

TABLE OF CONTENTS

	Page
1. OPENING OF THE MEETING.....	1
2. CONDUCT OF THE MEETING	1
3. REVIEW OF TASKS IN THE STRATEGIC WORK PLAN	1
4. GEBCO’S FINANCIAL SITUATION	5
5. REPORT OF THE SUB-COMMITTEE ON DIGITAL BATHYMETRY	6
6. STRATEGIC PLANNING COMMITTEE	8
7. REPORT OF THE SUB-COMMITTEE ON UNDERSEA FEATURE NAMES	9
8. COMPOSITION OF THE GUIDING COMMITTEE AND ITS SUB-COMMITTEES ...	9
8.1 The Sub-Committee on Digital Bathymetry.....	9
8.2 The Sub-Committee on Undersea Feature Names.	9
8.3 The Guiding Committee.....	10
8.4 Strategy Planning Committee.....	10
8.5 Centenary Organising Committee.	10
8.6 Review of GEBCO Working Groups.....	10
8.7 General review of the GEBCO Personality List.....	10
9. DATES AND PLACES OF THE NEXT MEETINGS	11
10. ANY OTHER BUSINESS	11
11. CLOSURE OF THE MEETING	11

ANNEXES

1. Agenda
2. Work Plan Version 4.0
3. Floating buoy proposal to the U.S. National Science Foundation
4. Marketing Report
5. GDA Sales Report
6. GEBCO's Future Strategy
7. Personality List
8. List of Acronyms

1. OPENING OF THE MEETING

- 1 The Nineteenth Meeting of the Guiding Committee of the joint IOC-IHO General Bathymetric Chart of the Oceans was held at the International Hydrographic Bureau, Monaco on 16th and 17th April 2003.
- 2 The Chairman, Sir Anthony Laughton, opened the meeting at 1430 on 16th April. Those present were the Chairman, Galina Agapova, Robert Anderson, Ray Cramer, Robin Falconer, Bob Fisher, Jose Frias, Andrew Goodwillie, Hugo Gorziglia, John Hall, Michel Huet, Peter Hunter, Martin Jakobsson, Meirion Jones, Mike Loughridge, Larry Mayer, David Monahan, George Newton, Tony Pharaoh, Bill Rankin, Hans-Werner Schenke, Walter Smith, Shin Tani, Dmitri Travin, Gleb Udintsev, Pauline Weatherall and the Permanent Secretary.

2. CONDUCT OF THE MEETING

- 3 Captain Hugo Gorziglia welcomed members to IHB. He restricted his remarks to commenting that whatever the Guiding Committee decided the IHB would do its best to carry out provided it was given clear guidance in writing. He said that any key strategic issues would be passed on to Member States so that they would be kept well informed in a similar fashion to the operation of the IOC General Assembly.
- 4 The Chairman warmly thanked Captain Gorziglia.
- 5 The Chairman drew attention to the Agenda (Annex 1) in which the first mention that he, as Chairman of the Guiding Committee, was standing down, was made in Item 3.1. He noted that there was only one nominee for the new Chairman, Mr Monahan, and it was up to the Guiding Committee to make a decision. The Chairman proposed Mr Monahan and Dr Loughridge seconded the motion. The motion was approved unanimously at which point Mr Monahan took the Chair.
- 6 Dr Falconer paid tribute to Sir Anthony Laughton's immense contribution to GEBCO over many years which was greeted by appreciative applause.
- 7 The Chairman said he wanted to re-arrange the order in which Agenda items were taken and would take Item 8, the Strategic Plan, first. Dr Fisher noted that eventually, under Item 7, he would report both on the 15th and 16th meetings of SCUFN.

3. REVIEW OF TASKS IN THE STRATEGIC WORK PLAN

- 8 Dr Falconer led the discussion of the status of tasks in the Work Plan Version 4.0 (Annex 2).
- 9 Task 1 (Production of products). All tasks in 1.1 had been completed except for 1.1.5 to establish the platform independence of the GDA-CE so that it could be distributed via the Internet. Under 1.2 attention was drawn to the lack of uncertainty estimates in the global grid which was the task of item 1.2.3. Dr Jones commented that Dr Carron, who was not present, had started to compile charts showing where data were absent or covered less than 5% of the chart area. This needed to be completed fairly quickly. Drs Goodwillie and Smith argued for showing examples of the track coverage used to generate the grid. It was concluded that this was an important ongoing item to be addressed as soon as possible but no individual was identified to action it. Item 1.2.4, the use of a variable resolution grid (and the linked items 1.2.5 and 1.2.6), was judged to be a longer term objective and even a research topic. Dr Smith suggested waiting a year to obtain expert advice at the next GEBCO meeting. Dr Jones agreed that the item should remain as a task even if it was not known who would execute it. Item 1.3, Internet availability, was postponed for later discussion.
- 10 Task 2 (Altimetry). Regarding item 2.1.1, the calibration of satellite altimetry against echo-sounding data, Dr Smith reported that he was negotiating with Mr Tani to obtain copies of the

Japanese multibeam data. This work was still in progress. Dr Smith also described item 2.1.2, liaison with the ABYSS system, as work in progress but he reminded members the ABYSS mission was not yet funded by NASA. It was agreed to discuss item 2.2 (Multibeam integration) at a later date. Dr Smith said that his WG had not even begun to address the issue. He stated that his WG wanted to include the views of a wider user base.

- 11 Task 3 (Data assimilation and acquisition). Item 3.1 (Establish Working Group) was postponed because there had been no activity. Regarding item 3.2 (Filling gaps) Mr Hunter reported (item 3.2.1) that he had been in contact with the British Antarctic Survey (BAS) about collecting swath bathymetry on passage between the UK and the Antarctic and that a Memorandum of Understanding between Southampton Oceanography Centre and BAS would be signed soon [Action Mr Hunter]. SOC had bought the Neptune software required to do post-processing and £1000 p.a. had been made available for XBTs. Dr Mayer added that he had recently found out that the US Coast Guard ice-breaker *Healy* goes to the Arctic every year without switching on its swath bathymetry system. He is trying to get support from NIMA for at least one year's data collection on passage. Mr Anderson reported (item 3.2.2; Annex 3) that a proposal had been submitted to NSF to develop buoys to collect bathymetry in remote regions. Part of the proposal was to seamlessly integrate the acquired data in the IBCs. The proposal was currently under review. A three-phase development was envisaged 1) design a sounding device that could be added to a flotation package, 2) build a deployable prototype, 3) build an entire floating system or add a system to existing buoys. The buoys would remain at the surface and contain a GPS receiver for fixing observations. The data link would use the Iridium system; Argos was not adequate for bathymetry. Sir Anthony Laughton pointed out that mid-water systems had advantages a statement with which Mr Anderson agreed.
- 12 Task 4 (Review roles, responsibilities and memberships). It was agreed to postpone this item.
- 13 Task 5 (Updating). Item 5.1 (the status of Southern Ocean mapping) was taken first. Dr Schenke reported on the status of the concept of an IBCSO. A meeting had been held in Honolulu, Hawaii. Dr Schenke had reviewed his own work in the Atlantic sector, the work of Dr Fisher in the Indian Ocean sector and the plans of US scientists who will collect bathymetry from the USS *Nathaniel B. Palmer* and the USCGC *Healy*. At the CGOM meeting in Monaco during the week of 7-11 April a short resolution had been prepared to go before the IOC Executive Council to formally announce the start of the IBCSO next year at the time of the SCAR biannual meeting in Bremen/Bremerhaven. Dr Schenke had detected very strong interest in the project in the SCAR community. Further, he reported that work had already started in AWI to build a database in collaboration with the Russian HDNO and Vernadsky Institute. The Russians were going to digitise all their plotting sheets by hand. AWI will also scout for other new data. An IBCSO mail server has already been set up. Dr Falconer responded that two people in his institute were already working on the Ross Sea sector and that Bill Ryan and a colleague at LDEO were also trying to collect data. Dr Schenke added that there was strong interest in BAS too because BAS (Peter Morris) held multibeam data in the Scotia Sea. He was also inviting Italian participation.
- 14 Dr Fisher asked whether Dr Schenke had acquired any data from the Japanese Geological Survey which he had found to be very co-operative. Dr Schenke replied that he had received only single beam data. Mr Tani remarked that some seamount topography had been published but the Japanese Geological Survey no longer went to the Antarctic although JAMSTEC are doing some work there. The data would be published after two years. Dr Loughridge added that a Japanese Antarctic Research Expedition publication listed available data although it had not yet been submitted to NGDC. Mr Tani cautioned that the JARE data was not quality checked. Dr Goodwillie reported that at the EGS Joint Assembly a visitor had told him of under-ice topography that might be available to GEBCO. Sir Anthony Laughton suggested that SOC might have collected under-ice bathymetry too using Autosub; Dr Jones thought BODC should collect any such data [Action Ms Weatherall].

- 15 Regarding item 5.1.3 (the link to the IHO) Mr Huet pointed out that Captain Gorziglia was Chairman of the IHO Hydrographic Committee on Antarctica; the Group would convene at IHB on 8-10 September 2003 during a meeting entitled 'Charting in Antarctica' attended by representatives of many organisations.
- 16 Item 5.2 (SE Pacific Ocean) was taken next. Little news was available. Dr Loughridge reported that a meeting had taken place in Valparaiso, Chile leading to the tentative establishment of an Editorial Board. Mr Travin confirmed that the first meeting had indeed taken place two years ago at which the Editorial Board was formed; it had already started compiling data. The next meeting was due to take place in Lima, Peru in early November 2003. Dr Loughridge added that Dr Frias possessed an index sheet on which areas of responsibility had been assigned. The limits were approximately 7°N in the north and out to the Galapagos Islands and Easter Island in the west. Mr Travin said the limits were provisional and would be confirmed at the November meeting.
- 17 Task 6 (Outreach). The issue of a paper edition of GEBCO charts (item 6.1) was deferred although it was pointed out that Drs. Jones, Jakobsson and Fisher had provided paper displays at the Centenary Conference. Regarding item 6.2 (Displays at conferences) Dr Goodwillie reported on his experience of manning a GEBCO booth at the Fall 2002 AGU meeting and the 2003 EGS/AGU/EUG Joint Assembly. He responded by saying that about 400 people had visited the booth at AGU of whom he spoke to about 120. Many visitors had not previously heard of GEBCO. At EGS again there were about 400 visitors of whom he spoke to some 250. He had received both positive and negative feedback. Positive comments referred to the 1-minute grid, appeal to PC/Unix users, charts based on echo-sounding, attractive plots, available database and just being there. Negative comments mentioned out-of-date bathymetry, GEBCO being a closed club and being unresponsive. He had made sure that people knew about the limitations of the imperfect track coverage. Some offered data. In his opinion running the booths was far-sighted but also expensive and had relied on him acting almost alone. He thought GEBCO needs to be more serious about marketing. He asked whether there would be, for example, a booth at the Fall 2003 AGU meeting. In closing he acknowledged help received from Dr Divins and the IHB (in Nice). He stated he would write a report of his experiences (see Annex 4).
- 18 Dr Jones, with reference to item 6.2.4, said that the WOCE meeting in December 2002 in Hobart, Tasmania had occurred too early for the GDA-CE to be on display. He had not attended.
- 19 Items 6.3 (Centenary book) and 6.4 (Centenary conference) had been completed.
- 20 Item 6.5 (Websites and Contacts). There was little to report. Dr Goodwillie stated that he had reorganised parts of the GEBCO web site recently. Dr Smith suggested that those Conference speakers, not already included, might be added to the Personality List [Action Secretary]. Dr Loughridge noted that a GEBCO List Server had been set up at http://mailman.ngdc.noaa.gov/mailman/listinfo/gebco_folk but the system is little used.
- 21 Item 6.6 (General articles to journals). It was reported that the magazine Hydro had requested articles on GEBCO, e.g. about the GDA-CE. Mr Pharaoh noted that the IHB was developing a web bulletin which could include such articles. Dr Goodwillie reported that a New Scientist journalist had shown interest in the GDA-CE in Nice (see New Scientist 26 April 2003, page 25).
- 22 Task 7 (Features). Regarding item 7.1, Mr Huet reported that the Gazetteer was updated every 3-4 months and the changes sent to Carla Moore to refresh the web site. Regarding item 7.2, Dr Loughridge mentioned that Steve Miller (SIO) had a digital copy of the bounds on all the areas published in the '*Limits of Seas and Oceans*' (IHO publication S-23). He also stated that these overlapped with the NGDC boundaries and that publication by the NGDC was currently on hold because of disagreements about naming certain features. Admiral Angrisano commented that the current S.23 co-ordinates were still valid. Only two states had raised problems about the new set of co-ordinates. Dr Loughridge said he would ask Dr Divins to liaise with Mr Miller to obtain an authoritative single version of S-23 [Action Drs Loughridge, Divins].

- 23 No action had been taken on item 7.3 (Feature rules and prototyping) either in the SW Pacific, where contentious UNCLOS issues existed, or in the Mediterranean. It was reported that Dr Jakobsson had classified features in the Arctic Ocean and the information was available.
- 24 Item 7.4 (Automatic name placing). Dr Schenke reported that this was an ongoing project. It was a difficult problem with no off-the-shelf software. Dr Frias confirmed that the IBCCA group had also considered the problem as, apparently, had the IBCAO team. Dr Jones remarked that it was a problem that had to be solved if GEBCO was to provide print-on-demand sheets. Dr Goodwillie noted that visitors to the GEBCO booth at the EGS/AGU/EUG Joint Assembly in Nice had been interested in print-on-demand.
- 25 Item 7.5 (Land/Water mask). Dr Carron reported that land/water masks had been prepared but that the informal GEBCO Gridding Group was uncertain how to use them. The project was ongoing.
- 26 Task 8 (Educational products). Sir Anthony Laughton summarised the situation regarding the Educational Working Group. Dr Sharman's approaches to LDEO had met with a requirement to charge commercial rates which were too expensive. An add-on to the GDA had been envisaged but the project appeared to have died. Regarding item 8.1.1. Dr Loughridge reported that an icosahedral globe existed as a prototype [Action Dr Sharman].
- 27 Task 9 (Finance) It was agreed that the item would be taken later in the Agenda.
- 28 Sir Anthony Laughton asked what was the status of the Draft Strategic Plan. The Chairman responded that Version 4.0 was the last one circulated (Annex 2). Sir Anthony Laughton responded by asking whether the returned amendments had been included. The Chairman responded in the negative saying that the views expressed had become contradictory and divergent and drafting had come to a halt. Sir Anthony Laughton said that a lot of time had already been expended on the document and asked whether it could now be agreed and improved?
- 29 Dr Jones opined that the GDA-CE could deliver a lot of what is available on paper charts. He wondered whether the world should be divided up into areas for a new set of charts. Dr Jakobsson concurred; there was a need for charts to be used as display items and they would create a source of revenue. He added that the IBCAO had been sent to NGDC for their approval for it to be added to their series of charts at 1:6 million scale. He was also planning a world map. Dr Smith also concurred that GEBCO 'wallpaper' charts would be a good product even though there was competition. He suggested that a small group be set up to mock up a new GEBCO world chart. Dr Falconer suggested that an Indian Ocean chart could also be prepared. Dr Jakobsson cautioned that the cartographic effort and time involved should not be underestimated. The Chairman remarked that if GEBCO had a marketing group or sub-committee that was exactly the sort of activity they would recommend. Drs Hall and Fisher noted that the National Geographic's Atlas of the Floor of the Oceans contained information that was 40 years old; it came nowhere near what the GDA-CE could offer. Dr Mayer agreed that the new GDA had enormous potential for use in generating a world map if the quality of the chart was high. Mr Tani thought that the Committee did not know the market well enough but that a Working Group could be set up to exploit the idea. Dr Loughridge thought there was a market for a world map that was not necessarily technically perfect but could be used to get the attention of politicians, commercial companies etc. Mr Newton noted the parallel with NSF's large outreach programme which has a substantial budget, for example, Teachers Experiencing Arctic (TEA). The Chairman concluded the discussion by noting the needs for 1) a Marketing Working Group and 2) an educational world map [Action Chairman]. Dr Jones countered that personally he was not in favour of a Marketing Working Group; he preferred to concentrate on a world map.
- 30 Sir Anthony Laughton noted the need for a GEBCO Marketing Flyer to be used when approaching companies. An opportunity had arisen when Dr Hussong had offered to circulate such a flyer to a large meeting of Fugro managers at the end of May. The Secretary and Dr Goodwillie volunteered

to produce a flyer [Action Secretary, Dr Goodwillie]. Mr Tani pointed out that the flyer could be used at the IUGG conference in Sapporo in July 2003.

- 31 Mr Newton concluded the discussion with four observations, 1) GEBCO needed a simpler URL, something with a .org extension which indicated 'not for profit'. Dr Loughridge volunteered to find a new and simpler URL [Action Dr Loughridge], 2) a .org (or even .edu) URL would help companies provide GEBCO with data which would not be the case with .com, 3) GEBCO could consider getting data from cable companies and oil companies in return for displaying their logo on GEBCO products, 4) in his view marketing should be equated with both the development of GEBCO and outreach to interested bodies.

4. GEBCO'S FINANCIAL SITUATION

- 32 Sir Anthony Laughton explained that GEBCO operates two separate accounts. First, a fund set up by Centenary Organising Committee, held at the IHB and controlled by the IHO/IHB. This fund contains various contributions from IOC, SOC, the Principality of Monaco and IHB towards the Centenary Conference, as well as the remaining income from Registration Fees. This fund may well end in surplus with a balance of ca. €5,000. The COC recommended that the Guiding Committee should decide how these funds were to be spent in future. Second, the fund held in Southampton University in UK, which is controlled by the Guiding Committee. The fund was set up initially to accept income from Global Marine Systems; one instalment, the first of three, was received in 2001 but the second promised tranche has been withheld because of the parlous state of the parent company Global Crossing. Sir Anthony said that following recent correspondence with GMS it was not clear when, or indeed if, GMS will resume payments. The fund has also received very generous private donations from John Hall and his family's Foundation. It also receives income from the sales of the GDA. Principal outgoings have been the payment of various honoraria associated with the Centenary activities, costs associated with publishing the 'History of GEBCO' book and Andrew Goodwillie's expenses incurred in running GEBCO booths and updating the web site.
- 33 Sir Anthony sought the Committee's approval to leave the funds in the IHB Account to support GEBCO activities as decided by the IHO/IOC. Signatories would be IHB Directors who would also be accountable for the funds. The signatories for the Southampton fund were presently the Chairman, Sir Anthony and the Secretary. Sir Anthony proposed that this arrangement remained because he was still the Chairman of the Finance Working Group. He pointed out that this fund gives GEBCO freedom of expenditure. He hopes to increase it by any appropriate means and has been in touch with various organisations. He reported that he hoped to meet David Rockefeller Jr. in the USA in summer 2003. He asked the Guiding Committee for guidance on his future role as Chairman of the Finance WG [Action Chairman].
- 34 Mr Tani reported that, in an attempt to raise funds for GEBCO, he had been in contact with the Nippon Foundation, a funding agency in Japan (www.nippon-foundation.or.jp/eng/how/summary.html). The Foundation was happy to donate funds for educational purposes, typically at a level of \$10,000-50,000 per annum for several years. Mr Tani's contact at the Nippon Foundation had written to Sir Anthony Laughton but the letter had not arrived. The situation also had been exacerbated by crashes of both Mr Tani's and Sir Anthony's personal computers. Sir Anthony asked if he should re-contact the Foundation. Mr Tani replied that Sir Anthony could simply apply for funds via the Foundations' web site but nevertheless he, Mr Tani, would talk to his contact again. Sir Anthony pointed out that GEBCO must first decide how it wanted to use the funds [Action Chairman, Sir Anthony Laughton, Mr Tani].
- 35 The discussion returned to the IHB Fund. Dr Falconer asked how much IOC contributed to GEBCO. Mr Travin replied that it normally contributed \$10,000-15,000 per annum plus, in 2003, \$29,000 for the Centenary and \$10,000 for GEBCO activities. Sir Anthony stated that IHB had supported GEBCO for years independently of the Guiding Committee. The new fund would be different from the Southampton Fund which, until now, had been controlled by Guiding Committee

Officers. Dr Loughridge thought that the IHB funds were heavily commingled so that the Guiding Committee had no right to exclusive control over them. The Chairman asked whether the Committee accepted the COC proposal. Mr Huet expressed his disquiet at the arrangements and wished the situation was clearer. He would prefer the Guiding Committee to provide guidance to the IHB Directors as to how the funds were to be spent. Dr Smith suggested that the Guiding Committee should provide Terms of Reference for funds to be spent on items such as travel. Dr Falconer thought that the IHB should inform the Chairman and Vice-Chairman (when appointed) of GEBCO how they proposed to spend the funds. Dr Hall pointed out that \$15,000 was too small a sum to affect GEBCO's strategy however it was spent. It could be spent, for example, on extracting ENC's from VHOs. The Chairman reiterated that members wanted some assurance of how the funds were to be spent.

- 36 Captain Gorziglia made a plea for clearer guidance to be given to the IHB Directing Committee in general. He pointed out that the IHO has 73 member states with 5-year work programmes and budgets that are part of a strategic plan. The IHO understands that one function of the Guiding Committee is to provide guidance on what support it requires and this may have funding implications. He has the impression that in the past GEBCO's input was not considered in detail by the IHO. He said it was difficult for the IHB Directing Committee to know what was required; for example, what funding does GEBCO need and for what? The Work Programme would be very useful but IHB Directors would need to know the financial implications. Dr Hall responded that the Guiding Committee itself did not know the cost of the Strategic Plan.
- 37 The Chairman concluded that he sensed the Committee has accepted the proposal from the COC that the funds remain in the care of the IHB to be spent by the IHO/IOC. The question of Sir Anthony's role as Chairman of the Finance WG would be addressed later.
- 38 Dr Goodwillie thanked the Guiding Committee for the funds provided to help him work on gridding the Indian Ocean data set. He reminded members that he had written to the Guiding Committee in 2002 suggesting a number of sub-projects that could be funded, such as working on the web site, instead of a single Fellowship. He asked whether this model had been discussed by the Guiding Committee and whether it would continue. Sir Anthony Laughton responded that he thought this model was the way to ensure that GEBCO activities continued, for example to make a start on the tasks in the Work Programme, provided they were not too expensive. On the other hand he suggested that maybe GEBCO funds could be used as leverage to fund a Fellowship. He ended by asking whether a formal set of accounts for the Southampton and IHB Funds should be provided annually to the Guiding Committee.

5. REPORT OF THE SUB-COMMITTEE ON DIGITAL BATHYMETRY

- 39 Dr Jones reported that the Sub-Committee had met on Saturday 12th April. He had given a presentation of the new GDA-CE and there had been a very general discussion of future activities. He wished to alert the Guiding Committee to four principal items, 1) the GDA-CE, 2) a discussion of the future work plan of Ms Weatherall, 3) a discussion of the future of the SCDB and 4) a discussion of whether or not to print a 6th Edition. A summary of sales statistics for the GDA in the previous year appears in Annex 5.
- 40 The GDA-CE. Dr Jones said that the GDA-CE had been finished only very recently just in time for the Centenary Conference. Many individuals had worked very hard to digitise and grid the data and to write the software used on the CDs. Initially the GDA-CE would be marketed through the British Oceanographic Data Centre. Profits from the sales would be shared equally between GEBCO and BODC. BODC needed some income from the sale of the GDAs to cover the cost of the software development. In conclusion Dr Jones stated that there was a link from the GEBCO web site to the BODC site but that no Order Form existed yet. Deliveries by ordinary mail to North America were slow and a better method of delivery had to be found [Action Dr Jones, Ms Weatherall].

- 41 Dr Jones wondered whether parts of the GDA should appear on the web. He noted that the UK government was moving in that direction and said that maybe ‘tasters’ from the GDA should now be made available.
- 42 Dr Jones drew the Committee’s attention to the copyright issue. The last GDA was accompanied by a paper volume with an explicit copyright statement. Now in the GDA-CE the copyright is affirmed in a .pdf file (pages 4-5 of the Data Sets User Guide). The copyright is held by the UK’s Natural Environment Research Council on behalf of the GEBCO Guiding Committee. Dr Goodwillie mentioned that he had been asked many questions about copyright while running the booth in Nice. People were very confused. He gave the following examples of how the GDA copyright might apply in different circumstances, 1) like the Tectonic Map of Europe, a UNESCO publication, which is copyrighted when printed on paper but not when accessed in digital form, 2) the oil company Unical wanted to be given one copy of the GDA which it would then send to its Data Management Group which in turn would distribute the GDA to all its company sites world-wide and 3) consultancy firms that want to use the GDA in their promotional literature. Dr Falconer responded that if copyright was used to create too many difficulties people would look elsewhere for bathymetric data. It was better not to apply copyright too strictly.
- 43 Dr Loughridge pointed out that GEBCO was now in a new era. Dr Jones had retired and was no longer Head of the BODC. He asked who will handle these problems in future and to what extent would BODC enforce copyright. He knew that Dr Jones successor Juan Brown was excited by GEBCO. Dr Jones replied that he would set down basic guidelines for Ms Weatherall to follow and in the short term he would handle the copyright issues. Sir Anthony Laughton noted that marketing of the new GDA-CE will lead to a growth in these sorts of problems and that the present arrangements may not work in future. He drew attention to two elements 1) the copyrights of a dozen or so individual contributors to GEBCO and 2) the copyright of the GEBCO community. He wondered whether GEBCO could re-negotiate copyright with the contributors and ease the situation. Only then could the Guiding Committee make decisions about copyright. Dr Smith asked what copyright was actually held by individual contributors to GEBCO and what copyright applied to derivative, value-added products. He remarked that some people would like to have access to the GDA via the Internet. Dr Jones responded that there were no tight legal agreements between the data suppliers and BODC other than a promise to protect copyright. Dr Smith wondered whether this situation would also discourage some contributors who would like their data to be distributed widely. Sir Anthony Laughton said he understood that derivative products might not be covered by copyright, for example, the bathymetric grid is a separate product from the contributed data and so might not be covered. GEBCO took a lot of data from individual contributors, re-packaged it and created the GDA.
- 44 The Chairman asked whether copyright was hindering or helping GEBCO.
- 45 Mr Tani said that some people think GEBCO is a closed shop. He wondered whether GEBCO products should be published more widely because GEBCO was supported by IOC and the IHO. Could the GDA, for example, be part of IHB’s B-series publications. Admiral Maratos responded affirmatively that in principle IHB could distribute the GDA. The publications of all Member States publications were copyrighted except in the case of bilateral agreements. He said that the IHO has a Legal Advisory Committee to which IHB could submit any questions from GEBCO. At this point the Chairman said he wanted to close the discussion because it was getting too detailed but he accepted that if copyright was an important issue, which it seemed to be, then GEBCO should seek advice [Action Chairman]. Dr Jones ended the discussion by suggesting that GEBCO set up a Working Group to examine the issues of marketing and copyright.
- 46 Sir Anthony Laughton stated that he was very impressed by Dr Jakobsson’s argument that sales would increase if the grid was made available on the Internet. Customers would pay only for the ‘packaging’ of the grid on the CD. This approach also avoids the objection of the Japanese concerning the sale of their data. He was convinced it was the correct approach. Mr Anderson thought GEBCO should seek endowments from companies for the use of the GEBCO grid. For

example, if airlines used the GDA for their charts on entertainment channels and made a contribution to GEBCO for the privilege both parties would benefit.

6. STRATEGIC PLANNING COMMITTEE

- 47 The Chairman used his second Centenary Conference presentation to generate a discussion on GEBCO's future strategy (Annex 6).
- 48 Discussion began around the issue of collecting soundings and other data in a database or data centre. Sir Anthony Laughton thought that people needed to be encouraged to submit data to data bases such as NGDC. Dr Loughridge concurred and said that NGDC needs to be more proactive in seeking data. He drew a parallel with the IOC National Co-ordinators who 'map' data; NGDC has no equivalent posts. Mr Tani noted that Hydrographic Offices are mandated to collect data from wherever they can find it.
- 49 The discussion then passed rapidly over digital products, the Internet, seabed information, remote sensing and the concept of map scale.
- 50 The Chairman had queried whether the concept of 'edition' was meaningful any more. Dr Loughridge responded that there was a need to have a 'versionary' scheme for gridded data. Dr Jones thought the problem over the next three years or so would be how to update data sets. Sir Anthony Laughton raised the issue of peer review; without peer review how was the data quality to be assured? Dr Loughridge even wondered how comments on the GDA would be tracked. Ms. Weatherall responded that she and colleagues were already setting up an email data base for comments and feedback on the GDA-CE. Dr Goodwillie asked whether future updates would be given away free to people who had already bought the GDA. Dr Smith said he favoured making the grid available on the Internet. The Chairman considered frequent updating of the grid to be an onerous task but members thought it was the only way forward.
- 51 The discussion then passed rapidly over issues of the continental shelf and rise, and the changing role of interpolation of bathymetric data.
- 52 It was recognised that maintaining links between the IHB/IHO and VHOs was a major task. Regarding the IBCs Dr Jones said he had been frustrated for years by the lack of co-operation from the IBCs although some had been very helpful. Sir Anthony Laughton noted that CGOM had covered this very topic at their meeting a few days before. Mr Travin informed members that at the last IOC Executive Council Meeting it had been agreed to encourage all IBCs to work with GEBCO. Dr Hall wondered whether people involved in the IBCs, especially younger scientists, could be drawn into GEBCO.
- 53 The discussion then passed rapidly over issues connected with the UN Atlas of the Oceans, CLCS and UNCLOS Continental Shelf submissions, the International Seabed Authority, universities, GoMap, OPD/IODP and land mappers.
- 54 The discussion next focussed on likely impacts from societal changes, particularly from UNCLOS. Dr Mayer noted that many countries including the USA, Australia, New Zealand and Ireland were currently mapping their offshore areas in support of UNCLOS claims. GEBCO should establish the connections required to obtain this data even in degraded form. Dr Loughridge reported that, since he had retired, he had heard from Richard Howarth in Canada that the UN had begun to set up its own data base for all such data. Sir Anthony Laughton noted that the Chairman of the CLCS had been at the Centenary Conference. Maybe he should be contacted directly with an offer that NGDC would host the UN database. Captain Gorziglia thought the IHO could help with such a proposal. He said that the IHO was recognised by the UN as a body qualified to participate in the General Assembly and had submitted reports on the status of hydrographic surveying. Dr Smith took the view that it would be helpful if GEBCO, as an international body, would make a stand publicly against setting up a UN database. Dr Loughridge thought that to begin with the Chairman should

ascertain the situation from Dr Howarth. Mr Tani reported that he would have an opportunity to talk very soon to Kensaku Tamaki, a Japanese member of the Commission on the Limits of the Continental Shelf, about the issue. Captain Gorziglia suggested that whatever initiative was taken by the Guiding Committee it should be passed to the IOC/IHO to jointly make a submission to the UN. [Action Chairman]

- 55 Dr Frias said he had had experience of the UN at a regional Caribbean Sea/Central America meeting held in 2002. There had been a presentation about the UN cartographic database. He suggested contacting the UN Commission on Marine Affairs to see what data they already had. He also mentioned that the CARISLOTS software, often used to draw UNCLOS Article 76 boundaries, offers ETOPO2 bathymetry and not GEBCO bathymetry. He asked whether CARISLOTS should be offered the GDA-CE.
- 56 Mr Huet reminded members that ABLOS (the Advisory Board on the Law of the Sea, chaired by Ron Macnab) would hold a conference at the IHB in October 2003 and about 80 people were expected. It would be very appropriate to present the GDA-CE to the meeting. The Chairman noted that another opportunity to show and sell the GDA-CE would arise in June 2003 during an UNCLOS meeting in Reykjavik, Iceland. [Action Chairman]
- 57 The discussion moved rapidly over 'The future role for GEBCO' and arrived at the final sections of the Chairman's Conference presentation entitled 'A model for the Sixth Edition' and a 'Vision of what GEBCO could become'. Members discussed whether it was better to include parameters other than bathymetry. The majority view was that it was better to concentrate on GEBCO's main product i.e. bathymetry.
- 58 The Committee then entered a period of essentially free-ranging discussion largely outside the Agenda. The discussion began to consider a detailed re-arrangement of the details of Task 1. Dr Fisher remonstrated strongly at this departure from the agreed Agenda and left the meeting. Several members then suggested that the Chairman consider the assignment of Tasks in the Work Plan outside the meeting. Mr Huet again reminded the Chairman that IHB needed a decision on the status of the Guidelines otherwise their publication would be delayed for another year.

7. REPORT OF THE SUB-COMMITTEE ON UNDERSEA FEATURE NAMES

- 59 Dr Loughridge requested that the Chairman write to Dr Fisher regretting that there had been insufficient time to accept his reports of the two previous meetings of SCUFN in October 2002 and April 2003 [Action Chairman].

8. COMPOSITION OF THE GUIDING COMMITTEE AND ITS SUB-COMMITTEES

8.1 The Sub-Committee on Digital Bathymetry.

- 60 Dr Jones expressed his personal confusion about the Committee's intentions regarding the future of the Sub-Committee on Digital Bathymetry. Dr Loughridge thought the SCDB could be disbanded now because it had completed its work. Sir Anthony Laughton noted the recent trend after 20 years to replace the SCDB by Working Groups set up on an *ad hoc* basis. The Chairman concluded that any further discussion of Working Groups replacing SCDB should be put in abeyance. He accepted Dr Jones resignation with regret and expressed his enormous thanks for what had been achieved during his Chairmanship over the previous 20 years.

8.2 The Sub-Committee on Undersea Feature Names.

- 61 The Committee next considered the Chairmanship of SCUFN. Dr Schenke was formally proposed to the Chairmanship by Dr Loughridge and seconded by the Chairman. The motion was carried unanimously. Dr Schenke replied that he was happy to accept the Chairmanship of SCUFN subject to his workload.
- 62 The membership of SCUFN was reviewed. It was noted that Dr Yashima, Mr Scott and Rear-Admiral Guy had all retired. Dr Schenke proposed Ms Taylor and Dr Nishizawa (in place of Dr

Yashima) as new members. In response to the Chairman's request for an IHO member Captain Gorziglia responded by saying that the IHB Directors' Committee had decided in principle not to join GEBCO Working Groups or Committees. Captain Gorziglia said IHB would consult with member states and offer a candidate later [Action Captain Gorziglia]. Dr Schenke also welcomed Mr Cherkis as a member of SCUFN and hoped that this would lead to fruitful links with ACUF.

- 63 Mr Travin said that Captain Vadim Sobolev would have been proposed by IOC as a SCUFN candidate but the relevant letter from Admiral Kamaritsyn, the HDNO, to Sir Anthony Laughton had been lost in the mail. Mr Travin said he would ensure another copy was sent to Sir Anthony [Action Mr Travin]. Dr Schenke said that, speaking personally, he would welcome more than one member from any one country. Sir Anthony Laughton and the SCUFN Secretary Mr Huet confirmed that the Terms of Reference of SCUFN did not preclude more than one member from any one country but, as Dr Loughridge pointed out, members were expected to raise their own travel funds. Mr Travin said that the IOC would help with such funds where necessary and this was greatly welcomed by the Committee.

8.3 The Guiding Committee.

- 64 Sir Anthony Laughton reminded the Chairman that the Committee needed a fifth member to represent the IHO. He himself, as a representative of the IOC, also needed to be replaced. He thought that, as SCOR, CMG and IAPSO no longer seemed interested, the Guiding Committee should put up a candidate to the IOC General Assembly for approval. He suggested that Dr Jones should replace him. Mr Travin responded that the next opportunity to put up a candidate to the IOC Governing Body would be in 2004. Meanwhile the name of a candidate could be submitted to the Executive Secretary of IOC for temporary approval. Sir Anthony Laughton said he would make a personal request to the Executive Secretary in support of Dr Jones [Action Sir Anthony Laughton].
- 65 Dr Loughridge noted that Dr Schenke's Chairmanship of SCUFN and possible Vice-Chairmanship of the Guiding Committee could place too great a load on Dr Schenke. He suggested that Dr Frias might become Vice-Chairman of the Guiding Committee instead. Dr Falconer said he would support either candidate. The Committee postponed a vote and decided to make a decision after consultation by email. The Chairman concluded by saying that the IOC members should propose a candidate for Vice-Chairman who would then be voted on by the whole Committee [Action Drs Falconer, Frias, Schenke, Udintsev; Secretary].

8.4 Strategy Planning Committee.

- 66 The Chairman and Dr Falconer would produce Version 5.0 of the Strategic Plan at which point the work of the Committee would probably end [Action Chairman, Dr Falconer].

8.5 Centenary Organising Committee.

- 67 The Chairman confirmed that the Centenary Organising Committee had been disbanded.

8.6 Review of GEBCO Working Groups.

- 68 Sir Anthony Laughton asked whether the Guiding Committee wanted his help, as Chairman of the Finance Working Group, in raising funds to which the Chairman responded affirmatively.

8.7 General review of the GEBCO Personality List.

- 69 Sir Anthony Laughton suggested that Rear-Admiral Guy was too busy to maintain his links with GEBCO. He also suggested that the Reviewer System had not worked for many years and should be abolished. Whilst agreeing, Dr Loughridge cautioned against breaking contact with these people entirely. He said that in many cases the Reviewer System provided their only link with GEBCO and GEBCO might need their help in future. It was therefore agreed that Reviewers, other than those separately connected with GEBCO, should become Corresponding Members and the Personality List should be altered accordingly (Annex 7) [Action Secretary]. Sir Anthony Laughton noted that consequently pages 1-12 to 1-13 in the Guidelines should be deleted.

9. DATES AND PLACES OF THE NEXT MEETINGS

- 70 Dr Loughridge reiterated that GEBCO had a standing invitation to meet in Boulder, Colorado, USA. He said he thought the current Director of NGDC would welcome GEBCO. Dr Frias added that his chief, who had attended the recent CGOM and SCUFN meetings, would like to receive GEBCO at his institution in Aguascalientes, Mexico.
- 71 Dr Jones raised the problem of members travel and subsistence to attend meetings. Dr Falconer noted that at the Durham, New Hampshire meetings it had been proposed that the Guiding Committee would meet every year and it had been suggested that the GEBCO Officers meetings would fall into disuse. Dr Loughridge suggested that the Guiding Committee could make decisions by email. Mr Travin stressed that the IOC could not support the Guiding Committee meeting every year. The Chairman concluded that GEBCO would meet in Mexico in 2004 at a time and place to be decided by Dr Frias [Action Secretary, Dr Frias].
- 72 The Secretary pointed out that La Spezia, Italy, hosted by Dr Carron, was a possible venue for 2005. Kiel, Germany, hosted by Dr Schenke, was another possibility.

10. ANY OTHER BUSINESS

- 73 Mr Huet returned to the question of updating the GEBCO Guidelines. He said that Chapters 2 and 4 and Annex 2 had been revised over several years. The changes to Chapters 2 and 4 had been accepted by the SCDB. Additional comments from CGOM had led to the current revised version. He said he had received only a few editorial changes. The Chairman set a deadline for any further editorial changes of 17 May 2003. Mr Huet said he wanted immediate approval. The Chairman suggested that in future the Guidelines could be published annually on a CD-ROM. He suggested that the Committee approve the Guidelines immediately and re-publish them on CD in a years timer with any revisions. Mr Huet agreed to this arrangement. Dr Falconer offered to write a sentence to be added to the Forward to the effect that GEBCO's structure is currently undergoing change. Mr Huet agreed [Action Dr Falconer, Mr Huet].

11. CLOSURE OF THE MEETING

- 74 The Chairman thanked all participants for their contributions. The meeting closed at 1836 on 17 April 2003.

ANNEX 1

Nineteenth Meeting of the GEBCO Guiding Committee

13.30 Wednesday 16th April and 09.00 Thursday 17th April , 2003

INTERNATIONAL HYDROGRAPHIC BUREAU, MONACO

AGENDA

1. OPENING OF THE MEETING
2. CONDUCT OF THE MEETING
 - 2.1 Adoption of the Agenda
 - 2.2 Documentation; Administrative Arrangements, etc.
3. COMPOSITION OF THE GUIDING COMMITTEE AND ITS SUB-COMMITTEES
 - 3.1 Guiding Committee
 - 3.2 Sub-Committee on Digital Bathymetry (SCDB)
 - 3.3 Sub-Committee on Undersea Feature Names (SCUFN)
 - 3.4 Conference Organising Committee
 - 3.5 Strategy Planning Committee
 - 3.6 Review of GEBCO Working Groups (4)
 - 3.7 General Review of the GEBCO Personality List
4. MATTERS ARISING FROM REPORTS OF PREVIOUS MEETINGS:
5. THE GEBCO FUND AT SOUTHAMPTON UNIVERSITY, UK
 - 5.1 Donations
 - 5.2 Financial statement
 - 5.3 Possible expenditure
 - 5.4 Finance Working Group report
6. REPORT BY THE CHAIRMAN OF THE SUB-COMMITTEE ON DIGITAL BATHYMETRY (TWENTIETH MEETING, , 12 April 2003)
 - 6.1 Centenary GDA – including copyright issues
 - 6.2 The future of SCDB
 - 6.3 Updating the Pacific Ocean
 - 6.4 Generation of 6th Edition charts
7. REPORT BY THE CHAIRMAN OF THE SUB-COMMITTEE ON UNDERSEA FEATURE NAMES (SIXTEENTH MEETING, , 10-12 April 2003)
 - 7.1 Ratification of new names
8. REPORT BY THE CHAIRMAN OF THE STRATEGY PLANNING COMMITTEE (THIRD MEETING, University of New Hampshire, 15 and 17 May 2002)
 - 8.1 Current status of Work Plan and achievements of new Working Groups (Education, Integration and Assimilation)
9. PROMOTION OF GEBCO
 - 9.1 AGU booth
 - 9.2 EGS booth

9.3 GEBCO web site

10. DATES AND PLACES FOR THE NEXT MEETINGS

10.1 Year 2004: Mexico, Boulder

10.2 Year 2005: Kiel

11. ANY OTHER BUSINESS

12. CLOSURE OF THE MEETING

ANNEX 2

Work Plan Version 4.0

Composed by attendees at GEBCO meetings, University of New Hampshire, May 20, 2002

List of agreed tasks

- TASK 1 PRODUCTION OF PRODUCTS
- TASK 2 GEOSCIENCE DATA INTEGRATION
- TASK 3 DATA ASSIMILATION AND ACQUISITION
- TASK 4 REVIEW ROLES, RESPONSIBILITIES AND MEMBERSHIPS
- TASK 5 UPDATING
- TASK 6 OUTREACH
- TASK 7 FEATURES
- TASK 8 EDUCATIONAL PRODUCTS
- TASK 9 FINANCE

Details of Tasks

TASK 1 PRODUCTION OF PRODUCTS

OBJECTIVE – To complete production of products and disseminate them

1.1	GDA NEW (2002) EDITION	Jones	March 03	
1.1.1	All contours digitized	Weatherall	Sept 02	
1.1.2	1 min grid	Carron/Goodwillie	Sept 02	Indian ocean critical
1.1.3	Text	Jones	March 03	
1.1.4	CD Produced	Jones	March 03	
1.1.5	Platform independence via HTML	Jones/ Sharman	Start 03	To be investigated
1.2	GLOBAL GRID	Carron		
1.2.1	1 min grid	See 1.1.2	Sept 02	
1.2.3	Uncertainty estimates	Carron/Hall/Tani	During 02	Development work
1.2.4	Variable resolution grid	Carron/ Sharman	During 02	
1.2.5	Continual Updated Grid from new data	Carron		
1.2.6	Quality assessment	Carron/Tani		
1.3	INTERNET AVAILABILITY	Sharman	Sept 03	
1.3.1	GDA on web	Sharman		
1.3.2	Updated grid on web	Sharman		

TASK 2 GEOSCIENCE DATA INTEGRATION

OBJECTIVE – To include all types of geoscience data to improve and update GEBCO products

2.1	ALTIMETRY	Smith		
2.1.1	Calibrate with Japanese database	Smith/Tani	Start Jun 02	
2.1.2	Liaison with ABYSS	Smith		
2.2	MULTIBEAM INTEGRATION	Monahan, Schenke, Tani	Start Jun 02	
2.3	ESTABLISH WORKING GROUP	Smith, Pharaoh, Tani, Divins, Schenke, Hall	May 02	

TASK 3 DATA ASSIMILATION AND ACQUISITION

OBJECTIVE – To increase the amount and type of data available for inclusion in the DCDB and in GEBCO products

3.1	ESTABLISH WORKING GROUP	Divins, Tani, Sharman, Hunter, Hall, Cherkis, Huet, Frias	Get it started	
3.1.1	Regional contacts	See 3.1		
3.1.2	IHO and VHO process	See 3.1		
3.2	Filling Gaps			
3.2.1	Brit Antarctic Surv Atlantic	Whitmarsh, Hunter	Started	
3.2.2	Bathymetry from Buoys	Anderson, Hall	started	

TASK 4 REVIEW ROLES, RESPONSIBILITIES AND MEMBERSHIPS

OBJECTIVE – To ensure that organizational structure continues to fulfil requirements

4.1	REVIEW PERSONALITY LIST	GC	ongoing	
4.1.1	Succession Planning	GC	ongoing	
4.1.2	Emeritus Members	GC	Next mtg	
4.2	REVIEW SUB-COMMITTEES	GC	Done May 02	
4.3	ESTABLISH NEW GROUPS			
4.3.1	Geoscience data	GC	Done	
4.3.2	Data Assimilation	GC	Done	
4.3.3	Finance	GC	done	

4.4	CLARIFY RELATIONS WITH IBC	Guy	Jun 02	
4.5	IMPROVE DIVERSITY	Smith/Goodwillie	Get started	
4.5.1	Recruit new skills			
4.6	RELATIONAL CONTINUITY	GC	ongoing	
4.6.2	Terms of reference	GC	Ongoing	
4.6.3	Internal structure	GC	ongoing	

TASK 5 UPDATING

OBJECTIVE – To ensure that GEBCO products include the latest data and incorporate current thinking.

5.1	SOUTHERN OCEAN (ANTARCTIC)	Schenke		
5.1.1	Establish Editorial Board	Guy/ Divins	Done here	Robin has minutes
5.1.2	Link to SCAR		June 02	
5.1.3	Link to IHO WG		July 02	
5.2	SOUTHEAST PACIFIC			
5.2.1	Investigate update with geoscience data	Carron	Late 02	
5.2.2	Data discovery	Divins	By next meeting	

TASK 6 OUTREACH

OBJECTIVE – To make GEBCO more accessible to the entire marine community.

6.1	PAPER EDITION	Jones/Weatherall		
6.1.1	Availability at Centenary	Jones/Weatherall	March 03	
6.1.2	Print on demand	Jones/Weatherall		
6.2	DISPLAYS AT CONFERENCES			
6.2.1	Base material available	Jones		Is available
6.2.2	AGU Dec 02	Goodwillie	Dec 02	
6.2.3	EGS/AGU Nice	Goodwillie	Apr 03	
6.2.4	WOCE	Jones	End of 02	
6.3	CENTENARY BOOK	Scott	Apr 03	
6.4	CENTENARY CONFERENCE	Loughridge	Apr 03	

6.5	WEBSITE AND CONTACTS			
6.5.1	Persons and expertise	Sharman/ Hunter	Aug 02	
6.5.2	Submission of additional experts	Members	ongoing	
6.5.3	Displays for web	Jones/ Sharman	Dec 02	
6.5.4	Maintenance of list servers	Sharman	ongoing	
6.6	general articles to journals	all	ongoing	

TASK 7 FEATURES

OBJECTIVE – To standardize and enhance the verbal description of the sea floor

7.1	SCUFN RECOGNITION	Guy		
7.1.1	Gazetteer	Huet	ongoing	
7.2	GIS VERSION OF S23 LIMITS	Divins/ IHB	Jan 03	
7.3	FEATURE RULES AND PROTOTYPING			
7.3.1	SW Pacific	Falconer		
7.3.2	Mediterranean	Hall/Carron		
7.4	AUTOMATIC NAME PLACING	Guy, Schenke, Tani		Investigate
7.5	LAND/ WATER MASK	Carron		

TASK 8 EDUCATIONAL PRODUCTS

OBJECTIVE – To bring the sea floor to the next generation

8.1	EDUCATION WORKING GROUP	Sharman		
8.1.1	Icosohedral globe	Sharman		

TASK 9 FINANCE

OBJECTIVE – To continuously examine and enhance the financial basis for GEBCO

9.1	EXISTING FUNDS	New Working	Established at	
-----	-----------------------	-------------	----------------	--

		Group	UNH meeting	
9.1.1	Review disposition			
9.1.2	Install accounting methods			
9.2	FUTURE FUNDS			
9.2.1	Seek future sources			
9.2.2	Seek partnerships			
9.2.3s	Travel funds			

ANNEX 3**BATHYMETRY FROM BUOYS**

Memo from Robert Anderson, University of Hawaii

1. At the 2002 meeting of the GEBCO Guiding Committee in Durham, New Hampshire, the sparseness of available sounding observations in polar regions and the SE Pacific was discussed, and a suggestion made that the situation might be alleviated by deployment of autonomous drifting buoys in these regions, each buoy instrumented with a single beam depth sounder and the means to telemeter sounding measurements back to a shore site. John K. Hall and I agreed to look into the feasibility of such a concept.
2. Dr Hall generously offered to provide \$1000 seed money for procurement of components of an acoustic sounder to facilitate initial development. After discussion with other engineers at UH, we accepted this offer and have procured two types of transducers used in similar autonomous buoy applications, and have begun integration of these transducers with sonar transmitter and receiver electronics.
3. In collaboration with Lamont and the Center for Coastal and Ocean Mapping at UNH, we have planned the development of a system incorporating a network of autonomous bathymetric buoys, satellite communications and a shore infrastructure to control the buoy network, archive data and merge sounding data into appropriate data bases. The development of this system will require three years of effort. The first year effort has been formally proposed to NSF and is currently undergoing review.
4. Our proposed system is called Seafloor Sounding in Polar and Remote Regions (SSPARR). Realising that the SSPARR concept could be supported by either dedicated buoys or by incorporation of the sounder into other buoys, we have initiated dialogues with the International Arctic Ocean Buoy Program, the International Program for Antarctic Buoys, the British Antarctic Survey and the Alfred Wegener Institute to investigate co-ordination of our activities. We are also in contact with the Data Buoy Co-operation Panel of IHO, who have invited our active participation in their activities as our system approaches operational capability.

ANNEX 4**Brief summary report on GEBCO exhibit booths at Fall AGU, 2002 and EGS, 2003**

by Andrew Goodwillie

Between December, 2002, and early April, 2003, I manned GEBCO exhibit booths at two major week-long international conferences: the American Geophysical Union held in San Francisco and the EGS-EUG-AGU Joint Assembly in Nice. The AGU meeting attracted over 9,000 earth scientists. The EGS assembly had almost 12,000 registrants. These exhibit booths represented the first real marketing efforts by GEBCO to promote an awareness of our organisation and of our data products amongst the wider earth sciences community. In particular, my goal was to alert people of the imminent release of the GEBCO 1-minute global bathymetric grid. At both meetings, we were fortunate to be assigned prime locations for the GEBCO booth. The number of booth visitors was as follows:

AGU and EGS

People who stopped to ask questions: 120-250

People who took a GEBCO leaflet: 300-400

In total, I spoke to approximately 370 people about the GEBCO bathymetric grid. I was able to persuade most of them to leave their name and e-mail contact details on my booth sign-in sheets. (These people have recently been e-mailed by Bob Whitmarsh to remind them of the release of the new GEBCO CD-ROM.) Over 700 people were interested enough to pick up an information leaflet from the booth. Visitors to the GEBCO booth at the EGS meeting comprised more Europeans than at AGU and I found that, curiously, significantly more of them had heard of GEBCO and had used GEBCO bathymetric charts and CD-ROMs. However, I noted that, at both meetings, it tended to be the older booth visitors who were aware of GEBCO. Without question, visitors to the GEBCO booth were delighted that a global bathymetric grid based upon echo-soundings data is being released. Some simply could not wait to get their hands on the gridded data base! Many people were very pleased that the GEBCO grid is compatible with the widely-used Wessel/Smith GMT software. In addition to the many marine geologists and geophysicists, the GEBCO booths were visited by numerous ocean circulation and tidal modellers who told me of the fundamental nature of bathymetry to their research. Many enquired about the shallow-water bathymetric content of the GEBCO global grid. Some considered the release of the GEBCO grid to be a milestone. The GEBCO exhibit booths were a very good forum in which I was able to educate booth visitors. For example, many people were surprised at just how much effort is involved in a thorough echo-soundings data compilation. I was able to explain the construction of the GEBCO bathymetric contours and the resultant gridded data base, to explain its limitations, and to point out the differences between the GEBCO grid and the ETOPO5 and ETOPO2 data sets. At both meetings, many people thought incorrectly that the GEBCO 1-minute bathymetric grid was merely a finer-sampled version of the satellite-derived predicted bathymetry. Many also thought that GEBCO is part of a US federal agency since our web site address is at NGDC. My reason for persuading GEBCO to have exhibit booths at these international meetings was that, even with the release of the global bathymetric grid, I feared that GEBCO would remain in obscurity if we were not pro-active in getting our name and our products into the community. The fact that relatively few booth visitors had heard of GEBCO and that a number of people had negative perceptions about GEBCO was proof enough that without new exposure GEBCO would remain irrelevant.

By volunteering to man the booths I have been the public face of our group - GEBCO's marketing person, if you will - and have spoken personally with hundreds of potential users of GEBCO data products. I volunteered my time because I wanted to show that young, active people are welcomed in GEBCO and because I felt that my experiences on research cruises, in constructing the bathymetric grid for the Indian Ocean and Environs, and in being able to enthusiastically engage people would create a pleasant, friendly experience for visitors to the GEBCO booths. I consider that my efforts at the GEBCO exhibit booths were a tremendous success and that the booths have done a great deal to revive the potential role of GEBCO in today's earth sciences community.

Although most other members of GEBCO probably saw the Centenary Conference in Monaco as GEBCO's showpiece, I operated under the premise that GEBCO had 'gone public' and 'gone digital' at last December's AGU meeting since I was to be standing there telling people all about GEBCO and the gridded data base. Although organising and manning a GEBCO exhibit booth is a lot of work (made worse by the acrid cigarette smoke wafting through the Nice conference centre) my reward for this largely one-man effort was in seeing just how excited people became when I engaged them with talk of bathymetry data and the release of the GEBCO global bathymetric grid. In fact, many booth visitors commended me on being enthusiastic and knowledgeable and on creating such an attractive and informative booth. Indeed, with this kind of positive feedback, I felt honoured to be associated with GEBCO, and my booth experiences reaffirmed to some extent my belief in our organisation.

I made a point of being honest by telling booth visitors that the GEBCO global bathymetric grid in the Pacific Ocean area is based upon old fifth edition contours. But, I assured them that GEBCO is painfully aware of this woeful situation and has as its top priority the updating of Pacific Ocean bathymetry. Understandably, many booth visitors impressed upon me repeatedly the necessity of providing a revised, accurate Pacific bathymetry. People were pleasantly surprised that the CD-ROM containing the global bathymetric grid (the GDA-CE CD-ROM) was so cheap. Some went as far to say that they would willingly pay many hundreds of dollars for such a useful data base.

A number of people suggested that, potentially, they could offer various bathymetric data sets to GEBCO. These contacts were given to Bob Whitmarsh. Some booth visitors also enquired about intricate copyright issues. Their details were passed on to Meirion Jones.

The reaction to GEBCO's presence at each meeting was very positive. However, at both the AGU and EGS meetings, some booth visitors harboured negative perceptions about GEBCO. As far as I felt justified, I tried hard to dispel their concerns. Common complaints were: GEBCO data products are out-dated; GEBCO is a closed club; GEBCO members tend to be old, out-of-the-loop and very much out of touch with today's earth scientists; GEBCO can be unresponsive. These are important concerns that we ignore at our peril. Repeatedly, I had to inform people that GEBCO is not a commercial enterprise but, rather, a largely volunteer non-profit organisation with charitable status. Most people had not heard of either the Intergovernmental Oceanographic Commission or the International Hydrographic Organisation. Only a handful of booth visitors appeared to show any interest in GEBCO-SCUFN. I was unable to fully answer some questions put forward by booth visitors. For example, will there be an ability for creating print-on-demand charts of GEBCO bathymetry; what are GEBCO's plans to ensure that shallow-water regions contain accurate bathymetry; and the perennial question of why, realistically, all world-wide agencies and institutions do not submit their cruise data to one central distribution organisation? There was significant interest in under-ice bathymetry around Antarctica.

Costs: GEBCO paid for the cost of renting the booth spaces and for my expenses to attend these meetings. My time and energy in designing the posters and leaflets (120 hours), in dealing with the booth organisation and logistics (60 hours), and in manning the booth for two entire weeks was donated by me to GEBCO for free.

Acknowledgements: David Divins printed the many booth display posters and leaflets that I had designed. Martin Jakobsson and John Hall provided attractive posters of the Arctic Ocean and Mediterranean Sea. Bob Whitmarsh, who went to the EGS meeting, kindly tended the EGS booth around midday each day so that I could grab some lunch. Michel Huet arranged for an IHB staff member to deliver various booth items to the Nice conference centre. Carla Moore (NGDC), at my instruction, efficiently made a plethora of changes to the GEBCO web site to improve its relevance and accuracy in time for the AGU and EGS meetings.

ANNEX 5

DISTRIBUTION/SALES OF GEBCO DIGITAL ATLAS (11 April 2003)

Country	SECTOR				Total (sold)	Country	SECTOR				Total (sold)		
	Gov	Univ	Comm	Other			Gov	Univ	Comm	Other			
Albania	1	-	-	-	1	(0)	Lithuania	1	-	-	-	1	(0)
Algeria	2	-	-	-	2	(1)	Madagascar	2	-	-	-	2	(0)
Argentina	2	-	-	-	2	(0)	Malaysia	1	-	-	-	1	(0)
Australia	28	13	13	-	54	(48)	Malta	-	1	-	-	1	(1)
Austria	1	-	-	1	2	(2)	Martinique	-	-	-	1	1	(0)
Barbados	-	-	1	-	1	(1)	Mauritania	2	-	-	-	2	(0)
Belgium	5	7	1	2	15	(12)	Mauritius	2	1	-	-	3	(2)
Benin	1	-	-	-	1	(0)	Mexico	2	2	1	-	5	(3)
Bermuda	-	-	1	-	1	(1)	Monaco	-	-	-	10	10	(7)
Brazil	5	12	1	-	18	(16)	Morocco	3	-	-	-	3	(1)
Bulgaria	1	-	-	-	1	(0)	Mozambique	3	-	-	-	3	(0)
Cameroon	1	-	-	-	1	(0)	Netherlands	7	3	9	2	21	(19)
Canada	28	21	8	5	62	(49)	New Caledonia	-	-	-	1	1	(1)
Chile	4	2	-	-	6	(4)	New Zealand	6	1	4	1	12	(10)
China	2	2	1	-	5	(2)	Nigeria	2	-	-	-	2	(0)
Colombia	3	1	-	-	4	(0)	Norway	18	4	14	3	39	(34)
Comoros	1	-	-	-	1	(0)	Panama	1	-	-	-	1	(0)
Costa Rica	-	1	-	-	1	(1)	Papua N.Guinea	1	1	-	-	2	(1)
Cote d'Ivoire	3	-	-	-	3	(1)	Peru	2	-	-	-	2	(1)
Croatia	4	-	-	-	4	(2)	Philippines	-	2	-	2	4	(3)
Cuba	1	-	-	-	1	(0)	Poland	2	-	-	-	2	(2)
Denmark	9	3	1	1	14	(12)	Polynesia (Fr.)	-	1	-	-	1	(1)
Dominica	1	-	-	-	1	(0)	Puerto Rico	-	1	-	-	1	(1)
Ecuador	3	-	-	-	3	(0)	Portugal	3	4	-	1	8	(5)
Egypt	2	-	-	-	2	(0)	Reunion	1	-	-	-	1	(1)
Falkland Is.	2	-	2	-	4	(4)	Romania	1	-	-	-	1	(0)
Faeroes	2	-	1	-	3	(3)	Russia	16	1	-	1	18	(1)
Fiji	-	-	-	1	1	(0)	Senegal	1	-	-	-	1	(0)
Finland	2	-	-	-	2	(1)	Seychelles	1	-	-	-	1	(0)
France	26	9	13	12	60	(46)	Singapore	1	1	-	-	2	(2)
Gabon	-	-	1	-	1	(1)	Slovenia	1	-	-	-	1	(1)
Germany	28	28	9	2	67	(63)	South Africa	6	-	2	-	8	(6)
Ghana	1	-	-	-	1	(0)	Spain	9	12	14	3	38	(36)
Greece	4	1	-	1	6	(4)	Sri Lanka	1	-	1	1	3	(3)
Guinea	2	-	-	-	2	(0)	St. Vincent	1	-	-	-	1	(1)
Hong Kong	-	1	-	-	1	(1)	Suriname	-	-	1	-	1	(1)
Hungary	-	2	-	-	2	(2)	Sweden	1	2	-	-	3	(2)
Iceland	7	2	1	-	10	(9)	Switzerland	-	1	1	-	2	(2)
India	5	1	-	-	6	(3)	Taiwan	1	3	-	-	4	(4)
Indonesia	-	-	1	-	1	(1)	Tanzania	3	-	-	-	3	(0)
Iran	1	-	-	-	1	(0)	Thailand	1	-	-	1	2	(2)
Ireland	4	5	5	-	14	(12)	Togo	1	-	-	-	1	(0)
Israel	1	1	-	-	2	(1)	Tunisia	2	-	-	-	2	(0)
Italy	17	10	3	13	43	(40)	Turkey	3	2	1	-	6	(4)
Jamaica	-	-	-	1	1	(1)	Ukraine	4	-	-	-	4	(0)
Japan	10	21	39	2	72	(69)	UK	112	75	74	21	282	(174)
Kenya	5	-	-	-	5	(0)	USA	61	98	172	13	344	(304)
Korea	7	1	1	-	9	(7)	Vietnam	2	-	-	-	2	(1)
TOTAL								519	361	396	102	1378	(1057)

Figures above refer to total number of copies sold or distributed up to 11 April 2003. GOV = Government/Public funded organisation; UNIV = University; COMM = Commercial organisation. Number in parenthesis refers to total number of copies sold as opposed to complimentary copies.

**DISTRIBUTION/SALES OF GEBCO DIGITAL ATLAS –
SUMMARY STATISTICS (11 April 2003)**

- a) Total number sold/distributed = 1378 copies
Total number sold = 1057 copies
Number of complimentary copies = 321 copies
- b) Copies sold/distributed to 96 countries
- c) Breakdown of copies sold/distributed by sector:
- | | |
|---------------------|------------|
| Government bodies | 519 copies |
| University groups | 361 copies |
| Commercial bodies | 396 copies |
| Other organisations | 102 copies |
- d) Distribution of 321 complimentary copies:
- | | |
|------------------------|------------|
| GEBCO community | 100 copies |
| International exchange | 127 copies |
| UK national exchange | 94 copies |

e) Sales/distribution by month:				Sold	Gratis	Total	
	Sold	Gratis	Total				
				1999			
1994				Jan	12	1	13
				Feb	7	4	11
May	17	18	35	Mar	8	2	10
Jun	33	52	85	Apr	10	11	21
Jul	20	3	23	May	8	2	10
Aug	8	9	17	Jun	2	2	4
Sep	21	7	28	Jul	6	3	9
Oct	16	1	17	Aug	3	-	3
Nov	18	2	20	Sep	9	-	9
Dec	13	6	19	Oct	10	1	11
				Nov	12	2	14
				Dec	12	-	12
				2000			
1995				Jan	7	1	8
Jan	16	1	17	Feb	11	2	13
Feb	48	5	53	Mar	10	-	10
Mar	31	8	39	Apr	8	1	9
Apr	18	5	23	May	8	-	8
May	28	8	36	Jun	6	1	7
Jun	20	3	23	Jul	9	-	9
Jul	23	6	29	Aug	10	-	10
Aug	16	2	18	Sep	8	1	9
Sep	18	4	22	Oct	11	-	11
Oct	15	3	18	Nov	12	1	13
Nov	20	3	23	Dec	7	-	7
Dec	13	2	15	2001			
				Jan	11	-	11
1996				Feb	6	1	7
Jan	10	1	11	Mar	9	2	11
Feb	10	23	33	Apr	3	6	9
Mar	10	1	11	May	9	-	9
Apr	9	-	9	Jun	13	-	13
May	17	5	22	Jul	7	1	8
Jun	6	-	6	Aug	8	2	10
Jul	6	2	8	Sep	6	-	6
Aug	4	2	6	Oct	6	-	6
Sep	3	-	3	Nov	3	-	3
Oct	15	2	17	Dec	5	1	6
Nov	11	1	12	2002			
Dec	5	2	7	Jan	6	-	6
				Feb	6	-	6
1997				Mar	4	-	4
Jan	7	2	9	Apr	4	-	4
Feb	13	-	13	May	-	-	-
Mar	5	3	8	Jun	2	-	2
Apr	11	2	13	Jul	3	1	4
May	7	-		Aug	5	-	5
Jun	18	8	26	Sep	4	1	5
Jul	11	-	11	Oct	2	-	2
Aug	8	1	9	Nov	2	25	27
Sep	10	2	12	Dec	3	-	3
Oct	8	2	10	2003			
Nov	10	2	12	Jan	2	-	2
Dec	8	11	19	Feb	4	-	4
				Mar	2	1	3
1998				Apr	1	-	1
Jan	15	3	18				
Feb	11	2	13				
Mar	8	2	10				
Apr	5	3	8				
May	7	1	8				
Jun	8	4	12				
Jul	7	2	9				
Aug	1	2	3				
Sep	9	3	12				
Oct	6	2	8				
Nov	1	1	2				
Dec	3	0	3				
				Total	1057	321	1378

ANNEX 6

A look to the future

Notes from David Monahan

Based on discussion of Strategic Issues at the GEBCO meeting Monaco, April 17 2003

Part 1. Introduction

1.1 Time Scale

what is GEBCO going to do the week after this celebration is over?

1.2 What do we dream the future will bring?

Many earth scientists share the dream of having the entire surface of the earth, both subaerial and sub-aqueous, mapped seamlessly to a fine resolution.

Part 2. Present situation

2.1 Hydrography at the Organizational Level

IHO Strategic Planning Work Group draft objectives:

1. To improve global coverage, availability, quality and access to hydrographic data (*and its related oceanographic*) information, products and services (*especially nautical charts and publications*)
2. To improve global hydrographic capability, capacity, science and techniques.
3. To establish international standards for the quality and formats of hydrographic data, information, products, services and techniques and to achieve the greatest possible uniformity in the use of these standards.
4. To give authoritative (*and timely*) guidance and advice on all hydrographic matters to governments and international organizations
5. To facilitate co-ordination of hydrographic activities among Member States.
6. To enhance co-operation amongst States on a regional basis

Continued support for GEBCO meets these objectives.

2.2 Oceanography at the Organizational Level

1999 IOC workshop, Potsdam, "Oceans 2020", does not mention bathymetry as an objective but states that accuracy of bathymetric data remains a limitation of some other branches of oceanography.

2002 SCOR Working Group 107 "Improved Global Bathymetry" Report lists many uses for bathymetry and many recommendations for producing bathymetric data bases, maps and grids

2.3 Oceanography and hydrography at the individual Level

Individual scientific co-ordinators and peer reviewers.

Future role of scientific co-ordinators greater amounts of data, a unifying theory of how oceans are created, acceptance of computer contouring as a tool, altimetry world wide (except poles), and multibeam surveys which do not need interpretation (within footprint).

Will require a different level of interpretation, one requiring skills not employed in previous editions.

2.4 Clients

Questionnaire Survey circulated by GEBCO Secretary 2002 showed that users did not see a change in their usage of GEBCO but are seeking finer scales Interaction at AGU and EGU.

Part 3. Likely impacts from science and technology over the next twenty years

3.1 Data Collection

Ships it will take some 800 ship-years to cover the entire seafloor from the 25 m contour out to the deepest ocean with MBES.

Submarines SCICEX program demonstrated value

Military data released to the public domain

Drifters and floats

Robots, tethered and autonomous

Satellites

On multi-disciplinary cruises bathymetry will seldom be the highest priority

Repetitive measurements = less bathymetry

3.2 Positioning

Positioning of the research vessel is no longer an issue

Current positioning research is focussed on positioning the ends of the acoustic beams of a multibeam system on the seafloor.

Upper limit on map publication scale removed

Transition Period new maps made from a combination of pre- and post-GPS positioned data.

3.3 Data base / data centre

National Geophysical Data Center operates a world-wide digital data bank of oceanic soundings on behalf of the IHO.

Soundings are inventoried, quality controlled and updated.

Member States and other organizations submit bathymetric data

In the future, bathymetric information may be locally managed and made available on servers

There will be an even greater need for quality control and standards through NGDC

3.4 Digital products

GIS in common use, bathymetry as one layer

Use digital methodologies for the production, distribution, and advanced visualization of bathymetric information in user-friendly form

Option for producing printed output always available

3.5 The Internet

Major driving force in mapping just coming into its own

Can easily download thousands of maps, data sets and images

The internet will go to sea: it will not be long before data can be moved from instruments aboard ships to shore-based labs

GEBCO will not have a future if it is not part of the internet.

3.6 Seabed information

Multibeam Sonar and other systems permit close to 100% coverage the seabed
 Within the area insonified, collect so much data that only computer analyses possible, no human interpretation is needed or practicably applicable
 Both single beam and MBES data will co-exist for some time and methods of combining them will have to be developed or perfected
 Acoustic backscatter related to bottom composition and texture easily mapped
 “Automatic” seabed classification being introduced

3.7 Remote sensing

Altimetry the only cohesive, single-instrument source of data for the deep oceans.
 Altimetry used to unify and interpret acoustic data where it is widely dispersed and randomly oriented
 GEBCO Working Group on the Integration of Geoscience Data is investigating current or future satellite altimeter data to better understand the signal and noise characteristics and will be used to improve altimetry data processing algorithms and demonstrate the possibility of higher-resolution mapping using new altimeter technology

Part 4. Likely Conceptual changes

4.1 Map scale

Entire concept of map scale is changing
 GIS users wanting to see more detail zoom in on an area of the same map. The area is enlarged and more detail is shown.
 Under this scenario, the scale of the map is whatever the user wants it to be.
 GEBCO will have to adapt to this new concept of scale.

4.2 Edition

The concept of “edition” from the age of paper printing is changing is a paper Sixth Edition needed or whether some other form of constantly updated map will evolve?
 Achieving a “constantly updated map” is possible and already exists in some disciplines, including the Electronic Chart.
 Issues to resolve e.g. how to apply the principal of peer review to a constantly updated product.

4.3 Increased Focus on Continental Slope and Rise

Coastal States collecting data needed to establish the outer limit to their juridical Continental Shelves (may not enter the public domain until the outer limit is established)
 New class of geomorphologic features being discovered and GEBCO scale, both horizontal and vertical, must be appropriate to show them.
 Presence of methane hydrates/clathrates in the sediments of the Rise the areas of their occurrence are coming under increased attention.

4.4 The changing role of interpretation

Within area of seafloor insonified during a multibeam survey, no need to interpret the shape of the seafloor

Between multibeam survey tracks, still a need to interpret from single beam tracks, and ways may be devised to use the extra information provided by the adjacent multibeam coverage

Altimetry provides long wavelength information. Combining altimetry and single beam has been made operational. Interpreting the three wavelengths of data together is under development.

Part 5 Likely impacts from Organisational developments

5.1 IHO /IHB and volunteering hydrographic offices

Support GEBCO and the IOC IBCs

See the data involved as a resource that will be exchanged freely

See the IBCs as forming a bridge between navigation charts and GEBCO charts.

Future participation of VHOs dependent on relationship between GEBCO and the IBCs - must be seen as positive to the VHOs and use limited resources to produce maximum return.

5.2 IOC regional mapping projects

IOC publishes regional bathymetric maps of localized areas through seven Editorial Boards and a Co-ordinating Committee on Ocean Mapping (CGOM)

Some IBCs already integrated into GEBCO, but not all of the seven Editorial Boards agree to this strategy.

IBC use the output of SCUFN.

NGDC is working with the IBC Editorial Boards

Some Hydrographic Offices supply data to the IBCs.

5.3 Combination of GEBCO and IBCs

Analogue production of paper charts justified the creation of two series of bathymetric charts

Digital technology/ data changes this. production of printed charts at several scales from same data set is almost a secondary process.

Makes economic sense to have a combined series. VHOs would supply data once, the areas covered by the ICMs would be mapped once, GEBCO would include the ICM detailed maps within its large ocean wide coverage.

There would appear to be clear advantages in GEBCO and the IBCs working more closely together.

5.4 UN Atlas of the Oceans

FAO Fisheries Department has "United Nations Atlas of the Oceans" web site.

"an Internet portal providing information relevant to the sustainable development of the oceans...Collaborators include the Russian Head Department of Navigation and Oceanography (HDNO), and the US National Oceanic and Atmospheric Administration (NOAA), the Census on Marine Life (CoML) and the National Geographic Society. Cinegram Media Inc., a private publisher, will be producing CD-ROMs and other media in order to reach a wider audience..."

On March 7, 2003 web site has, as freely downloadable images, the cover of the GDA and a portion of one of the 1:10,000,000 sheets.

Clearly there are some links to build here.

5.5 CLCS and UNCLOS Continental Shelf submissions

Guidelines of the Commission on the Limits of the Continental Shelf (CLCS) will impact all Ocean Mapping for at least the next ten years

Paragraph 3.2, Annex II, UNCLOS states “The Commission may cooperate... with the IOC [and] the IHO...with a view to exchanging scientific and technical information which might be of assistance in discharging the Commission's responsibilities.”

GEBCO has included members of the CLCS among its scientific advisors in the past and the Chair of CLCS is at this meeting

5.6 International Seabed Authority

The International Seabed Authority (ISA) organizes and controls activities in “the Area”, the seabed and ocean floor beyond the limits of national jurisdiction

ISA issued 15-year exploration contracts to explore patches of the seafloor with a view to recovering manganese nodules. The contractors have collected different types of data. Data confidentiality may be an issue as is normal in the mining and petroleum industries

Increase GEBCO's presence with ISA - it's Secretary General is at this meeting and the Legal and Technical Committee has been approached

5.7 Universities

Universities were a major player in Fifth Edition with fourteen of the scientific co-ordinators coming from universities in four countries.

A future GEBCO must include them, and new arrangements will have to be worked out to satisfy their needs and those of their funding agencies.

5.8 ODP – Ocean Drilling Program /Integrated Ocean Drilling Program (IODP)

International partnership of scientists and research institutions organized to explore the evolution and structure of Earth.

Produced bathymetry of drill locations

Depth data collected sent to NGDC.

ODP is actively developing partnerships and it may be fruitful to examine a possible role with GEBCO.

5.9 GOMaP (Global Ocean Mapping Program)

Vision to systematically map the ocean floors with at least 100 percent coverage sidescan and swath bathymetry and perform whatever other data collection could be carried out simultaneously.

Not (yet) funded

Some regional mapping initiatives could be considered test areas or pilots for GOMaP.

It could be mutually beneficial for GEBCO and GOMaP to be interlinked.

5.10 Land mappers

The dream of having the entire surface of the earth means that there will have to be programs developed with land mapping agencies.

Part 6 Likely impacts from societal changes

6.1 United Nations Convention on the Law of the Sea

Impact becoming apparent. GEBCO's future will be influenced by, and may help influence, division of the World Ocean into zones

Delineating the juridical Continental Shelf requires a large amount of sea floor mapping

Mapping the Foot of the Slope may lead to improved discrimination of small features at great depths and the development of mathematical models of the seafloor.

Isolated elevations, and, in some cases, the nature of “ridges”, will require further investigation.

Need to maintain a supporting data base that could be examined by the CLCS when they consider a submission.

6.2 The Declaration Of Special Or Protected Areas

Special marine areas in which human activity will be limited are being declared by many states

Establishment of these areas, and the research that will be undertaken within them, will lead to detailed mapping of localized areas.

GEBCO must assure that this information is incorporated in the database

Part 7 The Future Role of GEBCO

7.1 Purpose

GEBCO will serve the world’s marine community through mapping the world ocean floors in their entirety to the highest possible resolution through co-operative partnerships with organizations and individuals.

7.2 Idealized Process

Coastal hydrography will continue collecting data for the safety of navigation and the coastal zone will be mapped to greater intensity

Limits to juridical continental shelves will be mapped

Results will be combined into IOC Regional Maps in some areas

GEBCO will assemble these and combine them with surface and satellite measurements into ocean-wide maps

Outputs will include the data itself, gridded or otherwise, interpreted contours, digital and paper maps, and layers for marine GIS

Data sets will be continuously updated

7.3 Participants

Organizations at all levels

IHO member states will see their data multiplied in value since it will be used several times

IOC ‘s Regional Map projects will achieve greater return on investment though being used twice

GEBCO will concentrate on deeper oceans, on combining and managing data and on ocean –wide mapping.

Individuals will be able to participate at one or more levels. An individual scientist might, for example, work on producing an IOC Regional Map and then work on integrating it into GEBCO.

7.4 A Model for the “Sixth Edition”

“It is proposed that GEBCO consider adopting digital methodologies for the production, distribution, and advanced visualization of bathymetric information in user-friendly form. One way to do this would be to package global bathymetric

information and related facts in a series of information layers... The package would include easy-to-use GIS software that allowed users to combine and visualize selected layers within defined geographic limits, and to manipulate this information to produce special effects e.g. shaded relief maps, custom depth contours, oblique views, fly-throughs, etc. The option for producing printed output would be available, of course, as would be the capacity to export selected data to external GIS environments for specialized manipulation and for combination with other types of information." Macnab and Jakobsson, 2002

Part 8 Conclusion

8.1 A Vision of what GEBCO Can Become: Digital and Virtual

GEBCO can be the vehicle that assembles and converts data from the entire ocean floor into useable information and disseminates it to the world. The GEBCO that does so will: -

1. Be a creature of the digital world making digital products from digital data. (It will be able to produce a paper product if needed.)
2. Produce a diversity of products based on depth, bottom characteristics, and other geologic and geophysical data

8.2 The GEBCO that does so will: -

1. Understand scale, and produce information appropriate to many scales of investigation
2. Evaluate the quality of data, and provide uncertainty indicators
3. Continue to thrive on existing partnerships and expand its range of partners
5. Provide bathymetric and other layers to users of marine GISs who will integrate other layers of information from a variety of data holdings, by themselves, in real time

8.3 The GEBCO that does so will: -

6. Be led by a Guiding Committee whose roles include:
establishing standards for data quality and data access
maintaining a network of experts in data collection and interpretation
encouraging broad participation with other data suppliers in a common data warehouse framework
establishing new access channels between data holdings and end users.
7. Be driven by Sub-Committees and Working Groups established and restructured to meet evolving needs.

ANNEX 7

GEBCO PERSONALITY LIST

(Last Revised: 23 June, 2003)

JOINT IOC-IHO GUIDING COMMITTEE FOR GEBCO

Dr Robin K.H. Falconer	Mr David Monahan (Chairman)
Lic. José Luis FRIAS Salazar	Mr Alexis E. Hadjiantoniou
Dr-Ing. Hans-Werner Schenke	Dr Michael S. Loughridge
Dr Gleb B. Udintsev	Dr Kunio Yashima

SUB-COMMITTEE ON DIGITAL BATHYMETRY (SCDB)

Chairman to be appointed

Dr Michael Carron

Mr Norman Z. Cherkis

Dr Andrew Goodwillie

Mr Alexis E. Hadjiantoniou

Dr John K. Hall

Mr Peter Hunter

Dr Meirion T. Jones

Dr Michael S. Loughridge

Mr Ron Macnab

Capt. Andrey Popov

Mr William Rankin

Dr -Ing. Hans-Werner Schenke

Dr George Sharman

Dr Walter H. F. Smith

Mr Shin Tani

SUB-COMMITTEE ON UNDERSEA FEATURE NAMES (SCUFN)

Dr-Ing. Hans-Werner Schenke (Chairman)
Dr Galina Agapova
Mr Norman Cherkis
Ing.en Chef Michel Huet (Secretary)
Mr Kunikazu Nishizawa
Mr Vadim Sobolev
Ms Lisa Taylor

STRATEGY PLANNING COMMITTEE

Mr David Monahan (Chairman)
Dr Michael Carron
Dr Robin K.H. Falconer
Dr Günter Giermann
Dr Meirion T. Jones
Sir Anthony Laughton PhD FRS
Dr Michael S. Loughridge
Dr -Ing. Hans-Werner Schenke
Dr Walter H. F. Smith
Mr Shin Tani
Dr Dmitri Travin
Prof. Bob Whitmarsh (Secretary)

EDUCATIONAL GDA WORKING GROUP

Dr George Sharman (Chairman)
Dr Michael Carron
Mr Norman Z. Cherkis
Dr. Andrew Goodwillie
Mr Alexis E. Hadjiantoniou
Dr Meirion T. Jones
Dr Michael S. Loughridge
Mr Shin Tani

Prof. Bob Whitmarsh (Secretary)

FINANCE WORKING GROUP

Sir Anthony Laughton (Chairman)

Mr Norman Cherkis

Dr John K. Hall

INTEGRATION OF GEOSCIENTIFIC DATA WG

Dr Walter Smith (Chairman)

Dr David Divins

Mr Tony Pharaoh

Dr Hans-Werner Schenke

Mr Shin Tani

DATA ASSIMILATION AND ACQUISITION WORKING GROUP

Dr George Sharman (Chairman)

Mr Norman Cherkis

Dr David Divins

Dr John K. Hall

Mr Michel Huet

Mr Peter Hunter

Dr Luis Frias

Mr Shin Tani

GEBCO PERMANENT SECRETARY

Prof. Bob Whitmarsh

GEBCO BATHYMETRIC EDITOR

Mr Peter Hunter

GEBCO DIGITAL ATLAS MANAGER

Ms. Pauline Weatherall

**REPRESENTATIVES OF THE IOC SECRETARIAT AND THE I.H.
BUREAU**

Mr Dmitri Travin
Intergovernmental Oceanographic Commission

Captain Hugo Gorziglia
Director, International Hydrographic Organization

Ing. en Chef Michel Huet
International Hydrographic Bureau

Mr Tony Pharaoh
International Hydrographic Organization

SCIENTIFIC ADVISORS

Mr Robert Anderson

Mr Christian Andreasen

Dr. David L. Divins

Commander Luis GONZAGA Campos

Dr Martin Jakobsson

Ing. prin. Laurent Louvart

Dr Larry A. Mayer

Dr German Naryshkin

Mr George B Newton

Dr Walter H. F. Smith

Mr John Woodward

CORRESPONDING MEMBERS

Lieutenant Emilio Boassi

M C Luis A DELGADO Argote

Mr Daniel P. Donnell

Mr Gerald N. Ewing

Dr R.L. Fisher

Dr. Valeriy Fomchenko

Dr Juan GARCIA Abdeslem

Dr Troy L. Holcombe

Dr. Russell Howorth

Dr Toshio Nagai

Dr Arne Nielsen

Dr Gary J. Robinson

Mr Alfred Simpson

Dr Colin Summerhayes

Mrs Lois C. Varnado

Dr Ian Wright

Mr Alexei A. Zinchenko

**CHAIRMEN/CHIEF EDITORS: IOC'S REGIONAL 'OCEAN
MAPPING' PROJECTS**

Professor Dr -Ing. Werner Bettac (Chairman & Chief Editor IBCWIO)

First Admiral Mohd. R. Bin Hassan (Chairman IBCWP); Dr HOU Wenfeng (Chief Editor IBCWP)

Lic. José Luis FRIAS Salazar (Vice-Chairman IBCCA); Ing. Mario A. REYES Ibarra (Chief Editor IBCCA)

Captain Hugo Gorziglia (Chairman IBCSEP)

Mr Ron Macnab (Chairman IBCAO)

Professor Carlo Morelli (Chairman IBCM) ; Capt. Andrej Popov (Chief Editor IBCM)

Ing. Gen. André Roubertou (Chairman IBCEA)

**CHAIRMAN: IOC CONSULTATIVE GROUP ON OCEAN
MAPPING**

Dr Günter Giermann (Chairman of IOC/CGOM)

ALPHABETICAL LIST

Dr Galina Agapova

Geological Institute of the
Russian Academy of Sciences
Pyzevskiy, 7
109017 Moscow
RUSSIAN FEDERATION
Fax: +7 (095) 231 0443
Tel: +7 (095) 230 8180 or 8145
Email: marine@geo.tv-sign.ru
Time Zone: +3 (Summer +4)

Mr Marcus Allsup

Formerly Secretary ACUF
U.S. Board on Geographic Names
National Imagery and Mapping Agency
4600 Sangamore Road
Bethesda, Maryland 20816-5003
UNITED STATES OF AMERICA
Fax: +1(301) 227 5515
Tel: +1(301) 227 2363
Email: allsupm@nima.mil
Time Zone: -5 (Summer -4)

Mr Robert Anderson

Hawaii Mapping Research Group
University of Hawaii
1680 East-West Road, 814 Post Building
Honolulu HI 96822
UNITED STATES OF AMERICA
Fax: +1 (808) 956 6530
Tel: +1 (808) 956 9729
Email: rma@soest.hawaii.edu
Time Zone: -10 (Summer -9)

Mr Christian Andreasen

Chief Hydrographer
National Imagery and Mapping Agency
4600 Sangamore Road
Bethesda, Maryland 20816-5003
UNITED STATES OF AMERICA
Fax:+1 (301) 227 5016
Tel: +1 (301) 227 7407
Email: andreasenc@nima.mil
Time Zone: -5 (Summer -4)

Professor Dr-Ing. Werner Bettac

(Chairman & Chief Editor IBCWIO)
Poolstrasse, 7
D - 22844 Norderstedt
GERMANY
Fax:+49 (40) 31 90 5150
Tel:+49 (40) 52 24 720

Email: bettac@t-online.de
Time Zone: +1 (Summer +2)

First Admiral Mohd. Bin Hassan

Hydrographic Directorate
Department of the Navy
Jalan Padang Tembak
50634 Kuala Lumpur
MALAYSIA
Fax: +60 (3) 235 3075
Tel: +60 (3) 298 7972

Lieutenant Emilio Boassi

Servicio Hidrográfico y Oceanográfico
de la Armada (SHOA)
Errázuriz 232, Playa Ancha
P O Box 324
Valparaiso
CHILE
Fax: +56 (32) 266542
Tel: +56 (32) 266508
Email: eboassi@shoa.cl
SHOA Web: <http://www.shoa.cl>
Time zone: -4 (Summer, S. Hemisphere -3)

Dr Michael Carron

Senior Principal Scientist
Antisubmarine Department
Sound, Ocean, and Living Marine Resources (SOLMAR)
SACLANT Undersea Research Center
Mail from Non-US or non-Canada
Viale San Bartolomeo 400
19138 La Spezia, Italy
Mail from US or Canada
APO AE 09613-5000
Fax: +39 0187 527 330
Phone: +39 0187 527 445
Email: carron@saclantc.nato.int
Time Zone: +1 (Summer +2)

Mr Norman Z. Cherkis

6300 Saddle Tree Drive
Alexandria
VA 22310 2915
UNITED STATES OF AMERICA
Fax: +703 971-3141
Tel: +703 971-3141
Email: fiveoceanscon@yahoo.com
Website: <http://www.neptunesoci.com>
Time Zone: - 5 (Summer -4)

Dr Raymond N Cramer

British Oceanographic Data Centre (BODC)
Proudman Oceanographic Laboratory
Bidston Observatory

Birkenhead
Merseyside CH43 7RA
UNITED KINGDOM

From September 2003
Joseph Proudman Building
Brownlow Street
Liverpool L3 5DA
Fax:+44 (151) 652 3950
Tel:+44 (151) 653 8633
Email: rnc@bodc.ac.uk
Time Zone: UT (Summer +1)

M C Luis A DELGADO Argote
Investigador Titular A
Departamento de Geologia
Centro de Investigación Científica
y Educación Superior de Ensenada (CICESE)
Km 107 Carretera Tijuana-Ensenada
22860 Ensenada BC
MEXICO
Fax: (617) 449 33
Tel: (617) 445 01 to 08, ext 2410
Email: ldelgado@cicese.mx
Time Zone: -9 (Summer -8)

Dr. David L. Divins
National Geophysical Data Center
Mailcode E/GC3
325 Broadway
Boulder, CO 80305
UNITED STATES OF AMERICA
Fax: +1-303-497-6513
Phone: +1-303-497-6505
Email: david.divins@noaa.gov
<http://www.ngdc.noaa.gov/mgg>

Mr Daniel P. Donnell
4600 Sangamore Road
Bethesda
MS
Mailstop D-144 Code PTMNB
UNITED STATES OF AMERICA
Fax: +1-301-227-4586
Phone: +1-301-227-3399
Email: donnell@nima.mil

Mr Gerald N. Ewing
11 Canavan Drive
Mount Uniacke
Nova Scotia B0N 1Z0
CANADA
Tel: +1 (902) 866 2145
Time Zone: -4 (Summer -3)

Dr Robin K.H. Falconer

Institute of Geological and Nuclear Sciences Ltd.
69 Gracefield Road
PO Box 30-368
Lower Hutt
NEW ZEALAND
Fax: +64 (4) 570 4600
Tel: +64 (4) 570 1444
Email: r.falconer@gns.cri.nz
Time Zone: +12 (Summer, S.Hemisphere +13)

Lt Cmd Luis Antonio Félix

Diretoria de Hidrografia e Navegação
Rua Barão de Jaceguay
s/no Ponta da Armação
CEP - 24048-900
Niterói, RJ
BRAZIL
Fax: +55 (21) 620 0073/613-8210
Tel: +55 (21) 613 8249
Email: gebco@chm.mar.mil.br or gebcobr@hotmail.com
Time Zone: -3 (Summer -2)

Dr Robert L. Fisher

Geosciences Research Division
Scripps Institution of Oceanography
La Jolla, California 92093-0220
UNITED STATES OF AMERICA
Fax: +1 (858) 534 0784
Tel: +1 (858) 534 3597
Time Zone: -8 (Summer -7)

Dr. Valeriy Fomchenko

Head Department of Navigation and Oceanography
8-11, Liniya V.O. B-34
199034 St Petersburg
RUSSIAN FEDERATION
Fax: +7 (812) 277 59 00
Tel: +7 (812) 277 4362
Time Zone: +3 (Summer +4)

Lt Cmd. Alexandre Fontainha

Diretoria de Hidrografia e Navegação
Rua Barão de Jaceguay
s/no Ponta da Armação
CEP - 24048-900
Niterói, RJ
BRAZIL
Fax: +55 (21) 620 0073/613-8210
Tel: +55 (21) 613 8249
Email: gebco@chm.mar.mil.br or gebcobr@hotmail.com
Time Zone: -3 (Summer -2)

Lic. José Luis FRIAS Salazar

Instituto Nacional de Estadística,
Geografía e Informática
Av. Patriotismo #711-PH
Col. San Juan Mixcoac - C.P.03910
México D.F.

MEXICO

Fax: +52 (5) 563 9932,
Tel: +52 (5) 598 9946 or 5615 0057
Email: jfrias@mdf.inegi.gob.mx
Time Zone: -7 (Summer -6)

Dr Juan GARCIA Abdeslem

Investigador Titular A
Departamento de Geofísica Aplicada
División Ciencias de la Tierra
Centro de Investigación Científica
y Educación Superior de Ensenada
(CICESE)
Km 107 Carretera Tijuana-Ensenada
22860 Ensenada, BC

MEXICO

Fax: (617) 449 33
Tel: (617) 445 01 to 08, ext 2612
Email: jgarcia@cicese.mx
Time Zone: -9 (Summer -8)

Dr Günter Giermann

Chairman
Offenbachstr. 32
D-53173 Bonn - Bad Godesberg
GERMANY
Fax:+49 228 35 47 94
Tel:+49 228 35 47 94
Time Zone: +1 (Summer +2)

Commander Luis GONZAGA Campos

Diretoria de Hidrografia e Navegação
Rua Barão de Jaceguay
s/no Ponta da Armação CEP - 24048-900
Niterói, RJ

BRAZIL

Fax:+55 (21) 620 0073/613-8210
Tel:+55 (21) 613 8249
Email: 22@chm.mar.mil.br
Time Zone: -3 (Summer -2)

Dr Andrew Goodwillie

Flagstaff
AZ
UNITED STATES OF AMERICA
Fax:
Tel:
Email: andrew.goodwillie@nau.edu
Time Zone: -7

Captain Hugo Gorziglia

Director
International Hydrographic Organization
4 quai Antoine Ier
B.P.445 - MC 98011 Monaco Cedex
PRINCIPALITY OF MONACO
Fax: +377 93 10 81 40

Tel: +377 93 10 81 01
Email: dir2@ihb.mc
Web: <http://www.iho.shom.fr>
Time Zone: +1 (Summer +2)

Mr Alexis E. Hadjiantoniou
Hellenic Navy Hydrographic Service
TGN 1040
Athens
GREECE
Fax: +30 (1) 651 7811
Tel: +30 (1) 655 1830
Email: dcd@hnhs.gr
Email: alex@ath.forthnet.gr (private)
Time Zone: +2 (Summer +3)

Dr John K. Hall
Marine Geology, Mapping and Tectonics Division
Geological Survey of Israel
30 Malchei Israel Street
Jerusalem 95501
ISRAEL
Fax: +972 (2) 534 6590 or (2) 531 4257
Tel: +972 (2) 534 6455
Email: jkh1@012.net.il
Time Zone: +2 (Summer +3)

Dr Troy Holcombe
National Geophysical Data Center
325 Broadway NOAA Mail Code: E/GC3
Boulder, Colorado 80303
UNITED STATES OF AMERICA
Tel.: +1-979-845-3528
Email: tholcombe@ocean.tamu.edu
Time Zone: -7 (Summer -6)

Dr HOU Wenfeng
(Chief Editor IBCWP)
Director
National Marine Data and Information Service
93, Liuwei Road, Hedong District
Tianjin 300171
CHINA
Fax:+86 (22) 24304 408
Tel:+86 (22) 24301 297
Email: houwf@netra.nmdis.gov.cn
Time Zone: +8

Dr Russell Howorth
South Pacific Applied Geoscience
Commission (SOPAC)
SOPAC Technical Secretariat
Private Mail Bag, Suva
FIJI
Tel:+679 381 139 or 381 377
Fax:+679 370 040
Emails: russell@sopac.org.fj
Website: www.sopac.org.fj

Time Zone: + 12

Ing.en Chef Michel Huet

International Hydrographic Bureau
4 quai Antoine 1er
B.P.445 - MC 98011 Monaco Cedex
PRINCIPALITY OF MONACO
Fax: +377 93 10 81 40
Tel: +377 93 10 81 04
Email: pac@ihb.mc
Web: <http://www.iho.shom.fr>
Time Zone: +1 (Summer +2)

Mr Peter Hunter

GEBCO Bathymetric Editor, Challenger Division for Seafloor Processes
Southampton Oceanography Centre
Empress Dock
Southampton SO14 3ZH
UNITED KINGDOM
Fax: +44 (023) 80 596 554
Tel: +44 (023) 80 596 559
Email: peter.hunter@soc.soton.ac.uk
Time Zone: UT (Summer +1)

Dr Martin Jakobsson

Centre for Coastal and Ocean Mapping
University of New Hampshire
Durham
NH 03824
Fax: +1 (603) 862 0839
Tel: +1 (603) 862 3755
Email: martin.jakobsson@unh.edu
Time Zone: + 5 (Summer +4)

Dr Meirion T. Jones

4 Norfolk Drive
West Kirby
Wirral CH48 2HR
United Kingdom
Email: mtj@bodc.ac.uk
Tel: +44 151 625 3395
Time Zone: UT (Summer +1)

Sir Anthony Laughton PhD FRS

Chairman GEBCO (representing SCOR)
Okelands, Pickhurst Road
Chiddingfold, Godalming
Surrey GU8 4TS
UNITED KINGDOM
Fax: +44 (1428) 683967
Tel: +44 (1428) 683941
Email: anthony.laughton@soc.soton.ac.uk
Time Zone: UT (Summer +1)

Dr Michael S. Loughridge

Director (retired), National Geophysical Data Center
NOAA Mail Code: E/GC
325 Broadway

Boulder, Colorado 80305-3328
UNITED STATES OF AMERICA
Fax: +1 (303) 497 6386; (H) +1 (303) 494 1747
Tel: +1 (303) 497 6487; (H) +1-(303) 494 6008
Email: mike@loughridge.net
Website: <http://www.ngdc.noaa.gov/ngdc.html>
Time Zone: -7 (Summer - 6)

Ing. prin. Laurent Louvart

Etablissement Principal du SHOM
13 rue du CHATELLIER, BP30316
29603 Brest
FRANCE
Fax: + 33 (0) 2 98 22 08 99
Tel: + 33 (0) 2 98 22 1763
Email: louvart@shom.fr
Website : <http://www.shom.fr>
Time Zone: +1 (Summer +2)

Mr Ron Macnab

Geological Survey of Canada (Atlantic)
PO Box 1006
Dartmouth
Nova Scotia B2Y 4A2
CANADA
Fax: +1 (902) 426 6152
Tel: +1 (902) 426 5687
E-mail: ron.macnab@ns.sympatico.ca
Time Zone: -4 (Summer -3)

Mr. Jean-Michel Manzone

Département des Travaux Publics et des Affaires Sociales
Ministère d'Etat
Place de la Visitation
98000 MONACO
Fax: +377 -93. 15.92.33
Phone: +377- 93.15.85.12
E-mail: jmmanzone@gouv.mc
Time Zone: +1 (Summer +2)

Dr Larry A. Mayer

Director, Centre for Coastal and Ocean Mapping
University of New Hampshire
Durham
NH 03824
UNITED STATES OF AMERICA
Fax: +1 (603) 862 0839
Tel: +1 (603) 862 2615
Email: lmayer@unh.edu
Time Zone: -5 (Summer -4)

Mr David Monahan

Vice Chairman, GEBCO
Director, Marine Geomatic
Canadian Hydrographic Service
Department of Fisheries & Oceans
615 Booth Street

Ottawa, Ontario K1A 0E6
CANADA
Fax: +1 (613) 996 9053
Tel: +1 (613) 992 0017
Email: monahand@dfo-mpo.gc.ca
Time Zone: -5 (Summer -4)

Professor Carlo Morelli
(Chairman IBCM)
DINMA
Facoltà d'Ingegneria dell'Università
Piazzale Europa, 1
I - 34127 Trieste
ITALY
Fax: +39 (040) 676 3497
Tel: +39 (040) 676 7158
Email: morelli@geodinma.univ.trieste.it
Time Zone: +1 (Summer +2)

Dr Toshio Nagai
Director, Japan Oceanographic Data Centre,
5-3-1 Tsukiji Chuo-Ku
Tokyo 104-0045
Japan
Fax: +81-3-3545-2885
Tel: +81-3-3541-3818
E-mail: mail@jodc.jhd.go.jp
Time Zone: +9

Dr German Naryshkin
All-Russian Research Institute
for Geology and Mineral Resources
of the World Ocean
(VNIIOKEANGELOGIA)
1, Angliiskiy Avenue
190121 St Petersburg
RUSSIAN FEDERATION
Fax: +7 (812) 114 1470
Tel: +7 (812) 113 8379
Email: vnio@g-ocean.spb.su
Time Zone: +3

Mr George B. Newton
Chair, US Arctic Research Commission
4350 N. Fairfax Drive, Suite 630
Arlington
VA 22203
UNITED STATES OF AMERICA
Fax: +1 (703) 390 5084
Tel: +1 (703) 788 7729
Email: gbnewton@plansys.com
gbnewton@yahoo.com
Time Zone: -5 (Summer -4)

Dr Arne Nielsen
Head of Oceanographic Department
Royal Danish Administration of Navigation Hydrography
Overgaden O. Vandet 62B

DK 1034 Copenhagen K
Fax: +(45) 31 57 4341 or 32 54 1012
Tel.: +(45) 32 68 9605
Email: arn@fomfrv.dk
Time Zone +1 (Summer +2)

Mr NISHIZAWA Kunikazu

Head, Ocean Research Laboratory
Hydrographic and Oceanographic Department
Japan Coast Guard
5-3-1, Tsukiji, Chuo-ku
Tokyo 104-0045
JAPAN
Fax: + 81 (1) 3 3541 3870
Tel: + 81 (0) 3 3541 4387
email: kunikazu-nishizawa@kaiho.mlit.go.jp
Time Zone +9

Mr Tony Pharaoh

Professional Assistant (Data Management) PAD
International Hydrographic Organization
4 quai Antoine Ier
B.P.445 - MC 98011 Monaco Cedex
PRINCIPALITY OF MONACO
Fax:+377 93 10 81 40
Tel:+377 93 10 81 04
Email: pad@ihb.mc
Time Zone: +1 (Summer +2)
IHO Representative

Capt. Andrey Popov

Technical Director
ChartPilot
8-11, Liniya V.O. B-34
199034 St Petersburg
RUSSIAN FEDERATION
Fax: +7 (812) 321 6537
Tel: +7 (812) 277 4362, mob. 7-901-639-1825
Email: a.popov@chartpilot.ru
Time Zone: +3 (Summer +4)

Mr William Rankin

Code OTT
United States Naval Oceanographic Office
1002 Balch Boulevard
Stennis Space Center
Mississippi 39522-5001
UNITED STATES OF AMERICA
Fax: +1 (228) 688 4931
Tel: +1 (228) 688 5709
Email: rankinw@navo.navy.mil
Time Zone: -6 (Summer -5)

Dr Gary J. Robinson

Environmental Systems
Science Centre
University of Reading
Whiteknights, Reading

Berkshire RG6 2AB
UNITED KINGDOM
Fax:+44 (0118) 931-6413
Tel:+44 (0118) 931-8742
Email: gazza@mail.nerc-essc.ac.uk
Time Zone: UT (Summer +1)

Ingénieur général André Roubertou

(Président IBCEA)
c/o Service Hydrographique et
Océanographique de la Marine
BP 5
00307 Armées
Fax:+33 (1) 40 65 99 98 (at SHOM)
Tel:+33 (1) 45 77 52 86 (private)
Time Zone: +1 (Summer +2)
Mark all corespondence (including Fax messages) Prière de faire suivre
FRANCE

Dr.-Ing. Hans-Werner Schenke

Bathymetry & Geodesy
Alfred-Wegener-Institut für Polar-und Meeresforschung Postfach 12 01 61
Columbusstrasse
D-27568 Bremerhaven
GERMANY
Fax: +49 (0) 471 4831 1149
Tel: +49 (0) 471 4831 1222-1223
Email: Schenke@AWI-Bremerhaven.de
Time Zone: +1 (Summer +2)

Dr George Sharman

National Geophysical Data Center
325 Broadway NOAA Mail Code: E/GC3
Boulder, Colorado 80305-3328
UNITED STATES OF AMERICA
Fax:+1 (303) 497 6513
Tel:+1 (303) 497 6345
Email: George.F.Sharman@noaa.gov
Time Zone: -7 (Summer -6)

Mr Alfred Simpson

South Pacific Applied Geoscience
Commission (SOPAC)
SOPAC Technical Secretariat
Private Mail Bag, Suva
FIJI
Tel:+679 381 139 or 381 377
Fax:+679 370 040
Emails: alf@sopac.org.fj
Website: www.sopac.org.fj
Time Zone: + 12

Dr Walter H. F. Smith

NOAA Lab for Satellite Altimetry
NOAA code E/RA31,
1315 East-West Highway, Room 5408
Silver Spring
Maryland 20910-3282

UNITED STATES OF AMERICA
Fax: +1 (301) 713 3136
Tel: +1 (301) 713 2857, ext. 126
Email: walter@raptor.grdl.noaa.gov
Web: <http://ibis.grdl.noaa.gov/SAT>
Time Zone: -5 (Summer -4)

Captain Sobolev

8,11 Liniya
199034 St-Petersburg
Russian Federation
Fax: +7-812-323-75-48
Tel: +7-812-323-75-48
Email: gunio@chartpilot.ru
Time Zone: +3 (Summer +4)

Dr Colin Summerhayes

Chairman SCOR Working Group 107
Director of GOOS
Project Office
Intergovernmental Oceanographic Commission
UNESCO
1, rue Miollis
75732 Paris Cedex 15
FRANCE
Fax: +33 (1) 45 68 58 12
Tel: +33 (1) 45 68 40 40
Email: c.summerhayes@unesco.org
Time Zone: +1 (Summer +2)

Dr Alexander Svarichevskiy

Pacific Oceanological Institute,
Russian Academy of Sciences
Far Eastern Branch, 43 Baltijskaya Street,
690041 Vladivostok,
RUSSIAN FEDERATION
Fax: +7 (4232) 312 573
Tel: +7 (4232) 312 125
Email: mitnik@online.vladivostok.ru
Time Zone: +10

Mr Shin Tani

Hydrographic Department of Japan
5-3-1, Tsukiji,
Tokyo 104-0045
JAPAN
Fax: +81 (3) 3541-4535
Tel: +81 (3) 3541-3819
Email: stani@jodc.go.jp or t@ni.777.ac
Time Zone: +9

Ms Lisa A. Taylor

National Geophysical Data Center
Mailcode E/GC3
325 Broadway
Boulder, CO 80305-3328
UNITED STATES OF AMERICA

Fax: +1 303-497-6513
Tel: +1 303-497-6767
Email: Lisa.A.Taylor@noaa.gov
Time Zone: -7 (Summer -6)

Mr Dmitri Travin

Intergovernmental Oceanographic Commission
UNESCO
1, rue Miollis
75732 Paris Cedex 15
FRANCE
Fax: +33 1 45 68 58 12
Tel: +33 1 45 68 40 44
Email: d.travin@unesco.org
Time Zone: +1 (Summer +2)
Representative IOC Secretariat

Dr Gleb B. Udintsev

Vernadsky Institute of Geochemistry
19 Kosygina Street, 117975 Moscow
RUSSIAN FEDERATION
Fax: +7 (095) 938 2054 (for Udintsev)
Tel: +7 (095) 977 5125 (home evenings)
+7 (095) 137 86 48 (office)
Email: elkor@geokhi.msk.su
Time Zone: +3 (Summer +4)

Mrs Lois C Varnado

Scientific Technology Staff, Code OTT
Naval Oceanographic Office
1002 Balch Boulevard
Stennis Space Center
MS 39522-5001
UNITED STATES OF AMERICA
Fax: +1 (228) 688 4931
Tel: +1 (228) 688 4546
Email: varnadol@navo.navy.mil
Time Zone: -6 (summer -5)

Ms Pauline Weatherall

GEBCO Digital Atlas Manager
British Oceanographic Data Centre (BODC)
Proudman Oceanographic Laboratory
Bidston Observatory
Birkenhead
Merseyside CH43 7RA

From September 2003
Joseph Proudman Building
Brownlow Street
Liverpool L3 5DA
UNITED KINGDOM
Fax: +44 (151) 652 3950
Tel: +44 (151) 653 8633
Email: paw@bodc.ac.uk
Time Zone: UT (Summer +1)

Prof Bob Whitmarsh

Permanent Secretary, GEBCO
Challenger Division for Seafloor Processes
Southampton Oceanography Centre
Empress Dock
Southampton SO14 3ZH
UNITED KINGDOM
Fax: +44 (023) 80 593052
Tel: +44 (023) 80 596564
Email: bob.whitmarsh@soc.soton.ac.uk
Time Zone: UT (Summer +1)

Mr John Woodward

Technical Hydrographer
Royal Danish Administration
of Navigation and Hydrography
Overgaden O. Vandet 62B
DK 1023 Copenhagen K,
DENMARK
Fax: + 45 (3) 157 4341
Tel: + 45 (3) 268 9500
Email: jjw@fomfrv.dk
Time Zone: +1 (Summer +2)

Dr Ian Wright

National Institute of Water and Atmospheric Research Ltd.
Greta Point
Evans Bay Parade
PO Box 14-901
Kilbirnie, Wellington
NEW ZEALAND
Fax: +64 (4) 386 2153
Tel: +64 (4) 386 0300
Email: i.wright@niwa.cri.nz
Time Zone: +12 (Summer, S.Hemisphere +13)

Dr Kunio Yashima

Coastal Surveys and Cartography Division
Hydrographic Department of Japan
5-3-1, Tsukiji,
Tokyo 104-0045
JAPAN
Fax: +81 (3) 348 1250
Tel: +81 (3) 541 3685
E-mail: kunio-yashima@kaiho.mlit.go.jp
Time Zone: +9

Mr Alexei A. Zinchenko

Secretary to the UN Commission on the Limits of the Continental Shelf
2 UN Plaza DC2-0438
New York N.Y. 10017
UNITED STATES OF AMERICA
Fax: +001 (212) 963 5847
Tel: +001 (212) 963 3966
Email: zinchenko@UN.org
Time Zone: -5 (Summer -4)

ANNEX 8

LIST OF ACRONYMS

ABYSS	Altimetric Bathymetry from Surface Slopes
ACUF	Advisory Committee on Undersea Features (of BGN)
AGU	American Geophysical Union
AWI	Alfred-Wegener-Institut für Polar- und Meeresforschung (Bremerhaven, Germany)
BAS	British Antarctic Survey
BODC	British Oceanographic Data Centre
CD	Compact Disk
CGOM	IOC Consultative Group on Ocean Mapping
CLCS	(UN) Commission on the Limits of the Continental Shelf
CMG	Commission of Marine Geology
COC	(GEBCO) Centenary Organising Committee
DCDB	Data Centre for Digital Bathymetry (IHO - at NGDC, Boulder, Colorado, USA)
EGS	European Geophysical Society
ENC	Electronic Navigation Chart
ESA	European Space Agency
EUG	European Union of Geosciences
GDA	GEBCO Digital Atlas
GDA-CE	GEBCO Digital Atlas – Centenary Edition
GEBCO	General Bathymetric Chart of the Oceans (IOC/IHO)
GMS	Global Marine Systems
GPS	Global Positioning System
HDNO	Head Department of Navigation and Oceanography
IAPSO	International Association of the Physical Sciences of the Oceans
IBC	International Bathymetric Chart
IBCAO	International Bathymetric Chart of the Arctic Ocean (IOC/IASC/IHO)
IBCCA	International Bathymetric Chart of the Caribbean and Gulf of Mexico (IOC)
IBCM	International Bathymetric Chart of the Mediterranean (IBCM)
IBCSEP	International Bathymetric Chart of the SE Pacific (IOC)
IBCSO	International Bathymetric Chart of the Southern Ocean (IOC)
IHB	International Hydrographic Bureau (Secretariat of IHO)
IHO	International Hydrographic Organization
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
IODP	Integrated Ocean Drilling Program
IUGG	International Union of Geodesy and Geophysics
JAMSTEC	Japan Marine Science and Technology Center
JARE	Japanese Antarctic Research Expedition
LDEO	Lamont Doherty Earth Observatory
NASA	National Aeronautical and Space Administration
NGDC	National Geophysical Data Center (Boulder, Colorado, USA)
NIMA	National Imagery and Mapping Agency (USA)
NIWA	National Institute of Water and Atmospheric Research (New Zealand)
NSF	National Science Foundation (of USA)

ODP	Ocean Drilling Program
RIDGE	US national mid-ocean ridge research program
SCAR	Scientific Committee on Antarctic Research (ICSU)
SCDB	Sub-Committee on Digital Bathymetry (GEBSCO)
SCOR	Scientific Committee on Oceanic Research (ICSU)
SCUFN	Sub-Committee on Undersea Feature Names (GEBSCO)
SIO	Scripps Institution of Oceanography
SOC	Southampton Oceanography Centre (UK)
UNCLOS	United Nations Convention on the Law of the Sea
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNH	University of New Hampshire (USA)
URL	Uniform Resource Location (Internet address)
VHO	Volunteering Hydrographic Office (IHO)
WEND	World-wide Electronic Navigational Database
WG	Working Group
WOCE	World Ocean Circulation Experiment
XBT	Expendable Bathythermograph