

International Council for the
Exploration of the Sea

C.M.1984/Gen:21

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REPORT OF THE WORKING GROUP
ON ADP MATTERS

Copenhagen, 16-21 May 1984

TABLE OF CONTENTS

	<u>Page</u>
1. PARTICIPANTS	1
2. TERMS OF REFERENCE	1
3. INTRODUCTION	1
4. THE CURRENT ICES COMPUTER FACILITIES	2
5. REVIEW OF WORD PROCESSORS	3
6. UPGRADING OF THE ND-100	6
7. DETAILS OF COMPUTER CONFIGURATION REQUIRED	9
8. JOINT SESSION WITH THE MARINE DATA MANAGEMENT WORKING GROUP	10
9. COMMUNICATION FACILITIES	10
10. PROGRESS AND PROBLEMS ARISING IN THE IYFS EXCHANGE AND DATA BASE	11
11. EXCHANGE OF INFORMATION ON COMPUTER SOFTWARE ...	13
12. RECOMMENDATIONS	13
13. REFERENCES	14
FIGURE 1	16

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1. PARTICIPANTS

R Branton	Canada
H P Cormus	Federal Republic of Germany
W Dekker	Netherlands
C A Goody (Rapporteur)	United Kingdom (England/Wales)
W B Hall (Chairman)	United Kingdom (Scotland)
K Laumann	Denmark
R Lind	Sweden
P Mäilki	Finland
P Möller	Sweden
C de Verdelhan	France
T Westgård	Norway

W L Panhorst, ICES Systems Analyst and Ms K Paine, Chairman of the Statistics Committee, also attended the meeting. J M Pedersen (Denmark) attended the meeting during part of the first day.

2. TERMS OF REFERENCE

At the 1983 Statutory Meeting it was decided (C.Res.1983/2:6) that the Working Group on ADP matters should meet from 16 to 21 May 1984 at ICES headquarters under the chairmanship of Mr W B Hall to:

- (i) review the recommendations of the Secretariat's medium-term plan for acquiring word-processing equipment and for enhancing the Council's computer facilities. The review should take account of relevant national computer facilities and plans for their development with a view to making recommendations for the optimal development of the Council's facilities. The Group should report its findings to the Council through the Bureau at its mid-term meeting,
- (ii) discuss the progress and problems arising from establishing the IYFS data base at ICES headquarters,
- (iii) consider the possibilities of establishing direct connections between computers at the national institutes in the member countries and at ICES headquarters,
- (iv) exchange information on experience with statistical packages, fish stock assessment packages, standard plot routines, etc.

3. INTRODUCTION

The meeting was opened with some introductory remarks from the General Secretary, Mr Parrish, in which he stressed the importance of the work of the Group to ICES. He hoped that the Group would be able to advise on the computing and word processing developments for ICES, both in the immediate future, and as longer term strategy.

The agenda was adopted, as proposed.

4. THE CURRENT ICES COMPUTER FACILITIES

The Systems Analyst outlined the computing facilities currently available to ICES viz.

- a) An ND-100 mini-computer located in the ICES building
- b) Access to the UNIVAC computers of the University of Copenhagen (RECKU)
- c) Access to the IBM computers of the Technical University (NEUCC)

The ICES computer is connected to the RECKU computers by way of a 2400 baud full duplex link and the connection to NEUCC is made through the communication link between RECKU and NEUCC or by a 300 baud dial up line.

The NORD Computer

The NORD computer has recently had an increase in main memory to 1 megabyte to allow the latest release of the SINTRAN H operating system to be installed. Currently, the available software on the machine is a BASIC interpreter/compiler, a FORTRAN 77 compiler, a screen editor (PED), a data entry package and the Numerical Algorithms Group (NAG) mathematical and statistical analysis programs.

The main function of this computer is to process data required by the Assessment Working Groups and for data entry. The assessment programs require a fair amount of calculation with a low input/output load. As it is presently configured the system is not suitable for handling large data bases and jobs requiring large volumes of data are handled either at RECKU or NEUCC.

RECKU

RECKU is a university centre used by many scientists and the software available is generally of a high standard. Considerable interest is being shown in the use of the Scientific Information Retrieval (SIR) database language and the university has provided ICES with a student for six months to establish anSIR database for the International Young Fish Survey (IYFS) data. Part of the terms of reference of RECKU is that they provide preferential service to Danish Government departments and ICES is regarded as being in this category by the University.

The UNIVAC mainframes at RECKU are extensively used by ICES for magnetic tape data exchange and for holding large volumes of data, such as the STATLANP and IYFS projects. ICES also uses the computer centre for production of the Bulletin Statistique and for the intermediate listing of some of the tables in this publication. Back-up storage of the Assessment Working Groups' data files is done at RECKU.

Current charges from RECKU are approximately D.Kr.3,000/month and it is expected that this will increase by about D.Kr.1,000/month with the projected increase in workload.

NEUCC

The software facilities provided by NEUCC are very similar to those at RECKU. At present, the Service Hydrographique uses this centre for all its processing but a move to RECKU is being considered, because of the better service given at the UNIVAC mainframe.

5. REVIEW OF WORD PROCESSORS

The basic requirements of a word processing facility for ICES were proposed as follows:

- Ability to produce text in English and French.
- Capability for including Greek/scientific notations, and italic characters for scientific names in both the English and French text. These characters are to be displayed on the terminal screens, and output on the printers.
- High quality matrix printer output is acceptable for ICES requirements. Indeed it is considered more important to have the mixture of fonts supported by this type of printer, than to have the higher quality printing produced by daisywheel printers.
- In order to produce Working Group Reports in the most effective way it is important that all of the typing staff have access to all the files held on the word processor. This will favour the use of a centralised file handling capability rather than relying on floppy disc files associated with stand-alone work stations.
- It is imperative that adequate back-up is provided so that ICES typing services remain operational in spite of failure of a single device.
- Although many Working Groups produce tables and graphs associated with their Reports, these are usually appended to the text rather than being imbedded in it. It is not therefore considered essential that the word processor is capable of generating these items. They would continue to be provided by the data processing facility.
- The initial configuration should have 7-9 terminals with the ability for future expansions to twice this number.

A detailed discussion about these proposed requirements followed.

Some concern was expressed about providing a facility for French as well as English text, as this could increase the cost of the system while accounting for only 10% of the work. However there was general agreement that the ICES Secretariat must be able to support both the official languages, and that there were several suppliers who could provide this feature as a standard item. It is recommended that at least one of the keyboards has a standard French layout.

All members of the Group felt that the ability of the word processor to cope with scientific notation was an important issue but concern was expressed about the financial implication, some members feeling that it could double the cost of the installation, while accounting for a relatively small amount of the typing task. A hybrid system of word processors was considered, comprising of some low cost, non-scientific work stations, and some compatible, but more sophisticated devices which could meet the more demanding requirements. This arrangement had some attraction as Working Group members who chose to make use of the word processing (WP) facilities at peak times would only wish to use a simple device. It was eventually agreed that such an arrangement should be recommended only if it offered substantial financial savings to justify the extra operational difficulties which would result. It was eventually agreed that the use of scientific notation and mixtures of print styles was becoming more generally available now, and that ICES would, in the future, feel that its work was hampered unduly if this feature was not available.

The use of matrix printers was readily accepted by the Group as a fast and effective way of providing drafts of Reports with multiple print styles. It was felt that the quality of the print which can now be achieved with this type of device made it suitable for final copies of Working Group Reports and general correspondence. However, in the longer term ICES may wish to consider purchasing a "correspondance quality" daisywheel printer for producing letters to a higher standard (but perhaps not using any scientific notation). The connection of a phototypesetter to the word processor, in the future, at a cost of about D.Kr.300,000 would allow high quality offset litho plates to be produced directly by ICES, and help to reduce the present publication costs of D.Kr.1,000,000 per annum. Such an item could pay for itself in 2-3 years, but may put extra demands on the typing staff as at present all articles submitted by member countries are sent directly to printers for manual typesetting.

There was some reluctance to accept a centralised word processing system as it was felt that this increases the vulnerability of the system to hardware failures, and was against the trend of the technological development. Although many members of the Group were impressed by the features now available on stand-alone micro based systems, these currently did not have very good networking facilities and did not cater for all the features available on the more sophisticated centralised systems in a cost effective way.

Many of the Group were concerned about the proposal to supply 7-9 word processing stations initially as this gave a much higher ratio of work stations to staff than in any of the Group members home institutes. The principal reason for choosing this number was to cope with the high loading during the 3 months peak period when the Working Group meetings are held, although it was noted that these machines would be underutilised during the remainder of the year.

The suggestion that Working Group members should be provided with word processing terminals to allow them to generate some of their typing directly, sparked off a lively debate. Some members felt that it was wrong for Delegates to be pressured to undertake typing duties, others felt that this was becoming increasingly common, and acceptable, at their institutes. It was agreed that some word processing facilities should be made available for use directly by Working Group members, but it is recommended that pressure should not be put on the Groups to use this facility against their wishes.

Various methods of reducing the peak load on the typing services were discussed, including the staggering of Working Groups over a longer period of the year, and the generating of text at the home institutes of Working Group members after their meeting, the final copy being sent to ICES via floppy disc. These ideas were discounted as being impracticable. The Group however remained unhappy about the size of the initial configuration, as this would be underutilised for 9 months of the year.

Eventually it was agreed that the purchase of 5 work stations should be recommended, one for each of the typing staff involved in producing Working Group Reports. It was noted that if the same supplier was chosen for word processing and the data processing computer systems then the data processing terminals could also be used for typing facilities by the ICES technical staff and Working Group members. At least some of the existing typewriters should be retained for the production of correspondence, and ICES might consider renting extra terminals during peak periods.

The Group then turned its attention to the assessment of the products offered by the companies approached by the ICES Systems Analyst. There was some concern that the summaries provided were too biased towards centralised systems in general, and Norsk Data in particular, with the possibility that some likely contenders had not been invited to respond to the requirement. More liaison could have taken place with other institutes currently going through a similar exercise. It was acknowledged, however, that the time available to the Systems Analyst was limited and that the study had to be geared to the Danish market. The operational requirements given to the companies did not specify a particular solution, but the complex nature of ICES needs resulted in a bias towards the more sophisticated word processors.

At this point there was a demonstration of the Norsk Data word processing system, which was given by the company on the existing ND-100 with trial software supplied by the company. There was some feeling that the word processing application ran slowly and with more terminals might become unacceptable, but Group members who had experience of this system with 10-12 word processing users at their own institutes were able to offer reassurance that this had not been a problem in a working environment. The slow response on the current ICES computer was attributed to disc contention.

Although the Norsk Data system could support most European languages both in word processing and data processing modes, the full range of French characters could only be displayed easily if a French version of the keyboard for the display terminal was used.

The Group agreed that Norsk Data did offer a sophisticated, if rather expensive, product which met all of ICES requirements and accepted that it should be regarded as a baseline against which the other companies should be compared. On this basis the following companies were discounted:

- XEROX - even more expensive than Norsk Data!
- IBM - could not offer a multi-font printer
- BURROUGHS - could not display multiple fonts on the screen simultaneously
- WORDPLEX - poor handling of text to be moved across page boundaries
- OLIVETTI - no scientific capability
- AES (ESSELTE) - could not offer a multi-font printer and poor text manipulation in the Danish release of the software.

This left WANG and Norsk Data both able to meet ICES basic requirements. In cost terms WANG offered a significantly cheaper 7 station system D.Kr.584,000, compared with D.Kr.705,000 from Norsk Data. However, if a longer term view was taken and it was assumed that the system would be expanded to 14 terminals in the future, the overall costs were D.Kr.912,000 for WANG and D.Kr.936,000 for Norsk Data. It was noted by the Group that the two submissions did not offer identical facilities, in particular, for the WANG configuration only half of the work stations had the capability of displaying Greek characters, and the connection of phototypesetters to this machine was more complex than for NORSK Data, who supplied both devices. The WANG submission provided intelligent work stations with a central hard disc facility. Only one disc was provided in the 7 station submission so the whole system was vulnerable to a failure of this device. However, the 14 station configuration had two controllers so it was much more resilient. The Norsk Data submission did not provide for any hardware back up in itself, but if it was used in conjunction with the existing Norsk Data machine for data processing, then a full back up facility was available, and gave complete compatibility of hardware and software within ICES.

It was decided that the choice of word processor, and detailed discussions about the configuration to be recommended should be deferred until the data processing requirements had been discussed more fully.

6. UPGRADING OF THE ND-100

The Systems Analyst outlined the current data processing work undertaken by ICES. The existing Norsk Data computer is used principally for running assessment programs.

There are three classes of computing service provided to the assessment programs by the ICES computing staff:

A. Full Service

Programs in this class were developed and are fully maintained and supported by the ICES Systems Analyst. They include VPA and yield/recruit programs and are written in FORTRAN 77.

B. Working Group Specific Service

These programs are regularly used by specific Working Groups, and although the ICES Systems Analyst provides some support for them they remain the responsibility of the Working Group concerned. It was noted that there is pressure for the separable VPA and the Mesh assessment programs which are included in this category to be put in the class A service, and given full support by the Systems Analyst.

C. Ad hoc Service

These are user programs mainly written in BASIC which are merely held by ICES, with no support being provided.

The above programs are run mainly during the Working Group meetings, although the ICES Statistician uses them at other times during the year. Two major problems were associated with this area of work, disc space is severely limited, and several programs were restricted by the 64 k word partition size dictated by the 16 bit architecture of the machine. Although there was some scope for improving the situation by having programs and their associated data arrays in separate partitions, this would increase the size and run times of the programs because of the indirect addressing which would be required. This would only result in a temporary easing of the situation. It was agreed that a 32 bit machine, such as the ND-500 series would be required to solve this problem in a satisfactory way.

The Norsk Data computer is also used for data entry, the Statlant returns being the principal load. The contaminant forms for the Joint Monitoring Group data will be added to this in the coming year. The total load is relatively low. The Statlant forms take approximately 2 days per country to enter every year, in total about half of one person's time is expected to be involved in data entry. As data entry does not clash with Working Groups it is proposed that typing staff be increasingly used for this work. It is not felt that any additional facilities will be required to meet the task.

The Group agreed that the large data handling work should remain on the RECKU computer for the foreseeable future. It was noted that the use of SIR on this machine would allow applications to be moved more easily to another site should unforeseen problems occur. It would not be easy to transfer these applications to a Norsk Data computer, as a version of SIR is not available for these machines at present. The current batch links to RECKU are working well, the emulator does not place a significant burden on the ND-100, and the leased line only reaches 50% utilisation at peak periods. It was recognised that additional, interactive, connection to RECKU will also be required in the future to allow SIR retrievals to be set up in a more effective manner.

An assurance was given that no upgrade would be required to the environmental control equipment in the ICES building to service the extra in-house computing facilities which were envisaged.

At this point various methods of approaching the combined word processing and data processing requirements were considered. The most radical was to use the existing Norsk Data computer, suitably upgraded, to meet the word processing requirement and purchase a different manufacturer's 32 bit mini computer to provide the data processing facility. The DEC VAX range was

chosen as a representative example, which was well known to the Group. It was felt that such a solution would provide excellent word processing and data processing facilities, and many more software packages, including SIR, would be available than if a Norsk Data solution were chosen. There were however two severe drawbacks. No backup was provided for either the typing or the data processing work, and the operation of the system would be more complex because the ICES staff would have to become familiar with, and support, two operating systems and incompatible hardware. The problem of converting existing programs to run on the VAX was not considered to be a major factor, as most of these are written in FORTRAN 77 which is fairly easy to transport between the machines, and this process could be carried out in stages with the ND-100 providing limited data processing and word processing support during the changeover period. The cost of this solution was estimated to be D.Kr.2,200,000-.

This proposal focussed the attention of the Group on the desirability of ICES opting for an integrated solution, with word processing and data processing supplied by the same company. The Group felt that this approach would make the most effective use of ICES staff, who were already under pressure. The word processing facilities provided by Norsk Data were very good, although rather more expensive than its main competitors, but by selecting this system the technical staff in ICES' Working Groups would have access to word processing facilities without extra cost. The computing facilities offered by Norsk Data were good in hardware terms, offering more power than the VAX for a very similar cost, but showing deficiencies in the availability of software. The Group agreed that, assuming the commitment to use RECKU was assured in the longer term, the most effective solution for ICES was indeed the integrated approach, although some reservations still remained about the total cost of this solution.

In the light of this decision both WANG and DEC were not considered further as potential suppliers for the current ICES enhancements.

The next option considered was to enhance the existing ND-100 computer to provide more disc space (but retaining the 16 bit architecture) and purchase a ND-100 Compact computer to carry out the word processing function. This provided a solution which is simple to operate and has full back up for both the typing services and data processing activities, but the computing facilities can only be considered as adequate for the immediate needs and there is a lack of software availability. At an estimated cost of D.Kr.1,400,000 this is the lowest cost solution available to ICES, but the Group could not recommend its adoption as anything but an interim solution.

The third configuration considered was to upgrade the existing ND-100 computer to a ND-550/CXA, which would provide a 32 bit environment, while retaining software compatibility for the existing ICES programs. The power of the 500 series machines is a factor of 5-10 greater than the 100 series, so such a configuration could cope with all the technical requirements of ICES. The 500 series also offers some improvement in the available software, for instance it can support SPSS. The cost of this solution is estimated at D.Kr.2,000,000. Although such an approach would certainly be attractive, being simple for ICES staff to administer while providing very good word processing and data processing facilities, the Group felt

that they could not recommend it because of the vulnerability of the whole system to a single hardware failure.

The last option considered by the Group was to upgrade the ND-100 to an ND-550/CXA, and purchase in addition the smallest viable configuration in the ND-100 range to undertake part of the word processing workload. In this regime most of the word processing requirements would be carried out by the small ND-100, but at peak times, the ND-550/CXA could be used for word processing and data processing work. This solution would ensure that word processing facilities were always available to ICES, without introducing undue operational problems for ICES staff. The estimated cost of this solution is D.Kr.2,200,000, about the same as the VAX option. All members of the Group agreed that this configuration met ICES requirements most effectively and should be recommended to the Bureau, although reservations remained about the cost involved.

7. DETAILS OF COMPUTER CONFIGURATION REQUIRED

Having established the general strategy the Group turned its attention to the detailed configuration and phasing of the development. It was generally agreed that the upgrading should be undertaken in stages, to spread the workload placed on ICES staff during the development period. A schematic representation of the proposal is given in Figure 1.

It was felt that the highest priority was to provide the word processing facility, increase the disc capacity available on the data processing machine and provide some graph plotting facilities. Phase one of the development should therefore include:

- ND-Compact I processor
- 512 kbyte memory
- 5 VDU's for word processing
- Multi font matrix printer
- 23 Mbyte Winchester disc (for word processing)
- 140 Mbyte Winchester disc (for data processing)
- 1 VDU for data processing (hydrography)
- 1 Magnetic tape drive for security copies of disc files
- Graph plotter
- Linking hardware and software for the two processors.

Linking the processors would allow copies of the word processing files to be passed to the data processing machine automatically at frequent intervals, so that the typing staff could quickly restart their work, in the event of the word processor CPU or disc going down. Graph plotting software will also be required, the ICES Systems Analyst will investigate the packages available commercially and from within the ICES community and recommend the most cost effective approach.

The estimated cost of this phase is D.Kr.980,000. Once this has been installed satisfactorily the data processing machine should be upgraded to an ND-550/CXA at a cost of D.Kr.1,020,000. At this time the peripheral requirements should be re-examined. The Group felt that it was likely that the need would arise at some stage for a further printer and up to 6 further terminals, one of which could be a graphical device.

The Group would wish to emphasize that the first phase of the proposed development is only intended as an interim arrangement. If there is a long delay in moving to the second phase, the word processor may require a memory and disc file enhancement and this would hold back the upgrading of the separable VPA and mesh assessment programs.

The above configuration and prices may need some adjustment after detailed discussion between the ICES Systems Analyst and Norsk Data.

The development proposed will have a significant impact on the routine work of the staff at ICES. Some areas of work can be expected to increase, and savings should be apparent in others. The Group did not investigate these in detail, but advise that a review of staffing levels be undertaken.

8. JOINT SESSION WITH THE MARINE DATA MANAGEMENT WORKING GROUP

A combined meeting of the Marine Data Management Group and the ADP Group took place and the proposals were discussed in general terms. The main concern from the MDM Working Group was that insufficient details had been obtained from other Groups about their long term requirements. The ADP Group felt that it could not take on such a role with the timescale allocated to reach its recommendations. However, the ADP Group was confident that the system proposed was powerful enough to cope with the extra demands which were likely to be placed on the system and that the configuration was capable of considerable enhancement, should unexpected demands arise.

9. COMMUNICATION FACILITIES

The ADP Group then re-convened and discussed the communications facilities required on the ICES computer. It was felt that a 2780 RJE link with member countries for the routine transfer of data was unnecessary as, currently, this exchange is carried out satisfactorily via magnetic tape. However, several of the Group members felt that it would be useful to have an X.25 interface on the ICES computer to allow interactive links to be set up, on demand, with the other institutes via the packet switched network. This would allow members of Working Groups to transfer small amounts of data quickly, and use specialist software on their own institutes' computers, while they are working at ICES. It was envisaged that all connections would be initiated by ICES to overcome potential confidentiality problems which could result from allowing external sites direct access to the ICES computer files. The confidentiality procedures on the ICES computer should be reviewed.

It is also recommended that an X.25 interface should be included in the initial development phase of the ICES computer, or acquired on short term rental for initial trials. Trial connections should be made to interested sites before it becomes a general service. It is suggested that the Norwegian institute be used as the first test site as they have Norsk Data computers, followed by the Lowestoft and Aberdeen laboratories.

The effect of significantly increasing the communication facilities between ICES and the other institutes on the need to upgrade the ICES computer was considered. It was felt, however, that this did not materially affect the recommendations.

The interactive connections to RECKU could be done either by the X.25 link which would incur connections and transmission charges, or by purchasing the Univac terminal concentrator emulation software supplied by Norsk Data and utilise the existing leased line. The decision should be made, on cost grounds, following further investigations by the ICES Systems Analyst.

10. PROGRESS AND PROBLEMS ARISING IN THE IYFS EXCHANGE AND DATA BASE

The Systems Analyst reported that an extensive verification program, written in Cobol, has been completed and been made operational at RECKU, producing an edited list of all coding errors found on the exchange tape. As yet no check is made on the NODC species code as the problems in the application of this code (discussed later) make it difficult to perform a proper checking procedure.

This led to a discussion about the role of the ICES Secretariat in the IYFS data exchange, and three aspects of data handling were recognised:

The data checking is presently performed at two institutes, viz. the Fisheries Laboratory in IJmuiden and the Secretariat. This is a rather unsatisfactory situation, but provided that a good communication is established this should not give major problems. However, as a checking program is now completed in the Secretariat and, because a standard checking procedure is advantageous, the IJmuiden Laboratory would prefer the data checking to be centralised in the Secretariat.

The timing of data submission was then discussed and some participants proposed that a strict time-table be set up. Others indicated that, although agreeing in principle, it may be difficult to commit oneself to such a time-table, as a series of factors that are difficult to control are involved. However, the meeting agreed that a time limit must be set and, considering the timing of the various Working Groups, it recommends that all data are ready for checking at 15 June and that a set of screened and corrected tapes is sent to the various coordinators not later than 1 July. To expedite the corrections it furthermore recommends that a national contact is specified each time a tape is sent.

The medium of data exchange to the checking institute has never been strictly defined. The Report of the Study Group on Computerisation of International Young Fish Survey Data mentions tapes as well as forms. The ADP Group strongly recommends that tapes are selected as the exchange medium since forms cannot be utilized in the data exchange programme until provisions for data entry have been made. In this aspect the Systems Analyst informed the Group that RECKU now has software facilities available to convert a series of floppy disc formats to Univac's file format, and that countries may send floppy discs to the Secretariat for testing these software facilities.

The submission of historical data is in various stages of development. The Federal Republic of Germany expects that age/length keys from 1964 onwards will be ready very soon and Scotland, although no information was available on the earliest years for which data are available, expects that submission will take place during this year. Norway has a set of selected species entered in the computer, but manpower is a limiting factor in entry of the remaining material.

The Group discussed the exchange format and concluded that it had several shortcomings. The Systems Analyst suggested that for checking reasons two separate record identifiers are introduced for area SMALKs (Sex Maturity Age Length Keys) and haul SMALKs, as the present method of distinction by spaces in the fields for station and haul number in case of area SMALKs is not very secure. The Group recognised this problem, but it noted that changing the format at this stage may delay the submission of tapes. Instead, it recommends that the Secretariat maintains a record of all

proposals for changes, and that a major review will take place after two to three years at an extra session of the Young Fish Working Groups, in cooperation with data processing staff of the various institutes.

The Group paid special attention to the utilisation of the NODC species code in the IYFS exchange. The list of species codes recommended to be used is based on the NODC species code but, when the IYFS project started, a substantial part of fish species was not coded and temporary codes were assigned. The NODC office was not requested to create new codes at that time and after publishing updates of the code list the official NODC coding system and the IYFS version became ambiguous. The Group discussed the implications and concluded that data may have been exchanged using incompatible versions of the code.

The Group was informed by Mr Goody that Mr D Harding of the Lowestoft Fishery Laboratory had corresponded with the NODC office and very recently obtained new codes for a series of species. This may imply that most of the species reported by the IYFS exchange are now coded by NODC and the Group decided that data exchange should now follow the official NODC list. It was therefore recommended that:

- (i) the Lowestoft Fishery Laboratory distributes an updated IYFS species code list to all coordinators,
- (ii) each coordinator will implement this coding system in the IYFS data exchange,
- (iii) tapes with 1983 and 1984 data received by the Fishery Laboratory in IJmuiden will be resubmitted to ensure that the correct species coding is applied,
- (iv) countries send to the Secretariat a list of each species reported, the scientific name and the code used.

Considering that the Secretariat is now able to perform the checking, it is furthermore recommended that all exchange tapes are checked by the Secretariat.

At this year's meeting of the Marine Data Management Working Group the NODC species code was discussed and the representative of the NODC office asked that ICES serves as a clearing house for new requests for NODC codes in the ICES area. The Marine Data Management Working Group has prepared a recommendation that ICES will provide such a service, and this recommendation is strongly endorsed by the ADP Working Group.

However, the NODC representative could not provide a guarantee for the continuation of the coding services, and the ADP Working Group therefore also recommends that a general survey is started in ICES about the application of species codes. It seems necessary, as recommended by the Marine Data Management Working Group, that ICES develops a service to convert between the several species codes presently applied in ICES. Some of these systems may take over the role of the NODC code but such systems can only be selected if conversion tables are available.

The Systems Analyst informed the Group that in the SIR data bases for the IYFS data and the pollution data it has been decided to use the Rubin species code system. The Rubin system is maintained by the Swedish Museum for Natural History and contains codes for most species about which data are

recorded by ICES. In fact, the Secretariat concluded that the set of species not coded by Rubin was substantially smaller than the set not included in the NODC code list and it was shown to be rather easy to receive new code allocations. Another advantage is that it is a mnemonic coding system and, as such, is to be preferred to the numerical NODC coding system in applications such as searching through a data base.

Several other coding systems were discussed, among which FAO's 3-alpha species code and codes consisting of the complete scientific species name. The Group concluded it was difficult to give a judgement about a code, as codes that are very useful in some applications may be insufficient in others. However, it recommends that ICES should set up one single species coding system for data exchange and that it should aim to apply this coding system in any data exchange project. The Rubin coding system may well be a likely candidate, but the long term commitments of the Swedish Museum for Natural History should be carefully discussed and more information should be made available before this might be considered.

11. EXCHANGE OF INFORMATION ON COMPUTER SOFTWARE

The Canadian representative made a presentation of recently completed and developing software applications. The major topics on the presentation included:

- The International Observer Project, the Ichthyoplankton project, and Geographical Abundance Plotting Package systems on the Control Data Cyber 173
- Data Quality System and Research Cruise analysis systems on the Hewlett Packard 3000
- The shipboard collection system on the Hewlett Packard 1000
- Assessment analysis programs on the IBM personal computer.

The Norwegian representative described some of the features available on the GPGS-F graph plotting software package. Some of the more commonly used routines could be provided to ICES and it was agreed that the Systems Analyst liaises with the Norwegian representative. Other representatives described the software facilities available in their laboratories but, in the main, these were of a specialised kind and did not appear to be capable of being transported to other computer sites.

12. RECOMMENDATIONS

The Working Group recommends:

Computing recommendations

- (1) that a combined word processing and data processing system be established at ICES. As described in detail in the Report, this will consist of an ND-COMPACT computer servicing 5 word processing terminals and an ND-550/CXA computer for data processing.

The implementation of this total system has staffing implications and it is recommended that this system be implemented in two phases:

- (a) the introduction of the word processing system, the provision of a plotter and increased disc capacity for the present ND-100
- (b) the upgrading from the present 16-bit ND-100 to a 32-bit ND-550/CXA and, possibly, additional word processing equipment.

If the second phase is delayed, the ND-100 may require extra disc capacity and memory and provision should be made for this.

- (2) that ICES consider connecting a phototypesetter to the ND-550/CXA when installed. This could reduce considerably the publication costs currently incurred.
- (3) that an interface to the international public packet switching network X.25 be established as soon as possible and that the link is tested between various national laboratories, starting with the Institute of Marine Research, Norway, which has similar computing equipment

IYFS recommendations

- (4) that ICES take over the responsibility for checking of all exchange data tapes
- (5) that all data from a national IYFS set be sent for checking by the middle of June in each year and that the screened and corrected tapes are sent by the ICES Systems Analyst to the various coordinators not later than 1 July. Agreed contacts for solving problems associated with these tapes should be supplied each year when the magnetic tapes are sent to ICES
- (6) that the ICES Secretariat maintains a record of all proposals for change in data formats and that a major review takes place after two to three years at an extra session of the IYFS Working Groups
- (7) that an updated list of the IYFS species code is circulated quickly to each participating country by Lowestoft Fisheries Laboratory and that the previous tapes be resubmitted
- (8) that ICES serves as a clearing house for new requests for NODC codes
- (9) that a general survey is started by ICES on the application of various species codes and that a single species coding system for data exchange should be established.

13. REFERENCES

Several documents were used during this meeting including two especially prepared by the ICES Systems Analyst. The documents were:

- (1) Medium Term Plan for Staffing and Investment (Doc.C.M.1983/Del:6).
- (2) Functional Description of Word Processors for ICES.

- (3) A summary of steps taken in the Secretariat to follow up item (2) prepared in July 1983.
- (4) Detailed budget requirements for computer enhancement prepared in July 1983.
- (5) Updated configuration and prices for word processing and ND-100 enhancement prepared in May 1984.
- (6) Installation of word processing and implementation of the ND-100 enhancement. A discussion paper prepared for the Working Group on ADP matters in May 1984.

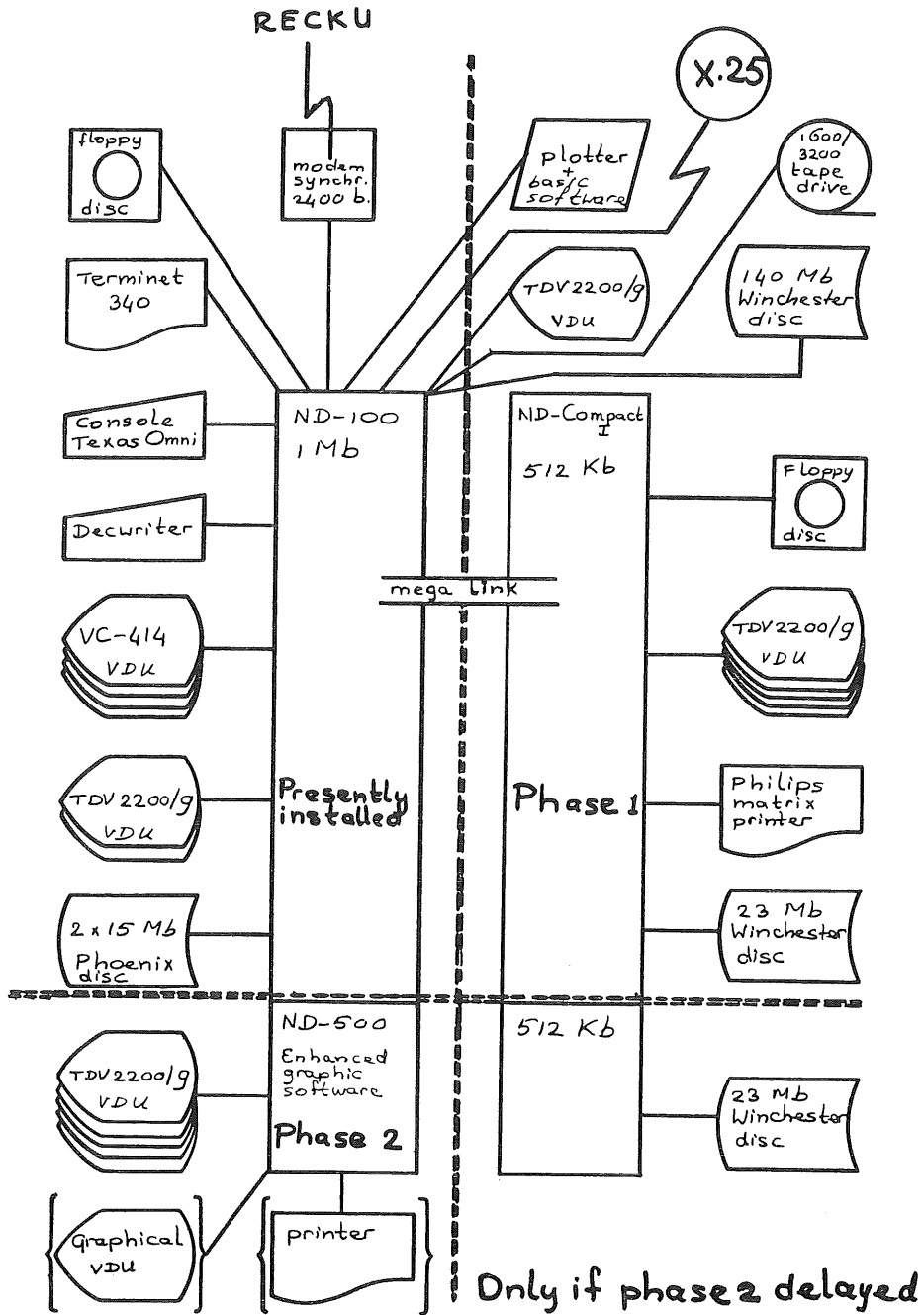


Figure 1

