

Intergovernmental Oceanographic Commission
Reports of Governing and Major Subsidiary Bodies



**Second Planning Session
of the IOC-WMO-UNEP Committee
for the Global Ocean Observing
System (I-GOOS)**

Washington DC, USA, 16-17 May 1996

UNESCO

IOC-WMO-UNEP/I-GOOS-PS-II/3

Paris, 25 June 1996

English only

TABLE OF CONTENTS

| SUMMARY REPORT | | Page |
|-----------------------|--|-------------|
| 1. | OPENING OF THE SESSION | 1 |
| 2. | ADMINISTRATIVE ARRANGEMENTS | 1 |
| 2.1 | ADOPTION OF THE AGENDA | 1 |
| 2.2 | DESIGNATION OF A RAPPORTEUR | 1 |
| 2.3 | CONDUCT OF THE SESSION | 1 |
| 3. | REPORT ON INTERSESSIONAL ACTIVITIES | 1 |
| 3.1 | REPORT BY THE CHAIRMAN OF INTERGOVERNMENTAL IOC-WMO-UNEP COMMITTEE FOR GOOS (I-GOOS) | 1 |
| 3.2 | REPORT BY THE CHAIRMAN OF THE JOINT SCIENTIFIC AND TECHNICAL COMMITTEE FOR GOOS (I-GOOS) | 2 |
| 3.3 | REPORT BY THE DIRECTOR OF THE GOOS SUPPORT OFFICE | 2 |
| 4. | STATUS OF PLANNING AND IMPLEMENTATION OF THE GLOBAL OCEAN OBSERVING SYSTEM | 2 |
| 4.1 | INTRODUCTION TO EXISTING SYSTEMS | 2 |
| 4.2 | IGOSS-IODE DATA MANAGEMENT STRATEGY | 3 |
| 4.3 | TAO IMPLEMENTATION | 4 |
| 4.4 | GCOS | 4 |
| 4.5 | COASTAL GOOS | 5 |
| 5. | IMPLEMENTATION ISSUES | 6 |
| 5.1 | SOCIO-ECONOMIC ISSUES OF GOOS | 6 |
| 5.2 | IMPLEMENTATION OF CAPACITY BUILDING ACTIVITIES | 7 |
| 5.3 | PREPARATION OF THE GOOS PRIORITIES AGREEMENT MEETING | 8 |
| 5.4 | REGIONAL APPROACH: ADVANTAGES AND SHORTCOMINGS | 9 |
| 5.5 | OCEANOGRAPHIC AND MARINE METEOROLOGICAL SERVICES | 9 |
| 5.6 | STRATEGY SUB-COMMITTEE | 10 |
| 6. | ESTABLISHMENT OF SESSIONAL WORKING GROUPS | 11 |
| 7. | CONSIDERATION OF REPORTS FROM SESSIONAL WORKING GROUPS | 11 |
| 7.1 | CAPACITY BUILDING | 11 |
| 7.2 | REGIONAL GOOS DEVELOPMENT | 12 |
| 7.3 | AGREEMENT MEETING | 14 |
| 8. | PLAN OF ACTION FOR 1996-1997 | 15 |
| 9. | NEXT SESSIONS OF THE I-GOOS | 15 |
| 10. | ADOPTION OF THE REPORT | 15 |
| 11. | CLOSURE OF THE SESSION | 15 |

ANNEXES

- I. Agenda
- II. Resolution I-GOOS-PS-II.1 "I-GOOS Strategy Sub-Committee"
- III. List of Participants
- IV. List of Documents
- V. List of Acronyms

1. OPENING OF THE SESSION

1 The second planning session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System (I-GOOS) was called to order by the Chairman, Prof. M. Glass, at 9.00 on 16 May 1996, at Bethesda, Maryland, U.S.A.

2 Dr. S. Wilson welcomed the participants on behalf of NOAA and IOC.

3 The Chairman welcomed the participants. He noted that formal I-GOOS sessions normally take place at the IOC, with interpretation, and that Planning Sessions are hosted by Member States and are of the same importance though less formal.

2. ADMINISTRATIVE ARRANGEMENTS

2.1 ADOPTION OF THE AGENDA

4 The agenda of the Session as adopted by the Committee is given in Annex I.

2.2 DESIGNATION OF A RAPPORTEUR

5 The Committee designated Dr. V. Ryabinin (Russia) as Rapporteur for the Session.

2.3 CONDUCT OF THE SESSION

6 J.P. Rebert, Director, GOOS Support Office, introduced the revised timetable and reviewed the list of documents available to the meeting. This list is given in Annex IV.

7 The list of participants is given in Annex III.

3. REPORT ON INTERSESSIONAL ACTIVITIES

3.1 REPORT BY THE CHAIRMAN OF THE INTERGOVERNMENTAL IOC-WMO-UNEP COMMITTEE FOR GOOS (I-GOOS)

8 Prof. Glass summarized the status of the modules and indicated that the Priorities Agreement meeting, originally scheduled for this time, has been postponed. He indicated the need for the role of the I-GOOS Strategy Sub-Committee (SSC) to be addressed at this meeting as well as the Agreement meeting and the frequency of I-GOOS meetings.

9 Prof. Glass then reported on the SSC meeting, 23-25 March 1996, Paris, France. Attendees examined a preliminary report of data requirements from operational met-ocean services; the final report is requested for I-GOOS III. A suggestion was made that the GOOS Space Plan be developed as an extension of the GCOS Space plan. Prof. Glass then indicated that a final version of the document "Towards operational oceanography" was prepared and is given for information to I-GOOS-PS-II. The overall outline of the future GOOS Handbook was approved and a first version is to be prepared for I-GOOS-III. It was suggested that SSC play a role for the long and medium term planning of GOOS, in order to prepare recommendations for I-GOOS.

10 The Strategy Sub-Committee proposed a new schedule of planning meetings with a regular I-GOOS meeting every other year, a short "briefing" session in between, in conjunction with meetings of IOC Assembly and EC bodies, and SSC meetings six months before a regular or briefing session.

11 A proposal was made to split up the previous "Outline of a strategic plan for GOOS" into two parts: a GOOS Strategic Plan (submitted to I-GOOS-PS-II) and a Plan for Action. The Strategic Plan prepared by SSC-II will serve as the basis for the Plan for Action in 1996 and will be updated by the GOOS Support Office annually. Prof. Glass also noted the need to provide guidelines on the role of GOOS in co-operation with regional bodies.

3.2 REPORT BY THE CHAIRMAN OF THE JOINT SCIENTIFIC AND TECHNICAL COMMITTEE FOR GOOS (J-GOOS)

12 Dr. Otis Brown reported on J-GOOS planning activities during this past year. At the recently held J-GOOS/III meeting, Paris, April 23-25, 1996, the current status was reviewed. There has been good progress in the climate module (OOPC) Ocean Observations Panel for Climate which met in Miami, March, 1996, the health of the ocean module (HOTO) which met in Bangkok, November, 1995, and the living marine resource (LMR) which met in Dartmouth, Massachusetts, USA, March 1996. Reports from these meetings are in draft or final form. The services module is being planned jointly with I-GOOS. A planning meeting for the coastal module is scheduled for later this year.

13 There have been a number of national and regional planning efforts concurrent with the international planning activities. Notable progress toward development of a coherent regional plan has been achieved in Europe (EuroGOOS). Planning in Northeast Asia is proceeding under the auspices of NEAR-GOOS. National planning is focusing on near-shore matters which overlap the coastal, HOTO & LMR modules. The current status of these various efforts is summarized in the J-GOOS-III meeting report.

14 There were major concerns expressed at J-GOOS-III regarding the level of financial support for international GOOS activities, needs for a broader more active co-ordination efforts by the international GOOS sponsors and the need for new enhancement of support. Budget and personnel are limiting the international GOOS planning efforts and need to be expeditiously addressed. The current level of financial and staff support is a major constraint on the further development of the LMR, HOTO, and particularly the coastal module plans.

15 J-GOOS-III identified the need for development of the next phase of an integrated GOOS plan, that is, a synthesis of the current individual modules plans, identification of cross cutting issues to assist national implementation of activities, and development of materials to assist the transition from planning to implementation. This planning/development activity, while extremely important, will further stress the already over stretched budget and staff support. J-GOOS requires the help of its sponsors and I-GOOS in finding needed support for this efforts.

3.3 REPORT BY THE DIRECTOR OF THE GOOS SUPPORT OFFICE

16 J.P. Rebert, Director of the GOOS Support Office, referred to document IOC-WMO-UNEP/I-GOOS-PS-II/8 describing the activities of the Office during the intersessional period. He informed the participants on the follow-up of recommendations and resolutions of I-GOOS-II Session and IOC-XVIII Assembly related to GOOS. He described the actions undertaken to increase participation of regional organizations in the South Pacific such as SOPAC and SPREP to GOOS.

17 He informed the participants that a permanent position for the director of the GOOS Support Office was announced by UNESCO. He stressed however, given the increase of activities of GOOS sub-bodies such as scientific Panels, the importance of maintaining an adequate staffing level at the Office, in particular to respond to demanding activities such as capacity building or issues related to the coastal module implementation. He emphasized the necessity for I-GOOS to adopt new ways of fast access and delivery of information such as electronic mailing lists and periodic consultation of the GOOS information server implemented at IOC, combined to the traditional communications means and suggested to reduce the frequency of I-GOOS meetings.

18 He drew the attention of the Committee on recent proposals in view of developing a common strategy in selected domains by the different global observing systems such as GCOS and GTOS.

4. STATUS OF PLANNING AND IMPLEMENTATION OF THE GLOBAL OCEAN OBSERVING SYSTEM

4.1 INTRODUCTION TO EXISTING SYSTEMS

19 The Director, GOOS Support Office, introduced his progress report on the existing ocean observing and data management systems (Document IOC-WMO-UNEP/I-GOOS-PS-II/10). The Committee was directed to details of the report and J.P. Rebert described ongoing efforts to incorporate existing implementing bodies within the GOOS structure. There has been discussion between GOOS, GCOS and the TAO Implementation Panel (TIP) regarding IOC co-sponsorship of TIP. This had not yet come to fruition. Relationships with the Global Coral Reef Monitoring Network and the Global Sea Level Observing System were also developing.

20 Japan noted that university groups were implementing acoustic Doppler current profiler observations on merchant vessels.

21 France noted that DBCP was considering the creation of a Global Buoy Programme, which would enable co-ordination and harmonization of both research and operational buoy deployments world-wide.

4.2 IGOSS-IODE DATA MANAGEMENT STRATEGY

22 Ben Searle, Chairman of IODE, presented a draft on IGOSS-IODE Data Management Strategy (Doc. IOC-WMO-UNEP/I-GOOS-PS-II/11). Mr. Searle noted that the IGOSS-IODE communities have a large role to play in GOOS data management activities. He pointed out that:

- (i) IGOSS and IODE consist of a comprehensive network of data management and processing centres and other capabilities for 60 countries. There is a close linkage with the scientific community, particularly in the areas of data quality control and product development.
- (ii) The boundaries between the traditional operational and non-operational ocean communities are disappearing. The success of the Global Temperature and Salinity Profile Programme (GTSP) demonstrates this.

23 The model provided by GTSP is perhaps one that can be used by GOOS to process a wider range of parameters. The integration of operational, non-operational and scientific Centres has resulted in a very effective programme. He encouraged the Committee to consider this model when determining data management components of GOOS.

24 In order to build on the existing capabilities of IGOSS and IODE, a Data Management Strategy has been developed which focuses on GOOS. The strategy document provides a brief overview of IGOSS and IODE. The Mission Statement and Objectives are provided together with the four main goals. There is a brief discussion on IGOSS and IODE support for Global Programmes, the significance of data management to GOOS, the need for compatibility of data management systems with other programmes including GCOS and GTOS. The document then examines the concept of "end to end" data management. Finally, there is an expansion of each of the four goals with an indication of some of the more significant future actions to address these goals.

25 The strategy is seen as providing a high level framework under which specific planning can be undertaken to meet GOOS requirements. The Strategy Document will evolve and expand over time as additional components of this document become available, such as the document entitled "Status of Planning, Existing Systems" presented by Dr. Nick Flemming at this session (Doc. IOC-WMO-UNEP/I-GOOS-PS-II/12).

26 Finally, IGOSS and IODE are ready to accept the data management challenge that will come from GOOS.

27 **The Committee acknowledged** the important contribution being made by IGOSS and IODE towards an effective GOOS data management system. It was **recognized** that the IGOSS-IODE Data Management Strategy provided the framework for much of an initial GOOS data management systems. As such, **the Committee supported** IGOSS and IODE's role in providing the underlying GOOS data management infrastructure. While there were a number of data management gaps to fill and new capabilities required an analysis of GOOS data management requirements demonstrated that there was already a solid base on which to build. **The Committee requested** IGOSS and IODE to continue the development of a GOOS data management strategy, taking into account the views and directions provide by J-GOOS, I-GOOS and the Strategy Sub-Committee.

4.3 TAO IMPLEMENTATION PANEL

28 There has been discussion between GOOS, GCOS and CLIVAR regarding joint sponsorship of the TAO Implementation Panel (TIP). Since 1993 JPO-GCOS has taken "administrative responsibility" for this Panel. I-GOOS recognizes that the TAO array in the Pacific is a logical and crucial element of initial GOOS implementation. **The Committee also recognized** that the TIP is the responsible body for TAO implementation and should be embraced as a GOOS body under joint sponsorship between I-GOOS, JSTC for GCOS and CLIVAR of the WCRP. **The Committee recommended** to IOC that support for TIP be a joint activity of JPO-GCOS, IOC-GSO and WCRP-CLIVAR in 1997 and beyond. These offices will be jointly responsible for provision of secretariat, travel support, and meeting arrangements for TIP as determined through their negotiation of suitable, equitable arrangements.

4.4 GCOS

29 Dr. Townshend, Chair of the JSTC of GCOS, expressed his pleasure at being able to attend this meeting of I-GOOS. He pointed out that GCOS activity is cross-cutting across several global observing systems including GOOS, GTOS, WWW and GAW. The Ocean Observing Panel for Climate is a jointly sponsored panel of GOOS, GCOS and WCRP. Recently it was agreed that the Space Panel of GCOS would have its remit extended to include the interests of J-GOOS. Also proposals have been made that the Data and Information Panel of GCOS should be extended to include the interests of GOOS.

30 Other efforts have also been made to increase co-ordination of global observing systems through the proposed Integrated Global Observing Strategy. Drivers for this have come largely from government agencies because of problems such as the high costs needed to provide comprehensive global observations and the need to gain a strategic oversight of space and *in situ* observations.

31 The space component of this strategy was discussed at an *ad hoc* meeting of the Committee for Earth Observation Satellites held in Seattle in March 1996. Members present at the CEOS Meeting were supportive of the concept of the Strategy and considered various mechanisms by which it could be implemented. A complementary meeting with respect to *in situ* observations is being organized by GCOS with co-operation from J-GOOS, GTOS and the International Group of Funding Agencies (IGFA) to be held in Geneva from 11 to 13 September 1996. The difficulties of developing a strategy for *in situ* observations compared with those from space were noted.

32 Finally, current discussions concerning a sponsor's Advisory Group on Global Observations were noted. This would have the role of co-ordinating the activities of the committees of the three global observing systems.

33 The Meeting welcomed the proposal by Dr. Townshend (Chairman of GCOS-JSTC) that GCOS, GOOS, and GTOS should discuss the objectives of an Integrated Global Observing Strategy (IGOS). **The Committee recognized** that the separate activities of the G(x)OS programmes are necessary in regard to their specific technical content, but that this diversity of Global programmes causes some problems. These are:

- (i) Each country may have to manage participation in numerous science programmes and operational systems, creating excessive demands on personnel, time, and resources.
- (ii) Space agencies need to be given a concerted assessment of the observational requirements of the G(x)OSs so as to plan satellite launch programmes and sensor packages in a logical way.
- (iii) The overlapping requirements and different policies and priorities of the G(x)OS's lead to increased costs, delays, and rejection by funding agencies.

34 In planning a co-ordinated approach to IGOS the representatives of G(x)OSs must apply a rigorous principle of "subsidiarity". That is: no decision or responsibility should be empowered to any co-ordinating structure which would be better carried out by one of the G(x)OS's, or managed at a bilateral or *ad hoc* level.

35 The Planning Session welcomed current activities leading greater co-ordination between the Observing Systems in the framework of the proposal Integrated Global Observing Strategy. **The Committee invited** the Chairman of I-GOOS to report back on this issue to I-GOOS III.

36 Dr. Tom Spence, Director of the GCOS Planning Office, proposed to the I-GOOS Committee, in concert with the Steering Committee for GCOS and GTOS, the establishment of a joint GCOS-GOOS-GTOS data and information management Panel (DIMP). The Panel would be charged to formulate, implement and oversee the data and information management strategy for these programmes.

37 **The Committee discussed** the proposal **and endorsed** the concept of a single, jointly sponsored Panel. **The committee agreed** that the data and information system should provide a common framework, to the degree practicable, for data and products from GOOS, GCOS and GTOS. The DIMP should consist of a core group of members representing the different Observing System communities, and a number of representatives from related disciplines. The DIMP should possess a broad range of expertise including research scientists who use and understand these data sets, and data management experts responsible for significant components of the overall information management system. The Panel should be a highly focused "*problem solving*" group concentrating on "*cross-cutting*" issues affecting common data and information management problems not already addressed by other groups.

- 38 The Panel should:
- (i) in concert with GCOS, GOOS and GTOS bodies and their user communities, formulate and develop the common elements of a data and information management plan;
 - (ii) monitor the overall implementation of the Plan;
 - (iii) review and provide oversight of the GOOS information management system to ensure:
 - (a) that deficiencies in "cross-cutting" data sets are addressed;
 - (b) that access to data and products is provided as required;
 - (c) that archiving activities are adequate.

39 **The Committee endorsed** the active participation of existing data management systems, *inter alia* IGOSS-IODE, in the work of the Panel. **The Committee agreed** to support the proposal for the jointly sponsored Panel and **recommended** the terms of reference be referred to GCOS and GTOS Committees for their concurrence.

4.5 COASTAL GOOS

40 W. Stanley Wilson, representative of the United States, presented "An Approach to Planning for a U.S. Coastal Module of GOOS", as a suggestion for the Committee to consider. He pointed out the importance of the coasts to the USA; half of the U.S. population lives in this 10% of the land surface area. The global economy entails global trade, with 98% of the U.S. foreign trade carried by sea and 3,500 commercial shipping accidents every year. Coastal problems are globally ubiquitous, requiring common approaches and frequently common solutions. Issues are particularly important for developing countries.

41 The proposed mission of U.S. Coastal GOOS is to "establish an operational system that integrates and facilitates access to *in situ* and remotely-sensed coastal observations for reliable assessment, prediction, and management of coastal areas and resources." He drew the analogy to the planning of the Climate module which entails (i) a clear definition of purpose, (ii) a clear sequence of steps from the collection of ocean observations to the delivery of a product to the ultimate user, (iii) a clear economic benefit to a user community, and (iv) a coupled (i.e. ocean/atmosphere) problem, where the Coastal module is at least a coupled ocean/terrestrial problem. He indicated that the Coastal module must be simplified by addressing specific geographic foci such as ports, watersheds, or coral reefs.

42 He presented three Coastal Themes:

- (i) Coastal Ecosystem Management (Land Use/Water Quality Habitat).
Purpose: to understand and monitor land use, water quality, and watershed-based habitat
- (ii) Coastal Hazards Reduction.
Purpose: to understand how, as a result of coastal zone development, exposure to catastrophic events is increased as well as vulnerability to longer term changes such as coastal erosion
- (iii) Safe Marine Navigation.
Purpose: to provide safe waterways through accurate forecasts integrated with vessel trafficking systems, electronic charts, and GPS navigation.

43 He also briefly described the customers, and benefits in each category. **The Committee discussed** the feasibility of adopting these themes for the global Coastal GOOS. **The Committee was pleased to note** the direct links to user communities that the themes indicate and **endorsed** the approach, noting that additionally themes could conceivably emerge. Themes need to reflect those issues that merit international co-operation and that have common elements.

44 The Chairman of J-GOOS indicated that Coastal GOOS is an especially difficult aspect of GOOS and welcomed the advice of I-GOOS. He supported this customer orientation. **The Committee recommended** to compile a report describing a Coastal GOOS to advance its planning and implementation. Such a report will explain Coastal GOOS in relation to the other modules and will include examples of relevant coastal facts and figures. It will describe practical problems and economic and social implications as well as justifying the need for a global Coastal GOOS. The report will be prepared during the intersessional period by an *ad hoc* group chaired by the United States and including Johannes Guddal (Norway), Nic Flemming (United Kingdom), George Needler (Canada), Jan Stel (The Netherlands), Hiroshi Muto

(Japan), Angus McEwan (Australia), Janice Trotte (Brazil), and one representative of Russia. It is to be available for presentation to the next session of the Strategy Sub-Committee planned in late January 1997. It will also be given to J-GOOS and will serve as a companion to the report provided by the Coastal Module ad hoc group, which will focus on scientific requirements.

5. IMPLEMENTATION ISSUES

5.1. SOCIO-ECONOMIC ISSUES OF GOOS

45 Rodney Weiher, Chief Economist, NOAA, reported on the Workshop held on 15 May 1996 on the subject of the socio-economic aspects of GOOS, in response to Resolution I-GOOS-II.1. Fifty persons attended the Workshop. After an outline of the scope of GOOS, the Workshop included seminars on the economics of the use of predictions based on TOGA; the economic methods for evaluating the value of information (VOI) provided by environmental research; methods for identifying the data needs of particular industries and services; the evaluation of non-market goods; the cost-benefit analysis (CBA) of a moored buoy observing system; and the methodology of international assessments of CBA.

46 The Workshop identified key aspects of standard procedures for CBA, and established three working groups of research into socio-economic benefits GOOS.

Group (A) reported on the America-Pacific area. They recommended that there should be 4 research projects addressing the value of information in the following sectors:

- (i) Agriculture and fisheries related to ENSO prediction;
- (ii) Energy and water industry value of ENSO prediction with emphasis on the U.S. and Canadian Pacific North West;
- (iii) Water quality in the coastal zone; and
- (iv) Benefits of scientific co-operation within GOOS.

Group (B) reported on Africa and Europe. They recommended 3 research projects into the value of information for improved coastal and climate forecasts on all time scales as applied in three regions:

Region (i) is South East Africa from Kenya to South Africa;
 Region (ii) is West Africa from Morocco to Nigeria, including the Niger delta;
 Region (iii) is the Mediterranean, with a special emphasis on North Africa and the connection between the Mediterranean and climate in the Sahel.

Group (B) identified potential customer groups for data products, and the key variables to be measured and processed in each region.

Group (C) examined economic assessment methods, and made the following recommendations: socio-economic assessment, CBA, and VOI studies should adhere to the following principles:

- (i) Use accepted principles of cost-benefit analysis, net present value, and rates of return;
- (ii) Adopt common assumptions of what GOOS will provide;
- (iii) Explicitly state all assumption;
- (iv) Define a baseline world, without GOOS;
- (v) Compare with alternative assumptions of products from GOOS used to generate socio-economic benefits;
- (vi) Specify the scope of benefits, what is included or excluded, identify costs and benefits presented separately on an annual basis;
- (vii) State monetary dimensions, dollars or numbers, real or nominal;
- (viii) State discount rate used.

47 The Workshop recommended that sponsors should be found to fund selected studies. The results of this Workshop should be brought to the attention of an expert consultative meeting being convened by UNEP on 3-4 June 1996.

48 **The Committee discussed** the report on the socio-economics Workshop. It **agreed** that, although statistics may be more difficult to obtain in developing countries the rate of return from the application of GOOS products should be as high as elsewhere. There was discussion whether to concentrate on the benefits to agriculture, or to approach both agriculture and the coastal zone. **The Committee concluded** that a total of 3 studies was feasible:

- (i) South East Africa, VOI applied to coastal zone and agriculture;
- (ii) Mediterranean and North Africa, VOI applied to coastal zone and agriculture;
- (iii) Latin America, VOI applied to ENSO prediction.

49 The delegate of Malta offered to host a meeting to discuss capacity building and socio-economic analysis of GOOS in the Mediterranean. The delegate of Peru offered to act as lead person for progressing the Latin American research. The delegate of the Netherlands offered to act as lead person for SE Africa, and the delegate from UK as the lead person to obtain support for the Mediterranean study.

50 The delegate of India suggested that a study on socio-economic aspects of GOOS covering Indian Ocean would also be required for popularizing importance of GOOS in this region. He recommended the Committee to consider a fourth study addressing Indian Ocean VOI applied to coastal sector.

5.2 IMPLEMENTATION OF CAPACITY BUILDING ACTIVITIES

51 Dr. Jan Stel, co-chairman of the *ad hoc* workshop steering group for organizing a series of regional GOOS development workshops for capacity building, presented the progress accomplished since the second session of I-GOOS held in June 1995.

52 A meeting that included donors was held in Canada in September 1995 to discuss the logistics for the workshops. A group travelled to Eastern Africa in November of 1995 to assess the needs of capacity building. A one to one meeting of the steering group with the co-chairman, Mr. B.N. Krishnamurthy, was held in New Delhi in April 1996 in which the strategies for organizing regional workshops were discussed. In the New Delhi meeting, it was decided to organize the workshop in Goa, India, 18-19 November 1996, in conjunction with the meeting of IOCINDIO.

53 Dr. Stel indicated the following tentative schedule for the regional workshops:

Eastern Africa, November 1996;
IOCINDIO, 18-19 November 1996 (Goa, India);
South America, Spring 1997.

54 The objective of the workshops is to provide interaction between experts in developed and developing countries:

- (i) to assess the present level of capacity in each country in terms of trained personnel, infrastructure, observation systems/equipment, to undertake activities of GOOS;
- (ii) Based on (i) above, assess the kind of capacity building required for each country, briefly quantifying the needs in terms of personnel, infrastructure, etc.

55 The *ad hoc* workshop steering group consists of representatives of Chile, China, India, Kenya, Malaysia, the Netherlands and USA, as per I-GOOS-II Session. Attempts were made to obtain nominations from these countries; however, only the Netherlands, India and the USA have responded. Malaysia has withdrawn from the group.

56 Dr. Stel indicated the following as next steps for action:

- (i) completing the nominations on the committee;
- (ii) discuss the funding;
- (iii) organize workshops;
- (iv) seek support from the IOC for carrying out the work.

57 A Sessional working group was set up under the chair of Dr. Stel to further address this issue and give insight on the content of these workshops.

5.3 PREPARATION OF THE GOOS PRIORITIES AGREEMENT MEETING

58 Eric Lindstrom (USA) summarized the process undertaken following I-GOOS-II to prepare a draft Priorities Agreement document.

59 Dr. Lindstrom (USA) reviewed the events following IGOOS-II where it had been resolved to hold a "Priorities

Agreement Meeting", hosted by the USA in 1996. For this meeting a briefing document has been prepared (Doc. IOC-WMO-UNEP/I-GOOS-PS-II/14).

60 Dr. Lindstrom explained that the meeting had been proposed as an attempt to orchestrate how GOOS would obtain formal government commitment to the implementation of the GOOS elements for three reasons:

- (i) to secure source existing observing systems as part of GOOS;
- (ii) to give immediate commitment to some "GOOS-like" elements, so that planning and product generation could proceed;
- (iii) to engage governments in the processes leading to long-term commitments to ocean observations and beneficial products.

61 The process to be followed at the meeting involved an assessment of candidate observing systems from a list of critical parameters and products, and the seeking of formal commitments to those candidate elements. During the year, it had become apparent that the meeting would have to be postponed because:

- (i) There was no consensus on the scope of what implementation is to be committed partly because scientific planning was not complete;
- (ii) There was incomplete governmental agreement on the approach and its relationship to overall GOOS strategy;
- (iii) US budgetary uncertainties suggested that postponement would be prudent.

62 The Document had been reviewed at both the recent SSC-II and the J-GOOS-III meetings. While the need for such a meeting was perceived as of high priority, some revision of the strategy and objective of the meeting was seen as essential to this and the meeting should be renamed "The First GOOS Agreements Meeting"

63 To advance consideration of the matter at IGOSS-PS-II, a Sessional working group was convened, under the chair of Dr. McEwan, to consider and advise on the objectives and fora of the proposed meeting. In the same context, it was asked to review a First Draft of the GOOS Strategy Plan which had been prepared following SSC-II (Doc. IOC-WMO-UNEP/I-GOOS-PS-II/Inf.2) as a possible part to the documentation for the meeting as well as a guiding framework for GOOS itself. The report of the working group is discussed under section 7.3.

5.4 REGIONAL APPROACH: ADVANTAGES AND SHORTCOMINGS

64 Professor Taira provided an update on the development of NEARGOOS and Dr. Flemming reported on the development of EuroGOOS. Both submitted written reports to the meeting. NEARGOOS has been endorsed by WESTPAC and will be developed under its umbrella. EuroGOOS has established regional task teams for the Baltic Sea, Arctic, North West European Shelf, Mediterranean Sea and Atlantic. An EuroGOOS strategy report will be available in about a month.

65 Mr. Ishii reported on U.S.-Japan co-operative GOOS activities under a bilateral programme called "TYKKI" and suggested this programme could be expanded to include other countries in the Pacific region. The U.S. agreed on the importance of this collaboration.

66 A Sessional working group was agreed, under the chair of Dr. Vladimir Ryabinin, to review regional GOOS developments and make recommendations.

5.5 OCEANOGRAPHIC AND MARINE METEOROLOGICAL SERVICES

67 **The Committee recalled** that, through Resolution I-GOOS-II.1, I-GOOS had established an *ad hoc* working group on services, chaired by Mr. J. Guddal (Norway), essentially to prepare a report on marine meteorological and oceanographic services, user requirements, perceived deficiencies and future trends, with a view to assessing where and how GOOS could assist in improving and expanding these services. **The Committee therefore noted** with interest and appreciation a preliminary report on the subject presented by Mr. Guddal.

68 **The Committee recognized** that some forms of service, ranging from methodological approach through data and information delivery to actual analysis and prediction products, would eventually be the endpoint of all the other GOOS modules. In addition, GOOS could play a role in assisting existing WMO and IOC programmes and activities involved in co-ordinating and supporting services, in particular, in raising political awareness of these programmes, as well as in enhancing data availability for service provision. It was noted further that some of the existing services and products have

been declared as GOOS products, although they are not yet official elements of GOOS in the global perspective. They stand, however, as manifested GOOS implementations in information given to marine users and authorities.

69 **The Committee therefore requested** the chairman of the *ad hoc* group to continue working towards the preparation of his full and final report, for eventual presentation to I-GOOS-III. It **endorsed** the suggestions of the Strategy Sub-committee concerning the widening of the data base for the final report, **and proposed**, in addition, that the IGOSS Regular Information Service Bulletin on Oceanographic Products might prove to be a further source of useful information. Finally, **the Committee reiterated** the value and effectiveness of the work of this *ad hoc* group, **and considered** that it provided a good example for similar groups established to deal with other modules.

5.6 STRATEGY SUB-COMMITTEE

70 Professor Glass opened the discussion by outlining the activities of the SSC at its second meeting held in Paris, 25-27 March 1996, and described in the Report of the session (Doc. I-GOOS/SSC-II/3). **The Committee took note** of the report **and reviewed** the recommendations submitted to its consideration.

71 The SSC took measures to finalize the document "Towards Operational Oceanography: the Global Ocean Observing System". **The Committee noted** the latest version it had before it **and agreed** the document should be considered as final unless opposition was expressed to the GOOS Support Office by 31 May 1996. The document was to be published as IOC/INF-1028.

GOOS Handbook

72 **The Committee noted with interest** the draft outline for the GOOS Handbook, as well as the proposed methodology for its completion, which was presented by Dr. V. Ryabinin (Russian Federation). It **endorsed** this and in addition **stressed** that:

- (i) A summary of the GOOS science plan should be an integral part of the Handbook;
- (ii) Reports on national activities should be very concise (one page maximum) and preferably given in a standard format;
- (iii) The data management strategy should be included in condensed form.

73 **The Committee noted** that the relationship between this Handbook, the Scientific Plan for GOOS and the Strategic Plan for GOOS would need to be resolved in due course. **It agreed** that work should continue on the Handbook with a first version to be issued in 1998, accessible electronically in whole or abridged form from the IOC server.

74 **The Committee requested** committee members to send any additional comments on the outline or contents of the Handbook to either Dr. Ryabinin or the GOOS Support Office, also by the end of May 1996.

Role of the Strategy Sub-committee

75 The underlying strategy of the SSC function had been considered by the SSC at its second session. It had been noted that some ambiguity existed in relation to its policy-making and implementation functions, vis-à-vis the responsibilities of I-GOOS and J-GOOS.

76 **The Committee noted with interest** the proposals from the second session of the Strategy Sub-committee concerning both the future role of the sub-committee and also the organization and timing of future I-GOOS meetings. **It agreed** that it was essential for GOOS planning that the chairman of I-GOOS should have available an effective intersessional advisory body, which could both review the implementation of decisions taken by I-GOOS and also assist in the preparation of policy proposals for the consideration of the full committee in session, though expressing some reservations about the possibility of SSC acting as an executive body of the I-GOOS Committee. **It further agreed** that such a body should also serve as an effective co-ordination link between I-GOOS and J-GOOS, something which had been lacking to date.

77 **The Committee therefore decided** to re-establish the Strategy Sub committee, but with modified terms of reference and membership to reflect its enhanced role in GOOS planning and co-ordination.

78 **The Committee adopted** Resolution I-GOOS-PS-II. 1.

79 With regard to the timing of I-GOOS sessions, and bearing in mind the new terms of reference of the Strategy Sub-committee, **the Committee agreed** with the proposal made by the second session of the SSC; viz. that full sessions of I-GOOS should be held every two years, beginning with I-GOOS-III in 1998; that the SSC should meet at least twice in each two year I-GOOS intersessional period, roughly six months before and after each I-GOOS session; and that a short GOOS briefing meeting might take place, as before in conjunction with sessions of an IOC governing body.

GOOS Strategic Plan

80 **The Committee noted with interest** the draft GOOS Strategic Plan as prepared by the second session of the SSC. **It agreed** that the Strategic Plan should form the basic overall planning document and framework for GOOS development and implementation, and that, as such, it should be widely discussed and reviewed before being formally adopted by I-GOOS and by the governing bodies of the GOOS Co-sponsors. **The Committee considered** that the draft presented by the SSC provided a good basis for the plan, but that it required further development and refinement. **It therefore requested** committee members to carefully study the draft, and to pass comments and proposals for modifications to the GOOS Support Office before the end of September 1996. A revised draft should then be prepared and circulated to Member States for comment and additional input, in time for a final revised draft to be prepared by the third session of the Strategy Sub-committee, tentatively in January 1997. This final draft would then be submitted to the GOOS Agreement Meeting planned for the first half of 1997, and eventually to I-GOOS-III in mid-1998 for formal adoption.

6. ESTABLISHMENT OF SESSIONAL WORKING GROUPS

81 Three working groups were established as discussed below. It was decided that there was not a need for a working group on socio-economic benefits. Instead a working group was set up on regional approaches.

7. CONSIDERATION OF REPORTS FROM SESSIONAL WORKING GROUPS

82 Dr. D. James Baker, Administrator, NOAA, addressed the group, acknowledging the extensive work done on GOOS and reiterating his personal long-standing interest in GOOS. He indicated his support, in particular, for the Workshop held on the topic of Socio-economic Benefits of GOOS. He made the analogy to the successful effort made to modernize the U.S. National Weather Service, which was undertaken based on studies pointing to an 8:1 ratio of savings in mitigation to loss avoidance costs. The same must be done for ocean activities. He said that USA was willing to host the first of a series of GOOS commitments meetings, at which agreement among countries would be sought in moving those mature elements of ocean research into operations. He was very interested in helping to move this process along, the sooner the better.

7.1 CAPACITY BUILDING

83 Dr. Jan H. Stel presented the report of this group. The working group concluded that membership should be permanent. If no replies were received within three months, countries that had expressed an interest could not participate. The interested countries and organizations included are India, Japan USA, Brazil, Chile, Peru, the Netherlands, Malta, Kenya and SOPAC. Steps proposed were as follows:

- (i) A series of workshops to assess the needs of the region;
- (ii) Five-year workplan, ten-year outlook;
- (iii) Tailor made/country specific approach;
- (iv) Different levels (scientist, institute, country, region);
- (v) Involve possible donors from the beginning;
- (vi) Scientific partnerships form the nucleus;
- (vii) Raise awareness.

84 The workshops planned are:

- (i) Eastern Africa (in Mombassa, Kenya, November 1996; to be combined with a cost/benefit study as described above);
- (ii) Indian Ocean (in Goa, India, November 1996);
- (iii) Mediterranean Sea (Malta, end of 1996; to be combined with a cost/benefit study as described above);
- (iv) South America (Brazil early in 1997);

(v) IOCARIBE (if possible).

85 Seed money for workshops is needed and IOC TEMA activities must be integrated with GOOS capacity building efforts.

86 Workshops are the instruments for capacity building working to close the North-South/South-South knowledge gap in marine science and GOOS. The output of workshops is the production of a workplan or action plan. The IOC should promote and facilitate capacity building by seeking funds and support of donors and the GOOS sponsors being: ICSU, UNEP, WMO. Workshop involvement of local people is crucial to the success.

87 The representative of WMO noted that, in the short-to-medium term it would be difficult to divert any existing marine related capacity building funds into specific GOOS capacity building activities, although in the longer term it may be possible to programme joint WMO-IOC-UNEP capacity building activities for GOOS, provided proposals were made early in the budgetary process. At the same time, however, he noted that already programmed activities could possibly be given a more GOOS-oriented slant, and be opened more widely to participants from oceanographic as well as meteorological agencies. In this content, he mentioned specifically:

- (i) The joint WMO-IOC SEACAMP project for the ASEAN countries, which could be regarded as a regional implementation of GOOS, and which involves a strong capacity building component;
- (ii) Training events planned for 1997 (jointly with the USA) on numerical wave modelling and on VOS management, which were also clearly related to GOOS.

88 It was pointed out by the Chairman of the Health of the Ocean Panel that in finalizing the Strategic Plan for this GOOS Module, the panel had developed a generic outline framework for identifying problems and needs on a regional basis. This framework, as well as a number of drafts of diverse regions, are contained in the Report of the Third Session of the J-GOOS HOTO Panel. Dr. Andersen invited Dr. Stel to take note of this information.

89 **The Committee accepted** the report and **adopted** the recommendations that it included.

7.2 REGIONAL GOOS DEVELOPMENT

90 Dr V. Ryabinin presented the report of the Sessional working group on regional developments, which comprised members from Japan (2), Norway, Russian Federation and UK. The group studied previous information on regional GOOS development, which is given in I-GOOS-II report, took into account relevant papers prepared by the GOOS Strategy sub-Committee, and considered other publications and documentation available. It was emphasized that as GOOS developed, we were experiencing the creation of a number of regional approaches for GOOS activities, such as EuroGOOS, NEARGOOS, and regional activity of Japan and USA in the Pacific Ocean (TYKKI). Regional approaches have been strongly encouraged since the inception of GOOS as logical means to plan, fund and implement operational oceanographic activities. However, meeting user needs would require a balance between regional, national and global-type activities. For example, where a country judges it to be important to form a national ocean service, it may be more economic and efficient to collaborate on a regional basis.

91 Regional GOOS activities have additional benefit of contributing to the global communities interests. By providing data and information to a global data and information management system each contributing region plays an important role in establishing a global network for monitoring the oceans and coastal areas of the world. Integration of regional projects into a global system is an eventual GOOS objective.

92 Regional development of GOOS should be initiated by nations in conformance with the general GOOS principles and policies. Such principles and policies are approved by the governing body of the IOC and developed in concert with other GOOS co-sponsors. An initial step for regional development of GOOS can also rely on agreements between agencies and institutes from neighbouring countries, agreeing on the GOOS policy, and with the ultimate objective of getting support from Member States. Potential of all national agencies active in ocean-related activities such as national meteorological services, should be used to the extent possible.

93 Regional subsidiary bodies of the IOC may undertake various GOOS activities or may actually have a major GOOS regional activity within their purview. Consideration should also be given to the regional subsidiary bodies of WMO, UNEP, and other sponsors of GOOS. The nature of the relationship between the regional GOOS activity and the IOC subsidiary can be defined by the two entities. Other regional organizations outside the UN system such as SOPAC, IOMAC, PICES, SPREP have expressed interest in participating in the GOOS programme. They have differed

membership criteria, programmes and established rules of procedures and statutes. Their relationship to GOOS therefore might be different than that of organization set up exclusively to implement GOOS.

94 The strategy for regional development is evolving and therefore needs attention and update. Ideally, one would seek to develop a single set of principles that would apply to all organizations associated with GOOS. Agreeing to, and abiding by the principles would be required of any country or regional organization requesting designation under GOOS. They should at least include:

- (i) Adherence to existing GOOS data policy agreement(s);
- (ii) GOOS related activities of the organization should be opened to all the countries in the region essentially adhering to the membership policies of the IOC, WMO, UNEP and ICSU;
- (iii) Agreement to abide by standards, methodology, data and communication specifications established by GOOS international infrastructures (i.e. I-GOOS, J-GOOS, Implementation Panels, etc.);
- (iv) Representation on committees, established by the IOC and other sponsoring agencies to plan and guide GOOS development, will be as observers and be based on procedures developed by the IOC, etc;
- (v) In regions having existing IOC Sub-Commissions (i.e. IOCARIBE), countries organizing regional GOOS activities will do so in consultation with the Sub-Commission. If a new regional GOOS organization is established, operating guidelines between the Sub-Commission and the new organization should be developed. Opportunities of co-operation with regional activities of other than GOOS programmes should be examined;
- (vi) Funds required to implement strictly regional GOOS activities should as principle derive from countries participating in the activity. Activities undertaken by regional organizations that are "global" in nature and consequently contribute to the international component of GOOS or those having an important role as pilot projects may derive their funds from GOOS sponsors with the expressed agreement of their member states. Regional organizations consisting largely of developing countries would not be subject to the funding principles. However, the data and standard principles as stated above would definitely apply. It is expected that some form of support would be provided by the IOC, etc., and by countries in the form of technical assistance to foster the development of GOOS activities in such regions;
- (vii) Exchange of information on all relevant aspects of regional GOOS activities should be encouraged to facilitate closer co-ordination between regions.

95 As GOOS continues to grow and experience is acquired, it may be necessary to reconsider the principles and guidelines governing regional organizations and activities.

96 **The Committee accepted** the report and its recommendations.

7.3 AGREEMENT MEETING

97 A Sessional working group was convened under the chairmanship of Dr. McEwan (Australia) to develop recommendations on the objectives, scope and form of the proposed GOOS Agreements Meeting. There was general consensus that such a meeting is needed urgently to maintain momentum in support of GOOS. It was considered that the meeting should take place within a year.

98 Recognizing that intergovernmental agreements have already been made by the IOC and WMO and at the United Nations Conference on Environment and Development on the GOOS concept, there were two clearly defined objectives for the proposed Agreements Meeting:

- (i) To secure agreement on a number of simple principles, to include issues such as:
 - (a) rules of involvement;
 - (b) capacity building;
 - (c) data management;
- (ii) To secure definite "pragmatic" commitments on a subset of actions that can be implemented immediately from

- (a) existing activities, components, and systems;
- (b) particularly those relating to the Climate module; and
- (c) perhaps to the Health of the Ocean module.

99 The group considered that the original briefing document (Doc. IOC-WMO-UNEP/I-GOOS-PS-II/14) should be replaced. Preparation is urgently needed for a new document to be distributed in December 1996. The draft GOOS Strategic Plan (Doc. IOC-WMO-UNEP/I-GOOS-PS-II/Inf.2) may be used as a foundation for the new briefing document.

100 The Agreements Meeting was seen as an opportunity to endorse and accept the GOOS Strategic Plan, as an important step in defining GOOS. To this end, suggested changes to the draft Plan are invited, so that a revised version can be prepared and distributed for comment. The final draft will be prepared for the SSC meeting in January 1997.

101 It was proposed that the first Agreements Meeting be conducted in two conjunctive parts:

- (i) A high level "principles" meeting linked closely to intergovernmental processes for agreement on general principles of GOOS participation such as those mentioned above;
- (ii) A "commitments" meeting directed to selected elements of GOOS on which implementation could proceed immediately. This meeting could be of a more informal nature and would involve representatives of the agencies having responsibility for ocean observations.

102 The implementable elements considered in (ii) above should not only include observing systems but also specific process studies and supporting science programmes, consistent with achieving the long-term, user-driven requirements of GOOS.

103 **The Committee agreed** to proceed with arrangements for an Agreements Meeting, to be known as the First Agreements Meeting, along the lines recommended by the working group. In accepting the suggestion of a two-part meeting, it **noted** that, while the "principles" part of the meeting would require high-level governmental representation, participation in the "commitments" part could be by senior representatives of national agencies. The appropriate delegations will differ from country to country.

104 The need for further agreements meetings was discussed. It was recognized that I-GOOS provides the formal intergovernmental forum for future review of GOOS agreements and principles, but that it would need to be supplemented by less formal commitment meetings, possibly specific to particular elements of GOOS implementation. These could accommodate a diversity of participating bodies, and may include non-governmental and nationally-sponsored meetings.

105 Concern was expressed for the need for suitable documentation for the first GOOS Agreements Meeting. The necessary documentation would be prepared by the GOOS Support Office and members of the SSC, with assistance by national participants, and drawing on the existing draft "priorities" document. It was noted that there also exists a considerable amount of supporting material in existing agreements and proposals related to global observing systems. **The Committee recommended** that this material should be incorporated wherever possible in the document.

8. PLAN OF ACTION FOR 1996-1997

106 **The Committee examined** the 1995-1996 Action Plan prepared by the GOOS Support Office, and **decided** on actions to be pursued. **The Committee requested** the GOOS Support Office to update this Action Plan for the 1996-1997 period with assessments of the financial implications on the basis of recommendations, resolutions and proposals of this session and of those from J-GOOS-III session. **The Committee expressed** that, during the 1996-1997 period, highest priority should be given to the preparation of appropriate documentation for the Agreement Meeting.

9. NEXT SESSIONS OF THE I-GOOS

107 The next briefing session of I-GOOS will be held in 1997 in conjunction with the IOC Assembly. It is recommended that a short national report is provided each year.

108 The next regular (or plenary) session of I-GOOS will be held in 1998 in location and time to be further defined.

10. ADOPTION OF THE REPORT

109 **The Committee reviewed and adopted** the Summary Report and its resolution.

11. CLOSURE OF THE SESSION

110 The Session was closed at 18.00 on 17 May 1996.

ANNEX I

AGENDA

- 1. OPENING OF THE SESSION**
- 2. ADMINISTRATIVE ARRANGEMENTS**
 - 2.1 ADOPTION OF THE AGENDA
 - 2.2 DESIGNATION OF A RAPPORTEUR
 - 2.3 CONDUCT OF THE SESSION
- 3. REPORT BY I-GOOS CHAIRMAN, J-GOOS CHAIRMAN AND DIRECTOR OF GOOS SUPPORT OFFICE ON INTERSESSIONAL ACTIVITIES**
- 4. STATUS OF PLANNING AND IMPLEMENTATION OF THE GLOBAL OCEAN OBSERVING SYSTEM**
- 5. IMPLEMENTATION ISSUES**
 - 5.1 SOCIO-ECONOMIC ISSUES OF GOOS
 - 5.2 IMPLEMENTATION OF CAPACITY BUILDING ACTIVITIES
 - 5.3 PREPARATION OF THE GOOS PRIORITIES AGREEMENT MEETING
 - 5.4 REGIONAL APPROACH: ADVANTAGES AND SHORT COMINGS
 - 5.5 OCEANOGRAPHIC AND MARINE METEOROLOGICAL SERVICES
 - 5.6 STRATEGY SUB-COMMITTEE
- 6. ESTABLISHMENT OF POSSIBLE SESSIONAL WORKING GROUPS ON ITEMS 5.1, 5.2 and 5.3**
- 7. CONSIDERATION OF REPORTS FROM SESSIONAL WORKING GROUPS**
- 8. PLAN OF ACTION FOR 1996-1997**
- 9. NEXT SESSIONS OF THE I-GOOS**
- 10. ADOPTION OF THE REPORT**
- 11. CLOSURE OF THE SESSION**

ANNEX II

**Resolution I-GOOS-PS-II.1
I-GOOS STRATEGY SUB-COMMITTEE**

The Planning Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System (I-GOOS),

Noting

- (i) recommendation I-GOOS-PS-II.1-I-GOOS Strategy Sub-Committee,
- (ii) the final reports of the first and second sessions of the I-GOOS Strategy Sub-Committee,
- (iii) the draft GOOS Strategic Plan,

Considering the need for

- (i) an intersessional mechanism to develop and review proposals for GOOS Policy and implementation,
- (ii) a mechanism to effect routine and/or urgent implementation matters, including the follow-up to I-GOOS decisions,
- (iii) a mechanism to ensure proper co-ordination between I-GOOS and J-GOOS,

Decides

- (i) to maintain the I-GOOS Strategy Sub-Committee, with the following revised terms of reference given in the Annex to this resolution;
- (ii) that the Strategy Sub-Committee be comprised of the Chairman of I-GOOS, the Chairman of J-GOOS and no more than ten other members selected by the Chairman of I-GOOS in consultation with the Secretariats of the GOOS co-sponsors and the Chairman of J-GOOS, to provide both broad, high level representation of marine scientific, industrial and environmental expertise, and also wide regional distribution;
- (iii) that the Sub-Committee be chaired by the Chairman of I-GOOS;
- (iv) that membership will normally be for three years and shall be rotated to reflect the projected needs for specialist expertise as they arise;
- (v) that the Director of the GOOS Support Office and representatives of the GOOS subsidiary panels or bodies may participate as non-voting members;
- (vi) that the SSC will meet more frequently than full I-GOOS sessions, and at least once per year.

**I-GOOS Strategy Sub-Committee
Terms of Reference**

1. To oversee the development, refinement and periodic updating of a Strategic Plan for GOOS, which will define:
 - objectives, products and outcomes of the GOOS modules;
 - a broad plan of implementation, including stages, milestones and relevant structural issues; and
 - process of priority setting and review.
2. To assist in the consideration and formulation of elements of GOOS policy and to arrange for the preparation of necessary action documents for presentation to and consideration by I-GOOS;
3. To advise on the prioritization, distribution and synthesis of resources to ensure the best parallel development of the GOOS modules in pursuit of the defined objectives.
4. To review and advise on the progress of actions decided by I-GOOS and J-GOOS.

ANNEX III

LIST OF PARTICIPANTS

I. MEMBER STATES

AUSTRALIA

Dr. Angus **McEWAN**
CSIRO, Senior Adviser Oceanography
Division of Oceanography
GPO Box 727G
Hobart, Tasmania 7001
Tel: (61 02) 206 673
Fax: (61 02) 206 660
E-mail: a.mcewan@bom.gov.au

Mr. Ben J. **SEARLE**
Director, Australian Oceanographic
Data Centre
Maritime Headquarters, Wylde St.
Potts Point, NSW 2011
Tel: (61 02) 563 4801
Fax: (61 02) 563 4820
E-mail: ben@southernright.aodc.gov.au

BRAZIL

Capitao de Mar e Guerra
Antonio Galvao de **ALMEIDA SIMOES**
Ministerio da Marinha - SECIRM
Esplanada dos Ministerios -
Bloco N - Axo B - 3
andar 70.055 - 900 - Brasilia - DF
Tel: 55 61 312 13 36
Fax: 55 61 312 13 16

Ms. Janice R. **TROTTE**
Ministerio da Marinha
Directoria de Hidrografia e Navegacao
Rua Barao de Jaceguay s/n
24 048-900 - Ponta da Armaçao
CEP 24.048.900, Niteroi - RJ
Tel: (55)(21) 717-0073
Fax: (55)(21) 719-7921/719-4948

Ms. Marilia G. De **ALBUQUERQUE**
Head, Marine Sciences Division
Ministerio da Ciencia e Tecnologia
Esplanada dos Ministerios
Bloco E. St. 398
70.067.900 Brasilia-DF
Tel: (55)(61) 3177715/3177719
Fax: (55)(61) 3177991/3177858
E-mail: marilia@rct.mct.gov.br

CANADA

Dr. George **NEEDLER**
Department of Fisheries and Oceans
Bedford Institute of Oceanography
P.O. Box 1006
Dartmouth, N.S. B2Y 4A2
Tel: (1 902) 426 3145
Fax: (1 902) 426 7827
E-mail: g_needler@bionet.bio.dfo.ca

CHILE

Cap. Hugo M. **GORZIGLIA**
Servicio Hidrografico y Oceanografico de la Armada
Errazuriz 232
Playa Ancha Casilla 324
Valparaiso
Tel: (56 32) 282697
Fax: (56 32) 283537
E-mail: shoa@huelen.reuna.cl

FRANCE

Mr. François **GERARD**
Chef du département résean - DGO/RE
Météo France
1, Quai Branly
75340 PARIS Cedex 07
Tel: (33 1) 4556 7024
Fax: (33 1) 4556 7005
E-mail: francois.gerard@meteo.fr

Prof. Michel **GLASS (Chairman)**
Directeur du programme
Géosphère/Biosphère
IFREMER
Technopolis 40
155, rue Jean-Jacques Rousseau
92138 Issy-Les-Moulineaux Cedex
Tel: (33)(1) 46 48 22 22
Fax: (33)(1) 46 48 22 24
E-mail: michel.glass@ifremer.fr

Ms. Catherine **LARGET**
IFREMER
Technopolis 40
155, rue Jean-Jacques Rousseau
92138 Issy-les-Moulineaux Cedex
Tel: (33)(1) 4648 2211
Fax: (33)(1) 4648 2224

GERMANY

Prof. Dieter **KOHNKE**
Bundesamt für Seeschifffahrt und Hydrographie
(Federal Maritime and Hydrographic Agency)
Postfach 30 12 20
Bernard-Nocht-Strasse 78
D-20305 Hamburg
Tel: (49 40) 31 90 34 00
Fax: (49 40) 31 90 50 00
E-mail: kohnke@hamburg.bsh.d400.de

JAPAN

Prof. Keisuke **TAIRA**
Ocean Research Institute
University of Tokyo
1-15-1 Minamidai, Nakano-ku,
Tokyo 164
Tel: (81)(3) 5351-6417
Fax: (81)(3) 5351-6418
E-mail: taira@ori.u-tokyo.ac.jp

Mr. Masataka **HISHIDA**
Director
Ocean Research Department
Japan Marine Science and Technology Center
(JAMTEC)
2-15, Natsushina-cho, Yokosuka 237
Tokyo
Tel: (81)(468) 66-3811 (Standard)
(81)(468) 67-3870 (Direct)
Fax: (81)(468) 65-3202
E-mail: hishidam@mstkid.jamstec.go.jp

Mr. Daisuke **MACHIDA**
Deputy Director
International Scientific Affairs Division
Ministry of Education, Science,
Sports and Culture
3-2-2, Kasumigaseki
Chiyoda-ku, Tokyo 100
Tel: (81 3) 3581 4211
Fax: (81 3) 3503 7048

Ms. Naoko **ICHIYAMA**
Official
International Scientific Affairs Division
Ministry of Education, Science,
Sports, and Culture
3-2-2, Kasumigaseki
Chiyoda-ku, Tokyo 100
Tel: (81 3) 3581 2754
Fax: (81 3) 3503 7048
E-mail: ichiyama@monbu.go.jp

Mr. Tomoaki **OZAKI**
Senior Staff
Office of Earth Sciences and Technology
Research and Development Bureau
Science and Technology Agency
2-2-1 Kasumigaseki Chiyoda-ku,
Tokyo 100
Tel: (81 3) 3581 6561
Fax: (81 3) 3581 7442

Mr. Katsuhiro **KUSUNOKI**
Assistant Director
Ocean Division, Transport Policy Bureau
Ministry of Transport
Tel: (81 3) 3580-5119
Fax: (81 3) 3580 3086
E-mail: katsu-kusunok@so.motnet.jo.jp

Mr. Toshikazu **ISHII**
Manager, International Affairs Division
Planning Department
Japan Marine Science and Technology Center
(JAMSTEC)
2-15 Natsushima-Cho, Yokosuka 237
Tokyo
Tel: (81 4) 6867-5511
Fax: (81 4) 6866-3061
E-mail: plan@jamstec.go.jp

MALTA

Dr. Vanessa **GRIMA-BALDACCHINO**
First Secretary and Consul
at the Embassy of Malta
Embassy of Malta
2017 Connecticut Avenue, NW
Washington, DC 20008, USA
Tel: (1 202) 462-3611
Fax: (1 202) 387-5470
E-mail: vanessagb@aol.com

NETHERLANDS (The)

Dr. Jan H. **STEL**
Director, Geosciences Foundation
Laan van N.O. indië 131
NL-2593 BM The Hague
Tel: (31 70) 344 07 010
Fax: (31 70) 383 21 73
E-mail: stel@nwo.nl

NORWAY

Dr. Johannes **GUDDAL**
Regional Manager
Norwegian Meteorological Institute
DNMI Region W, Allegt. 70
5007 Bergen
Tel: (47 55) 23 66 31
Fax: (47 55) 23 67 03
E-mail: j.guddal@dnmi.no

PERU

Mr. Hector **SOLDI**
Peru Hydographic Office
Casilla Postal 80,
Callao-Peru
Tel: (051) 429 8925
Fax: (051) 465 2995
E-mail: hidronav+@amauta.rcp.net.pe

RUSSIAN FEDERATION

Dr. Vladimir E. **RYABININ (Rapporteur)**
Principal Researcher
Hydrometeorological Centre
of the Russian Federation
9-13 Bolshoi Predtechensky Per.
Moscow 119270
Tel: (7 095) 255 21 78
Fax: (7 095) 246 3970

SWEDEN

Mr. Hans **DAHLIN**
Swedish Meteorological and Hydrological Institute
S-60176 Norrköping
Tel: (46 11) 158 305
Fax: (46 11) 158 350
E-mail: hdahlin@smhi.se

UNITED KINGDOM

Dr. Nicholas **FLEMMING**
Director, EuroGOOS Office
Room 346/18
Southampton Oceanography Center
Empress Dock, Southampton SO14 3ZH
Tel: (44 1) 703 596 242 or 262
Fax: (44 1) 703 596 399
E-mail: n.flemming@soc.soton.ac.uk

Dr. R.J. **SHEARMAN**
Director, Observation Provision Branch
Meteorological Office, Room 112
London Rd, Braknell, Berks.
Tel: (44) (1344) 856-625
Fax: (44) (1344) 856-412
E-mail: rjshearman@meto.govt.uk

UNITED STATES OF AMERICA

Dr. W. Stanley **WILSON**
Assistant Administrator
National Ocean Service, NOAA
1305 East-West Highway
Silver Spring, MD 20910
Tel: (1 301) 713-3074
Fax: (1 301) 718 4269/4263
E-mail: swilson@ocean.nos.noaa.gov

Dr. Neil **ANDERSEN**
University of Maryland
Center for Environmental & Estuarine Studies
(CEES)
2020 Horn Point Road
Cambridge, MD 21613
Tel: (1 410) 228-8200 x 847
Fax: (1 410) 476-5490
E-mail: andersen@hpel.cees.edu

Ms. Dorothy **BERGAMASCHI**
Acting Director, Division of Marine Science
U.S. Department of State
2201 C Street, NW, Room 5801
Washington, DC 20520
Tel: (1 202) 647-0239
Fax: (1 202) 647-1106
E-mail: dbergama@state.gov

Ms. Muriel **COLE**
International Affairs Specialist
National Ocean Service, NOAA
SSMC4, Room 13317
1305 East-West Highway
Silver Spring, MD 20910
Tel: (1 301) 713 3063
Fax: (1 301) 713 4263
E-mail: mcole@spur.nos.noaa.gov

Mr. Ned **CYR**
National Marine Fisheries Service
NOAA
1335 East-West Highway
Silver Spring, MD 20910
Tel: (1 301) 713-2319
Fax: (1 301) 713-0376
E-mail: ned_cyr@ssp.nmfs.gov

Dr. Eric **LINDSTROM**
Director
U.S. GOOS Project Office
National Ocean Service, NOAA
SSMC4, Room 13317
1305 East-West Highway
Silver Spring, MD 20910
Tel: (1 301) 713 3063 x 139
Fax: (1 301) 713 4263
E-mail: elindstrom@ocean.nos.noaa.gov

Mr. Michael **JOHNSON**
Associate Program Manager
Office of Global Programs, NOAA
1100 Wayne Avenue, Suite 1210
Silver Spring, MD 20910-5603
Tel: (1 301) 427-2089 x 62
Fax: (1 301) 427-2082
E-mail: johnson@ogp.noaa.gov

Mr. Paul **PAN**
Oceans and Coastal Protection Division
Office of Water
Environmental Protection Agency
Mail Stop 4504F
401 M Street, SW
Washington, DC 20460
Tel: (1 202) 260-9111
Fax: (1 202) 260-9960
E-mail: pan.paul@epamail.epa.gov

Mr. Bob **GELFELD**
NODC, NOAA
1315 East-West Highway, Sta. 4230
Silver Spring, MD 20910
Tel: (1 301) 713-3295 x179
Fax: (1 301) 713-3303
E-mail: rgelfeld@nodc.noaa.gov

Mr. Ron **MOFFATT**
NODC, NOAA
1315 East-West Highway, Sta. 4230
Silver Spring, MD 20910

Mr. Rodney **WEIHER**
Chief Economist
NOAA
1305 East-West Highway, Sta. 10110
Silver Spring, MD 20910-3281
Tel: (1 301) 713-3552
Fax: (1 301) 713-4101

Ms. Catherine **WOODY**
National Data Buoy Center
National Weather Service, NOAA
Stennis Space Center
Bldg. 100, Room 344
SSC, MS 39529-6000
Tel: (1 601) 688-2800
Fax: (1 601) 688-3153
E-mail: cwoody@ndbc.noaa.gov

Ms. Kathryn **RIES**
Acting Chief, External Affairs
National Ocean Service, NOAA
1305 East-West Highway, Sta. 13332
Silver Spring, MD 20910
Tel: (1 301) 713-3078
Fax: (1 301) 713-4263
E-mail: kries@ocean.nos.noaa.gov

II. REPRESENTATIVES OF OTHER BODIES/ORGANIZATIONS

Joint Scientific and Technical Committee for GOOS (J-GOOS)

Dr. Otis **BROWN**
Chairman J-GOOS
Rosenstiel School of Marine and Atmospheric Sciences, University of Miami,
Dean's Office
4600 Rickenbaker Causeway
Miami, FL 33149, USA
Tel: (1 305) 361 4000
Fax: (1 305) 361 4711
E-mail: obrown@rsmas.miami.edu

**IOC-WMO-UNEP Committee for Global Ocean
Observing System (I-GOOS)**

Prof. Michel **GLASS** (Chairman I-GOOS)
Directeur du programme Géosphère/Biosphère
IFREMER
Technopolis 40
155, rue Jean-Jacques Rousseau
92138 Issy-Les-Moulineaux Cedex, France
Tel: (33)(1) 46 48 22 22
Fax: (33)(1) 46 48 22 24
E-mail: michel.glass@ifremer.fr
(Also representing France)

Global Climate Observing System (GCOS)

Prof. John **TOWNSHEND** (Chairman GCOS)
Department of Geography
University of Maryland, 1113 Lefrak Hall
College Park, MD 20742-8225, USA
Tel: (1 301) 405 4050
Fax: (1 301) 314 9299

Dr. Thomas **SPENCE**
Director, Joint Planning Office for the Global
Climate Observing System (GCOS)
c/o World Meteorological Organization
P.O. Box No. 2300
CH-1211 Geneva 2, Switzerland
Tel: (41 22) 730 8275
Fax: (41 22) 740 1439
E-mail: jpo@gcos.wmo.ch

**IOC-WMO Committee for Integrated Global
Ocean Services System (IGOSS)**

Prof. Dieter **KOHNKE** (Chairman IGOSS)
Bundesamt für Seeschifffahrt und Hydrographie
(Federal Maritime and Hydrographic Agency)
Postfach 30 12 20
Bernard-Nocht-Strasse 78
D-20305 Hamburg, Germany
Tel: (49 40) 31 90 34 00
Fax: (49 40) 31 90 50 00
E-mail: kohnke@hamburg.bsh.d400.de
(Also representing Germany)

**IOC Committee on International Oceanographic
Data & Information Exchange (IODE)**

Mr. Ben J. **SEARLE**
Director, Australian Oceanographic Data Centre
Maritime Headquarters, Wylde St.
Potts Point, NSW 2011, Australia
Tel: (61 02) 563 4801
Fax: (61 02) 563 4820
E-mail: ben@southernright.aodc.gov.au
(Also representing Australia)

III. SECRETARIATS

**Intergovernmental Oceanographic Commission
(IOC)**

Mr. William **ERB**
Senior Adviser
IOC, UNESCO
1, rue Miollis
75732 Paris Cedex 15
France
Tel: (33 1) 45 68 39 91
Fax: (33 1) 40 56 93 16
E-mail: w.erb@unesco.org

GOOS Support Office

Mr. Jean-Paul **REBERT**
Director
GOOS Support Office
IOC Secretariat, UNESCO
1, rue Miollis
75732 Paris Cedex 15
France
Tel: (33 1) 45 68 40 42
Fax: (33 1) 40 56 93 16
E-mail: j.rebert@unesco.org

World Meteorological Organization (WMO)

Dr. Peter **DEXTER**
Chief, Ocean Affairs Division
World Weather Watch, WMO
41 Avenue Giuseppe Motta
CH-1211 Geneva 2, Switzerland
Tel: (41 22) 730 8237
Fax: (41 22) 733 0242
E-mail: dexter@www.wmo.ch

United National Environmental Programme

Mr. Rohit **KHANNA**
United Nations Environment Programme
(UNEP)
1775 K Street, NW, Suite 310,
Washington, DC 20006, USA
Tel: (1 202) 331-9140
Fax: (1 202) 331-9333
E-mail: rkhanha@igc.apc.org

ANNEX IV

LIST OF DOCUMENTS¹

| Document Code | Title |
|---------------------------------------|--|
| WORKING DOCUMENTS | |
| IOC-WMO-UNEP/I-GOOS-PS-II/1 prov. | Provisional Agenda |
| IOC-WMO-UNEP/I-GOOS-PS-II/1 Add.prov. | Provisional Timetable |
| IOC-WMO-UNEP/I-GOOS-PS-II/2 | Annotated Provisional Agenda |
| IOC-WMO-UNEP/I-GOOS-PS-II/3 | Summary Report (This document) |
| IOC-WMO-UNEP/I-GOOS-PS-II/4 prov. | Provisional List of Documents |
| IOC-WMO-UNEP/I-GOOS-PS-II/5 prov. | Provisional List of Participants |
| IOC-WMO-UNEP/I-GOOS-PS-II/6 | Report of the Chairman I-GOOS |
| IOC-WMO-UNEP/I-GOOS-PS-II/7 | Draft Report of J-GOOS-III |
| IOC-WMO-UNEP/I-GOOS-PS-II/8 | Report of the Director of GOOS SO |
| IOC-WMO-UNEP/I-GOOS-PS-II/9 | Plan of action for 1995-1996 |
| IOC-WMO-UNEP/I-GOOS-PS-II/10 | Progress Report on the existing Ocean Observing and Data Management System |
| IOC-WMO-UNEP/I-GOOS-PS-II/11 | Joint I-GOSS-IODE Data Management Strategy in support of GOOS |
| IOC-WMO-UNEP/I-GOOS-PS-II/12 | Status of Planning, Existing Systems |
| IOC-WMO-UNEP/I-GOOS-PS-II/13 | Draft Summary Report and Recommendations of the Workshop on socio-economic dimension of GOOS |
| IOC-WMO-UNEP/I-GOOS-PS-II/14 | Preparation of the GOOS Initial Priorities Agreements Meeting |
| IOC-WMO-UNEP/I-GOOS-PS-II/15 | Report on EuroGOOS |

¹

This list is for reference only.

No stocks of these documents are maintained, except for the Summary Report.

| Document Code | Title |
|----------------------------------|--|
| INFORMATION DOCUMENTS | |
| IOC/GOOS-II/3 | Report of I-GOOS-II |
| I-GOOS/SSC-II/3 | Draft Report of SSC-II |
| I-GOOS/SSC-II/9 | Elements of a GOOS Space Plan |
| I-GOOS/SSC-II/10 | The GOOS Services Modules: A Preliminary Report |
| IOC/INF-1028 | Towards operational oceanography: the Global Ocean Observing System (GOOS) |
| IOC-WMO-UNEP/I-GOOS-PS-II/Inf. 1 | Draft Report of OOPC-I |
| IOC-WMO-UNEP/I-GOOS-PS-II/Inf. 2 | The GOOS Strategic Plan |
| IOC-WMO-UNEP/I-GOOS-PS-II/Inf. 3 | A Pilot Implementation Plan for the North-East Asian Regional GOOS (NEAR-GOOS) |
| IOC-WMO-UNEP/I-GOOS-PS-II/Inf. 4 | An Approach to Planning for a U.S. Coastal Module of the Global Ocean Observing System |
| IOC-WMO-UNEP/I-GOOS-PS-II/Inf. 5 | Global Terrestrial Observing System - GTOS: Turning a sound concept into a practical reality |
| IOC-WMO-UNEP/I-GOOS-PS-II/Inf. 6 | Statement by the South Pacific Regional Environment Programme (SPREP) |

ANNEX V

LIST OF ACRONYMS

| | |
|-----------|--|
| ASEAN | Association of South-East Asian Nations |
| CBA | Cost-Benefit Analysis |
| CEOS | Committee on Earth Observation Satellites |
| CLIVAR | Climate Variability and Predictability |
| DBCP | Drifting Buoy Co-operation Panel |
| DIMP | Data Information Management Panel |
| ENSO | El Niño and the Southern Oscillation (USA) |
| Euro-GOOS | European Programme for the Global Ocean Observing System |
| GAW | Global Atmosphere Watch |
| GCOS | Global Climate Observing System |
| GTOS | Global Terrestrial Observing System |
| GTSP | Global Temperature and Salinity Profile Programme |
| ICSU | International Council of Scientific Unions |
| IGFA | International Group of Funding Agencies |
| IGOS | Integrated Global Observing Strategy |
| I-GOOS | IOC-WMO-UNEP Committee for the Global Ocean Observing System |
| IGOSS | Integrated Global Ocean Services System (IOC-WMO) |
| IOC | Intergovernmental Oceanographic Commission |
| IOCARIBE | IOC Sub-Commission for the Caribbean and Adjacent Regions |
| IOCINDIO | IOC Regional Committee for the Central Indian Ocean |
| IODE | International Oceanographic Data and Information Exchange |
| IOMAC | Organization for Indian Ocean Marine Affairs Co-operation |
| J-GOOS | Joint Scientific and Technical Committee for the Global Ocean Observing System |
| JSTC | Joint Scientific and Technical Committee for the Global Climate Observing System |
| LMR | Living Marine Resources |

| | |
|-----------|--|
| NEAR-GOOS | North-East Asian Regional GOOS |
| NOAA | National Oceanic and Atmospheric Administration (USA) |
| OOPC | Ocean Observation Panel for Climate |
| PICES | North Pacific Marine Science Organization |
| SEACAMP | South-East Asian Center for Atmospheric and Marine Prediction |
| SOPAC | South Pacific Applied Geoscience Commission |
| SPREP | South Pacific Regional Environment Programme |
| SSC | Strategic Sub-Committee |
| TAO | Tropical Atmosphere Ocean Array |
| TEMA | Training, Education and Mutual Assistance in Marine Sciences (IOC) |
| TIP | TAO Implementation Plan |
| TYKKI | Regional Activity of Japan and USA in the Pacific Ocean |
| UNEP | United Nations Environment Programme |
| VOI | Value of Information |
| VOS | Voluntary Observing System |
| WCRP | World Climate Research Programme |
| WESTPAC | IOC Sub-Commission for the Western Pacific |
| WMO | World Meteorological Organization |
| WWW | World Weather Watch |