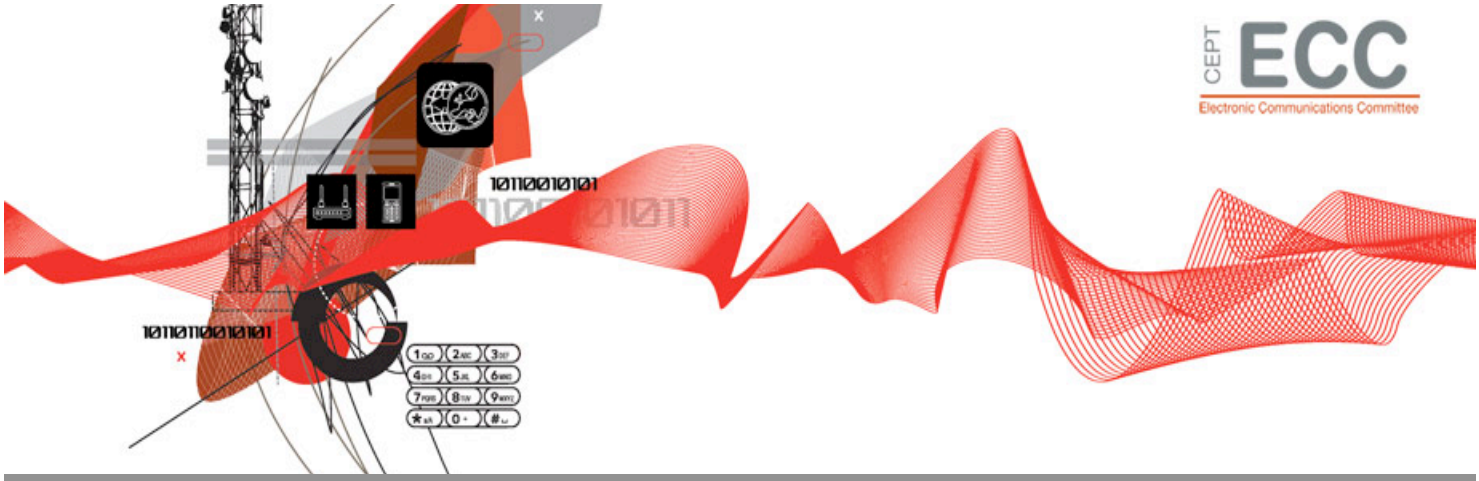


ECC NEWSLETTER **June 2012**

Short Range Devices - a shift in regulatory approach

In the January 2011 edition of the ECC Newsletter, we highlighted the importance of Short Range Devices (SRDs). Given their pervasive use in the European Community and the world over, short-range devices play a major and increasing role in the economy and in the daily lives of citizens, with different types of applications such as alarm and metering devices, radio frequency identification devices (RFID), local fixed and mobile communications equipment, e.g. door and car openers or medical implants. The development of applications based on short-range devices in the European Community also contributes to achieving specific Community policy goals, such as the completion of the internal market, promotion of innovation and research, and development of the information society.

So, SRDs are valuable applications which need a good regulatory environment to thrive. That requires keeping technical barriers low and simple, but also effective enough to avoid interference problems and the waste of spectrum. The ECC's Short Range Device Maintenance Group (SRD-MG) draws on the expertise of administrations and many industry partners, and has for years maintained its Recommendation ERC Rec.70-03, a de facto technical reference for SRDs in Europe and beyond, to keep it fully up-to-date with technology and user requirements and thus to keep the regulatory environment strong.

The EU framework and how the ECC works with it

The EU member states are also subject to the legally binding EC Decision on the technical harmonisation of spectrum used for SRDs[1]. The ECC and the European Commission work closely together to keep this Decision and our Recommendation 70-03 current and mutually consistent. There is a permanent mandate from the Commission to the ECC's SRD-MG based on an annual review cycle and update of the technical annex of this Commission Decision. We are now on the fifth one.

A new report is being developed by the ECC in response to this permanent mandate. This report, CEPT Report 44, will be delivered in its first version expected to be approved for public consultation in September 2012. Another report, CEPT Report 43, was agreed by the ECC at its May 2012 meeting; that one deals specifically with a narrow SRD band at 169 MHz, and takes a similar philosophy to the one described here. In some ways it is a form of precursor to the approach of the 5th update cycle. Below we explore some of the current issues in this evolving sector, and set out some of the key principles which we expect to be used in CEPT Report 44.

What is changing?

This latest update sets out a clear policy background which marks a transition from the past and present situation where most applications are subject to quite specific conditions designed around how its existing equipment functions. This also comes with a salami-sliced set of narrow frequency bands each specific to a narrow range of applications.

The new objective is to increase flexibility for manufacturers and users by applying more generic technical conditions and reducing these to the minimum number necessary. This should bring two benefits. First, it may widen the technological approaches used to address a need (good for competitiveness) and, second, it should allow different applications to share the same ranges of spectrum, thus widening the ranges available to a given application; SRDs typically operate with quite a low usage density.

Of course this requires care. The new conditions need to anticipate what happens when dissimilar applications use the same spectrum in proximity, and proponents of some applications still make the case for quasi-exclusive spectrum, for safety reasons. Here we consider some of the implications of applying the principles of application and technology-neutrality in the European and national frequency regulatory frameworks.

CEPT Report 44: key points

The CEPT report should deal substantially with many of the issues covered in this article. In addition, within this update, CEPT proposes to add the existing regulations for meter reading, asset tracking and tracing and social alarms, taken from another EC Decision, 2005/928/EC. This follows the recommendations of CEPT Report 43. The existing regulation for wireless hearing aids should be included as for Adaptive Listening Devices (ALD). This will enable the separate EC Decision 2005/928/EC to be withdrawn. CEPT also proposes to add in the 169 MHz band a new regulation for non-specific SRD with Low Duty Cycle (LDC) parameters.

The rise of SRDs requires us all to take some positive steps forward. We're hoping to make some significant progress towards a predicable sharing environment and more generic technical conditions. Industry has an important role here too. By building SRDs in a way that minimises the risk of interference either from or to other radio communications services or devices, manufacturers can play their part in getting the devices working effectively without the need for regulatory intervention. This, together with a new range of flexible regulatory measures, will help to support the growth of this burgeoning environment enabling it to develop more confidently.

Background

The rest of this article deals in more depth with:

- general neutrality principles
- application neutrality
- technology neutrality
- some practical regulatory steps to give effect to the principles of neutrality.

General neutrality principles

The EC framework for electronic communications services includes the principle that regulations should be application and technology neutral. This is intended to provide a more responsive environment for the continuous process of development and innovation in industry, by having regulations which can more easily

admit new techniques and services. The scope of this EC framework includes the specific environment of SRDs (low power/general authorisation).

The technical layout of complete radio systems can be chosen with maximum freedom. The choice of modulation systems, error correction protocols and link establishment choices for robustness, latency and the application are all the choice of the manufacturer.

It is likely that for the same reason of technology neutrality there will be a trend towards grouping users not by application but more by the type of signal transmitted. This also supports the principle of 'commons' segments of spectrum not specifically designed for one application but available for those users obeying common access rules.

For example, access to a frequency sub-band will depend on a combination of parameters such as power, duty cycle, length of transmission, spectrum access method.

Application neutrality

Two characteristics of the SRDs sector are:

- that the expectation and requirement of the user varies widely;
- that various ranges of applications are needed to answer to the market demand.

The term 'application' should not be misunderstood as a specific field of technology. However, the spectrum compatibility studies made when making spectrum regulations have to deal with real usage scenarios. Even though the signal parameters may be identical, the relationship between spectrum access and perceived functionality is different for different applications. Therefore, true application neutrality can only be achieved if the proper technology, in terms of latency, reliability or data bandwidth is described for all application types in the same environment.

Another important element of achieving application neutrality is to recognise the responsibility of manufacturers to build short-range devices in a way that protects them against harmful interference to the best extent possible. This means minimising the risk of interference from other radio communications services as well as from other SRDs. This is particularly important for SRD uses which have high requirements in terms of latency, throughput, predictability or reliability of the wireless communications link for example. In such cases, the implementation of adaptive techniques to 'escape' interference or the definition of special conditions for certain frequency bands may provide a solution.

Technology neutrality

Technology neutrality has different definitions in different areas of technology and, in electronic communications, is usually described as follows: "the rules should neither require nor assume a particular technology." This definition centres on two important parts: "require" as in regulation and "assume" as in (harmonised) standards.

The main problem of technology neutrality is that it can detract from technical efficiency in spectrum use. It should still be possible to frame regulations so that, for instance, either analogue or digital modulation is allowed or a range of bandwidths is possible. In most cases, however, it is necessary to set specific technical conditions to allow successful and efficient sharing. Therefore, there may be a case for a special (very neutral) 'sandpit' area, akin to the concept of bands identified for industrial, scientific and medical applications (ISM), where technology neutrality is applied as far as possible, to assist the emergence of new technologies.

Technology neutrality is a desirable aim but, similarly, it is only truly achievable when applications have equal access and equal requirements.

In order to ensure that SRDs have equal access to bands they have to protect each other, instead of being directly protected by regulators. The regulators make the sharing rules mandated in spectrum regulation which then become the level playing field on which SRDs would have to operate and co-exist. This Predictable Sharing Environment (PSE) is understood as common behaviour for communication equipment and systems, common rules with common well-defined technical parameters and mitigation techniques to provide better defined sharing conditions within a specified frequency band.

From the requirements presented by industry, it is clear that some new services and functions, such as safety related applications, may require a more predictable sharing environment than that provided by traditional mitigation techniques. Different scenarios need to be considered during compatibility studies in order to determine an acceptable solution for combining services in the same frequency sub-band. We hope that by careful specification of the technical parameters and mitigation techniques, it may be possible to create a predictable sharing environment for the whole band that could apply to all SRDs.

Some practical regulatory steps

In practical terms, an important improvement is needed to achieve predictability of spectrum availability for some applications having specific requirements such as low latency, high reliability/availability or wideband data throughput. This requires a medium access definition for adaptive equipment. The relevant ECC and ETSI groups are giving attention to the presently under-developed dynamic spectrum access regulations. Existing techniques also need to be better evaluated, such as DAA (a more sophisticated LBT - Listen-Before-Talk), LDC (Low Duty Cycle) robust spread spectrum techniques or signal parameter requirements. The application of a MUF (Medium Utilisation Factor) may be used to make spectrum more application neutral. This is not a new concept. It is mentioned in ITU Recommendation SM.1046-2 and ETSI TG11 used the concept to devise the mitigation methods in standard ETSI EN 300 328. Ongoing studies in ECC and ETSI show that the principle cannot be applied without caution and setting boundary conditions for each frequency range.

Thomas Weber, ECO Expert and
Chairman, ECC Short Range Device Maintenance Group

[1] 2006/771/EC

Surfing the clouds: ECC works on Broadband Direct-Air-to-Ground Communications

Connectivity everywhere

Mobile customers expect to be connected everywhere, every time, with all kinds of mobile devices. This includes the provision of broadband services onboard aircraft and European airlines are very keen to offer internet services to their flight passengers as soon as possible, especially in their continental fleets.

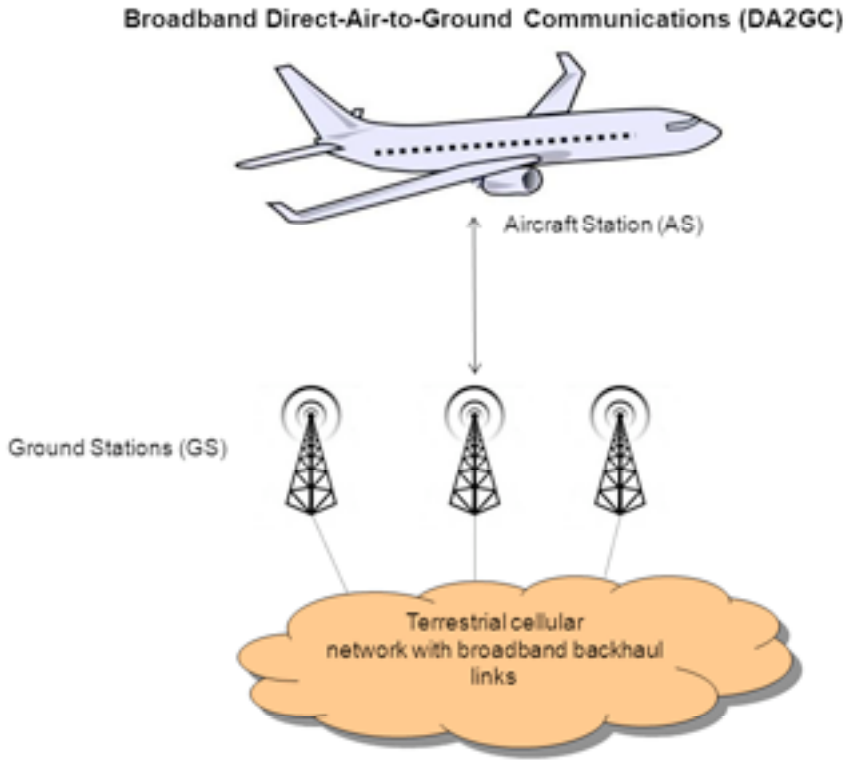
Two ways to link up

The connection link between the aircraft and the ground can be established either via satellites or by means of Direct-Air-to-Ground Communications (DA2GC), in which the radio signal travels directly between the aircraft and the ground.

For future broadband services, it's likely that the service provision via satellite will be conducted by using Ka-Band satellite capacity and a considerable number of Ka-Band satellites have already been put into operation or are under procurement. Satellite operators also consider mobile platforms, such as aircraft and vessels, as a considerable part of the addressable market and the ECC is currently working on a new ECC Decision supporting Earth Stations on Mobile Platforms (ESOMP).

Alternatively, in North America, a DA2GC system has been established with more than 1500 commercial aircraft and 5000 business aircraft equipped so far. In addition, the Civil Aviation Administration of China (CAAC) is testing a DA2GC system.

The ECC is now conducting investigations with the aim to identify spectrum for broadband DA2GC services after having received two ETSI spectrum utilisation proposals for them. The proposal for Europe is however designed to offer more bandwidth than today's solution in North America and hence is expected to be future-proof against increasing capacity demand by passenger and airline related services.



Overall end-to-end system architecture for broadband DA2GC

The establishment of a pan-European regulatory environment for broadband DA2GC would provide ample benefits for the users - i.e. airline companies and flight passengers - in Europe:

- As an alternative to satellite service provision, which by fostering competition might lead to a lower cost for the airlines and for the flight passengers;
- The technical implementation of broadband DA2GC and also the stimulus of competition may lead to a provision of other services at improved cost structures - including non-safety-relevant administrative communication services. This benefit to end customers and airlines may encourage higher and earlier service take-up;
- A DA2GC system avoids the round trip signal delay that is unavoidable with using geostationary satellites and hence can avoid the inefficiency of pauses in conversation;
- The costs for aircraft installations and maintenance are a key issue for airline companies. The broadband DA2GC equipment can be installed overnight to a plane, clearly an advantage to airline operators. In particular with regard to the aircraft antenna, a terrestrial solution has a clear advantage compared to existing satellite usage, with their smaller size giving better aerodynamics – meaning a lower penalty for fuel consumption and CO_2 emissions than with satellite antennas.

Rapid growth

A further motivation arises from the expected growth of air traffic. A forecast from Eurocontrol published in October 2011 estimates 11.5 million movements (under Instrument Flight Rules) in Europe in 2017. This is 21% more than in 2010.

About 66 % of the European air traffic consists of domestic or continental flights, i.e. the main part of the airline business. In general a strong increase in percentage of aircraft fleet equipped with internet

connectivity solutions is expected during the next years. According to market research approximately 50% of the world's fleet will have been equipped with Wi-Fi connectivity by 2020.

What and how

A broadband DA2GC system enables various types of telecommunications services, such as internet access and mobile multimedia services. It aims to provide access to broadband communication services during flights on a Europe-wide basis. The request for spectrum is related to the broadband direct air-to-ground radio solution. The connection with the flight passengers' user terminals onboard aircraft is to be realised by fixed or Wi-Fi-based onboard connectivity network (sometimes already available) and/or via GSM on-board aircraft and in the future possibly also via UMTS and/or LTE.

High interest from European industry

European industry successfully tested high-speed broadband for in-flight services to passengers using a direct-air-to-ground communication system based on LTE in late 2011. Several European airlines have indicated their interest in DA2GC services to the ECC, and we are also in contact with the Association of European Airlines (AEA).

Thomas Weber,
ECO Expert in Frequency Management

New operator, same phone number: Number Portability in today's competitive telecommunications market

Commercial competition is a key element to how the modern telecommunications market serves the interests of the consumer, and national regulators work hard to ensure that this competition works effectively. 'Number portability' (NP) is one of the most important facilitators of this competition. Without the possibility for a subscriber to keep their telephone number while changing operators (called 'porting'), there would be less competition, higher prices and a decrease in telecom innovation.

The ECC is playing its part to promote NP with the creation of a special Project Team 'Number Portability' (PT NP) under the leadership of Johannes M. Vallesverd (Norway). This project team focuses on making improvements to the current implementations and also looks to the future of NP to consider how it could evolve.

The PT NP has recently produced a new ECC Recommendation on Number Portability Best Practices consisting of 12 individual recommendations. This includes: a one-stop-shop, direct routing, the right to port during ongoing contract periods, and efficient porting. These European guidelines on number portability should be beneficial to those countries which have not yet implemented number portability and are considering doing so in the future and to those countries which have implemented number portability but are planning to improve their current practices. As always, national variations must be taken into consideration.

The project team has also produced an ECC report on NP efficiency. This work identified that the process to port a number is a rather slow one in many countries. The European Union's revised Universal Service Directive (USD) Article 30 addresses this and introduces an obligation on operators to port a telephone number in the shortest possible time and that subscribers who have concluded an agreement to port a number to a new undertaking shall have that number activated within one working day. This introduces new subscriber rights and possibilities regarding number portability.

But this also raises some questions of detail, particularly around the meaning and regulation of the "one working day" requirement, as Article 30 is the result of negotiations and as such may be open to interpretation. However, the objective of the general provision of "the shortest possible time" in the USD Article 30, could encourage the investigation of existing NP processes in order to evaluate whether they are optimal or not. Probably we will see a decrease in porting times in years to come.

As well as the Recommendation on Number Portability Best Practices and the NP Efficiency report, the group is also looking at issues of abuse, delay and compensations within NP. How can we prevent abuse and delay? The focus is drawn to the need to have stable parameters of validation, to accept only legitimate reasons for rejecting NP requests, and to use mainly automated validation methods, good monitoring procedures and sufficient information and other tools.

A further step is to enable "service portability", which is another work item of the project team. Service portability means, in short, the ability for a subscriber to use his telephone number regardless of the fixed or mobile nature of the service. As mobile termination rates are decreasing, more and more hybrid solutions pop up. Ultimately, geographic and mobile telephone numbering ranges can merge into one pool. The project team looks at the impacts of service portability for the many different stakeholders.

Furthermore, the project team will monitor some key figures of NP implementations in the CEPT countries in terms of efficiency, costs, geographic portability, rejection rates, validation procedures, porting rates, best practise compliance and many other interesting aspects of this crucial institution of telecoms.

This article gives a brief overview of our work. Anyone interested in finding out more is welcome to contact me at mailto:jmv@npt.no.

Johannes M. Vallesverd
Chairman of the Number Portability Project Team
(ECC Numbering, Naming and Addressing Working Group)

Maritime Radio: Helping to Save Lives at Sea

Nowadays the maritime mobile service uses a wide range of sophisticated systems and communications technologies across the radio spectrum in order to support safe navigation, efficient maritime operations and commercial activities.

And the CEPT/ECC through its FM Maritime Forum Group (MARFG) works extensively on radiocommunications across a range of maritime applications, such as safety, security, containers and ships tracking, personal communications between the crew members, even entertainment on board, to ensure the systems and technologies continue to run smoothly. The group's reach also extends to inland waterways, achieving a real coordination between the two environments which seem different, but in practice are closely related.

However, the focus of this article is on the development and significant contribution of maritime communications in securing safety at sea for European citizens.

Safety of Life at Sea

Although mankind has been sailing in rivers and seas since time immemorial, maritime radiocommunications only started a hundred years ago, shortly after the invention of radio.

How it began…

By the beginning of the 20th century, the increasing number of accidents at sea showed the importance of using radio for saving lives. The most famous of these occurred on 14th April 1912 when the super passenger ship **TITANIC** (the "Unsinkable") sank with the loss of more than 1500 lives. Although 700 people were saved after the **CARPATHIA** received the **TITANIC**'s distress message, the number of lives saved could have been greater if the **CALIFORNIAN**, which was a relatively short distance away from the scene, had also received it. Regrettably, its radio officer was off duty at that time.

Three months later an international radio conference was held in London and adopted the first version of the 'Safety of Life at Sea' (SOLAS) convention. Although it was decided that the installation of on board radio equipment should not be mandatory for all ships, the conference prescribed numbers of lifeboats and other emergency equipment along with safety procedures, including continuous radio watches.

The conference also adopted the now well-known letters "SOS" as the international distress call (instead of the previously used "CQD"). Contrary to a popular myth, "SOS" is not an abbreviation for "Save Our Souls" and has no special meaning other than that the now familiar "**… --- …**" signal is deemed to be easy to remember to transmit in Morse Code. It's also interesting to note that the famous "Mayday" distress call used in radiotelephony derives from the French word "M'AIDER" which simply means "help me".

So the TITANIC disaster was of enormous importance in fostering the creation of international regulations for maritime radiocommunications, mainly to safeguard future sea voyages. Indeed, for a long time much of the international Radio Regulations were concerned with maritime radio.

International maritime radio regulations and GMDSS

In addition to the International Telecommunication Union (ITU) and its Radio Regulations a new international body, the International Maritime Organization (IMO), was established in 1948. It came into

force ten years later with responsibility for developing international regulations for the shipping industry, particularly with regard to safety at sea.

Since then both ITU and IMO, two UN organisations where almost all UN members are represented, have been constantly enhancing their regulations and other guidance documents in order to respond to the growing demands of maritime safety, navigation and commercial equipment on the market. These developments have led to the establishment of the Global Maritime Distress and Safety System (GMDSS), an internationally agreed framework covering safety procedures, types of equipment, and communication protocols used to increase safety and make it easier to rescue distressed ships and persons at sea.

The World Radiocommunication Conference in 2007 confirmed that the GMDSS was "de facto" the only truly international distress and safety system. This framework is described within the ITU Radio Regulations.

The old maritime distress and safety system was based on the premise that ships, when at sea*, keep a continuous radio watch on the international distress frequencies (500 kHz) dedicated worldwide to distress communications in accordance with the ITU Radio Regulations and carry on board radio equipment capable of transmitting distress messages on the same channels.* That system was primarily focused on *ship-to-ship operations*. The fundamental difference between the old (500 kHz) system and the new (GMDSS) system is that the *new one is shore focused and coordinated, changing the emphasis from ship-to-ship alerting to ship-to-shore alerting*. The GMDSS is specifically designed to automate a ship's radio distress alerting function, and consequently, remove the requirement for human watch-keeping on distress channels.

GMDSS is intended to perform 9 functions from which several are as follows: alerting (including position determination of the unit in distress), search and rescue coordination, locating (homing), maritime safety information broadcasts, general communications, and bridge-to-bridge communications. Specific radio carriage requirements depend upon the ship's area of operation. The system also provides duplication of distress alerting equipment, and emergency sources of power.

Recreational vessels do not need to comply with GMDSS radio carriage requirements, but will increasingly use the Digital Selective Calling (DSC) VHF radios. Vessels under 300 gross tonnage are not subject to GMDSS requirements.

European maritime regulators cooperate within CEPT

Since the early 90s, CEPT has also played an important role in maritime frequency regulation. Our responsibilities fall within three key areas: policymaking, technical studies and creating a forum for interaction between regulators and industry. And our FM Maritime Forum Group (MARFG) and its several predecessor groups are widely known as the European centre of expertise in maritime radiocommunications not only within CEPT but well beyond. MARFG is responsible for maintaining ECC deliverables related to maritime issues. It is also a place for coordination of national positions in the preparation for ITU-R and IMO meetings. Membership of MARFG is open to both CEPT administrations and relevant maritime organisations and industry.

The group's contribution to the CEPT harmonisation process has been extensive and many deliverables have a strong record of national implementation. A few in particular in the area of operator certification are worthy of note[1]: reminding us of where this all started 100 years ago.

MARFG also collects and makes available information through the ECO, such as on the use of 'Personal Locator Beacons' (PLB) in the European area.

The maritime group has been continuously looking for ways to move maritime communications further forward. Even in periods of economic difficulties new developments continue to demand our attention, such as the modernisation of the GMDSS, the implementation of the so-called "e-Navigation" concept, and developments related to the further improvement of the Automatic Identification System (AIS).

The generally increased demand for radio spectrum is both driven and to some extent addressed by the enormous technological advances in the public radiocommunications sector.

This means that CEPT's development of possibilities for allocation and sharing are well-informed by the expertise of its MARFG group. Spectrum used for maritime radiocommunications has to ensure a high level of safety of European citizens aboard both big cruise ships and recreational vessels. History has taught us that this should not be compromised.

Jaap Steenge,
Chairman of the FM Maritime Forum Group

[1] ERC Decision (99)01 on the harmonised examination syllabus for the General Operator's Certificate (GOC) and the Restricted Operator's Certificate (ROC), (currently under revision) ERC Recommendation 31-04 establishing the harmonised examination syllabi for the Short Range Certificate (SRC) and for the Long Range Certificate (LRC), another ERC Recommendation 31-06 on the mutual recognition of the GOC and ROC certificates and the recently approved ECC Recommendation (10)03 defining the harmonised CEPT examination procedures for the LRC for NON-SOLAS vessels.