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REPORT OF THE WORKING GROUP ON MARINE DATA MANAGEMENT

ICES Headquarters, 29 April - 2 May 1986

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1 Opening of the Meeting

The Working Group met at ICES Headquarters with P. Geerders (Netherlands) in the chair. Members present were T. Dalzell (UK), H. Hecht (Federal Republic of Germany), M.T. Jones (UK), R. Leinebø (Norway), J. Saarinen (Finland) and J. Szaron (Sweden). One other expert was present, M.N. Nicholson representing C.A. Goody (UK). The Council was represented by the Hydrographer (H.D. Dooley), the Environment Officer (J.F. Pawlak) and Marine Data Scientist (K. Jancke). Apologies for being unable to attend were received from D. Hamilton (USA) and A. François (France).

2 Composition of the Working Group

In reviewing the membership, the Chairman welcomed J Szaron as a new Swedish member. The chairman also referred to a discussion he had had with Dr Pestana, Portuguese member of the Working Group, who was also in the Secretariat attending the meeting of the Sardine Working Group, of which she was Chairman. As a result it was hoped that more active participation from Portugal could be forthcoming.

3 Adoption of Agenda

In introducing the provisional agenda, the Chairman referred to the meeting of the sub-group on the ICES "blueprint", which had met the previous day. To provide a basis for this meeting, he had prepared a note of a general nature which he had distributed to the members of the sub-group prior to the meeting. Rather than consider the details of this note, which approached the problems of information and data management by ICES, the group had concentrated its discussions on the best way to attack the problem of developing the blueprint and on the best way to handle this item during its meeting. It had concluded that two of the agenda items be merged as it was clear that there was a certain amount of overlap. The chairman also noted the desirability for the group to split up into sub-groups, but the composition and terms of reference would be determined after the Hydrographer and Environment Officer had presented their respective reports. The agreed agenda is as per contents list of this report.

The Chairman reminded participants of a presentation to be made immediately after the completion of the meeting, on Friday afternoon. This presentation, by Dutch colleagues, would describe the work being done to establish an on-line Marine Information System, MARIS, containing information on environment and human activities, primarily in the North Sea. A more detailed description is contained in Annex I of this report.

4 ICES Data Centre Activities (Oceanography and Pollution)

4.1 Oceanography

In spite of a 6 month vacancy in the key post of Marine Data Scientist following the resignation last summer of Jan Szaron, some progress had been made in the re-organisation and correction of the historical hydrographic files held at the Secretariat. The Hydrographer introduced Kai Jancke, who replaced Jan Szaron in January 1986, and who will look after the data management requirements of the Statistician and Environment Officer, as well as the Hydrographer. Kai is an oceanographer by training, and has considerable experience in the use of computers.

Mainly due to K. Jancke's expertise, considerable progress had been made in developing the most cost effective and efficient way of managing the data bank. In particular the capabilities of the in-house Norsk Data machine were being exploited to the full, and it is clear that many of the "smaller" jobs, such as those related to data acquisition, quality control, and project data sets can be handled in-house, effecting considerable savings on the cost of utilising the main-line computer located at the Technical University (NEUCC).

The Hydrographer, in speaking to his document "Information Notes", which he had prepared for the attention of all the Hydrography Committees Working Groups, and which was handed out during the meeting, indicated however that there was still a lot of groundwork to be done before a thorough assessment of all the data holdings could be made. Some parts of the data bank were in a terrible mess, but it was clear that, even after completion of the data bank reorganisation, there would be some very large gaps in the data holdings. In discussion it was noted that there may be several reasons for this, especially for more recent years, when data quality was so bad that scientists felt it inappropriate to submit their data to National Data Centres. Data are also becoming commercially sensitive, and this could also increase the difficulties in their acquisition, unless controls with regard to redistribution are imposed. It was apparent that some of the remaining gaps could only be filled by direct cooperation with the National Data Centres concerned, especially UK and Norway. Furthermore, since these countries provide an important source of data, especially for the north east Atlantic area, it was necessary to ensure that future acquisition of data could be guaranteed, and made as swiftly and smoothly as possible. The Chairman noted that there were many difficulties in achieving this, and the Working Group would have to consider urgently how best to overcome this difficulty in view of the increasing demand for data from the ICES region, especially nutrient data.

The Working Group was, however, gratified to note that there had been substantial progress made in acquiring some data sets. In particular, the backlog of Soviet Sections/Weather Ship data had been almost removed and the full hydrochemistry data set from the Marine Laboratory Aberdeen for the period 1960-85 had been acquired, quality controlled and incorporated into the data bank.

The Hydrographer described progress with the development of a project data centre for PEX, in response to Council Resolutions endorsed at recent Statutory meetings. This would involve the preparation of data products from the 1st level Inventory stage (ROSCOP) through quality control to the preparation of data products which would become the base material to be utilised in a Workshop in summer 1987 to discuss the features of the PEX data set.

Some concern was expressed at the ad hoc way in which the ICES Format had been modified to meet the needs of PEX. The Hydrographer stated that many factors had militated this decision. In particular a more radical change to the format would be premature, pending the outcome of the "Blueprint" considerations. Also resource restrictions meant that the necessary careful attention to more permanent modifications could not be made. The Hydrographer hoped that a generalised reporting format he had designed to facilitate the flow of non-standard data collected during PEX may provide an appropriate vehicle for reporting all types of data relevant to ICES activities. The "Blueprint" sub group meeting had decided that this particular format should provide the basis for further discussion of an ICES "Blueprint".

In this context it was noted that the ICES list of ship codes needs regular updating. The members of the group were invited to provide updates/additions to this list, to the Hydrographer, at regular intervals.

Concerning products, the Working Group noted that the only routine publication to be produced was the Weather Ship Inventory. This was, however, becoming a relatively minor publication because of the demise of most of the Ocean Weather Ship Stations. As agreed at recent meetings no ROSCOP products were produced but the Secretariat's computerised ROSCOP file was continuing to be maintained. Following the departure of Finn Guldman, who had looked after the ROSCOP information in the Secretariat for some 10 years, the maintenance of this file was now an additional burden to the limited resources available to the Hydrographer. It was also clear that some countries were facing difficulties in preparing their information, mainly because of lack of interest on the part of scientists. The Working Group however re-affirmed that ROSCOP was a very valuable management tool and its use should continue to be encouraged. It, furthermore, endorsed the role of SH as regional information centre, where this ROSCOP file is a necessary tool. The SH also copies the ROSCOP forms it receives to the World Data Centres, except those received from the UK, Federal Republic of Germany and France, all of whom have a considerable number of cruises outside the ICES area and submit their returns directly to the WDCs.

4.2 Pollution

In her report 'Overview of the data bank on contaminants in marine media', made available in written form during the meeting, the Environment Officer provided an overview of the data bank on contaminants for which she was responsible. This bank consists of three sections, viz:

- Contaminants in fish and shellfish.
- Contaminants in sea water.
- Contaminants in sediments.

She explained that the first two of these sections have been operational since autumn 1984 and it is expected that the third will be operational by August 1987.

The fish and shellfish data bank consists of data collected by ICES under the Cooperative ICES Monitoring Studies Programme and data processed by ICES for the Oslo and Paris Commissions under the Joint Monitoring Programme (JMP). Owing to a two-year moratorium on any use by ICES of JMP data, the JMP data are not available for exchange for this period. Both ICES and JMP data are collected according to three separate purposes, which influence the type of data reported and their mode of handling in the data center. These purposes are:

1) assessment of risk to human health
2) assessment of geographical distribution of contaminants (i.e., a baseline study)
3) determination of temporal trends in contaminant concentrations.

As this data bank became operational in 1984, the holdings at present cover only the years 1983 and 1984. However, in connection with the trial of a set of statistical analyses to determine temporal trends in contaminant concentrations (purpose 3, above), the data sets submitted to ICES before 1984 are being reviewed and those portions of the data considered to be valid are being entered into the data bank. Thus, for some countries and certain contaminants, the data series may extend as far back as 1977. Owing to analytical difficulties and lack of interlaboratory intercomparability, no data older than this will be archived. The group also noted that the problems with pollution data were far from solved and that therefore even more recent historical data should be handled with extreme care.

Data are presently held from the following countries: Belgium, Denmark, Federal Republic of Germany, France, Ireland, Netherlands, Norway, Portugal, Sweden and the United Kingdom.

In 1985 a major study under purpose 2 was conducted, namely, the 1985 Baseline Study on Contaminants in Fish and Shellfish. All ICES member countries have indicated their intention to participate in this study, for which the data should be reported by 1 August 1986. The data from this study will considerably enhance the holdings in this part of the data bank.

All data are reported according to the Interim Reporting Format for Contaminants in Fish and Shellfish. To date, most countries (except Denmark, Sweden and Norway) have used paper forms to report their data, but it is anticipated that several more countries will submit data on magnetic tape this year.

Data on contaminants in sea water for the Joint Monitoring Programme cover the years 1983 and 1984. However, ICES is presently coordinating a three-year (1985 to 1987) Baseline Study of Trace Metals in Coastal and Shelf Sea Waters. Data from the first year of this programme will be reported by 1

September 1986.

These data are reported according to the Interim Reporting Format for Contaminants in Sea Water, which has recently been revised to accommodate the extension in the number of contaminants covered by the JMP. It is anticipated that the Joint Monitoring Programme will also include nutrients from 1987, so some provision must be made for reporting nutrient data in connection with this programme.

Finally the Environment Officer referred to the forthcoming system for handling sediment data for the Oslo and Paris Commissions' JMP. A preliminary draft reporting format for this purpose had been reviewed two years ago, but no further work has been done on this subject since then. A draft reporting format must be prepared before December of this year so that it may be fully reviewed and accepted for use in mid-1987.

4.3 Discussion

In thanking the Environment Officer and Hydrographer for their detailed accounts, the Chairman noted several issues that require much more detailed discussion by the Working Group. The Hydrographer had identified serious problems with regard to data acquisition. Accordingly a sub-group was set up to discuss the question of inflow of data to the Service Hydrographique (SH). In particular the group was tasked to identify demands for a regional data centre and what its future shape should be, bearing in mind the restrictions due to data security which are currently becoming more evident. The group was also requested to consider the question of routine data and information products, using the ideas contained in the Hydrographer's document as a basis. This group was led by T Dalzell. A second group, led by H Hecht, was requested to take up the question of a proposed ICES "blueprint" for reporting formats, examining in particular the technical aspects of a system for the acceptance, storage and output of physical, chemical and biological data. The Chairman also requested the group to take careful account of the needs of the Baltic Monitoring Programme, for whom the present biological storage format was developed.

With regard to the development of the pollution formats the Chairman expressed regret that the Working Group had not been kept informed. The Working Group had been charged with ensuring that compatibility was maintained with other data sets by establishing a compromise format that was flexible and could be easily modified in the light of experience. This was necessary since analytical methods still continue to change and improve. This interim format could eventually lead to a more long-lasting format compatible with GF3. The Environment Officer undertook to ensure that the Working Group or selected members of it would be given the opportunity to comment on any subsequent versions of these formats. It was later agreed that the group with whom the Environment Officer should liaise should be François, Szaron, Nicholson, Adam, Perttilä and the Chairman.

5 ICES "blueprint" and Data Centre Development

5.1 Introduction

The two ad-hoc groups announced in the preceding section met for 1 day and reported to plenary the following day. Details of these reports, and the discussion pertaining to them is as follows:

5.2 Ad hoc group on technical aspects of a system for the acceptance, storage and output of physical, chemical and biological data

5.2.1 Report of Group

The group commenced its deliberations by reviewing the recent history pertaining to matters relevant to SH. The following ICES resolutions were considered relevant for the future development of the data systems at ICES:

C.Res. 1985/2:18 (T.o.R. for MDM 1986)

C.Res. 1984/4:20 calling for a system of acceptance, storage and output of physical, chemical and biological data.

C.Res. 1985/4:6 With new terms of reference for work programme for SH (in particular paras 1,3,5, and 8)

C.Res. 1984/2:16 - T.O.R. for MDM 1985, particularly paras b) and c).

C.M. 1982/C:4 calling for a comprehensive data bank.

According to these statutory references, SH has the following assignments:

- Regional Data Center, covering the area of the North Atlantic, North Sea and Baltic Sea.
- National Data Center for Denmark and Iceland.
- Project Data Center for a variety of projects, like JONSDAP, BOSEX, PEX and other primarily multidisciplinary projects; in future: possible Project Data Center for exercises in the WCRP (C.Res. 1985/4:6, para. 8).

In addition to this, ICES is also acting as a RNODC (Formats) in conjunction with the IOC Working committee on IODE.

Furthermore, the ICES Secretariat is

- acting as a consultant to BMP,
- processing data for JMP

- holding data collected under the Cooperative ICES Monitoring Studies Programme.

In view of these various assignments to the Service Hydrographique (Hydrographer) and Environment Officer, the ad-hoc group sought to set up some guidelines on how ICES should develop its data systems in order to provide the most flexible, economic and user-friendly response to current and foreseeable forthcoming demands.

5.2.1.1 Data Reporting Formats

Due to the increasing power of measurement techniques and in response to the increasing demands resulting from monitoring programmes, both the ICES Secretariat and data originators have to cope with a correspondingly increasing amounts of data, number of parameters and additional information.

In order to meet these new requirements in the most flexible and economical way it is necessary to develop a new generation of data reporting formats following the generalised approach of GF3. This approach is represented by defining a master record and data set level, consisting of a parameter record and a data record.

The draft reporting format for hydro/chemistry data presented by the Hydrographer to the meeting (Appendix I) could be used as a basis for this development. All new reporting formats required, including those for contaminants and biological data, could be developed along these lines in order to eventually create a new consistent system compatible with GF3. This approach should also take into account the responsibility of ICES as being the RNODC Formats, so ICES formats are not only used locally and ad-hoc, but are of importance for a much wider scientific audience and could prove to be of lasting value.

The expected benefit for ICES would be a standardisation of the data acceptance software and, additionally, that it should be possible to carry out some quality control already on the reporting format level. This new system of reporting formats could thus form a basis for a new, unified data input interface.

The currently existing ICES punched card system has to be preserved for the sake of continuity, but an update of the manual is necessary in order to explain the formats in terms of modern technology (eg the explanation of overpunches in terms of characters).

5.2.1.2 Storage and output

The group reviewed the existing cruise-oriented hydrodata files at the SH, namely the water bottle and the BT data sets. These data sets are still incomplete with respect to historical data. The long-term weathership "Charlie" data set still needs completion.

There exist a number of project data files; as far as hydrodata are concerned, all of these data are included in the hydrodata files.

It was noted with appreciation the progress that has been made in the past years, in spite of the insufficient resources allocated to the Hydrographer. There is now a good cruise level inventory available based on the ROSCOP data, as well as an inventory programme on station level. Progress has also been made in quality control and in providing some products (as presented in the Hydrographer's Information Notes).

In order to meet forthcoming requirements, SH should further develop its hydrodata system in the following direction:

- complete the water bottle data bank, including the historical hydro/chemistry data (C.Res. 1985/4:6, No. 1).

- complete the long-term time series file of USSR sections/weatherships programme, add other long-term data sets, mainly light vessel data (partly continued with automated stations) - in response to C.Res. 1985/4:6, No. 5,

- create a capability of providing various geographically oriented products as well as statistical reference information for different time periods (C.Res. 1985/4:6, No. 3, 5).

- create a surface data bank comprising all types of high quality T and S data available at the surface; this would be an air/sea interface data set valuable to, eg, WCRP projects (C.Res. 1985/4:6, No. 8 and 5) and of value to scientific work concerned with the relation of environment to changes in fish stocks.

These proposed activities are expected to be of special use for the WCRP projects, where ICES with its unique historical data holdings could provide valuable input.

The group restated that sufficient resources should be allocated to the Hydrographer in order to accomplish this work.

A very lively discussion arose on the issue of how far to expand the considerations also to contaminant and future biological data. In particular, it was discussed whether a "product interface" is needed allowing local access to all types of data holdings, in view of expected demands from monitoring programmes and related work. It was felt that, as a result of political influences (North Sea Conference, EC programmes) there is an increasing pressure to investigate the marine environment system as a whole, including all possible interactions between chemical, biological and physical parameters. This is expected to have its impact on the demands that ICES will face in the near future, and therefore the infrastructure for handling data and information in ICES should take these facts into account.

5.2.2 Discussion

In the verbal presentation of his report, Dr Hecht emphasised that the important issue at hand was that of reporting formats, taking into account the needs of HELCOM and the contaminant

programme, as well as the important role the SH played in its function as RNODC(Formats). His group had considered that a very general approach to reporting formats was essential in order to meet future demands and that the specific approach adopted in some of the contaminant formats was not a good way to proceed. However the group considered that the Hydrographer had provided the capability of acquiring a new generalised approach to reporting data and considered the "blueprint" as displayed in Appendix I as a valuable approach to a new generation of reporting formats. This, in particular, will enable the establishment of a new consistent system for handling multi-disciplinary data and information. Appendix I was considered to be an important step ahead as it provided open-ended flexibility for a host of new parameters coming forward in new programmes. It was also considered that such an approach would be a great benefit to all involved in ICES as it would enable the standardisation of data acceptance software. With regard to existing systems it was considered that the old punch card system should be preserved for some time to come, and documentation concerning it should be updated. It was clear however that its future as a reporting format was very limited. Concerning issues related to the structure of future data banks Dr Hecht remarked that there were increasing demands to deal with the environment as a whole system. For example in the Federal Republic project, "Circulation and Exchange of Pollutants in the North Sea" it was clear that it was very important to set up a unified data bank including biological and contaminant data. This would provide scientists with the opportunity to bring together data of various types and process and interpret these in conjunction with each other.

In discussion it was noted that the community had much to gain from a stable and, where possible, unified reporting format. This would ease the creation of new products which would be of benefit to the user-community. Ease of data reporting would also facilitate overall quality control of data. In conclusion the Working Group agreed that the Hydrographer's proposals provided a good basis for a "blueprint" but there was still some work to be done, especially with regard to the structure of master records and the full implications with regard to the BMP and ICES programmes had yet to be assessed. Accordingly the Chairman proposed that a study group should work inter-sessionally to study these matters, and further develop the "blueprint" and a generalised reporting system. In consultation after the meeting it was decided that this group would consist of H. Hecht, D. Hamilton, M. Jones, M. Perttilä (as Chairman of IODE's task team on marine pollution data exchange) and the Chairman. H. Hecht would lead this group in close collaboration with the Chairman.

5.3 Ad hoc group on submission of Hydrographic data to ICES

5.3.1 Report of group

The group reported that they accepted that there was a general consensus on the requirement for ICES to hold a comprehensive data bank of hydrographic data for the ICES area but there was a feeling that this requirement was not easily identified in past ICES Resolutions. This may be one of the reasons for the poor flow of data to ICES in the recent past and the stumbling block in some nations making a direct commitment to the ICES data

bank.

To clarify the position and to enlist a clear and direct response from all nations the group proposed that a general resolution be submitted to the Hydrography Committee. The proposed wording of this resolution is:

Recommendation 1: In order that a data set of known and constant quality can be maintained in the ICES area, and to meet the requirements of the Service Hydrographique in the preparation of environmental data products in support of of marine researchers in the ICES area, the following data should be routinely submitted to ICES through National Data Centres,for inclusion in the ICES data bank:

- classical water bottle data

- STD/CTD data

Member states are requested to make determined efforts to implement this recommendation in a timely fashion.

The reasons for non submission of data were considered to be (a) that the scientific communities in various countries were not aware of a specific ICES request to submit data, (b) that - according to originators of data - the data were not sufficiently screened to be released by the originators and (c) that the work needed was not given sufficient priority either at the originator's institute or at the data centre, resulting occasionally in considerable backlogs in processing data for international exchange. Accordingly it was hoped that the ICES resolution could be used as a catalyst to improve the data flow to ICES.

5.3.1.1 Inventories

The ad hoc group finally turned its attention to the requirement for inventories to advertise the content of the ICES data bank, in particular to indicate the data coverage available. The form such inventories could take were reviewed but it was decided not to make specific recommendations but make only an expression of the need for some sort of general inventory. The Working Group looked forward to seeing some examples of these products at its next meeting.

The presentation of the USSR Atlantic Sections displayed in the Hydrographer's information notes, were reviewed. It was agreed that a graphical presentation was the appropriate way of indicating hydrographic sections. It was recommended that ICES should identify sections by an appropriate flag in the master record. The Working Group agreed that the products shown by the Hydrographer indicate some possibility to continue on this line.

5.4 Discussion of ad hoc group report

The group agreed that this report reflected the existing problems relative to international oceanographic data exchange. Clearly there are many and varied reasons for this state of affairs as, for instance, specified in the preceding sub-section. Although the group had identified, amongst others, lack of priority at certain data centres it was also clear that other factors, such as lack of appropriate staff at both data centre and data collection level were responsible. Another factor was the awkward transition from water bottles to CTDs that took place in the 1970s. At this time inadequate quality control has probably resulted in the the permanent loss of a great deal of data. This emphasises the need for a centre such as the Service Hydrographique to advise and assist the ICES Community on matters concerned with data collection, processing and quality control, in order to prevent a repetition of this deplorable state of affairs.

The Working Group observed that in the present situation the submission of data to data centres relies much on the goodwill of the scientist collecting the data. In most European countries, in contrast to the situation in the USA, marine scientists were under no obligation whatsoever to submit their data. The group expressed the hope that, in view of the rapidly rising cost of oceanographic data acquisition in relation to the limited funds available, on the policy level the awareness will grow that oceanographic data is a valuable commodity and should be taken care of in a proper way. The Service Hydrographique and the Working Group are in a position to contribute to this process. In particular the Working Group members should use their influence at the national level in order to improve the situation.

6 Other Matters

6.1 Management of Data in the BMP

Mr Saarinen reported that considerable progress had been made following the signing of a 2 year contract in May 1985 by the Finnish Institute of Marine Research. Data had been made available as listings and microfiche and the Service Hydrographique had been provided with a magnetic tape of all hydrographic, chemical and biological data collected as part of the BMP. Software is being developed to perform various analyses of the data, and to present it graphically, using charts.

Currently the biological and hydro-chemistry data were stored separately but it was the intention to have these merged in the data base by September 1987. The demands for this data base have not yet been finalised. The data centre had encountered some species code problems, especially with regard to zooplankton age groups (the Rubin code seems incomplete on this), and this had delayed development somewhat.

Mr Saarinen remarked that changes in reporting formats such as being considered at this meeting would not cause too great a difficulty for the Finnish (BMP) data centre.

6.2 Taxonomic codes and their allocation

The Statistician and the Systems Analyst were present for the discussion of this item. The Systems Analyst reported on the activities regarding the setting up of a conversion table between several existing taxonomic code systems, as recommended by the Working Group at its last meeting. This proposal was endorsed by Council. It appeared from his presentation that now an approach was being taken which was far beyond the scope envisaged by the Working Group. The table now would encompass the full NODC code list of species and would be developed as a sophisticated hierarchical data base.

The investment involved seemed, to the Working Group, to be out of proportion in relation to the ideas expressed at its previous meeting. Also, the fact that the US-NODC code was taken as a 'stable' reference was considered dangerous and it was observed that, besides the high development costs, the present approach would be expensive to maintain in computer time and manpower.

The Working Group restated that its original purpose was that ICES maintain a conversion table between existing taxonomic code systems and the Latin name for species relevant to ICES and departing from an existing scheme, freely available from MAFF, UK.

The Working Group advised that ICES avail itself of the MAFF conversion table and expand this table only for the species relevant to ICES activities. According to the Group, this could be done with an investment which would be minor in comparison to the present activity.

From the discussion, it also appeared that the Systems Analyst's work is only concerned with the IYFS and the technical operations of the ICES computer. The Working Group expressed its concern over this, since it was always understood that after the re-organisation of the Secretariat, the Systems Analyst would provide support to all 'computer' activities within the Secretariat. It is the Working Group's opinion that there should be a close collaboration between the Environment Officer, Hydrographer and the Secretariat's Computer Group.

At the previous meeting, A François informed the group that in BNDO it was intended to abandon taxonomic codes and use the full Latin name. Following this meeting, the Chairman had been in consultation with Dr François and was informed that French scientists preferred to use the abbreviated Latin names of the Rubin code instead of the full Latin names. It is hoped that this particular issue can be discussed more fully at the next meeting of the Working Group.

6.3 ICES Current Meter Inventory

Dr Jones reported that this inventory is still being maintained by MIAS and consideration was being given to developing it further so that it could meet the needs of the forthcoming large-scale projects of the WCRP eg WOCE, and other (inter)national needs. The inventory had been of use to the US WOCE committee. Consideration was being given to extending the inventory to cover other types of moored/bottom mounted data

collection systems eg inverted ech sounders, bottom mounted pressure records, and also to the possibility of MIAS becoming RNODC (Currents). It was recommended that each country try to maintain a national current meter inventory along the lines of the MIAS inventory, and send updates to MIAS regularly.

6.4 Brochure on ICES Data Centres

The Chairman reported that not many updates had been received recently. Since the usual biennial edition of an updated brochure was now due, members were encouraged to submit relevant information by mid-July to him. As usual the brochure would be distributed as an ICES "Gen" paper.

It was mentioned by the Chairman that the Washington NODC has requested information for a survey of data centres they were conducting. As most of the information they were requesting was similar to that in the ICES Brochure the Group agreed that the updated version of this Brochure should be submitted by the Chairman to Washington NODC in lieu of separate submissions by the data centres. mentioned in the Brochure.

6.5 Report from World Data Centres - Oceanography

In the absence of the representative from WDCA (D. Hamilton) this item was not dealt with at the meeting. Some information relevant to this report was submitted subsequently. This information shows that, as of 23 April 1986 a total of 13,586 ROSCOP forms have been received from ICES nations. This accounted for 86% of submissions to WDC-A. The information also showed a more detailed breakdown by country for the year 1983.

6.6 General Format-3 (GF-3)

Dr Jones reported that the latest developments in GF-3 had been considered at the third meeting of the IOC Group of Experts on Format Development, which had been held at the Service Hydrographique in September 1985. In relation to GF-3 three issues had been discussed viz (a) format, (b) software and (c) subsets. Details are:-

a) Two minor amendments to GF3 (now GF3.2) had been accepted. In cases where tape usage is critical, eg sea beam data, an increased blocking factor could be used, if exchanging parties agree. It had also been found necessary to insert a dummy file header record in front of the end of the tape record in the tape terminator file. Because of these and other earlier minor changes made to make GF3 easier to handle, existing manuals on GF3 were now out of date and a new set of manuals is under preparation.

b) Dr Jones reported that a new general purpose software package for handling GF3 tapes was now complete as was relevant documentation. Known as GF3-Proc it is a package of some 250 FORTRAN subroutines, all but 50 of which are transparent to the user. It had not been possible to make the package totally portable across all computers, operating systems and Fortran compilers without slight system specific adjustments - however, MIAS was prepared to make the necessary adjustments before releasing the package to

individual installations. System specific versions of the package now exist for Honeywell, Univac, Burroughs, VAX, GEC, IBM and CDC machines. The Group of Experts had decided to implement a pilot phase by installing the package at a number of centres (MEDS, NODC, Argentine DC, BNDO, the Soviet Centre and DOD). Dr Jones remarked that there was no reason why other ICES centres could not have it installed. It was particularly appropriate to have it installed at the SH since it was RNODC (FORMATS). In this context it was noted that the Group of Experts had agreed that MIAS would assist SH in its role as RNODC (FORMATS) by the provision of technical support and advice on the use of GF3.

c) Several new GF3 subsets had now been finalized, including one for digitised contours. Subsets for sea level data and gridded data were also being developed. The water bottle subset was more-or-less finalized. However with regard to this latter subset it had been decided that no single subset be recommended as this would produce too rigid a framework for what is very variable data. Thus this subset is merely a collection of guidelines. A remaining problem was how best to handle meteorological data which would be an important requirement in order to meet the demands of WCRP.

On other GF-3 matters, Dr Jones reported that the Group of Experts had opened up discussion on possible implementation of the package on PCs. This is seen as a very complex problem and no clear way to proceed was suggested.

In discussion on this item, the Chairman reported that GF3-Proc was implemented in just 2-3 weeks on the Burroughs machine at the Netherland Data Centre (KNMI). As a result he was hoping to build up comprehensive data sets of Dutch CTDs ready for international exchange, in the near future. Dr Hecht reported the DOD had acquired a copy of GF3-Proc at the end of last year. He considered the supporting documentation to be excellent, and as a result he had been able to instal the package in just 2-3 hours, including the time to convert to the internal library format of their CDC machine. Two minor compilation errors had occurred, both related to character constants. The test program had hit one "bug" which was easily isolated, following which a GF3 test tape was generated and successfully read at MIAS. DOD had now converted current meter data into GF3, with considerable ease. In this context, Dr Hecht remarked that he had found GF3-Proc extremely easy to use. The Working Group were pleased to note the good progress being made in the world-wide implementation of GF-3, especially the ease with which this was being done.

6.7 Remote Sensing

The Chairman reported that there were no new developments with regard to the activities of the IOC task team on remote sensing, which he chaired. The MEDI catalogue now included references to remote sensing and the IOC Secretariat were compiling general information on the availability of remote sensing data on a geographical basis and for a selection of parameters.

It was noted that the ICES Aerospace Working Group had not yet met, although there had been some correspondence amongst

members. Progress in this Group was currently being delayed by the need to find a new chairman following the resignation of Dr Thomas.

It was also noted that there was considerable interest in the use of remote sensing in several ICES countries, and it was hoped that the Aerospace remote sensing group could help to coordinate this work. In particular it was noted that PEX had a major input from remote sensing applications, and other applications included upwelling (Sweden), waves (UK), coastal current dynamics (Norway) and ice (F.R. Germany).

The group felt that it was becoming necessary to consider the need for the long term storage of remote sensing data. Concerning the ICES area the only historical archive of this type of data is at Dundee University, UK. In the future this could become a problem (funds, manpower). Besides the apparent political aspects, several other basic issues have to be resolved. In particular it was still not certain whether this data could be regarded as oceanographic data and therefore it was not clear where the responsibilities for archiving these data lie. The Group agreed to devote a more thorough discussion of this subject at its next meeting.

6.8 Digital Bathymetric Data

The group were informed of the work being carried out at the Bureau Gravimetrique Internationale, Toulouse to digitise the the 1:10 million GEBCO charts. It is intended that a data set for all contours will become available to the scientific community over the next two years. Dr Jones stated that the DBDS-5 (Digital Bathymetric Data Set - 5') with gridded bathymetry at 5' intervals, and prepared by the US Naval Oceanographic Office, was available through MIAS or WDC-A (marine geology and geophysics, Boulder).

With regard to the available bathymetry of the North Sea, there was some discussion on a telex received from Dr Y Adam, concerning Belgian activities on this topic. A prime and urgent objective was to provide modellers with a gridded data set, but it was clear that ther were difficulties in this because different criteria used by the various data sources. For example, in sand wave areas, the depth of the crests of sand waves will be taken, if the objective of the survey is navigational safety.

A subgroup, consisting of Jones, Dalzell, Adam and the Chairman will, during the inter-sessional period, look into the feasibility of creating a digitised dataset of the bathymetry of the North Sea.

6.9 Methods for screening BT data

T Dalzell's draft on "Guidelines for Evaluating and Screening of Bathythermograph data" was now ready for the preparation of a final draft, following the incorporation of comments received.

6.10 Review ROSCOP form

The Hydrographer drew the attention of the meeting to the Council Resolution requesting him to respond to the request of the IOC Group of Experts on Format Development to make proposals for a new ROSCOP form, and report to IODE-X11 (Moscow, December 1986). He explained that this request had been made during the Copenhagen meeting of the Group of Experts, following a demonstration of the computerised handling of ROSCOP information at ICES.

In making this review the Hydrographer was asked to take into account existing comments already compiled (eg at previous MDM meetings), and additional comments expected to be received in response to a circular letter promulgated by the IOC Secretariat. It was the clear wish of the Group of Experts that there should be no radical change to the ROSCOP form, in particular existing codes should be retained.

In presenting his preliminary ideas to the Working Group, the Hydrographer remarked that he was in a good position to adopt a balanced approach, as the SH was responsible for the "banking" of ROSCOP forms from many ICES countries. He was looking at ways to simplify the form to make the task of ICES easier, and quicker, and presumably that would also make the task of other data centres easier. He was also taking into account the fact that the vast majority of ROSCOP forms are filled in centrally (including the data centres), or by one person within an Institute. Thus although the original intention was for the form to filled in by the chief scientist or his substitute, this was normally not the case. The Hydrographer said that he considered that this fact provided more flexibility in the way a revised form may look.

The Hydrographer had identified three areas that required substantial revision viz:-

1) Ergonomics. The present form was rather user-unfriendly and contained far too much information and was too rigid.

2) Position information. The present system was far too complicated, unsuitable for data bases without conversion and subjected to a wide ranging resolution. The Hydrographer did not agree with suggestions made by some, that minimum and maximum cartesian coordinates should be used. This, he considered was the worst possible compromise.

3) Time series data. The present form did not cater at all well for this type of data.

Based on these criteria, the Hydrographer considered that the basis of his proposals, subject to the agreement of the working group, will be that the form should be divided into 4 sections viz (i) General information; (ii) Geographic information, (ii) non-time series parameter information and (iv) time series parameter information. Details are:-

i) This section will be simplified, removing all information that most do not understand (such as DNP). A questionnaire type approach will be used.

ii) The basis of this section will be maps of 5^0 Marsden squares. The area of working will be designated by an 'x'. The opportunity will be given to record any fixed (anchored ship) positions, and general geographical descriptions of localised areas, where relevant.

iii) It is proposed that this section will be radically altered. ROSCOP parameter code lists will be kept seperate. The person completing the form will record the appropriate ROSCOP parameter, number (of stations), and queries/designation address, and if applicable, a plain text description. Under description, information on data restrictions may be entered and the actual type of observation may also be entered here, to cater for those who do not wish to go to the trouble of finding the ROSCOP parameter. In other words it may evolve that the ROSCOP parameter will be for the use of a data centre only.

iv) The section on time series (moored data) is a completely new proposal. It is suggested that it is completed only on the cruise that a mooring is recovered, and consists of the ROSCOP parameter, period in days that the mooring was deployed, latitude and longitude, and description (if applicable).

In considering these proposals it was remarked that the ROSCOP form should not be regarded as a storage form, but rather as a reporting form. Thus the needs of most data centres will be met as it is becoming common practice to transfer information from the forms into computer files. This is presently the case at eg NCOG, BNDO, DOD, ICES and JODC (Japan).

In general the working group were content with these proposals and asked that the Hydrographer keep them informed of future developments on this matter and looked forward to seeing the new layout of this form at its next meeting.

7 Time and place for next meeting

Following an offer from the Chairman, it was agreed to propose that the next meeting of the WG should be held for 4 days in De Bilt, Netherlands in late April/ early May 1987. Topics to be considered should include:

i) Further development of the ICES "Blueprint" for providing a framework for the handling of multi-disciplinary data and information.

ii) Contaminant data: progress, experience, new demands and developments.

iii) Handling of standard surface data.

iv) Review of progress concerning Taxonomic Code cross-reference table.

The ICES Hydrographer and Environment Officer should be present at this meeting.

8 Any Other Business

The Chairman brought up problems concerned with the archiving of data: What to archive? How? And for how long? Several criteria could be used for this, depending on the specific demands. Can there be ICES criteria? If so how would they look? Dr Dalzell and the Chairman will look into this in the inter-sessional period.

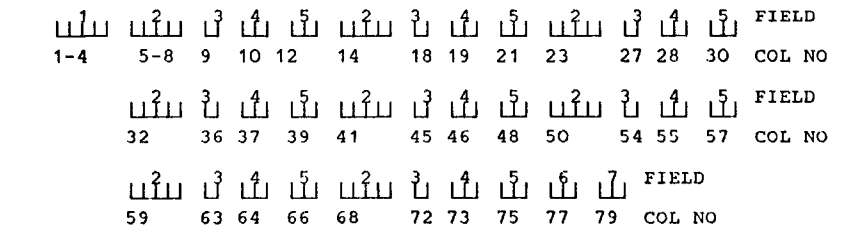
The Chairman raised the matter of inputting ICES papers into international literature systems, like ASFA/ASFIS. The Hydrographer explained that in future Abstracts of Statutory meeting papers would be published in a formal publication and it is likely that these will find their way into such systems. The full papers, whether bearing a "not to be cited" flag or not, would however not be retained by the Secretariat and requests would have to addressed to authors.

The Chairman mentioned that last year's report of the Statutory meeting mentioned the possibility of setting up a data bank for information on plankton blooms. The Environment Officer will look into this and report to the Chairman on the results.

9 Closure of Meeting

In closing the meeting, the Chairman paid tribute to his predecessor, Dr Meirion Jones, and presented to him a tangible token of the group's esteem. He regarded him as a most valuable member of the group and expressed the hope that he will remain active on it for many more years.

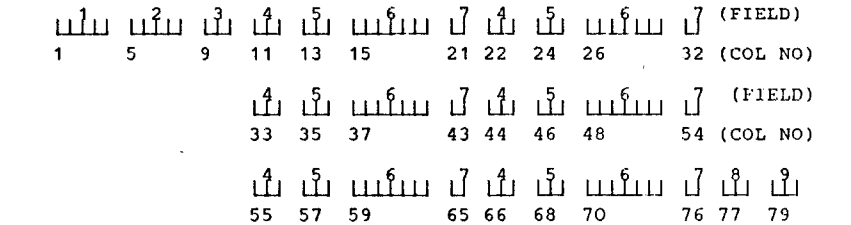
A. PARAMETER RECORD



FIELDS:

1 Country/ship
2 'GF3' parameter code
3 units flag (GF3)
4 method identifier
5 SET code (to link with data field)
6 spare/next record flag
7 Record code (02)

B. DATA RECORD



FIELDS:

1 Country/ship
2 Station/sequence no.
3 year
4 SET code (ref par card)
5 qualifier
(quality flag + < > indicators)
6 value (6 figs, r. justified)
7 no of decimal places in value
8 spare/next record indicator
9 record type (10)

Marine Information System (MARIS)

Lecture given by ir. H.G.H. ten Hoopen and ir. D.M.A. Schaap of the North Sea Directorate of the Ministry of Transport and Public Works of the Netherlands at the meeting of the ICES-workinggroup "Data management" 2 May 1986 - Copenhagen, Danmark.

1. Introduction

Recently Rijkswaterstaat, one of the departments of the Ministry of Transport and Public Works in the Netherlands, has taken the initiative to develop an information system on behalf of policy, management, design, execution of works and research, related to the North Sea. It is called "Marine Information System" (MARIS) and will be for use of public authorities, trade and industry and private persons.
In the following an explanation is given of the political and social backgrounds, the export possibilities and the ideas about the realization. Both technical and organizational aspects are highlighted.

2. Backgrounds

2.1 Activities at the Dutch part of the North Sea

In a geographical sense the Marine Information System deals primarily with information of the Dutch part of the North Sea. Because of management and policy the North Sea is divided in subarea's, for which the different coastal states are responsible. This division is particularly of interest in case of mineral wealth, such as oil and gas.
The Netherlands are responsible for the management and control of the Dutch part of Continental Shelf, shortly DCS, with an area of 57.000 square kilometers.(see figure 1)

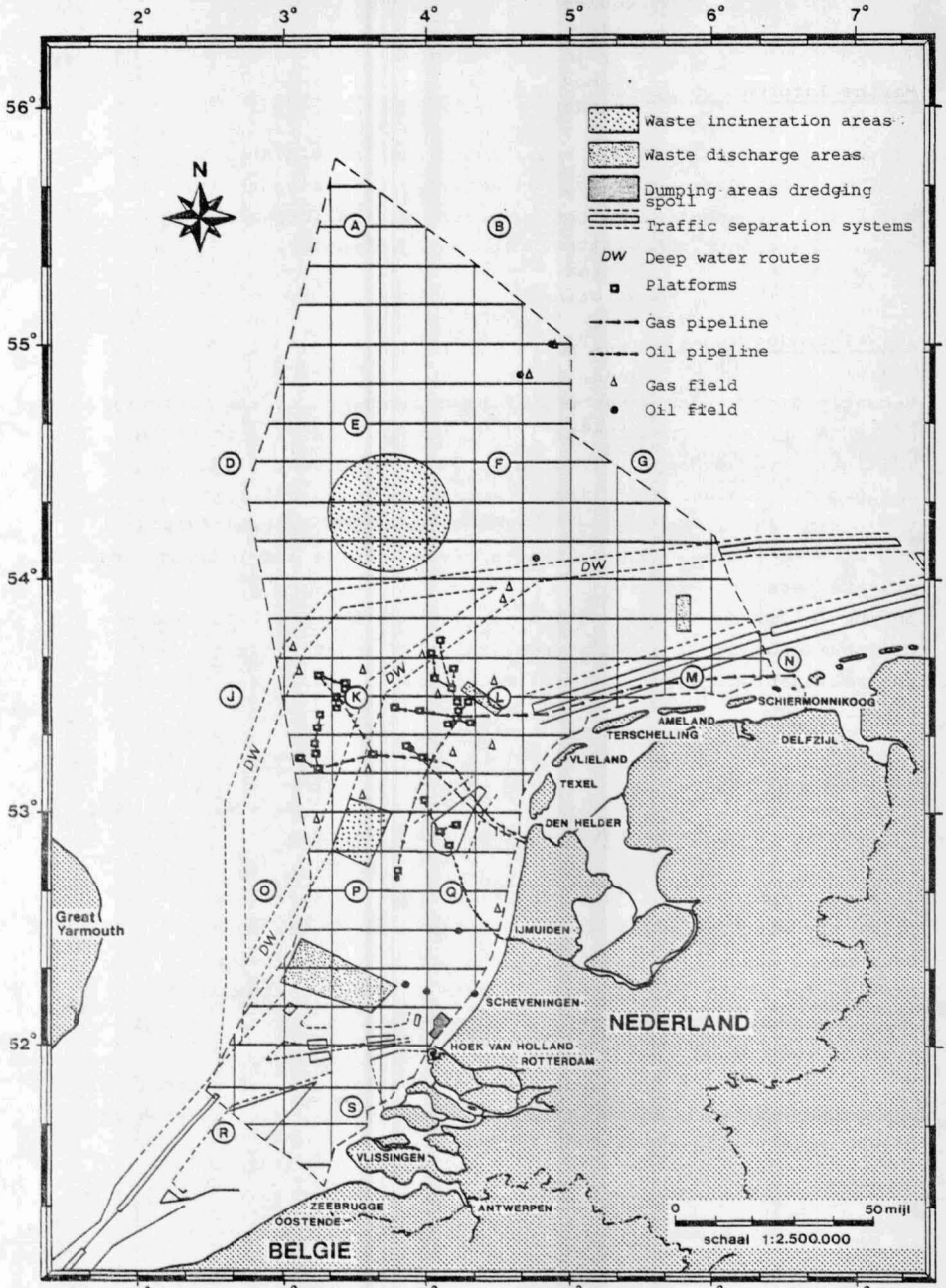


Figure 1:
Dutch section of the Continental Shelf and shipping/offshore industry

Worldwide, the North Sea is known as one of the busiest seas, in which a great variety of activities takes place. The activities contribute to the welfare and prosperity of the surrounding coastal states.
One of the most striking activities is shipping. Per year the Dutch seaports import approx. 250 million tons of cargo and export approx. 75 million tons.
The amount of shipmovements at the North Sea is about 420.000 per year, of which the greater part takes place along the Dutch coast.
To conduct this traffic sealanes are defined, given as "highways" in the charts.

Next to this fishery is an old and important activity. Per year approx. 2.5 million tons of fish is caught in the North Sea, of which the Netherlands acquire approx. 300.000 tons.

Another important activity is the offshore-industry. At this moment there are approx. 10 movable and 30 fixed installations on the DCS. The oil- and gastransport to the mainland is mostly arranged by pipelines.

Alltogether shipping, fishery and the offshore-industry already occupy a large part of the DCS-area. Next to these other activities, like recreation, military exercises, dumping and combustion of industrial waste, etc. take place (see figure 1). Often these activities are in contradiction with each other.

As the foregoing shows, the North Sea is of great economical importance to the Netherlands. The potential strained relationships among the activities on the DCS ask for attention. A good management to tune these activities is more than ever necessary.

2.2 Harmonization of the Dutch North Sea policy

In the Netherlands many different departments, each from it's own point of view and interests, deal with the activities on the DCS.
At first no form of co-ordination existed among the policies of the different departments. In parliament the policies only came up for integral discussion (per separate activity) during the debate on the budgets of the different departments.
However due to the increasing activities on the DCS interest slowly arose into the connections and strained relationships among the before mentioned activities. Especially the awareness of the environment in the seventies and the increasing need for good co-ordination led in 1977 to the establishment of a so called Interdepartemental Committee of Co-ordination for North Sea Affairs, shortly ICONA. ICONA's main task is the continuous co-ordination of the various departments'policies involving the North Sea.
To facilitate their mission the ICONA has defined a policy framework, consisting of broad outlines and basic premises, which was accepted by parliament in 1984. The main guideline of this policy is to achieve a further development of activities on the Shelf, which shows harmony and balance.
To emphasize this aim an institutional frame work has been defined, with several procedures and deliberation-groups.
Also, an action-program was defined and set into motion meant to gain more insight into activities and their mutual relationships and to acquire means to plan and manage the activities.
This action-program is not rigid, but can be adapted to new views during the progress.

Some examples of actions are: a water quality plan for the North Sea, integrated ecological research, planning of mining-activities and regulations concerning the safety of shipping with regard to mining-activities.

2.3 The importance of information

Information about the environment and the activities at the North-Sea, i.e. rough data, research results, documentation and expert advices, are of vital importance for the development and execution of a North Sea policy. The execution of the action-program requires means to consider various kinds of information, coming from various sources, in an integral way.
Only then it is possible to penetrate complex processes, to discover mutual dependences and to develop integrated numerical models for, for instance, physical and marine-biological processes. Then the effects of human interferences and activities can be predicted and evaluated.

The importance of a well-functioning information service is not confined to the departments, in charge of the management and policy-making for the Dutch Shelf, but also extends to trade and industry and research institutes.
The basic information about the environment and the human activities determines for a great part the dimensions of civil works and the operating methods at sea.

2.4 Present availability of information in the Netherlands

The present availability of information in the Netherlands related to the North Sea does not meet the present needs. The information is scattered over a large number of departments, scientific institutions and trade and industry, whether or not collected in several kinds of data-bases (computerized or otherwise). Standardisation of the data-bases didn't take place up till now.

In general lines the availability of information is characterized by:

a) unacquaintance with available knowledge and information, with all consequences:

* precious measurements and research will (unnecessarily) be repeated;
* one has to be contented with limited information and consequently minor results;
* the search for correct information and expertise costs a lot of money and effort.

In this field (as reference service) the Netherlands Oceanographic Data Centre offers some relief.
However, restricted by lack of manpower and finances, this data-centre can only in some degree accomplish this role.

b) Inaccessibility of information (restricted standardisation, not exchangeable, too widely spread, too detailed and so on).

c) Insufficient possibilities to overlook all types of information in their mutual coherence quickly and efficiently.

2.5 MARIS-project

Because the present availability of information is not sufficient to carry out and to tune the Dutch North Sea policy, the ICONA agreed upon the proposal of Rijkswaterstaat to develop a Marine Information System and to incorporate this project into the Actionprogram.
To initiate this MARIS-project Rijkswaterstaat, as one of the organizations responsible for the management and policy of the Dutch part of the North Sea, has two reasons.
First: the above mentioned insufficient availability of information. Second: some years ago Rijkswaterstaat started the so called product-innovation-activities.
These activities aim at the initiation, development and realisation of innovative projects with promising export chances within the scope of Rijkswaterstaat activities.

These projects must be realized in close co-operation with other departments, trade and industry and scientific research institutes.

The MARIS-project is considered to be one of the product-innovation activities, for the following reasons:

1) Close co-operation with, among others, leading hard- and software houses and telecom is necessary to realize an easy accessible information system;
2) It is to be expected that there is worldwide interest for similar information systems in developing countries.

Eventually the export product may consist of a blueprint for the set up of an information system including the necessary hard- and software, to be delivered by the Dutch trade and industry on a turn-key-base.
Before proposing the MARIS-project to the ICONA a marketing-survey was made among several departments, institutes and trade and industries to establish the feasibility of this approach. Thanks to the positive results the MARIS-project was transformed within one year's time from an idea into an interdepartmental happening, which may be considered as remarkable.

3. Design outlines of the Marine Information System

3.1 System objectives

Roughly the following objectives must be fulfilled by the information system:

- it must give a general view of the knowledge and information, which are available in the Netherlands, spread over several government services, research institutions and private enterprises;

- information, important and relevant for several applications and therefore frequently asked for, must be well accessible, to a great extent automatically, and it must be possible to exchange this information between the participating members in an easy manner;

- it must be possible to execute a quick survey of for instance boundary conditions, territories, environmental zones, location-fixed activities and so on. This concerns a higher level of information, accomplished after an expert interpretation or processing of the basic information.
  To a great extent this involves graphical presentations and manipulations;

- there must be provisions to store and keep available historic valuable information on a permanent basis, in case the original sourceholders no longer whish to or can take care of the storage;

- it must be possible to implement several numerical models and applications in the system.
  Co-operations between experts must be broadened and intensified to operate and to interpret the results of the models into advices;

- the system must have a clearly recognizable entrance. A service-organization, which acts as intermediary in case of requests for information and advices and which can inform anyone about the Marine Information System itself.

The remark must be made that the word "system" is used for an integrated network, which involves both technical components and humans.

3.2 Project - phases

To promote the realization of the project an approach in stages is decided on. These stages are:
phase 1: an on-line referral service
phase 2: a data-storage and exchange system
phase 3: an advisory system.

The greatest effort and challenge gives phase 2 of the project: the objective of phase 2 is to optimize the accessibility and the exchange facilities of the information, available at the several services and institutions.
Finally it must be possible to exchange information, not only alpha-numeric, but also in a graphic form. To realize this objective will take a long way. Part of this process is the analyzing of the available data-collections and the need for information in behalf of several applications.
To get a general view of the information available a survey will be made among the several institutions, services and private enterprises. But because the results of this survey are already very useful in an earlier stage, it was decided to develop an operational referral-service as the first phase of MARIS.
This relative less, complicated first phase will partly act as a demonstration-project for MARIS and will stimulate the further development.

The third phase concerns the development and implementation of numerical models, which describe physical, chemical and biological processes. In this stage it must be possible to study and to analyze complicated processes, not only for research purposes, but also on behalf of management and policy-making. For instance it must be possible to use the Marine Information System as a tool to plan the several activities at the Dutch part of the Continental Shelf.

In the following the ideas about the first 2 phases will be illustrated. More details about phase 3 will not be given, because that is still to far ahead. The ideas about phase 1, the operational referral service, are the most concrete, because this part is already in execution.
The phase 2 must be seen as a rough concept, which is intended to give direction and food for thoughts, but which is not yet determined among all the participating parties.

3.3 Phase 1: Operational referral service

Objective:

"the objective of the operational referral service is to ease the identification of the existence, the location, the characteristics and the availability conditions of knowledge and information, related to the environment and human activities of the North Sea and to intermediate in the acquisition of this knowledge and information."

Structure of the referral service

The referral service will be composed of a technical and an organizing component:

- a central referral data-base, placed in a central computersystem, which can be searched on-line by participating users by means of a network with simple terminals, PC's and so on.
- a service- and management-organization, which takes care of the maintenance and management of the technical infrastructure and of the updating of the data-base, which assists if necessary in the searching of relevant references and which acts as intermediary in the acquisition.

Coverage and scope

Information is a word, which can be explained in several ways. In the case of MARIS distinction is made into disciplines and types of information.

The referral service will cover information concerning the environment and the human activities of the North Sea.

The environment concerns disciplines such as geology, hydrography, biology, meteorology, oceanography, ecology, pollution and so on, while the human activities imply shipping, fishery, offshore-industry, recreation, and so on, also including juridical matters, such as concession-area's, boundaries of territorial area's and so on.

The referral data-base finally will be composed of several autonomous subdatabases, variegated to types of information. At this moment the following subdatabases are considered:

- measurements and observations
- numerical models
- measurement instruments
- experts
- (potential) literature
- acronyms
- institutions (adress and speciality)

As a start the development of a subdatabase for measurements and observations is underway, because this is estimated to be very valuable and useful.

Marketing survey

To identify the target user community and their needs for certain types of information and certain disciplines more accurately a research and marketing bureau is executing a marketing survey. This survey will give a guideline for the priorities in the development of the referral service. Besides the willingness of participation in the network by means of an annual subscription will be scanned at the potential users.
The marketing survey will also serve as some form of pre-announcement for the coming MARIS.

Functioning and management of the referral service

Central in the referral service is the referral data-base system, which will include a relational data-base, for reasons of flexibility to searching and changing.
The users can search the data-base system by means of on-line terminals. In the first stage use will be made of telephonelines with a modem-connection. Later on depending on the frequency of use and the amount of users communication will be possible by way of the digital network, exploited by the Dutch Post and Communications Department, the so called DATANET 1.

The charges for this network are dropping, the network is already compatible to most terminals and PC's and the amount of enterprises and services already connected to this network is growing steadily.
So there are a lot of advantages to make use of this technically advanced and trouble-free network.

To deliver new references and mutations the source holders are also connected to the central system. They deliver their new supplies in the right form automatically to a buffer-database, which will be checked by the central data-base-manager, before it is transferred to the on-line referral data-base.

In principle the source holders are responsible for the contents of their share; the data-base-manager only checks if tne references are consistent and obey the rules for filling in the references.
To co-ordinate this process the data-base-manager and the source holders will meet regularly.

In the use of the referral data-base an optimal user-friendliness is strived for: translated, the system has to be so simple, that the users don't need to take any courses. The system must lead the users. This implies the use of menus and of help- and instruction-functions.

All the subjects or parameters in the data-base will have an unique identification label. These labels are the ends of a hierarchical system of controlled keywords, a thesaurus, which is under development at this moment.
This thesaurus can be used as help to enter a sub-data-base on its identification label.
It is also possible to go straight into the sub-data-base, ignoring the thesaurus.

Once connected to the sub-data-base the actual searching and retrieval can take place, using primary keys with controlled terms, also shown in menus, or using secondary keys with uncontrolled terms.

Once a relevant reference has been found, this can be ordered at the source by means of the telephone or by visiting or by use of the electronic mailservice which will become part of the system.

Other features, meant for the management of the referral service are a tracking-system and a charging-system.
The tracking-system will give user-statistics, useful for the further development.

Composition of the sub-data-base - measurements and observations

Largely inspired by the National Environmental Data Referral Service (NEDRES) of the North American NOAA a composition for the references in the sub-data-base measurements and observations has been made.

The reference contains 16 data-elements. The first 4 can be searched with controlled terms, to be chosen from menus.(see table 1)

DESCRIPTION OF THE DATA-ELEMENTS

DATA-ELEMENTS				
Number	Label	Name	Function	Use
1	DD	Data Description	Search, *Display	Mandatory
2	PE	Period of Record	Search, *Display, Value Parameter	Mandatory
3	GP	Geographic Place Names	Search, *Display	Mandatory
4	GC	Geographic Codes	Search, *Display, Value Parameter	Mandatory
5	GL	Grid Locators	(Search), Display	Mandatory
6	DC	Data Collection Description	(Search), Display	Optional
7	DQ	Data Quality Control Description	(Search), Display	Optional
8	DP	Data Pre-processing Description	(Search), Display	Optional
9	AA	Availability Address	(Search), Display	Mandatory
10	AC	Availibility Conditions	(Search), Display	Mandatory
11	PO	Processing/Collecting Organization	(Search), Display	Optional
12	PN	Project Name	(Search), Display	Optional
13	PU	Related Publications	(Search), Display	Optional
14	RR	Related Records	(Search), Display	Optional
15	DT	Data Entered/Updated	(Search), Display, Value Parameter	Mandatory
16	AN	Accession Number	(Search), Display, Value Parameter	Mandatory

* search with controlled terms ;

Table 1

To give some explanation: the first data-element describes the subject or parameter of the measurement or observation in terms or the phenomenon/entity/zone/object and/or variable, the environment in which the parameter has been observed and method or instrument used.

For the geographic place names the geographic indexing in MARIS is related to the geological division of the North Sea, applied by both the British and the Dutch Geological Survey. For the geographic codes three coding systems are used, which can be transformed easily.

These coding systems are:
- the Continental Shelf Code
- ICES coding system
- MARSDEN-squares coding system

Planning

It is planned to operate an interim-on-line database around the middle of '87 within a select group of participants.
This experience must lead to a definite system and the public launching around the middle of '88.
The volume of the data and the types of subdata-bases will enlarge gradually.

3.4 Phase 2

The objective of the second phase is to optimize the accessibility and the exchange facilities of the information, available at the several services and institutions. Particularly this involves the information, which is or will be frequently needed for several applications. To solve this problem the building of several discipline-oriented data-bases is considered.

A very important design criterium is that the organizations, responsible for the acquisition of the information, stay responsible for the maintenance and management of the data-bases. Per type of information this requires agreement among the organization about tne method of storage and management and the classification of parameters.
To search the data-bases a datacommunication-network will be developed. Finally it must be possible for a participating user to search the different data-bases in an unique way, regardless of the used computer hard- and software.

The above mentioned data are alpha-numeric and mostly detailed information. In addition to these data there is also a great need for a higher level of data, conceived by an expert interpretation, processing or composition of the basic information. To a great extent this information will be of a graphic nature.

To serve this purpose an image-information system is considered. With this system an abstract or a view can be given for several parameters.
One can think of a survey of infrastructure in a certain area, such as pipelines, telephone cables, wave climate, geological profiles and so on.
This image-information system also will serve as an sort of stand to make connections to the discipline-oriented data-bases.

Finally provisions will be made to store historic valuable informations, which the original source holder no longer can store.

The Dutch industry can play a great role in the development and implementation of the hard- and software, which will be set up as standard modules where ever possible.
Especially the use of optical storage-medium for the several data-bases is considered; also the image-information system gives a great challenge.

The communication-network will probably be integrated into the research-network, SURFNET, which is being installed at this moment among several universities and research-institutions in the Netherlands. This network is based on the DATANET 1, exploited by the Post and Communication Department.

3.5 Project management

For the MARIS-project an extensive project-organization has been set up, consisting of a steering committee, a co-ordination team with added a project-bureau and several workinggroups.
Participating are the several departments, research institutions and some representitives of industry.
The industry is involved in three ways: as a source holder, as an user and as a constructor/designer of the system.

The project bureau plays a central role in the planning and development of the system. Together with two advisory-groups (technical aspects and financial and management aspects) and several experts the project bureau will develop in consultation with the participating organizations a masterplan of activities for the main concept of the information system.
This masterplan, which will be further developed during the project, is evaluated in the co-ordinating committee and after approval translated into activities regarding the actual information for the discipline-oriented working-groups.
Next to this the project bureau is responsible for documentation, secretariate and public relations.

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