

COMMISSION OF THE EUROPEAN COMMUNITIES

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REPORT FROM THE COMMISSION TO THE COUNCIL

ON RADIONAVIGATION SYSTEMS FOR EUROPE

RADIONAVIGATION SYSTEMS FOR EUROPE

1. Introduction

Since the Second World War a wide variety of maritime radio aids of a local nature have been established for navigation and off-shore activities in European waters.

Some of these aids, such as the Decca Navigator system, have been established, at least partially, by private organizations or companies.

To ensure the continued availability of the services, these have now all been taken over by maritime authorities and considerable efforts have been taken by Member States to provide adequate maritime navigational aids in order to fulfil their commitments to the 1974 Safety of Life at Sea Convention.

In addition to these local systems, the United States and the Soviet Union have provided regional and worldwide radionavigation systems in pursuance of their national policies. Some of the transmitters of the systems provided by the United States have been located in Member States and because of their extended coverage, use has been made of the systems by many ships and aircraft.

The development of continuous satellite radionavigation systems, the effect of this on the national policy of the United States and the implications on terrestrial radionavigation services has instigated a review by Member States of the requirements for radionavigation facilities in their waters.

The International Association of Lighthouse Authorities (IALA) recognizes the need for a terrestrial radionavigation system in order to complement global satellite navigation systems for the foreseeable future.

Taking into account the concern of the Community to ensure a high degree of safety of navigation and protection of the environment, the Council adopted on the 25th February 1992 the Council Decision on radionavigation systems for Europe (92/143/EEC)¹.

The Council, took note of the intention of certain Member States to participate in one or more regional agreements on the establishment of LORAN-C chains covering North-West Europe and the North-Atlantic, the Mediterranean, the Iberian Peninsula and the Baltic, while a number of these areas are already covered by other terrestrial system, such as Decca and Omega.

¹OJ N° L 59, 4. 3. 1992, p.17.

The Council having stressed that the establishment of regional LORAN-C systems must ensure coherent and complete coverage of the European maritime area, avoiding as much as possible additional costs upon the users of existing radionavigation systems, decided that Member States which participate in or join regional LORAN-C agreements shall seek to achieve the radionavigation configurations which cover the widest possible geographical area in Europe and neighbouring waters.

In particular the Commission was charged by the Council with ensuring co-ordination between the member states participating in regional LORAN-C agreements with a view to ensuring compatibility between the LORAN-C chains introduced at regional level and to pursue its work with a view to setting up a radionavigation plan.

Since financial implications of the LORAN-C system are important elements in the decision process to join regional agreements, the Council adopted, together with the Decision, the following statement for entry in the Council minutes:

"The Council takes note of a Commission statement to the effect that it will make a study of the financial implications of the regional LORAN-C systems for Member States and will submit a report to the Council on this matter before 1 October 1992. In this study, the Commission will also set out the comparative costs of the various existing radionavigation systems used in the Community and examine the ways they are funded by the Member States."

Having completed its task, the Commission submits its report, which outlines briefly the commitments of Member States with regard to LORAN-C and their financial contributions (approximate values) to provide radionavigation systems. The information relates to those systems primarily used by the maritime services. In addition, a progress report is given on the fulfilment of the Councils' mandate by the Commission.

2. Financial implications of Member States with regard to radionavigation aids.

2.1. Terrestrial radionavigation systems intended to provide positional information.

2.1.1. Loran-C System.

LORAN-C fulfils undoubtedly the requirements to secure safety of navigation as prescribed by the International Convention for the Safety of Life at Sea (SOLAS 1974).

Due to their interoperability, long range, high availability and an accuracy of 0.25 nM (2 dRMS) or better, the LORAN-C and CHAYKA² systems are recognized by IALA as the preferred systems for adoption as a standard, worldwide terrestrial radionavigation system in accordance with the policy set out in IMO Resolution A 665 (16).

Besides the marine interest in LORAN-C, its use and development also benefit aviation and inland transport.

A combined coverage by satellite and LORAN-C, in those areas where it is available, will offer an excellent degree of system verification and continuity of accurate radionavigation coverage.

The Loran-C system was provided, maintained and operated by the US Coast Guard. The US still continues to develop the LORAN-C system in the continental USA. This US-LORAN-C Chain is linked with the Russian CHAYKA Chain in the Bering Sea.

However, with the forthcoming introduction of the GPS satellite navigation system, the US authorities have decided to withdraw support for Loran-C outside the mainland of North America with effect from 1st January 1995.

Following this decision an offer has been made by the US to the host nations to take over and to operate the existing stations. This has resulted in regional discussions taking place in the Far East, northern and southern Europe, in order to decide the future of Loran-C in those areas.

On 7th September 1992, an Agreement on an international programme for the establishment of a joint radionavigation service in Far Eastern waters using LORAN-C and CHAYKA stations was signed between China, Japan, Korea and Russia.

The on-going developments in the European area are given below.

²The Russian system similar to LORAN-C, which covers practically the entire CIS.

2.1.1.1. Northern Europe (\pm north of latitude 44° North).

On 6th August 1992, an Agreement was reached between Denmark, Germany, France, Ireland, the Netherlands and Norway to take over the Loran-C stations in the area and to enhance the system by updating existing and building some new stations. In addition, two stations already provided by France for national purposes will be made available for international use as part of the total Loran-C coverage of Northern Europe.

Although some investment has taken place within the Community, major investment will take place during the next three or four years to implement the Agreement.

In addition to the Agreement already made, discussions are taking place with the intention of including the Baltic Sea in the area to be covered by the system.

INVESTMENTS AND OPERATIONAL COSTS:

An important part of both the investment costs and annual running costs is supported by Norway. The commitments of the EC- Member States which participate in the North-West European agreement are:

France:	- to provide the two existing stations	10	M ECU
	- additional investments agreed:	4	M ECU
	- annual operating and maintenance costs of existing system:	1	M ECU

These costs will increase slightly resulting from the NW European Agreement.

Germany:	- future annual running costs:	0.2	M ECU
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There may be a future contribution to the extension of coverage to the Baltic Sea in terms of investment and running costs.

Denmark:	- future annual running costs:	0.1	M ECU
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Ireland:	- investment for near future:	2	M ECU
	- future annual running costs about:	0.2	M ECU

Netherlands:	- investment for near future:	1.5	M ECU
	- future annual running costs about:	0.2	M ECU

There may be a future additional increase related to an eventual extension of land coverage.

2.1.1.2. Southern Europe.

Discussions are currently taking place at expert level between Italy, France, Spain, Portugal and some non-Community countries concerning taking over the existing Mediterranean LORAN-C chain from the US authorities, up-dating the equipment and extending the coverage to include the Iberian peninsula and the Atlantic Ocean as far as the Canary Islands, the Madeira Islands and the Azores.

No commitments on governmental level, nor any decisions regarding the costsharing and the funding of these developments have yet been made, but the estimated costs are:

Mediterranean chain:

- annual running costs for the existing chain (without any up dating) ³ :	3	M ECU
- investment to up date existing equipment:	7	M ECU
- annual running costs for up dated chain ⁴ :	2	M ECU

Iberian chain:

- installation of an Iberian chain with 3 or 4 new stations:	20	M ECU
- annual running costs of an Iberian chain:	2	M ECU

³Due to the deadline of 31/12/1994, imposed by the US Coast Guard, with regard to the funding of the existing stations and the present lack of an agreement, it will be necessary, as a first step to continue to operate the chain in its present condition with a possible modernization in a later stage.

⁴These annual running costs are not additional to the 3 M ECU, rather the updating will result in a cost reduction from 3 to 2 M ECU.

2.1.1.3. Cost estimates for the entire European coverage:

The coherent and complete coverage of the European maritime area with the LORAN-C system, as put forward by the Council, will require the following once and for all financial efforts and annual operational costs:

CHAIN	NEW INVESTMENTS	ANNUAL RUNNING COSTS
N.W. Europe and N. Atlantic	21 M ECU	2 M ECU
The Mediterranean	7 M ECU	2 M ECU
Iberia and neighbouring waters	20 M ECU	2 M ECU
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Europe and neighbouring areas	48 M ECU	6 M ECU

These figures reflect:

- the financial commitments of the involved EC-Member States and Norway as foreseen in the existing North-European agreement,
- the estimate of the full costs (before an eventual costsharing with third countries) of an updated Mediterranean chain, and
- the estimated costs of an entirely new Iberian chain ensuring the widest possible European and Atlantic coverage,

Original investments made by the US and France in existing stations were not taken into account.

2.1.2. Omega and Differential Omega.

The Omega system is a worldwide radionavigation system comprising of eight widely spaced transmitting stations. The system provides independent positional fixes once every 10 seconds. Omega is the only other terrestrial radionavigation system which is able to cover the entire European waters, however with a predictable accuracy of 4 nM (2 dRMS) which is much less than with the LORAN-C. The accuracy of the system is limited by the accuracy of the propagation corrections that must be applied to the individual receiver readings.

Differential Omega is a means of transmitting local corrections to eliminate some of the errors inherent in the Omega system.

France provides one transmitting station, located at La Reunion Island, the investment cost was in the order of 8 M FF in 1973, (1992 actualized 5,7 M ECU, and the running cost (1991) is about 1 M ECU.

Differential Omega stations are provided by France, Portugal and Spain. The approximate costs are:

Country	Investment costs	Running costs (1991)
France	474,000 ECU ⁵	30,000 ECU
Portugal	270,000 ECU ⁵	12,000 ECU
Spain	392,000 ECU	37,000 ECU

⁵1992 value.

2.1.3. Decca Navigator System.

There are 12 Decca Navigator systems currently provided by Community members. Although these chains could be used by both aeronautical and maritime services, their configuration and coverage is more suited to marine users than to aircraft and the achieved coverage at European level is limited.

Due to its limited range the DECCA system fulfils essentially local needs and therefore it has not been retained, by IALA, as a standard, worldwide terrestrial radionavigation system.

The disposition of the chains is:

Country	No. of chains	Investment costs about	Running costs about
Denmark	1	1.7 M.ECU	0.4 M ECU
Ireland	1	1.13 M ECU	0.35 M ECU
Netherlands ⁶	2	9 M ECU	0.4 M ECU
Spain	2	7	0.38 M ECU
United Kingdom	6	-	6.1 M ECU ⁸

2.1.4. TORAN.

Toran is a hyperbolic radionavigation system used for survey and fishing purposes in local and limited areas.

France has provided 7 TORAN chains, with a total of 29 transmitting stations. The investment cost was about 2 M ECU, and the running cost is in the order of 0.5 M ECU.

2.1.5. RANA.

RANA is also used for fishing and other specialised applications in local and limited areas.

France has also provided one RANA chain, comprising of 10 transmitting stations. The investment cost being about 2 M ECU, and the running cost is about 0.7 M ECU.

⁶Germany is contributing to the system. In 1984 0.8 M ECU for the upgrading of 1 station and supports annually about 0.6 M ECU running costs.

⁷Not communicated.

⁸Annual Running costs, including repayment of capital for 1992.

2.2. Systems intended to provide information on the bearing, or range and bearing, and identity of the location of the aid.

Substantial investment has been made by Member States on the provision of radio beacons for both aeronautical and maritime services and on radar beacons for use by shipping.

2.2.1. Radio Beacons.

Radio beacons are non-directional radio transmitting stations which provide ground wave signals to a receiver. A radio direction finder receiver is used to measure the bearing of the transmitter with respect to an aircraft or ship.

The use of maritime radio beacons is decreasing following the more widespread introduction of reliable radionavigation systems. However, a re-arrangement of these beacons is currently taking place and the opportunity is being taken to provide for the transmission of differential corrections for Global Navigation Satellite Services (GNSS), such as GPS and GLONASS.

If Member States take up all the options available, on completion of the re-arrangement the situation is expected to be:

Country	Maritime radio beacons	Diff. GNSS stations
Belgium	4	-
Denmark	11	3
France	37	6
Germany	10	2
Greece	2	-
Ireland	8	2
Italy	18	-
Netherlands	6	2
Portugal	12	-
Spain	40	3
United Kingdom	36	9

The budgetary cost of a radio beacon station is ± 40,000 ECU.

2.2.2. Radar Beacons

Radar beacons are devices intended to improve identification of radar targets. A radar beacon provides range, bearing and identification information. Radar beacons are also used to indicate to shipping any uncharted navigational hazards.

Currently the number of radar beacons provided as aids to marine navigation is:

Belgium	2
Denmark	22
France	18
Germany	13
Greece	1
Ireland	12
Italy	18
Netherlands	18
Portugal	1
Spain	12
United Kingdom	80

The budgetary cost of a radar beacon is 10,000 ECU.

2.3. Recovery of costs:

In several Member States radionavigation aids are together with lighthouses and buoys, part of a mix of navigational aids (navaids).

The United Kingdom and Ireland charge "light dues" to all commercial ships calling their ports and to registered tugs in order to finance their general marine navaids. Fishing vessels are also charged in UK waters.

Denmark imposes a user fee of 268 ECU/ship to all Danish commercial and fishing vessels for the use of the DECCA facilities.

France, Greece, Germany, Italy, Portugal and Spain do not charge the users for the provided navigational aids. A new Spanish legislation intends to impose charges to the users of the facilities.

Belgium and the Netherlands do not levy any user fee for radionavigational aids, nevertheless part of their costs are covered by pilotage dues.

3. Progress report on the Commission initiatives.

3.1. LORAN-C.

The Commission attends as an observer the Steering Committee of the North West European and North Atlantic LORAN-C Systems.

The Commission was asked by the IALA Mediterranean Loran-C Committee to foster a meeting of the representatives of the Governments of E.C. Mediterranean countries and other countries concerned with radionavigation services in the Mediterranean area.

The Commission will do its utmost to bring the concerned parties together with the aim of political commitments with regard to the maintenance of an appropriate LORAN-C coverage in the area.

3.2. European radionavigation plan.

In the beginning of 1993 the Commission will convene meetings with governmental experts and the users to determine the users' requirements with regard to radionavigation aids and the scope of the European radionavigation plan.

Afterwards it will establish, in close cooperation with the Member States and interested third countries, the terms of reference for a tender on the matter.

The Commission expects to be able to submit concrete proposals in the second half of 1994.

3.3. Navigational (including radionavigation) aids as an essential part of the safety and pollution prevention infrastructure.

The development of an appropriate safety and pollution prevention infrastructure providing adequate navigational aids in the European waters is a Community concern.

It is necessary to ensure that budgetary constraints do not unduly hinder the provision of required safety and pollution prevention and to avoid imbalances in competition with regard to traffic to European ports.

Taking into account existing unequal coastal responsibilities among the EC-Member States and the disparity both in efforts and cost recovery, as shown under item 2 of this document, a mechanism must be provided to ensure that expenditure on the infrastructure reflect the real and current needs of the maritime community and coastal population of the EC.

Such a mechanism can only be provided through the optimization of the efforts of the Member States to provide appropriate navigational aids and shore based facilities, under which users pay, directly or indirectly, for the provision of the safety infrastructure.

The Commission believes that the EC dimension is appropriate, in terms of both a coherent geographical area and institutional framework, to assess the risks, establish the objectives, identify and optimize resources, harmonize the collection of dues and their sharing among the national authorities and in inflicting penalties for non compliance of the rules.

In its search for an appropriate solution the Commission intends, as a preliminary step, to gather all the necessary comparable information from the Member States on the costs of providing all general marine navigation aids outside harbour limits, the methods of finance, the length of national coast lines, the provided navigational services (pilotage, buoys, radionavigation aids, VTS...), the level of traffic and the income out of which dues are to be paid.

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