



CEPT/ERC

Civil / Military Meeting 2001

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Dubrovnik, 6 - 7 March 2001

Subject: ERO study on the current and future use of the LF, MF and HF frequency bands

Origin: ERO



ERO study on the current and future use of the LF, MF and HF frequency bands

In general new digital technologies providing new applications and markets is expected to be realised within the LF, MF and HF frequency bands during the next 5-10 years. This will change the stagnating and decreasing use of these bands that has been seen for some years. In general the radio communication services within the LF, MF and HF frequency bands are currently used to a limited extent for commercial civil purposes. The technology has been analogue and over the past years the use of the LF, MF and HF frequency bands decreased and this decrease seems to continue. With the introduction of digital technologies and frequency adaptive systems these bands will experience a renaissance.

Within the Maritime Mobile Service the commercial use is decreasing and particular services and applications such as morse telegraphy has in general been closed down both in the MF and in the HF bands. The Maritime Mobile Service, however, also includes distress and safety of life services and it is expected that this part of the service supported by social public correspondence may continue for a number of years.

The Aeronautical HF radiocommunication services continue to be the only means of communications for some aircrafts on the intercontinental routes even if the mobile satellite communication has overtaken some of the HF traffic.

The Radionavigation and Radiolocation services both within the Aeronautical Radionavigation Service and the Maritime Radionavigation Service continue to be in operational use in Europe. It is not foreseen that those services are closed down within the next 10-15 years.

The above services all have safety of life elements and the necessary protection of those services from interference from other services and technologies must be ensured.

The Broadcasting service both in the LF, MF and HF bands has been facing some decrease over the past years but a number of national operators are now using MF as well as HF bands for radio broadcasting.

It is expected that the development of a global digital standard (DRM) with higher quality and new markets and services will further support and accelerate the development of the Broadcasting Service in particular in the LF and MF bands but also in the slightly longer term in the HF bands.

It may be expected that the digital technology within the broadcasting service could be adapted by other commercial radiocommunication services such as the Fixed and Mobile services and the Maritime Mobile service.

The civil Fixed and Land Mobile Services have decreased over the past years and there is no indication that these services will develop further in Europe in future. There are, however, particular applications such as low data rate services, which might be developed in the LF and MF bands. MF and HF fixed and mobile applications are still used to some extent in large countries in the eastern part of Europe for very long-range national communications.

The Radio Amateur Service has been facing some stagnation in certain countries within the recent years because of computer and Internet opportunities. The service is, however, expected to continue with active use of all the frequency bands made available for the service. The removal of A1A morse telegraphy requirement for radio amateurs is expected to increase further the amateur activity.

The military frequency requirements within the LF MF and HF bands are still increasing. The technologies used and the propagation conditions for those bands provide a lot of military communication opportunities both for the Land, Air and Maritime forces. The Combined Joint Task Forces concept adopted by NATO has extensive and increasing frequency requirements in these frequency bands.

It is important that this use of existing and new radiocommunication services with digital technology and new applications and market developments are not in any way hampered by interference from other sources and technologies such as ADSL, xDSL, cable communications and power line transmissions.

LF, MF and HF frequency bands



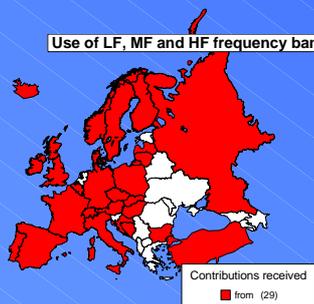
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Søren Hess - ERO

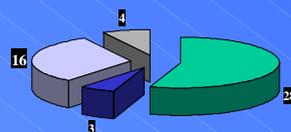
ERC Report on the current and future use

Background and objective

Use of LF, MF and HF frequency bands



- ▶ General information
- ▶ PLC and xDSL
- ▶ World wide changes
- ▶ Contributions



General trends

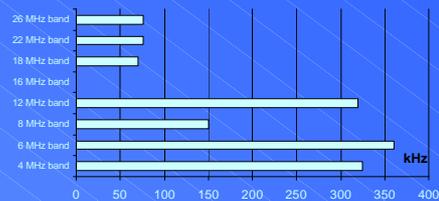
- ▶ Special propagation conditions
- ▶ Family of frequencies
- ▶ High power
- ▶ Low signal to noise ratios
- ▶ Limited civil use
- ▶ Still Analogue technology
- ▶ International plans and procedures



Aeronautical Mobile

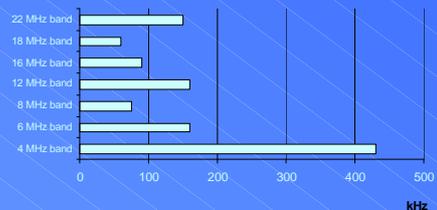
Route - Service

- ▶ Allotment plans App27
- ▶ North Atlantic ATC
- ▶ Future Data traffic



Off Route service

- ▶ Military traffic control
- ▶ Allotment plan App26



Protection needed

Radionavigation/Radiolocation

- ▶ Aeronautical 255-526.5 kHz
- ▶ Maritime DGPS 283.5-325
- ▶ Radioloc. 1610-3025 kHz
- ▶ Radionavigation 9-130 kHz

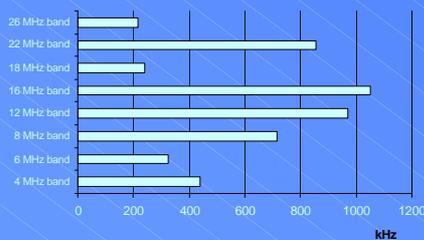
- ▶ Agreed Frequency plans
- ▶ Continued use → 2015



Protection needed

Maritime mobile service

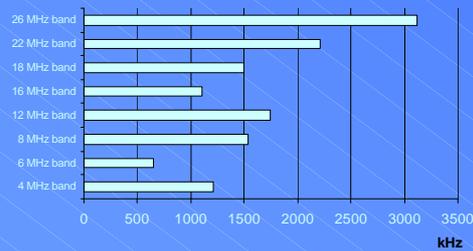
- ▶ GMDSS -Safety of life
- ▶ MF and HF bands still important for GMDSS
- ▶ Limited commercial traffic
- ▶ Analogue technology



Protection needed

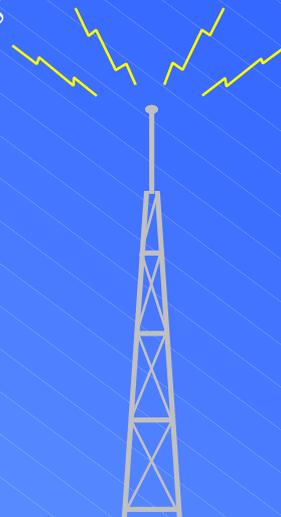
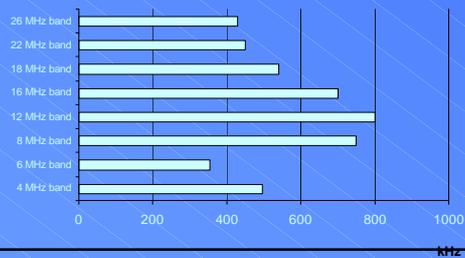
Fixed Service

- ▶ More than 50% of spectrum
- ▶ Limited civil use
- ▶ Large countries below 12 MHz
- ▶ Only analogue technology



Broadcasting

- ▶ LF, MF and HF in use
- ▶ ITU plans and procedures
- ▶ Digital technology soon
- ▶ Long transitional period
- ▶ Further requirements below 9 MHz
- ▶ WRC 2003 and 2006



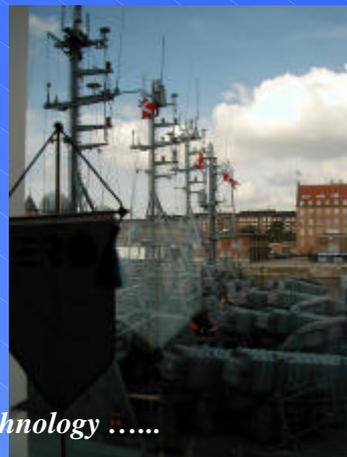
Amateur Service

- ▶ Stagnation - computers
- ▶ All bands in use
- ▶ Low noise levels
- ▶ Analogue to Digital
- ▶ 7 MHz at WRC 2003



Military frequency usage

- ▶ Strong interest below 12 MHz
- ▶ New technologies support HF
 - ▶ Tactical communication
 - ▶ Air command and control
 - ▶ Maritime communication
 - ▶ Combined Joint Task Force



Concern on Power Line Technology

Military requirements

CJTF with NATO and PfP

- ▶ Pease support operations
- ▶ 540 HF channels (3kHz) <12 MHz
- ▶ 2 CJTF needed

Maritime communications

- ▶ Above 70 degrees North
- ▶ 150 HF channels (3kHz) < 12 MHz

National mobile networks CJTF

- ▶ 540 HF channels (3kHz) <12 MHz



Conclusions

- ▶ LF, MF and HF bands still in use in Europe
- ▶ Safety of life
- ▶ Analogue to digital
- ▶ Strong military interest and use

Radio use must be protected from PLC interference

Possible ECA on the LF, MF and HF bands

