Dossier del BHI No. S3/2620

CIRCULAR LETTER 27/2004
23 de Abril del 2004

Información GEBCO de la OHI /COI

Estimado Director,

La presente Circular es para mantenerle informado sobre el progreso de varias actividades relativas al Proyecto GEBCO de la OHI / COI.

a) "Nippon Foundation" – Proyecto de Formación GEBCO:

- Un Grupo de Evaluación de la Organización Docente de GEBCO *(Teaching Organisation Evaluation Group)* (TOEG) revisó seis propuestas procedentes de cuatro países y eligió la Universidad de New Hampshire, en Durham, New Hampshire, EE.UU., como Institución de Formación, que dirigirá el Programa de Formación. GEBCO está ahora negociando un contrato con el Centro de Cartografía Costera/Centro Hidrográfico Conjunto de la UNH;
- GEBCO ha anunciado también que habrá un administrador de Proyecto, el proceso de selección está en marcha;
- El BHI completó la primera fase del proceso de selección de estudiantes, invitando a los Estados Miembros mediante la Circular No. 10/2004 de la OHI a proporcionar los CVs de sus candidatos. Los CVs recibidos hasta ahora (12) han sido transmitidos al Presidente del Comité Director GEBCO de la OHI /COI y al Secretario Permanente de GEBCO, para su consideración por el Comité de Selección establecido para examinar las solicitudes y llevar a cabo las entrevistas necesarias. Los resultados serán comunicados al BHI y a la Secretaría de la COI, para su aprobación;
- Tan pronto como haya finalizado el proceso de selección, el BHI informará a los Servicios Hidrográficos que hayan propuesto candidatos, proporcionando el nombre de los estudiantes seleccionados.

ACCION: No se requiere ninguna acción por parte de los Estados Miembros.

b) Propuesta de una nueva Estructura para el Programa de Cartografía Oceánica de la OHI / COI:

- El año 2003 fue un año importante en la vida del Proyecto GEBCO: Celebraciones del Centenario del Proyecto; publicación de la 3ª versión del GDA en esa ocasión; y el hecho de que hubo un aumento considerable en la conciencia de los científicos con respecto a la batimetría global;
- Durante más de 100 años, GEBCO ha cubierto con éxito las necesidades de la comunidad oceanográfica y eso ha llevado a un conocimiento mejor del relieve del fondo de los océanos mundiales, que es la misma base de muchos proyectos que cubren varios aspectos de la oceanografía.
- Para la OHI y la COI, las organizaciones matrices de GEBCO, parece natural que el objetivo de ambas sea mejorar el programa existente, para hacerlo más eficaz y para que cumpla los requerimientos del Siglo XXI.

- Las Secretarías del BHI y de la COI han estudiado la estructura actual de GEBCO y de la Cartografía Oceánica en general y han propuesto un proyecto de nueva estructura organizativa para actividades del programa de cartografía oceánica en la OHI y en la COI, que será sometido a los Estados Miembros para su consideración y comentarios. Hasta ahora, ha sido transmitido el Presidente del Comité Director GEBCO de la COI / OHI y al Presidente del Grupo Consultivo de la COI sobre Cartografía Oceánica, para sus comentarios.
- Aprovechando el próximo Consejo Ejecutivo de la COI (Junio del 2004), el Grupo Consultivo de la COI sobre Cartografía Oceánica (CGOM) presentará esta iniciativa y se anticipa que el Consejo Ejecutivo adoptará una Resolución, que invita a la COI y a los representantes de los Estados Miembros de la COI a expresar sus opiniones al Secretario Ejecutivo de la COI y al Presidente del Comité Directivo del BHI sobre la dinámica propuesta para los mecanismos de apoyo de la cartografía oceánica, reuniendo a GEBCO y a las IBCs en una Junta de Cartografía Oceánica de la OHI / COI. Las Secretarías de la COI y del BHI prepararán conjuntamente, y someterán el texto final de este nuevo mecanismo de coordinación a los órganos de gobierno respectivos de la COI y la OHI en el 2005, para su aprobación.
- En el Anexo "A" encontrarán un Proyecto de Documento de Trabajo, incluyendo la Propuesta. También se adjuntan, en los Anexos "B" y "C", otras estructuras diferentes desarrolladas, preparadas y presentadas por algunos de los participantes que asistieron a la última Reunión del Comité Director de GEBCO (Abril del 2004).

  ACCION: Se ruega a los Estados Miembros que proporcionen sus opiniones y comentarios sobre esta iniciativa, de modo que se reciban en el BHI **antes del 31 de Octubre del 2004.**

c) Resumen de la XXª Reunión del Comité Director Mixto COI / OHI de GEBCO

- La XXª Reunión del Comité Director de GEBCO (GGC) se celebró del 1 al 6 de Abril del 2004, en la Isla de Palmaria, en Porto Venere, Italia. La reunión fue organizada por el Dr. Mike CARRON del Centro de Investigación Submarina de la OTAN, en La Spezia, y fue presidida por Mr. David MONAHAN, Presidente del GGC. El Orden del Día cubrió las discusiones de orden general y los informes, durante el fin de semana varios grupos *ad hoc* se reunieron y discutieron sobre varios temas y los dos últimos días se dedicaron al análisis y la toma de decisiones. Estuvieron presentes sólo 3 de los 5 representantes de la OHI. El BHI estuvo representado por el Capitán de Navío H. GORZIGLIA, Director del BHI. A la reunión asistieron varios miembros de la cada vez mayor 'Comunidad GEBCO', cada uno de ellos actuando en su propia capacidad personal.
- **SCUFN**:
  Un nuevo formato digitalizado del Diccionario Geográfico *(Gazetteer)* está en preparación para facilitar la oficialización del proceso de solicitud de los nuevos nombres de formas del relieve submarino. Ha habido una reacción positiva por parte de los Estados Miembros de la OHI en cuanto a proporcionar nuevos miembros para este subcomité. El grupo lamentó enterarse de que Colombia tuvo que retirar a su representante. El BHI informó que buscará un sustituto, de entre los Estados Miembros de la OHI.
- **Atlas Digital de GEBCO**:
  El editor del GDA informó sobre las actividades que incluyen propuestas de atlases regionales. Se habló del coste. Se expresaron tres opiniones diferentes: mantenerlo tal y como está, reducir el coste o publicarlo gratis. Algunos consideraron que los ingresos obtenidos (£20.000) eran muy bajos en el contexto general de GEBCO. Varias personas sugirieron que un producto gratuito aumentaría la visibilidad y el reconocimiento de GEBCO. Puede ser bajado actualmente gratis de Internet, pero en alrededor de 180 bloques separados, lo que toma tiempo. Se pensará en este tema.

- **Proyecto de la "NIPPON Foundation"**:
  El Secretario Permanente explicó los antecedentes y la situación actual de este proyecto. Se informó a los participantes de la selección de la institución docente (Universidad de New Hampshire, Durham, EE.UU/, sujeta a un acuerdo contractual) y del proceso que se seguirá para seleccionar estudiantes, así como del nombramiento de un Director de Proyecto. El representante del BHI informó a la reunión sobre las acciones tomadas hasta ahora por el BHI, solicitando el nombramiento de candidatos. Se expresó una cierta preocupación por los plazos de tiempo precipitados, pero esto fue debido al requerimiento de la "Nippon Foundation" de que este proyecto debía empezar en el 2004. Además del programa de formación de la Universidad, hay dos partes suplementarias, los proyectos de trabajo y las becas. Estos tenían que empezar más adelante y no hubo más tiempo disponible para iniciar el proceso.

- **Nueva estructura para la Cartografía Oceánica:**
  Los representantes del BHI y de la COI presentaron la propuesta de examinar y reestructurar la totalidad del Programa de Cartografía Oceánica, con el objetivo de mejorar los Proyectos GEBCO e IBC actuales. El representante del BHI indicó claramente que el objetivo de esta propuesta era mejorar la cartografía oceánica, evitando la duplicación y utilizando mejor los recursos. Los participantes proporcionaron dos estructuras suplementarias, que podrían constituir también un modelo apropiado para un futuro desarrollo. Se convino que el BHI y la Secretaría de la COI se pondrían en contacto con los Estados Miembros y el Consejo Ejecutivo respectivamente, intentando obtener opiniones y comentarios sobre la iniciativa de mejorar el Programa de Cartografía Oceánica.

- **Programa de Trabajo:**
  El BHI destacó la necesidad de que la OHI tuviese un Programa de Trabajo GEBCO definido claramente, que se sometería a los Estados Miembros, identificando donde se necesitaban recursos y ayuda financiera. El BHI solicitó que el Programa de Trabajo final convenido fuese transmitido a la COI y a la OHI para su consideración.

- **<u>En conclusión</u>,**
  Se requiere mejorar la participación de la OHI en el Comité Director. El proyecto de estructura preparado por el BHI y por la Secretaría de la COI constituye un buen punto de partida para estudiar una estructura para mejorar el programa de cartografía oceánica OHI / COI en su conjunto. Se espera que la próxima reunión del GGC tenga lugar en México en el 2005. Las Actas de esta reunión están siendo preparadas por el Secretario Permanente de GEBCO.

  <u>ACCION</u>: Se ruega a los Estados Miembros que propongan nombres y CVs de candidatos para cubrir un puesto vacante como representante de la OHI en SCUFN. Deberá recibirse la documentación en el BHI **antes del 1 de Septiembre del 2004.**

En nombre del Comité Directivo
Atentamente,
(original firmada)

Capitán de Navío Hugo GORZIGLIA
Director

ANEXOS: *(en Inglés únicamente)*
A: Propuesta de nueva estructura organizativa para las actividades del programa de cartografía oceánica en la OHI y la COI.
B: Diagrama alternativo propuesto por Mr. Ron MACNAB en la reunión del GGC.
C: Diagrama alternativo propuesto por el Grupo de Trabajo del GGC en la Reunión del GGC.

ANNEX "A"

PROPOSAL FOR A NEW ORGANIZATIONAL STRUCTURE FOR THE OCEAN MAPPING PROGRAMME ACTIVITIES WITHIN IHO AND IOC

1.- INTRODUCTION

The Intergovernmental Oceanographic Commission (IOC) and the International Hydrographic Organization (IHO), being aware of the growing need for close-co-operation in activities of common interest to both Organizations and their Member States, agree among other topics, on the following:

To continue to co-operate in the development of the IOC/IHO General Bathymetric Chart of the Oceans (GEBCO), and in the development of International Bathymetric Charts (IBC) in accordance with the decisions of the International Hydrographic Conference and the IOC Assembly, and, in particular, to promote the free exchange of processed data between the two Organizations both for the production of future editions of GEBCO and IBC, and for use as a base for the preparation of various kinds of geological/geophysical, physical, chemical and biological overprint/overlay sheets;

Co-operate in the formulation of proposals for, and the execution of, technical cooperation projects having components which fall within the competence and the expertise of the respective Organizations, including advance exchange of relevant information and the formulation of other measures required to implement the projects;

To promote training, education and capacity building in all spheres of surveys mapping and charting of mutual interests by enhancing the awareness of the Member States of both Organizations to the importance of co-operation in the use of training facilities, research institutions, vessels, data, and the expertise and experience of personnel, especially to the benefit of developing States;

2.- RELEVANT OCEAN MAPPING PROGRAMME'S ORGANIZATIONS

2.1 THE INTERNATIONAL HYDROGRAPHIC ORGANIZATION (IHO)

The International Hydrographic Organization (IHO) is an intergovernmental organization of a consultative and technical nature comprising over 70 Member States represented by their respective national Hydrographic Offices. IHO objectives include the coordination of the activities of national hydrographic offices; the greatest possible uniformity in nautical charts and documents; the adoption of reliable and efficient methods of carrying out and exploiting hydrographic surveys and the development of the sciences in the field of hydrography and the techniques employed in descriptive oceanography, all aiming at contributing to safety of life at sea, safety of navigation and the protection of the marine environment."

2.2 INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (IOC)

The Intergovernmental Oceanographic Commission is a body with functional autonomy within the United Nations Educational, Scientific and Cultural Organization (UNESCO).
The purpose of the Commission is to promote international cooperation and to coordinate programmes in research, services and capacity-building, in order to learn more about the nature and resources of the ocean and coastal areas and to apply that knowledge for the improvement of management, sustainable development, the protection of the marine environment, and the decision-making processes of its Member States. The Commission will collaborate with international organizations concerned with the work of the Commission
Among others, the functions of the Commission shall be to recommend, promote, plan and coordinate international ocean and coastal area programmes in research and observations and the dissemination and use of their results.

2.3 IHO DATA CENTRE for DIGITAL BATHYMETRY (IHO-DCDB)

The US National Geophysical Data Center (NGDC) on behalf of the IHO operates the IHO Data Centre for Digital Bathymetry and has agreed to provide the services indicated in **Annex A.**

3.- JOINT IOC-IHO OCEAN MAPPING DIRECTING BOARD (OMDB)

The Joint IOC-IHO Ocean Mapping Directing Board (OMDB) has the overall responsibility for fostering the GEBCO Global Project and the International Bathymetric Chart Regional Projects in conformity with resolutions adopted by IHO and IOC, proposing to its two parent organizations the policy and strategy for the preparation and dissemination of the world and regional series of contoured charts of the ocean floor and the "GEBCO Digital Atlas" (GDA). Its Terms of Reference are provided in **Annex B**.

A Structural Diagram illustrating the components of OMGC is given in the last page.

3.1 JOINT IOC-IHO GEBCO GLOBAL PROJECT

3.1.1 Background Information:

The preparation of the first world series of oceanic bathymetric charts was started in 1903, and was published one year later as the GEBCO, under the auspices of Prince Albert 1st of Monaco.

As additional data became available over the years, new editions were compiled, first by the Prince's scientific committee and later, after the Prince's death, by the International Hydrographic Bureau. The last sheet of the 4th Edition, which was printed by the Institut Géographique National (IGN) of France, was published in 1973.

With the increasing knowledge of the morphology and of the geological processes on the ocean bed in the 1950s and 1960s, a scientific input into the preparation of the contours was introduced into GEBCO by linking the Intergovernmental Oceanographic Commission (IOC), of UNESCO, with the IHO as joint sponsors of the project.

Under the new Joint IOC/IHO Guiding Committee for the GEBCO, a 5th Edition was prepared and completed in 1982. This edition differed in many ways from its predecessors. There were new sheet boundaries, new specifications, sounding control was shown by track lines and dots, and an extensive scientific review process was carried out prior to publication.

The contours of the 5th Edition have been digitised, together with the tracks, sounding control and the names, to form the basis for the "GEBCO Digital Atlas" (GDA) which were initially available on magnetic tape, and now on CD-ROM.

The database of the GDA is updated as new contour data are acquired and blocks of older data are replaced. Users can extract from the database the areas they need on any suitable scale.

At an appropriate time it is planned to produce a 6th Edition of printed sheets from the GDA database.

3.1.2 The Organization and Components of the GEBCO Global Project

3.1.2.1 The Joint IOC-IHO GEBCO Global Project Committee (GGPC).

The GEBCO Global Project will have a Committee formed by 3 representatives of the IHO, 3 representatives of the IOC and the Chairmen of the Sub Committees of the GEBCO Global Project Permanent Secretary. The Terms of Reference of this Committee are provided **in Annex C**

3.1.2.2 The GEBCO Global Project Sub Committees.

The following two Sub Committees will provide the required technical support for the GEBCO Global and the IBC Regional Projects:

- The Sub-Committee on Geographical Names and Nomenclature of Ocean Bottom Features (SCUFN) that recommends to the Ocean Mapping Directing Board names to be included in the global and regional charts as well as in the GDA. Its Terms of Reference are provided in **Annex D.**
- The Sub-Committee on Digital Bathymetry that advises the Ocean Mapping Directing Board on procedures to achieve a fully digital version of the GEBCO Global Projects as well as IBC Regional Projects and to prepare the "GEBCO Digital Atlas" (GDA). Its Terms of Reference are provided in **Annex E.**

3.2. JOINT IOC-IHO INTERNATIONAL BATHYMETRIC CHARTS REGIONAL PROJECTS

3.2.1 Background Information:

IOC activities in international ocean mapping began in 1969 after the endorsement by the UN General Assembly of the Long-Term and Expanded Programme of the Ocean. The first activity was the compilation of the Geological and Geophysical Atlas of the Indian Ocean taking advantage of the data collected through the International Indian Ocean Expedition (IIOE). This atlas was published in 1975 by the Academy of Sciences and the Main Administration of Geodesy and Cartography of the former USSR.

The International Geological-Geophysical Atlases of the Atlantic and Pacific Oceans (GAPA) is another endeavour of IOC in Ocean Mapping. The Atlantic Ocean Atlas was published in 1991 and the Pacific Ocean Atlas was published in 2003, thus completed the GAPA project

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3.2.2 The Organization and Components of the IBC Regional Projects

3.2.2.1. The IBC Regional Projects

There are 8 established IBC regional projects:

- IBC Southern Ocean, covering the Antarctic (IBCSO)
- IBC Artic Ocean (IBCAO)
- IBC Caribbean Sea and Gulf of Mexico (IBCCA)
- IBC Central East Atlantic (IBCEA)
- IBC Mediterranean (IBCM)
- IBC South East Pacific (IBCSEP)
- IBC West Indian Ocean (IBCWIO)
- IBC Western Pacific (IBCWP)

Additional IBC projects may be established as necessary.

3.2.2.2 The Joint IOC-IHO IBC Regional Projects Committee (IRPC).

The IBC Regional Project Committee will comprise the Chairman of each of the IBC Projects listed above. The Terms of Reference of this Committee are provided in **Annex F**

ANNEXES

ANNEX A Services provided by IHO Data Centre for Digital Bathymetry (DCDB)
ANNEX B Terms of Reference of the Joint IOC-IHO Ocean Mapping Directing Board (OMDB)
ANNEX C Terms of Reference of the Joint IOC-IHO GEBCO Global Project Committee (GGPC)
ANNEX D Terms of Reference of the GEBCO Global Project Sub-Committee on Undersea Feature Names (SCUFN) .
ANNEX E Terms of Reference of the GEBCO Global Project Sub-Committee on Digital Bathymetry (SCDB).
ANNEX F Terms of Reference of the Joint IOC-IHO IBC Regional Projects Committee (IRPC)

ANNEX A

Services provided by IHO Data Centre for Digital Bathymetry (DCDB)

Oceanic soundings are acquired by hydrographic and oceanographic ships during surveys and on passage between survey areas and ports. In addition many warships, fisheries and others vessels also collect oceanic soundings.

These data are submitted to the IHO Data Centre for Digital Bathymetry (DCDB) at Boulder, Colorado (USA), in digital or hard copy (collector tracing) format. The DCDB carries out the following functions:

(1) Operation of the data center with a focus of activity on oceanic regions with depths greater than 100 meters.

(2) Provision free of charge to the IHO and IOC for use by its Member States, of the data needed for their national or international projects. The IHO and IOC Member States will submit their requests for data through directly to the IHO-DCDB. IHO Member States' Hydrographic Offices (HOs) will provide the center with the digital bathymetric data collected by their nation's institutions in oceanic regions, such as the national oceanographic commissions.

(3) Maintenance of a quality control facility whereby data provided to the center are at least subjected to simple checks for violation of physical principles (instantaneous changes in position, impossibly high ship speeds, etc.) and completeness of labeling, referring detected obvious errors back to suppliers of data for possible corrections. Member States' Hydrographic Offices may be requested to assist in resolving matters of quality control concerning data originated by their nation's organizations.

(4) Maintenance of inventories in digital form of all digital bathymetric data including digital contour data and the production of an annually updated catalogue of recently acquired bathymetric data. The center will provide this catalogue to the IHB in a form analogous to the IHO publication B-4.

(5) Maintenance of trackline catalogues of newly collected data for further studies.

(6) Collaboration with various international organizations in the development of exchange formats and standards to expedite bathymetric data exchange, including digital bathymetric contours.

(7) The operational procedures, systems and formats supporting the Banking of Bathymetric data at the IHO DCDB are given in APPENDIX 1 TO Annex A.

Appendix 1 to ANNEX A

OPERATIONAL PROCEDURE, SYSTEMS AND FORMATS SUPPORTING THE BANKING OF BATHYMETRIC DATA AT THE IHO DATA CENTRE FOR DIGITAL BATHYMETRY (DCDB)

The IHO DCDB operates on the basis that the prime responsibility for quality control of the data rests with the collector or custodian of the raw data. DCDB receives data from IHO Member States' Hydrographic Offices or other national Institutions or Agencies in oceanic regions on any specially agreed-upon transfer media. Contributors are responsible for providing digital cruise data and headers (which list general information about the cruise and data acquired during the cruise) preferably in MGD77 format. The MGD77 format is described in a separate document available from DCDB. Data provided in other formats are accepted when accompanied with concise documentation. If data are provided to DCDB in an alternate format, written headers on MGD77 coding forms are accepted.

As soon as the data package arrives, DCDB reviews the accompanying written enclosures, checks the physical condition of the data storage media and assigns the data a project number used as a permanent identifier. Documentation which should be provided as enclosures with the data by each contributor is listed in Appendix 1. If data are not provided in MGD77 format, a concise description of the format used and completed MGD77 header coding forms should be included. DCDB provides enclosure forms and header coding forms to contributors on request. If the data and headers are in MGD77 format, or if the data are in a well documented alternate format with completed MGD77 header coding forms, data processing begins. Acknowledgement via mail or electronic mail is sent to the contributor within one week of receipt of the data. If necessary the acknowledgement includes a request for any information needed by DCDB to begin processing.

Within 3 weeks of the arrival of the data to DCDB they are copied for archival protection reasons and are scanned electronically using a digital scanning routine to determine whether the format matches that described in the written documentation. A manual check of the printout of the scanning routine is completed to determine if the data are entered in the proper record fields. After this scanning review is completed, a follow-up letter or electronic mail notice is sent to the contributor explaining the results and describing the expected date of completion of assimilation. This notice will also include a request for further documentation on any received format not familiar to DCDB staff.

The first step of assimilation occurs when the data are electronically transferred to a computer to begin error checking. Validation software is employed to routinely check several parameters. Latitude and longitude are checked to determine whether they fall within the normal ranges of 90E to –90E and 180E and –180E respectively. Each depth value, 2-way travel time, magnetic value, and gravity value

is checked against physically possible values. Any value not physically possible (see Appendix 2) is flagged by the software. Navigation is also checked by comparing the time and navigation points for accelerations and/or course changes physically possible on an oceanic vessel. If there are errors discovered in the navigation check, plots of the navigation are reviewed. If there is a discrepancy, a staff person further reviews the situation and communicates with the contributor as necessary.

There are two checks done by DCDB staff at this point in the assimilation process. First the header record is reviewed for possible data entry errors. Second, randomly selected depths of the survey are compared to GEBCO chart depths as a check for two possible errors – mismatched units of depth such as fathoms instead of meters or the misplacement of a decimal point in the depth record.

The staff at DCDB reviews any errors discovered and flagged by the validation software or during the two checks discussed above. If there are relatively few errors, the processing continues. But if there are a significant number of flagged errors, the contributor is notified and asked to correct and resubmit the data or provide enough information so the errors can be corrected by DCDB staff.

Next, an inventory file is created, which is a compacted version of each cruise. Normally the inventory file includes just enough data to define the trackline of the original cruise, usually about 2 percent of the total. The inventory file includes a list of the total number of data records for each parameter in the data set and a complete header for each cruise. The trackline of the inventory is displayed on a computer screen, where it is reviewed for obvious errors such as ship travel across a land mass, gaps in the cruise track or unusual navigational deviations. Quality Control processing is now complete.

The final assimilation steps are data management and archival functions. All assimilated cruises are added to the master inventory which is available for IHO Member States' hydrographic offices and other appropriate Agencies as described in documentation establishing the IHO DCDB. A copy of the master data file for each cruise is archived on-site and another off-site for added security. The inventory file, which is used by DCDB as part of the data request system, is also duplicated and stored in two locations. After the data are archived, the results of the DCDB validation software checks are offered to the contributor of the data along with a copy of the assimilated data set.

Sub - Appendix 1 to Annex A

Documentation to be Provided with Data

ITEM	EXAMPLES
Contributor	Royal Australian Navy
Project Name	1986 Offshore Cruises
Contact	John Smith
Address	self explanatory
Telephone number	self explanatory
Facsimile number	self explanatory
Electronic mail address	(if applicable)
Digital Data Format	Internal J.O.D.C. (provide complete documentation)
Cruises Names	OFF8601, OFF8602
Storage Media	CD-Rom
Character Code	ASCII or EBCDIC (only)
Record Size	120 bytes
Block Size	1920 bytes
Other Media Specific Information	(if applicable)
Cruise Information	MGD77 Header Coding Forms
Comments	Anything that will assist DCDB staff in the data processing.

Sub - Appendix 2 to Annex A

Data Range limits

DATA PARAMETER	ALLOWABLE RANGE
Latitude	90E to –90E
Longitude	180E to –180E
2-way Travel Time	greater than 0 less than 15 seconds
Corrected Depth	0 to 11,000 meters
Magnetic Total Field	20,000 to 72,000 nanoteslas
Gravity	977,000 to 985,000 mgals.

ANNEX B

JOINT IOC-IHO OCEAN MAPPING DIRECTING BOARD (OMDB)

Terms of Reference

Considering the need to promote and coordinate the development of their ocean mapping projects, the Intergovernmental Oceanographic Commission (IOC), of UNESCO, and the International Hydrographic Organization (IHO) establish a joint Ocean Mapping Directing Board (OMDB) with the following Objectives and Rules of Procedure:

1. Objectives

The objectives are to:

1.1 Foster the achievement of, and keep under continuous review, all ocean mapping activities agreed by the two parent organizations. Provide annual reports on the jointly sponsored programs, to both Parent Organizations.

1.2 Guide the ocean mapping programme, for implementation by its two subsidiary committees, i.e. the GEBCO Global Project Committee (GGPC) and the IBC Regional Projects Committee (IRPC), and make recommendations to the two parent organizations on policy and strategy issues to be followed for the preparation and dissemination of all products from the global and regional projects.

1.3 Develop a costed four-year work programme, identifying tasks, products, responsibilities, resources and target dates. This programme shall be updated and submitted by the Board to the Parent Organizations annually.

1.4 Taking into account technological development and data availability, identify new applications for bathymetric data and/or define new bathymetric products. Draft specifications for these products, as appropriate.

1.5 Explore the potential, for the better interpretation of oceanic bathymetry, of techniques such as acoustic imagery and satellite observations.

1.6 Provide a technical link between the groups supervising each ocean mapping project, so as to ensure that common specifications are used for all resulting products.

1.7 Encourage subsidiary regional bodies to identify their requirements for the development of bathymetric chart series, as well as overlay series showing other scientific parameters, including marine resources.

1.8 Advise the IHO (in its capacity as the World Data Centre for Bathymetry),on matters connected with the collection and exchange of bathymetric data, including the development of automatic data assimilation, archival, retrieval and distribution methods, soliciting the advice and assistance of the IOC Committee on International Oceanographic Data and Information Exchange (IODE), and others as necessary.

1.9 Stimulate the flow of data relevant to the Ocean Mapping programme by actively identifying sources of new data and encouraging release of data to appropriate data banks, with the object of ensuring that maximum available data are provided to the World Data Centre for Bathymetry and its IHO Data Centre for Digital Bathymetry.

1.10 Provide advice on ocean mapping, as requested by intergovernmental and non-governmental organizations.

1.11 Develop and promote training opportunities in ocean mapping.

1.12 Recommend and develop measures for optimum publicity, distribution and sales of copies of Ocean Mapping Projects and other bathymetric products produced under the aegis of the Committees.

2. Rules of Procedures

2.1 Membership of the Ocean Mapping Directing Board is covered by the following guidelines:

(1) The Board will consist of 12 members, plus a Permanent Secretary. Five members will be nominated by the IHO and five by the IOC. The other two members will be the Chairpersons of the GEBCO Global Project Committee (GGPC) and the IBC Regional Projects Committee (IRPC).

(2) In close consultation, the Parent Organisations will ensure that nominated members of the Directing Board will be appointed from as wide a geographical area as possible.

(3) Members of the Board are experts acting in their personal capacity and shall not represent their governments[1].

[1] So far as IOC is concerned, the Directing Board is classed as a Joint Group of Experts under the IOC guidelines for subsidiary bodies.

2.2 The Chairperson and Vice-Chairperson are elected by the Board and endorsed by the Parent Organizations. The Chairperson, or in his/her absence the Vice-Chairperson, will conduct the business of the Committee. The Chairperson and Vice-Chairperson should come from different Parent Organizations.

2.3 The Chairperson is elected for a four-year period and will normally be succeeded by the Vice-Chairperson. The Chairperson may be re-elected for one additional four-year period

2.4 Meetings of the Board will normally be held every 2 years. The venue and date will be discussed at Board Meetings and confirmed twelve months in advance. In the intervening period the Board will conduct its business by correspondence (usually electronic).

2.5 The Chairperson, at the request of Members of the Board, may invite interested scientists and hydrographers to attend meetings as observers. IHB and the IOC Secretariat will have *ex-officio* representation at meetings.

2.6 Meetings of the Board will be held in conjunction with those of the GEBCO Global Project Committee (GGPC) and of the IBC Regional Projects Committee (IRPC). GGPC and IRPC meetings will be conducted in parallel, typically over two days, and will immediately be followed, by an OMDB meeting, at same venue, normally for two days.

2.7 The Board, under the Chairperson's guidance, will appoint a Permanent Secretary to the Board. He will be primarily tasked, on the occasion of meetings of the Board, to make the necessary arrangements, send invitations, prepare the documentation (including an agenda), act as rapporteur and write a report of discussions and conclusions.

2.8 The Board should strive to make decisions by consensus. If a vote is necessary, the quorum required is 7 members, the majority required for acceptance is to be a simple majority.

2.9 Any nominated member of the Board [see 2.1 (1)] absent from two consecutive OMDB meetings will loose its position. A replacement will then be nominated by IHO or IOC as appropriate.

2.10 A yearly report on the progress and status of all ocean mapping projects (see 1.1) is to be submitted by the Chairperson through IHB and the IOC Secretariat to the Parent Organizations. It should include all recommendations of the Board (see 1.2), an updated work programme (see 1.3) and any other relevant information.

ANNEX C

JOINT IOC–IHO GEBCO Global Project Committee (GGPC)

Terms of Reference

1. Objectives:

The objectives are to:

1.1 Guide the GEBCO project and make recommendations to the Ocean Mapping Directing Board (OMDB) on the policy to be followed for the preparation and dissemination of that world series of contoured charts of the ocean floor and of the "GEBCO Digital Atlas".

1.2 Identify the needs of the various users of the bathymetry of the world's oceans; study the ways and means whereby these needs can be met, and implement actions found feasible, which meet these needs.

1.3 Stimulate the flow of data relevant to the GEBCO Project by actively identifying sources of new data and encouraging the release of data to appropriate data banks, with the object of ensuring that maximum available data are provided to the World Data Centre for Bathymetry and the IHO Data Centre for Digital Bathymetry.

1.4 Supervise the means of maintaining, further developing and routinely updating the "GEBCO Digital Atlas" (GDA). Activities to include but not restricted to:

(1) Organizing procedures for new compilations of bathymetry;

(2) Advising on standards and methodology;

(3) Generating and developing a supplementary file containing ship tracks, for the purpose of providing graphic presentation for quality assurance related to interpreted bathymetric information;

(4) Producing a worldwide gridded data set of bathymetric data, at the best resolution compatible with the compiled bathymetry available, in order to support various marine applications, e.g. geosciences, law of the sea, offshore exploration.

(5) Integrate, in an appropriate way the geographical names of undersea features; and

(6) Consider the best medium and software for the effective use of the GDA by all users.

1.5 Investigate and develop new extra-budgetary logistic and financial arrangements necessary for the furtherance of the GEBCO Project.

1.6 Prepare and maintain, in association with national and international bodies, an authoritative Gazetteer on Geographical Names of Undersea Features.

1.7 Maintain, as necessary, advisory Sub-Committees on: Undersea Feature Names and Digital Bathymetry. Form Working Groups to investigate and report on specific topics as required.

1.8 Advise regional IBC projects, through the IBC Regional Projects Committee (IRPC), of the specifications for, and collaborate in the preparation of, bathymetric charts at scales suitable for regional projects, to help ensure their compatibility with, and later inclusion in, the GDA.

2. Rules of Procedure

2.1 Membership of the GEBCO Global project Committee is covered by the following guidelines:

(1) The Committee will consist of 8 members, 3 members will be appointed by IHO and 3 by IOC. The additional two members will be the Chairpersons of the Sub-Committee on Undersea Feature Names (SCUFN) and the Sub-Committee on Digital Bathymetry (SCDB).

(2) Members of the Board are experts acting in their personal capacity and shall not represent their governments[2].

2.2 The Chairperson and Vice-Chairperson will be elected by the Committee and endorsed by the OMDB. They should come from different Parent Organizations.

2.3 The Chairperson is elected for a four-year period and will normally be succeeded by the Vice-Chairperson. The Chairperson may be re-elected for one additional four-year period.

2.4 The Chairperson, or in his/her absence the Vice-Chairperson, will conduct the business of the Committee. Meetings will usually be held every 2 years, in

[2] So far as IOC is concerned, the Project Committee is classed as a Joint Group of Experts under the IOC guidelines for subsidiary bodies.

parallel with a meeting of the IBC Regional Projects Committee (IRPC) and will normally last 2 days. The GGPC and IRPC meetings will precede that of the OMDB, which will be held at the same location. In the intervening period the Committee will conduct its business by correspondence (usually electronic).

2.5 The Committee should strive to decide by consensus. If a vote is required, the quorum required is 5 delegates, the majority required for acceptance is to be a simple majority.

2.6 The Chairperson is to submit an annual report to the OMDB.

2.7 The Chairperson is to provide a costed business plan for approval at the biennial meeting of the OMDB.

ANNEX D

GEBCO Sub-Committee on Undersea Feature Names (SCUFN)

Terms of Reference.

1. Objectives:

1.1 The Sub-Committee on Undersea Feature Names reports to the Joint IOC-IHO GEBCO Global Project Committee (GGPC) as its designated authority for all matters concerning undersea feature names.

1.2 It is the function of the Sub-Committee to select those names appropriate for use on GEBCO graphical and digital products, on the IHO small-scale INTernational chart series, and on the regional IBC series.

1.3 The Sub-Committee shall:

(i) Select undersea feature names on the basis of:

a) undersea feature names provided by national and international organizations concerned with nomenclature;
b) names submitted to the Sub-Committee by individuals, agencies and organizations involved in marine research, hydrography, etc.;
c) names appearing in scientific journals or on appropriate charts and maps, with valid supporting evidence.
d) Names submitted to the Sub-Committee by the Chairpersons or Chief Editors of IBC projects, in relation to the work on these projects.

Such names will be reviewed before they are inputted into the Gazetteer.

(ii) Define when appropriate the extent of named features;
(iii) Provide advice to individuals and appropriate authorities on the selection of undersea feature names in international waters and, on request, in waters under national jurisdiction;
(iv) encourage the establishment of national boards of geographical names and undersea features, and when such a board does not exist for a given coastal state, co-operate in the naming of seafloor features related to those national waters;
(v) prepare and maintain an international and worldwide gazetteer of undersea feature names;

(vi) encourage the use of undersea feature names included in the Gazetteer, on any maps, charts, scientific publications, and documents by promulgating them widely;

(vii) prepare and maintain internationally agreed guidelines for the standardization of undersea feature names and encourage their use;

(viii) review and address the need for revised or additional terms and definitions for submarine topographic features.

(ix) maintain close liaison with the UN Group of Experts on Geographical Names, the focal point of which shall be invited to attend meetings of the Sub Committee, and international or national authorities concerned with the naming of undersea features.

2. Rules of Procedure

2.1 Membership of the Sub-Committee on Undersea Feature Names is covered by the following guidelines:

(1) The Sub Committee will consist of 10 members, 5 members will be appointed by IHO and 5 by IOC.

(2) Members of the Sub Committee are experts acting in their personal capacity and shall not represent their governments[3].

2.2 The Chairperson and Vice-Chairperson will be elected by the Sub Committee and endorsed by the Joint IOC-IHO GEBCO Global Project Committee (GGPC). They should come from different Parent Organizations.

2.3 The Chairperson is elected for a four-year period and will normally be succeeded by the Vice-Chairperson. The Chairperson may be re-elected for one additional four-year period.

2.4 The Chairperson, or in his/her absence the Vice-Chairperson, will conduct the business of the Sub Committee. Meetings will usually be held every 2 years, ideally before the GGPC meeting. In the intervening period the Sub Committee will conduct its business by correspondence (usually electronic).

2.5 The Sub Committee should strive to decide by consensus. If a vote is necessary, the quorum required is 6 delegates, the majority required for acceptance is to be a simple majority.

2.6 The Chairperson is to submit an annual report to the GGPC.

2.7 The Chairperson is to provide a costed business plan for approval at the biennial meeting of the GGPC.

[3] So far as IOC is concerned, the SCUFN Sub Committee is classed as a Joint Group of Experts under the IOC guidelines for subsidiary bodies.

ANNEX E

GEBCO Sub-Committee on Digital Bathymetry (SCDB)

Terms of Reference

2. Objectives:

1.1 The Sub-Committee on Digital Bathymetry reports to the Joint IOC-IHO GEBCO Global Project Committee (GGPC) as its designated authority for all matters concerning digital bathymetry.

1.2 It is the function of the Sub Committee to maintain a watching brief on developments in deep sea bathymetric mapping and related activities, and on the evolving technologies used to support such work.

1.4 The Sub-Committee shall:

(i) Keep under review, and provide advice on, standards and procedures for ensuring the continued and effective management, availability and depiction of digital bathymetric data.

(ii) Maintain, routinely update and further improve the GEBCO Digital Atlas (GDA) by:

a) developing procedures for incorporating new compilations of bathymetry;

b) advising on standards and methodology;

c) generating and developing a supplementary file containing shiptracks, for the purpose of providing graphic presentation for quality assurance related to interpreted bathymetric information;

d) integrating in an appropriate way the geographical names of undersea features; and

e) investigating the best medium and software for the effective use of the GDA by all users.

(iii) Investigate and recommend ways and means by which digital methods may be used to expedite production of the GEBCO (6th Edition).

(iv) Provide advise on matters connected with the collection and exchange of bathymetric data.

(v) Interact with the relevant committees and working groups, to bring about, to the extent possible, uniformity and compatibility with IODE developments and also with IHO Classification Criteria for Deep Sea Soundings (IHO Special Publication No. 44, Annex A).

2. Rules of Procedure

2.1 Membership of the Sub-Committee on Digital Bathymetry is covered by the following guidelines:

(1) The Sub Committee will consist of 10 members, 5 members will be appointed by IHO and 5 by IOC.

(2) Members of the Sub Committee are experts acting in their personal capacity and shall not represent their governments[4].

2.2 The Chairperson and Vice-Chairperson will be elected by the Sub Committee and endorsed by the Joint IOC-IHO GEBCO Global Project Committee (GGPC). They should come from different Parent Organizations.

2.3 The Chairperson is elected for a four-year period and will normally be succeeded by the Vice-Chairperson. The Chairperson may be re-elected for one additional four-year period.

2.4 The Chairperson, or in his/her absence the Vice-Chairperson, will conduct the business of the Sub Committee. Meetings will usually be held every 2 years, ideally before the GGPC meeting. In the intervening period the Sub Committee will conduct its business by correspondence (usually electronic).

2.5 The Sub Committee should strive to decide by consensus. If a vote is necessary, the quorum required is 6 delegates, the majority required for acceptance is to be a simple majority.

2.6 The Chairperson is to submit an annual report to the GGPC.

2.7 The Chairperson is to provide a costed business plan for approval at the biennial meeting of the GGPC.

[4] So far as IOC is concerned, the SCDB Sub Committee is classed as a Joint Group of Experts under the IOC guidelines for subsidiary bodies.

ANNEX F

JOINT IOC–IHO IBC REGIONAL PROJECTS COMMITTEE (IRPC)

Terms of Reference

1. Objectives:

The objectives are to:

1.1 Keep under continuous review all regional ocean mapping activities of the Committee, reporting to the Ocean Mapping Directing Board (OMDB) on the progress made with each International Bathymetric Chart (IBC) project sponsored by the Board.

1.2 Facilitate the exchange of expertise and experience between the groups supervising each regional IBC project.

1.3 Provide a technical link between the IBC projects, so as to ensure that a standard form of presentation is used for all ocean mapping products published by, or on behalf of the International Oceanographic Commission (IOC) and the International Hydrographic Organization IHO).

1.4 Encourage regional IBC projects to identify the requirements for bathymetric chart series and overlay (overprint) series showing other scientific parameters, including marine resources

2. Rules of Procedure

2.1 Membership of the IBC Regional Projects Committee is covered by the following guidelines:

(1) The Committee will consist of the Chairpersons of each IBC Regional Project.

(2) Members of the Board are experts acting in their personal capacity and shall not represent their governments[5].

[55] So far as IOC is concerned, the Project Committee is classed as a Joint Group of Experts under the IOC guidelines for subsidiary bodies.

2.2 The Chairperson and Vice-Chairperson will be elected by the Committee and endorsed by the OMDB.

2.3 The Chairperson is elected for a four-year period and will normally be succeeded by the Vice-Chairperson. The Chairperson may be re-elected for one additional four-year period.

2.4 The Chairperson, or in his/her absence the Vice-Chairperson, will conduct the business of the Committee. Meetings will usually be held every 2 years, in parallel with a meeting of the GEBCO Global Project Committee (GGPC) and will normally last 2 days. The IRPC and GGPC meetings will precede that of the OMDB, which will be held at the same location. In the intervening period the Committee will conduct its business by correspondence (usually electronic).

2.5 The Committee should strive to decide by consensus. If a vote is required, the quorum required is half the IRPC membership, plus one delegate, the majority for acceptance is to be a simple majority.

2.6 The Chairperson is to submit an annual report to the OMDB.

2.7 The Chairperson is to provide a costed business plan for approval at the biennial meeting of the OMDB.

…….

REINVENTING GEBCO
A PROPOSED MANIFESTO FOR THE TWENTY-FIRST CENTURY

A discussion paper submitted to the Twentieth Meeting of the GEBCO Guiding Committee

Ron Macnab
Geological Survey of Canada (Retired)
Portovenere, Italy
April 3, 2004

1 GEBCO's Mission

Before attempting any administrative or technical re-organization, it is essential to have a clear idea of what a renewed GEBCO can and should do. The following are suggested as key elements in choosing a direction for the future:

1. To construct an accurate and up to date digital model of global bathymetry from original observations.

2. To promote international cooperation and coordination in the design and execution of ocean mapping programs.

3. To sanction the naming of undersea features.

2 Current project layouts in the GEBCO and IBC undertakings

GEBCO's traditional chart scheme comprises seventeen sheets, complemented in recent years by nine 'update sheets'. The IBC project scheme consists of eight separate project areas, divided into nearly 130 sheets. Thus we are faced with the necessity of assembling and manipulating information in nearly 160 separate map/project areas, and of managing the overall process so that seamless outputs are generated on time and according to specifications.

There are several disadvantages to this approach:

(a) it is difficult to monitor progress over so many fronts in order to identify problems and to resolve them in a timely fashion;

(b) project areas are divided arbitrarily, fostering the fragmentation of data sets that should otherwise remain intact;

(c) there is a significant cost in production and communication overhead, given the necessity of matching the contents of adjoining sheets, and of sharing information among numerous project teams;

(d) there is a strong potential for duplication of effort when work is pursued independently in overlapping areas;

(e) there are prospects of incompatible products arising from the use of different data sets.

3 A simplified project scheme for building a digital model of global bathymetry

The Ocean is large, but Life is short. To achieve meaningful results within the careers and lifetimes of participants, the job must be broken into manageable segments. It is recommended that GEBCO define eight Ocean Project areas, each one corresponding to a major oceanic area and its marginal seas:

Arctic Ocean
Indian Ocean
Mediterranean and Black Seas
North Atlantic Ocean
South Atlantic Ocean
North Pacific Ocean
South Pacific Ocean (perhaps further sub-divided into SE and SW components)
Southern (circum-Antarctic) Ocean

A suggested administrative and technical structure that would support this arrangement is illustrated in the Appendix.

There are several advantages to this approach:

(a) fewer project areas result in a simpler, leaner management structure;

(b) project areas are naturally and geographically integrated, so major features may be defined with coherent data sets;

(c) reduced production and communication overheads (no edge matching!);

(d) less scope for overlaps and duplication of effort between project areas;

(e) common databases to ensure compatibility of output products;

(f) better value from limited funds?

(g) easier to create and apply uniform specifications.

4 Ocean Projects: what they would do

The Ocean Project for any given area would seek to accomplish the following:

(a) assemble all available acoustic observations in analog and digital form;

(b) digitize selected analog observations;

(c) as an interim measure, fill blank areas with information from alternative sources, e.g. altimetry;

(d) combine and rationalize all assembled observations;

(e) preserve the rationalized observations for future re-use and updates

(f) build a seamless grid for the project area;

(g) create standard derivative products, e.g. isobaths and shaded relief images from the grid;

(h) post seamless grid and standard derivative products on the Web for public distribution;

(i) prepare thorough documentation for all data sets and procedures;

(j) (optional) design and prepare more advanced derivative products;

(k) (optional) prepare scientific papers addressing the contents of the grid and derivative products.

5 Ocean Project Working Groups: composition and tasks

Each Ocean Project would be the responsibility of an Ocean Project Working Group (OPWG). It is hardly necessary to state that the leadership and membership of each OPWG would have to consist of competent and well-qualified individuals who had the required enthusiasm and willingness to commit to their undertaking. OPWGs should be quasi-autonomous bodies with the freedom to establish their own operating procedures, however they would have to agree to certain conditions and specifications in order to qualify for the support and endorsement of IOC/IHO.

Ideally, an OPWG should be based in its project area, and housed in a recognized institution with adequate facilities. To achieve regional buy-in and credibility, it would be essential to draw upon local talent wherever possible, but members from elsewhere should be invited to join in order to capitalize on their specialized skills and knowledge, and to help promote communication with external parties.

6 SCUFN

No change is anticipated in the mandate or the operation of this sub-committee.

7 DCDB

The role of the DCDB would remain essentially unchanged, except for the addition of a new function: to act as a closed archive for the refined data sets that were used to produce grids within each project area. These data sets would be homogenized into one coherent global data base. It is strongly recommended that this archive remain inaccessible to the public, for several reasons:

(a) it may contain proprietary or classified data sets that were contributed to the initiative under a non-disclosure agreement;

(b) representing a significant investment of human, financial, and other resources, its future use should be reserved for GEBCO purposes, e.g. scientific research, updating with new data sets, building custom products, etc;

(c) it prevents misuse of the data base by casual or opportunistic operators, which might reflect badly upon GEBCO.

8 A commentary on synthetic bathymetry derived from observations of satellite altimetry

Pros:

Near-global coverage
Reasonably uniform coverage
Free – collected for other purposes
Useful for tectonic investigations
Useful reconnaissance tool for large unmapped features

Cons:

Wide 8-12 km footprint limits the resolution of seabed features
Depth accuracy limited to several hundred metres
Also reflects the effect of sediment layers beneath the seabed
Creates illusion that global seabed already fully mapped

9 The necessity for revenue generation

Much has been said about the voluntary nature of GEBCO, however this approach has drawbacks because it restricts the participation of individuals who might not have access to the funding necessary for salaries and/or expenses. It also curtails the scope of certain project activities because money is not available to pay for selected services.

Two possible approaches have been suggested for dealing with this situation:

(a) implement a business plan that would permit GEBCO to generate revenue through the sale of value-added products; these products could be sold directly to the public, or indirectly through licensing and partnership arrangements whereby the products were embedded in selected commercial packages;

(b) approach funding organizations that might be prepared to support GEBCO's objectives through the outright provision of operating grants.

10 An expanded role for GEBCO

GEBCO could do other things in addition to producing a model of global bathymetry. Some suggestions:

(a) advocate the furtherance of global ocean mapping, particularly in areas that remain poorly mapped;

(b) persuade major data holders to contribute the contents of their archives to centralized data centres;

(c) monitor the state of ocean mapping worldwide;

(d) support the development of advanced techniques for manipulating and visualizing bathymetry;

(e) devise innovative means of disseminating bathymetric information.

Appendix: Proposed GEBCO-IBC Re-organization

The accompanying figure illustrates an organizational structure that would support a fully-integrated IBC/GEBCO operation. It would consist of several elements:

(a) a Directing Committee that combined the functions of the IBC Consulting Group for Ocean Mapping (CGOM) and the GEBCO Guiding Committee. The DC would report to IOC and IHO through an Executive Committee that included a Chairman, a Vice-Chairman, and a Permanent Secretary;

(b) the DCDB, whose function would remain largely unchanged;

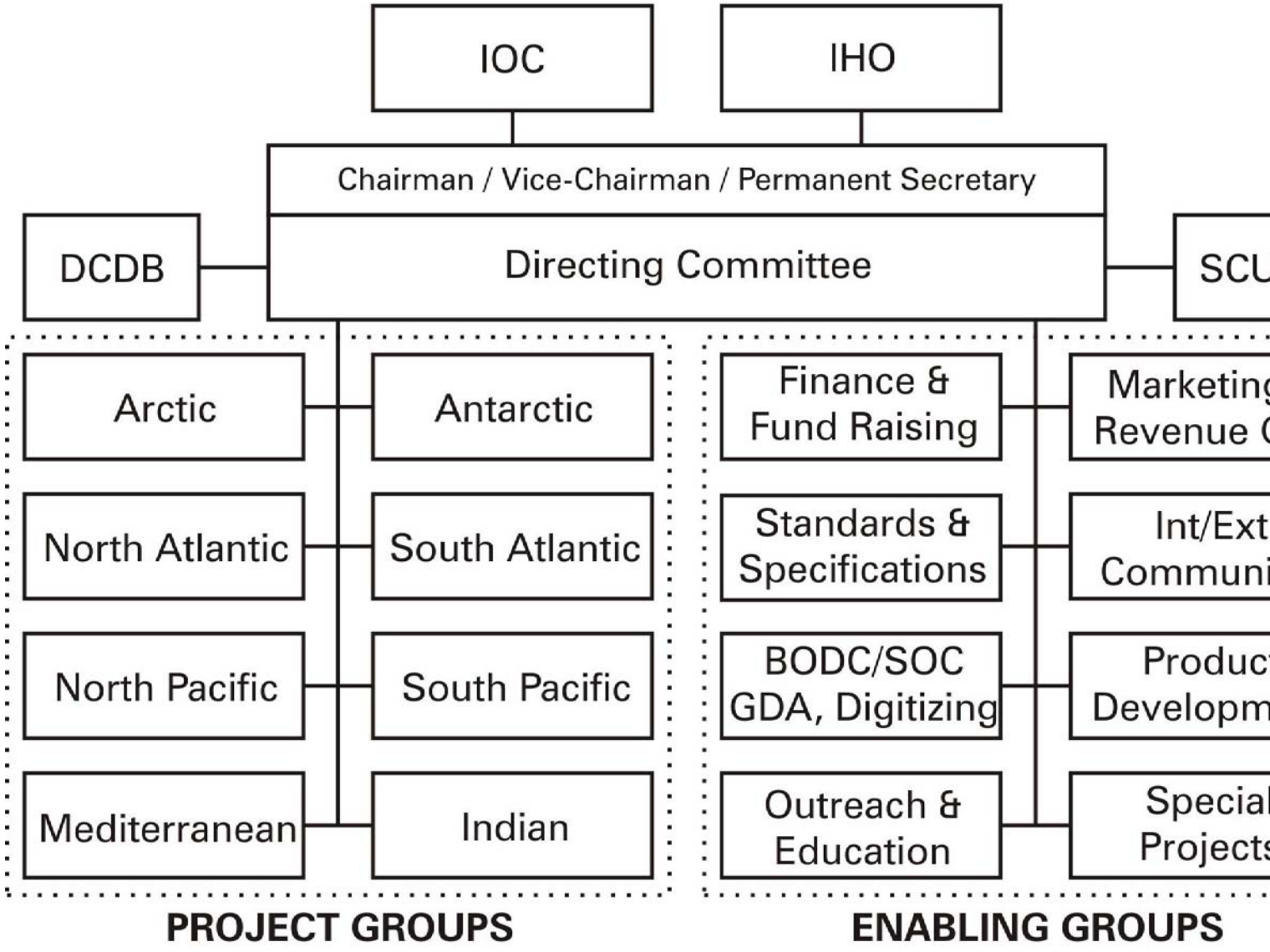
(c) SCUFN, whose function would remain largely unchanged;

(d) eight Project Groups charged with constructing digital bathymetric models in their assigned areas;

(e) eight or so Enabling Groups that provided the necessary technical and administrative infrastructure for the Project Groups.

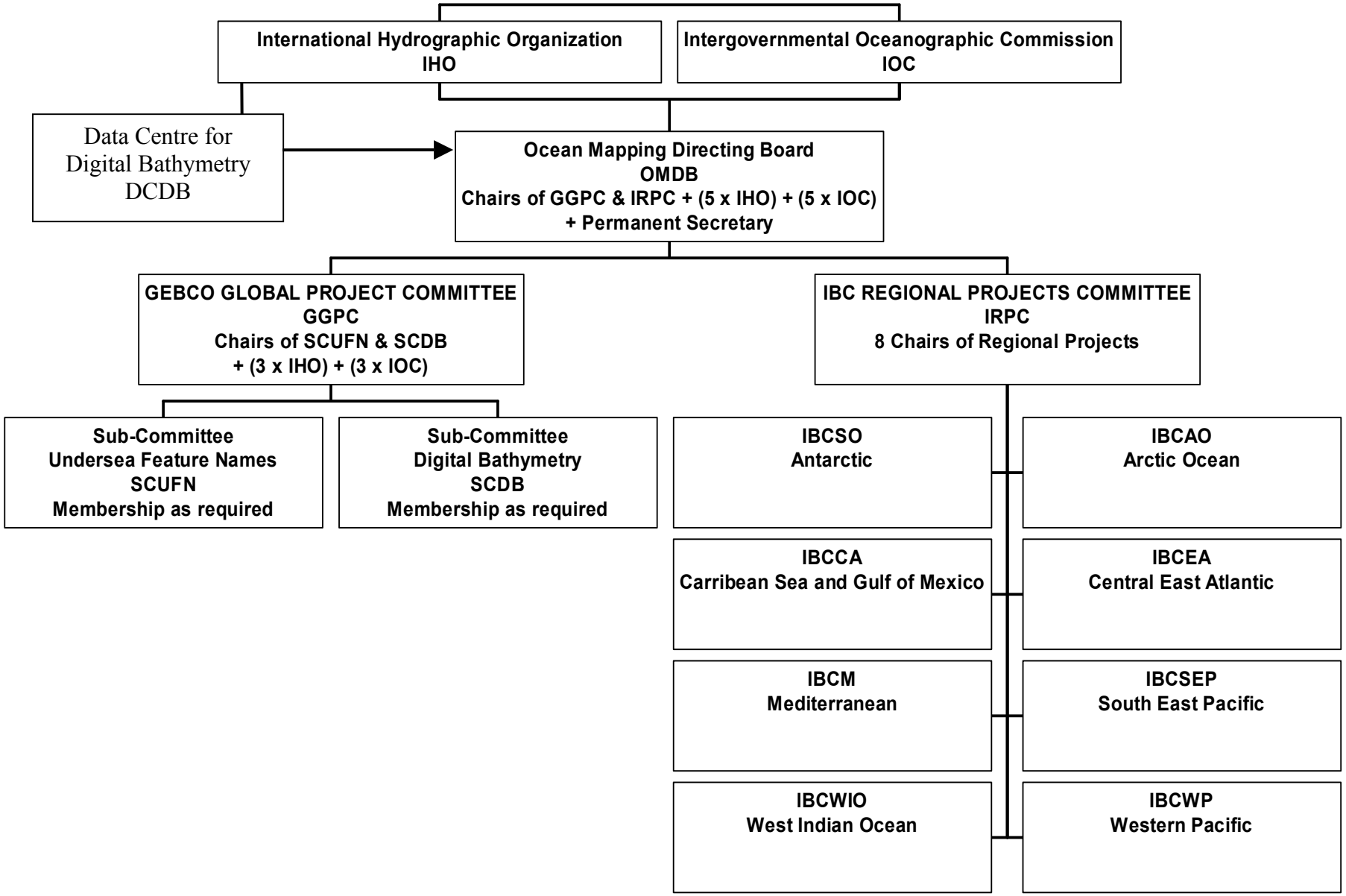
Membership in the DC would include representatives of IOC and IHO, the heads of DCDB and SCUFN, the heads of the Project and Enabling Groups, and others invited to join as appropriate.

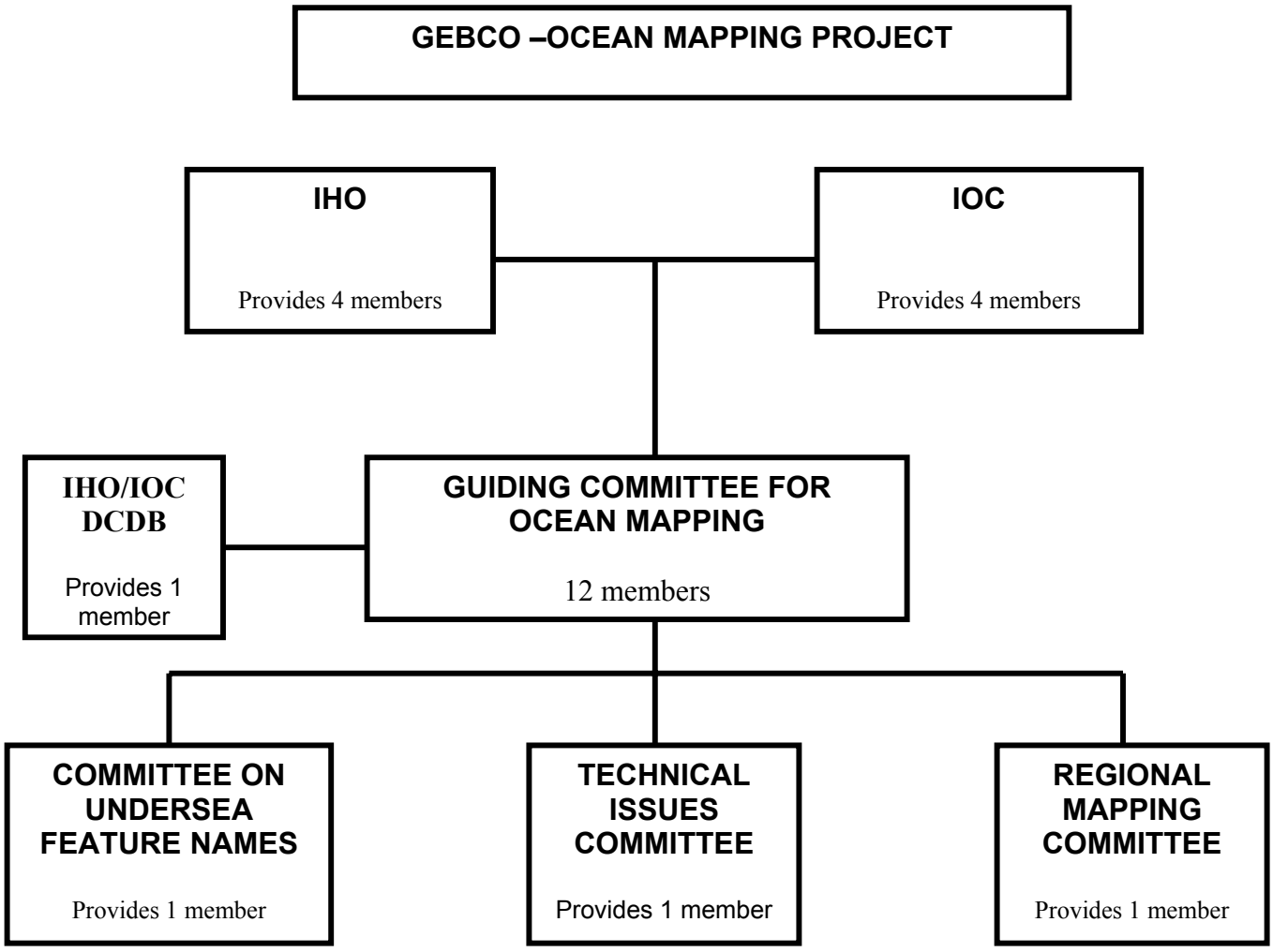
PROPOSED GEBCO/IBC RE-ORGANIZATION



RM, Apr

Proposed Ocean Mapping Programme Organization




GEBCO –OCEAN MAPPING PROJECT
IHO
Provides 4 members
IOC
Provides 4 members
IHO/IOC DCDB
Provides 1 member
GUIDING COMMITTEE FOR OCEAN MAPPING
12 members
COMMITTEE ON UNDERSEA FEATURE NAMES
Provides 1 member
TECHNICAL ISSUES COMMITTEE
Provides 1 member
REGIONAL MAPPING COMMITTEE
Provides 1 member