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SATELLITE INTERNET ACCESS IN THE ENC UPDATE PROCESS

ABSTRACT

The paper describes actual satellite systems in the light of Internet access for electronic charts and charts corrections transmission. Authors tried to point out the universal system for each vessel and also compare present systems finding them useful for particular range of vessels.

Keywords: ECDIS, Satellite Systems, Internet

INTRODUCTION

The main purpose of chart distribution and updating process is to keep them up to date as frequent as possible. Both, new charts and corrections are delivered by Regional Coordination Centres to receiver on the data medium or wirelessly. Data medium contained chart corrections are published in regular periods of time, but taking into consideration irregular vessels calls at the ports, sailing areas and voyage time, such a way of updates distribution is not satisfactory and do not improve vessel safety. Taking above into account the wireless way of update distribution was necessary. Each vessel owner should equip his vessels with adequate communication system for chart correction.

During sailing in the inshore or inland areas such a communication could be realized by cellular telephone. Mostly it is optimal solution taking into account transmission speed and prices both devices and connections. But one must remember about additional fees for roaming connections, which could be not acceptable. Sometimes in such situation satellite systems might be cheaper and as global systems provide communication on the open sea while cellular phones not. Moreover, vessels sailing in the inshore areas frequently call at the ports, so can easily get the data medium. In connection with above, wireless access problem for getting actual chart data concerns oceangoing vessels.

INTERNET SATELLITE SERVICES

Nowadays each vessel is equipped with communication devices conform to GMDSS requirements, but they do not provide global access and were not so modern as new services offered by satellite net operators.

Inmarsat

That communication firm thanks to constant developing tries to deliver the complex solution for shipping. In effect they set working a few new services:

Fleet Broadband – it is the newest system working with I-4 satellites designated for shipping, which make voice communication and broadband Internet access possible. Service characteristics:

- IP protocol – transmission speed 432kbps, e-mail, Internet access,
- Stream data transmission – speed up to 256kbps,
- Phone & fax – simultaneously with data transmission,
- Data transmission by ISDN – in order to provide compatibility with older application, speed up to 64kbps,
- Short message service (SMS).

Inmarsat Fleet – in this service three terminals are available: Fleet 33, Fleet 55 and the most advanced compatible with GMDSS requirements, Fleet 77. What distinguish them is: number of services, data transmission flow capacity, antenna size and price. Available services are:

- Telephony & fax,
- Data transmission (e-mail, Internet),
- Private calls,
- Vessel tracing (fleet management)
- Short message service (SMS).

Internet access is done with packet data transmission (charge for amount of transmitted data, not for the connection time) with speed from 9,6 to 128kbps depending on Fleet terminal version.

Moreover, Internet connection can be realized with “dial-up” access (ISDN) with speed up to 64kbps (except Fleet 33). Such a connection with ISDN service is for keeping the compatibility with older devices and application which are can not handle with packet data transmission [1, 2].

Thuraya system

The construction of Thuraya net started in 1997 in United Arab Emirates. The user segment consists of: vessel terminals, car terminals and mobile phones. That system makes GPS tracing, satellite and cellular communications possible. Thuraya Marine service has been prepared for shipping, especially private yachtsmen and fishing boats. It gives them the following services:

- Telephone & fax communication,
- Internet communication in “always-on” mode using ThurayaGmPRS technology with speed 60/15kbps,
- Short message service (SMS),
- Cooperation with GPS system for vessel tracing and fleet management,
- “Distress button” which sends messages through SMS and e-mail for all users stored in the alarm list,
- “Postpaid” and “prepaid” plan rates,
- Private calls thanks to “Crew calling” mode using “prepaid” cards [3].

VSAT system

The developing of VSAT (Very Small Aperture Terminals) started at the beginning of 80's. Its name originated from ITU-R recommendation RS.725, which defined VSAT as a communication system which utilizes very small user terminals (antenna diameter not exceeded 2,4 metres). Nowadays it is hard to say that they are small terminals. Among described systems VSAT has the biggest ones. The number of VSAT operators is estimated for more than 150. The most known in Europe are: Eutelsat, Intelsat, Astra and Telecom. As a sample of firm which provide marine services could be Eutelsat.

The service Eutelsat@sea delivers sea and land communication:

- Telephony & fax,
- Data transmission with speed up to 2Mbps.

Their offers also include broadband transmission used for e-mail, video conference and video on demand [4, 5].

Iridium system

Iridium started in the 1st of November 1998 and bankruptcy was announced in 13th of August 1999. As a reason of failure the heavy expenses, discomfort in operational use and strong competition were pointed. But instead of bankruptcy, Iridium satellites remain on the orbits and Iridium Satellite LCC group restored the system in 2001. It is private firm and the only one in the world which provide the true global satellite communication including voice and data transmission as well in every place on the world including polar areas. Depending on the used equipment the Iridium system can provide:

- High quality voice transmission,
- Short message service and fax,
- E-mail,
- Advanced voice services like redirecting calls, waiting for the particular call, vocal mail,
- Data transmission with speed up to 128kbps

The newest Iridium service named OpenPort, which will be operative in the September 2008 will provide:

- Data transmission in “always-on” mode with speed up to 128kbps,
- Charging for sent/receive data, not for the connection time,
- Independent voice services access (regardless of data transmission),
- Standard Ethernet connection,
- Three independent voice ports,
- Separated accesses for business and private calls.

The most interesting device is “SeaWave Integrator 3.0” which unite different systems into one: Iridium, GSM and compatible with GMDSS: Inmarsat B and Fleet77. In case of making call that device choose the best system in the light of availability and fees [6, 7].

Globalstar system

The project of a system came into light in 1994, but the beginning of activity in 1999. Likewise Iridium, the Globalstar became insolvent in 2002. And in the April 2004 the satellites net were taken over by Thermo Capital Partners LLC. The managing board decided to modernize the system by increasing the amount of satellites. That process should end until 2009. Globalstar system works on LEO satellites. It means that voice transmission is in high quality without delays.

In order to encourage users to utilize the Globalstar system the management offered very attractive charges for voice and data transmission as well. For marine industry they prepare a few terminals. At present among them the best is Globalstar GSP-2900 which together with StarPort 700 provide data transmission used for Internet connection with speed up to 9,6kbps and fax with the same speed [8].

STATEMENT OF SERVICES FUNCTIONALITY OFFERED FOR MARINE INDUSTRY

Deciding which system would be adequate for particular vessel it is necessary to know:

- sailing areas,
- size of a vessel,
- present vessel equipment,
- convention requirements,
- terminals costs,
- operating costs.

Owners of polar vessels should equip their ships with Iridium system, which at present is the only one which offers communication in that areas. New Iridium service called OpenPort provide high quality voice and data transmission. The flow capacity is enough for receiving electronic chart corrections for ECDIS systems. System VSAT with its big antennas, restricted range and high installation costs but the fastest data transmission is rather adequate for line traffic like e.g. passenger cruisers.

Globalstar system is in possession the slowest data transmission among all mentioned systems (9,6kbps) and offers only “dial-up” mode for Internet connection. But is the cheapest one both regarding installation and operations, moreover, as it works on LEO satellites it provides high quality voice transmission without delays. That system seems to be perfect for small inshore vessels.

Another interesting solution is ThurayaMarine which is rather for small vessels. It offers small and not expensive user terminals and competitive charges. Every ThurayaMarine terminal joins functionality of GSM unit, satellite telephone and GPS receiver. It guarantees permanent Internet connection.

The newest Inmarsat service called FleetBroadband works on new positioned satellites. Relatively small antennas, wide spectrum of services and very fast

bidirectional data transmission (432kbps) seems to be very attractive for both big and medium vessels. The only disadvantage comparing to Fleet terminals is smallest range and non-conformance with GMDSS. But the nonconformity problem can be easily solved by additional Inmarsat Mini-C terminal.

CONCLUSIONS

The necessity of actual information regarding charts and nautical publications on such objects as vessels was noticed by IMO and IHO. During defining electronic charts standards the correction of charts was of big importance. But standards and chart correction software is not enough to keep our charts up to date as frequent as possible. Technical means which are intermediaries in delivering charts and charts corrections as well are ship satellite terminals. Their functioning can utilize GEO satellites like Inmarsat, Thuraya and VSAT or LEO satellites like Iridium and Globalstar. Each of above mentioned system is appropriate for charts' corrections receiving. The choice of particular system depends on sailing areas, vessel size, costs and reliability.

Only Iridium system provides global range and is the most reliable system among others which offers quite small access terminals. The best recommendation for that system is utilization it by United States Ministry of Defence. Application of LEO satellites and framework access architecture assure the highest voice transmission quality and make the system independent of land stations. Iridium tries to keep the competitive prices for their services and uses the high-end solutions in access terminals. All that facts makes the Iridium system as universal global satellite system adequate for charts and charts corrections transmission in every place and time in the whole world.

But it is worthy to mention that vessels which never sail to polar areas might find some other attractive satellite system. For example, considerable bidirectional flow capacity in Fleet Broadband Inmarsat service, low call prices and small terminals in Thuraya Marine service or the lowest charges for voice and data transmission for Europe and North America in Globalstar net. And for liners which demand permanent, fast and lump sum charges access to Internet and additional communication services the most interesting is VSAT system.

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