000	\$ 10 000
Voice / min	\$ 2.50	\$ 2.50	\$ 2.20 ?
ISDN / min	\$ 7.60	\$ 7.60	N/A
MPDS /Mb	\$ 4.00	\$ 4.00	< \$ 4.00 ?

The reason why Fleet77 and Fleet55 are so similarly priced, is that the services are very similar and the main difference is the slightly smaller antenna for Fleet55. The prime market for Fleet77 is commercial shipping, while Fleet55 is for superyachts or backup systems on vessels when full ISDN is required, but not fully global coverage. Fleet33 is targeting the yachting market.

Please note that the MPDS price is by the Mega-bit and not the usual Mega-bite. This is somewhat confusing, and I would thus like to remind you of the fact that there are 8 bits to a bite. To download one Mega-bite by MPDS, thus costs 8 x \$4.00 = \$32.00. Not cheap, really. Thus it is often more efficient to dial up your



Intranet/Internet when you want to send and receive larger data-files and use the ISDN service, accessing 64 kbps. But here, it costs \$7.60 for one minute being connected!

The prices for Fleet33, being so new, are not quite set. It is awaited that the hardware price will be "just under \$10 000", but the airtime price is not decided, yet. Maybe somewhat less than for the Fleet77 and Fleet55 prices.

Continue reading my final conclusion for your own communication setup. Click [here](#)!

