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INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (of UNESCO)

WORLD METEOROLOGICAL ORGANIZATION

Twelfth Session of the Data Buoy Co-operation Panel
(Henley-on-Thames, United Kingdom, 22-25 October 1996)

SUMMARY REPORT

SC-97/WS/4

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ANNEXES

1. ORGANIZATION OF THE SESSION

1.1 OPENING OF THE SESSION

1 The Twelfth Session of the Data Buoy Co-operation Panel was opened by the chairman of the panel, Mr G. Brough, at 14.00.hours on Tuesday, 22 October 1996, in the Leander Club of Henley-on-Thames, United Kingdom. After welcoming the participants, Mr Brough introduced Mr R.J. Shearman, .Director of the Observations Branch (Land) of the United Kingdom Meteorological Office and president of the WMO Commission for Marine Meteorology.

2 On behalf of the United Kingdom, and particularly of the Natural Environmental Research Council and the Meteorological Office, Mr. Shearman welcomed the participants in the twelfth session of the panel. He expressed the hope that they would find the attractive surroundings at Leander Rowing Club conducive to successful discussions and that they would enjoy their stay in Henley. He said that the DBCP had a good record of achievement and it was evident that members had a number of ideas for initiatives to increase the activity and success of the panel. He pointed out that this would have to be achieved within the existing expenditure, given the financial pressures upon members, but that this should not discourage development.

3 On behalf of the Secretary-General of WMO, Professor G.O.P. Obasi, and the Executive Secretary IOC, Dr G. Kullenberg, the WMO Secretariat representative also welcomed participants to the session, and in particular thanked the United Kingdom hosts, the Meteorological Office and NERC, for supporting the session and for providing such excellent facilities. He also thanked personally Messrs R. Shearman, D. Meldrum and D. Painting for their efforts in co-ordinating all the arrangements for the workshop, the DBCP session and the following JTA meeting.

4 The list of participants in the session is given in Annex XI.

1.2 ADOPTION OF THE AGENDA

5 The agenda as adopted by the session is given in Annex I. It was noted that, following the agreement reached at DBCP-XI (Pretoria, October 1995), a technical session had to be held under agenda item 7, encompassing scientific and technical presentations. This technical session had been combined with the joint DBCP-GDP (Global Drifter Programme) Technical Workshop held just prior to the session.

1.3 WORKING ARRANGEMENTS

6 Under this agenda item, the panel decided on its hours of work and other relevant arrangements for the session. The documentation for the session was introduced by the Secretariats.

2. REPORTS

2.1 REPORT BY THE CHAIRMAN OF THE DATA BUOY CO-OPERATION PANEL

7 The chairman briefly summarised his first year as chairman of the DBCP. The DBCP is now represented on an increasing number of fora and it appeared to be playing an ever expanding role in many international programmes.

8 The panel had agreed upon a significant workload for the intersessional period at its previous session in Pretoria. Indications are that progress has been made on most items and action is in hand on all the remaining matters. The chairman wished to record his appreciation for the hard work of panel members and especially the efforts of the two vice-chairmen, the technical co-ordinator and the Secretariats of WMO and IOC in advancing the workplan.

9 The chairman drew special attention to two achievements during the intersessional period:

(i) The creation of the International Buoy Programme for the Indian Ocean (IBPIO);

(ii) The production of two technical documents in the DBCP series - covering the Annual Report for 1995 and the Technical Presentations made at the eleventh session.

10 The chairman reported that he had represented panel interests at one international meeting during the intersessional period, which was the first preparatory meeting for the establishment of the IBPIO, held in Goa, India. The chairman also assisted CLS/Service Argos in organizing an Australian Argos Users Conference in Hobart, Tasmania, in July 1996.

11 The chairman expressed his appreciation of the assistance of the two vice-chairmen during the intersessional period, particularly with respect to representing the panel at various international meetings and making the Global Implementation Programme progress.

12 The chairman then requested the two vice-chairmen, who had proved very active on behalf of the panel during the past intersessional period, to briefly report on their activities.

Report by Mr. William E. Woodward

13 During the past intersessional period, Mr. Woodward' s primary activity was to work with the technical co-ordinator to prepare a document describing the objectives, functions and organization of a possible global buoy programme within the DBCP. A proposal for a DBCP-Global Implementation Programme (GIP) had been prepared and was included in the working documents for the session.

14 He continued to provide technical support and continuous operation for the DBCP Web Page which is run from a server in his group in NOAA. He also provided on loan to the technical co-ordinator a high performance workstation that allowed him to access real-time GTS data via a connection to Météo-France in Toulouse.

15 In addition to the above, he also represented the DBCP at, and reported to the DBCP leadership about discussions in the United States regarding an emerging proposal to establish a separate tariff agreement for global drifting buoys. This proposal would be discussed at the session and would be presented for action at the subsequent JTA meeting.

16 Finally, he recently represented the DBCP at the Third Programme Committee Meeting of the International South Atlantic Buoy Programme (ISABP), hosted by the Brazilian Hydrographic Office in Niteroi, Brazil, where he presented a brief overview of the DBCP-GIP proposal which was received well. ISABP-III was an excellent meeting and it was rewarding to see the exceptional progress that had been made in increasing the quality and quantity of buoy deployments in the ISABP area. That progress was testimony to the dedicated efforts of the ISABP leadership from the South African Weather Bureau and to the increasing participation and commitments of the ISABP member countries and their willingness to work together towards an integrated programme.

Report by Mr. David Meldrum

17 During the intersessional period, the main DBCP activities in which he was involved were as follows:

(i) SVP-8, Château de Bonas, France, May 1996. Along with the technical co-ordinator, he attended the final session, in its present form, of the WOCE Surface Velocity Programme. In addition to a stimulating scientific and technical programme, the session addressed a number of issues, including the emergence of the SVP as an Action Group of the DBCP and a new pricing strategy for large drifter programmes.

(ii) First Session of the International Programme for Antarctic Buoys (IPAB-1), Cambridge, United Kingdom, August 1996. Together with the technical co-ordinator, he represented the DBCP at the

inaugural session of this DBCP action group, and helped the group address a number of technical and logistical problems regarding the implementation of their programme. In addition to a co-ordinated deployment strategy, the group would maintain a central archive of Antarctic buoy data.

(iii) He organised the Technical Workshop of this session of the DBCP, including the recruitment of speakers from outside the DBCP, particularly from those organizations offering alternative satellite communications systems.

18 The panel expressed its appreciation to the chairman and the vice-chairmen for their reports and for their actions on behalf of the panel during the past intersessional period. Discussions on issues raised are recorded under the relevant agenda items.

2.2 REPORT BY THE TECHNICAL CO-ORDINATOR

19 The technical co-ordinator, Mr. Etienne Charpentier, reported on his activities on behalf of the panel during the last intersessional period. As compared to previous intersessional periods, he spent more time on missions and user assistance issues. Considering the increasing number of DBCP action groups and that a DBCP member or representative should as far as possible be present at each action group session, he stressed that this person should not necessarily be the TC, provided that good communication exists between the person and him after an action group session. Time spent on user assistance could be increased, thanks to partial automation of TC work regarding QC guidelines (i.e. PMOC QC messages automatically redirected to the Principal GTS Co-ordinators (PGC)).

20 As discussed at the previous DBCP session, Météo-France offered an office for the TC to work part time at the Service Central d'Exploitation de la Météorologie (SCEM) in Toulouse on behalf of the panel. Since March 1996, the TC is basically spending every Tuesday at Météo-France, accessing SCEM computer networks thanks to a PC offered by the NOAA National Ocean Service. He is basically conducting monitoring activities and specific case studies of severe events using a sensitivity technique to identify interesting cases. The panel thanked both Météo-France and NOAA for their support to this work.

21 He then reported on activities specific to the last intersessional period. Regarding the GTS sub-system, he had been particularly working on upgrading the system to deal with CLS XBT systems, assisting CLS in switching to new types of computers, writing dedicated software modules to deal with salinity drifters. On other issues, the DBCP Working Group on BUFR met in Geneva, 2-3 May 1996, and produced a comprehensive report which expressed proposed modifications to BUFR tables. The DBCP World Wide Web server had been substantially upgraded and many links added to useful products elsewhere.

22 The TC worked closely with Mr. Woodward, vice-chairman of the DBCP, to refine a DBCP proposal for establishing a Global Implementation Programme. This issue would be debated at this DBCP session. The Global Drifter Programme (GDP) and the DBCP are now both co-operating in this context.

23 A survey on buoy user requirements regarding Service Argos was also conducted as requested at the Fifteenth Meeting on JTA. All contacted PIs replied and a synthesis document expressing these requirements would also be discussed at this panel session. A questionnaire is also being regularly sent to buoy users in order to have a good picture of the overall buoy community and potentially increase the number of buoys on GTS.

24 The full report of the technical co-ordinator is given in Annex II, which also includes the list of normal tasks undertaken by him during any intersessional period and which are not detailed above. The panel expressed its appreciation to the technical co-ordinator for his substantial achievements on its behalf during *inter alia* the past intersessional period. Discussion on various issues raised is recorded under appropriate agenda items.

2.3 REPORT BY THE SECRETARIATS

25 The representative of the WMO Secretariat reported to the session that WMO had continued to support the work of the panel in a variety of ways, including managing the overall panel budget, co-ordinating the initial efforts for the establishment of the IBPIO, and maintaining various data bases including the list of DBCP focal points and the buoy ID register for GTS data distribution. Participants were urged to notify any errors in these lists. It was noted in particular that the buoy ID register was in danger of exhausting the number supply in certain areas, and users were urged to reuse old numbers wherever possible, with an appropriate time delay (greater than 6 months) to reduce confusion in the archives. The WMO Secretariat in turn was requested to inform users of those areas where an ID allocation problem was likely to occur in the near future.

26 The representative of the IOC Secretariat reported that there had been no agenda item devoted to the panel at the Twenty-ninth Session of the IOC Executive Council (Paris, 24 September - 2 October 1996) because of the decision of the IOC Assembly at its seventeenth session (March 1993) that "*the agenda of the Executive Council [of IOC] should be restricted primarily to those issues concerning the programme implementation of the [Intergovernmental Oceanographic] Commission requiring decisions or management actions [by the Council].*" The IOC Secretariat had prepared the Annual Report of the DBCP for 1995 and passed it to the WMO Secretariat for publication in the DBCP Technical Documents series. The major activity of the IOC Secretariat in support of the panel had continued to be concerned with the management of the employment and missions of the Technical Co-ordinator, recruited since June 1993 as a "*UNESCO funds-in-trust expert*" (see agenda item 3 for more details). No new progress was reported with regard to the study of the legal status of ODAS.

27 The IOC representative reminded the panel of the proposal made at the panel's eleventh session, that it might consider funding the missions of the IOC and/or WMO officers in charge to attend its sessions. The panel decided to postpone discussion on this topic until it had reviewed its financial situation and related matters under agenda item 3.

2.4 REPORTS BY THE ACTION GROUPS OF THE PANEL

28 The panel noted it had before it written reports by the European Group on Ocean Stations (EGOS), the International Arctic Buoy Programme (IABP) and the International South Atlantic Buoy Programme (ISABP). These reports would be published in the Annual Report of the panel as usual, together with reports from the International Programme for Antarctic Buoys (IPAB) and from the International Buoy Programme in the Indian Ocean (IBPIO).

European Group on Ocean Stations

29 Mr. F. H. Sigurdsson, vice-chairman of the EGOS Management Committee, gave an oral presentation on EGOS activities and on the status of drifting and moored data buoys in the North Atlantic. He introduced the written report by EGOS and noted that the operational status of the EGOS programme had remained relatively stable over the past four years, with a network of 6 moored and some 15-25 drifting buoys in operation at any time.

30 Mr. Sigurdsson informed the session that, on 1 October 1996, a total of 26 EGOS drifting buoys were in operation. He highlighted the availability and generally good quality of the data from the EGOS drifting and moored buoys. In this connection, he emphasized the great value of the Local Users Terminals in Oslo and Søndre Strømfjord and the importance of regular and near-real time quality control of the data.

31 Finally, Mr. Sigurdsson mentioned that the June meeting of EGOS had been held at the United Kingdom Meteorological Office, Beaufort Park, in parallel with the annual meeting of the International Arctic Buoy Programme. A joint seminar was successfully arranged for discussion of technical and operational matters of interest to both groups.

32 The representative of France informed the panel that his country was now in a position to join EGOS and would officially do so at the next EGOS Management Committee meeting, this December. The panel acknowledged the information with warm appreciation.

International Arctic Buoy Programme (IABP)

33 The technical co-ordinator presented the report by the IABP, which met in Bracknell, United Kingdom, in June 1996 in conjunction with the European Group on Ocean Station (EGOS). A joint technical session permitted excellent exchange of information between the two communities. The IABP now maintains a network of approximately 25 buoys deployed by aircraft, submarine, ice-breaker and other types of vessels. All buoys transmitting good data are reporting onto the Global Telecommunication System. These buoys include now 3 Russian buoys deployed in the Laptev Sea, and two Japanese buoys (IOEB) deployed by JAMSTEC in co-operation with WHOI. An IABP Web site, also accessible via the DBCP server, is maintained (**http://iabp.apl.washington.edu**), which among other information includes a status map and a list of operational buoys.

34 Beside routine observation of air pressure and air temperature, IABP is now seeking the development of other types of measurements such as snow, ice temperature and internal stress. New potential participants are encouraged to join the Programme. The IABP chairman is Mr. Brian O'Donnell. The programme co-ordinator is Mr. Roger Colony.

International South Atlantic Buoy Programme

35 The chairman ISABP, Mr. P. Le Roux, reported that the ISABP-III meeting took place in Niteroi, Brazil, from 15 to 17 October 1996. The final report should be available towards mid December 1996. In the meantime, copies of the provisional report are available and can be obtained from the ISABP programme co-ordinator, Mr. E. Burger.

36 The participants in ISABP III reviewed the work done during the past year and came to the conclusion that, all taken into consideration, it was a successful year. On the average more drifters were deployed and subsequently more data became available, as compared to any comparable time in the past. The meeting, however, recognized that the sub-tropical Atlantic, i.e. the area between 15° to 35°South, remained data sparse. Unfortunately there was no particular programme under consideration for this area. It was therefore considered important to canvas new participants with possible interest in this area.

37 The participants in the meeting agreed that the programme was participant driven. Much time was spent on compiling a list of possible contributions. The contributions were moulded into an action plan by the programme co-ordinator. The tasks and responsibilities which emanated from the meeting were listed and the ISABP was therefore set for a productive 1996/97 operational year.

38 Mr. Le Roux brought to the attention of the DBCP that, as chairman of the ISABP, he was given the task to discuss with the panel the following items:

(i) the ISABP need for better data communication from the South Atlantic. They would like panel support in convincing Argos to provide LUT's to the area.;

(ii) the ISABP envisaging a training session for new participants. They needed panel support to convince more of the African and South American countries to participate in the ISABP. One of their endeavours to accomplish this was a brochure on their South Atlantic activities which they would like to disseminate via the WMO and IOC with panel assistance.

(iii) finally, the ISABP had the representative of GOOS during the meeting and found a mutual common ground to enhance the observations over the South Atlantic. They would also be needing panel assistance in this.

39 The panel considered that the question of improving the data communication in the region was of an utmost importance. It therefore decided to officially request, at the forthcoming meeting on Argos Joint Tariff Agreement, that an *ad hoc* working group be established, comprising CLS/Service Argos and ISABP representatives, to study the possibility and ways and means for CLS/Service Argos to install the required LUT(s) in the region, maybe as a development to be taken into account within the *amortization* items in future.

3. FINANCIAL AND ADMINISTRATIVE MATTERS

3.1 FINANCIAL SITUATION

40 The panel considered the financial statements provided by IOC and WMO as follows:

(i) finalized IOC account 1 June 1995 - 31 May 1996;
(ii) interim WMO account 1 January 1996 - 31 August 1996;
(iii) provisional WMO statement of estimated income and expenditure to 31 May 1997.

These statements are reproduced in Annex III. The panel accepted and approved the various statements.

3.2 REVIEW OF CONTRACTS

41 The panel reviewed and approved the terms of the IOC/UNESCO employment contract for the technical co-ordinator, as well as of the contract between IOC/UNESCO and CLS/Service Argos for his logistic support.

3.3 FUTURE EMPLOYMENT STATUS OF THE TECHNICAL CO-ORDINATOR AND COMMITMENTS FOR FUTURE FUNDING

42 The panel recalled the agreement made with Mr Charpentier at the end of 1995, that he would be willing to remain as technical co-ordinator, located in Toulouse and employed by IOC/UNESCO, until at least 31 May 1998. It therefore decided to continue the existing arrangements for the next financial period, viz 1 June 1997 to 31 May 1998, subject to the availability of funds. With regard to future years (beyond May 1998), and bearing in mind the long lead-time required to recruit a new technical co-ordinator, the panel noted the agreement of Mr Charpentier to inform the chairman and the Secretariats, by the beginning of December 1996, whether or not he may wish to continue as technical co-ordinator beyond 31 May 1998. In the event of a decision to continue on the part of Mr Charpentier, it was agreed by the panel that it would retain him as technical co-ordinator, subject to availability of funds.

43 The panel then reviewed the overall likely financial situation for 1997-98 and for future years. It recognized that all panel Member States were currently experiencing severe financial constraints, and that this situation was likely to continue for the foreseeable future. At the same time, it considered that the technical co-ordinator was essential to the evident success of the panel, and that this success in turn had engendered requirements for some additional expenditures, for example to support regional action groups and for DBCP publications. It therefore agreed that every effort should be made to maintain a budget for 1997-98 sufficient to support the technical co-ordinator and the other essential panel activities, while exercising maximum possible financial restraint.

44 In this context, the panel reviewed expenditure estimates for 1997-98 provided by the Secretariats. It finally agreed on the estimates as given in Annex IV, on the basis that these represented expenditures no greater than those actually incurred in 1996-97, and requested that the actual expenditures for 1996-97 and for the previous year be included for comparison with the estimates for 1997-98 in a table to appear in the 1996 Annual Report.

45 The panel then addressed the contributions necessary from Member States to cover these estimated expenditure requirements. On the basis of provisional commitments made at the meeting or otherwise, the panel drew up the table of provisional contributions for 1997-98 given in Annex V. It expressed its appreciation to all contributing Member States for their continuing support for the panel, and requested the Secretariats, as in past years, to ensure that invoices for these contributions were issued as soon as possible and in any case before the end of 1996.

46 Finally on this item, the panel placed on record its concern regarding the potential effects of continuing budgetary constraints on contribution levels by existing contributors in future years, and the consequent impact of this on the future of the technical co-ordinator position. It therefore firstly urged both the Secretariats and panel members to make every effort to recruit new contributors to the trust fund, stressing that even small contributions from several countries would have a significant positive impact on the future of the panel. At the same time, it requested the Secretariats and the chairman to prepare for the next session a tabulated assessment of the likely impacts of future budget reductions and of possible scenarios to deal with these, while maintaining the required technical support. In this context also, the panel could not accept the Secretariat proposal to fund Secretariat missions to support the panel.

4. RELATIONSHIP WITH INTERNATIONAL PROGRAMMES/ORGANIZATIONS

4.1 WORLD CLIMATE RESEARCH PROGRAMME (WCRP)

47 The panel noted with interest the comments provided by the chairman of the GCOS/GOOS/WCRP Ocean Observations panel for Climate (OOPC) relating to the work of the DBCP in general and to the proposed Global Implementation Programme in particular. With regard to the latter, discussion is recorded under item 6.7. The panel recognized that the OOPC was now the primary scientific advisory body to GCOS and GOOS on matters relating to ocean observations for climate, and that it was thus important to interact closely with it in defining requirements for buoy data in support of global climate studies. The panel therefore agreed that once the structure and details of the GIP had been defined, the technical co-ordinator should work closely with the regional action groups and the Secretariats to prepare a set of specific actions and proposals from the DBCP to present to the next session of the OOPC (Capetown, February 1997). The panel further requested its vice-chairman, Mr W. Woodward, to write to the chairman of the OOPC on its behalf, expressing appreciation for his comments and interest, as well as the desire of the panel to work closely in the future with the OOPC in implementing requirements for buoy data for global climate studies.

4.2 WORLD WEATHER WATCH (WWW)

48 The panel noted that the requirements for ocean surface data for the WWW continued to be expressed clearly in the World Weather Watch component of the WMO Long-Term Plan, and that these had not changed substantially in recent years. It recalled its previous request to be kept informed of developments with regard to the WMO policy and practice for the exchange of meteorological data and products, and noted also in this regard that there had been no substantive developments during the past year.

4.3 INTEGRATED GLOBAL OCEAN SERVICES SYSTEM (IGOSS) AND INTERNATIONAL OCEANOGRAPHIC DATA AND INFORMATION EXCHANGE (IODE)

49 The panel was presented with the reports of the IGOSS Specialized Oceanographic Centre (SOC) for drifting buoys, operated by Météo-France, and the IODE Responsible National Oceanographic Data Centre for buoys, operated by the Marine Environmental Data Service (MEDS) of Canada, and expressed its appreciation to both centres for the work undertaken.

50 With regard to the former, the panel wished to place on records its thanks to Météo-France for providing very useful statistics, as in particular the diagnostic charts, which were invaluable to pinpoint data sparse areas, *inter alia*.

51 With regard to the latter, the panel acknowledged once more the difficulty of "counting buoys", since the choices made to perform the counting exercise led to different figures for the same situation. It further highlighted the difficulty of taking account of duplicate and quasi-duplicate messages within an archive and encouraged the RNODC to pursue its efforts in the field.

4.4 GLOBAL OCEAN OBSERVING SYSTEM (GOOS) AND GLOBAL CLIMATE OBSERVING SYSTEM (GCOS)

52 The panel was presented with a report on developments within GOOS of relevance to the panel during the last 12 months, which included: the Second Session of the Strategy Sub-committee (SSC) of the IOC-WMO-UNEP Committee for GOOS (I-GOOS) (Paris, March 1996); the Third Session of the Joint Scientific and Technical Committee for GOOS (J-GOOS) (Paris, April 1996); and the Second Planning Session of I-GOOS (Washington DC, May 1996). It noted in particular that the document *Towards Operational Oceanography: the Global Ocean Observing System (GOOS)* had been finalized and published as document IOC/INF-1028, and acknowledged the progress in the preparation of the GOOS Strategic Plan.

5. REPORTS ON CURRENT AND PLANNED DATA BUOY PROGRAMMES

53 The panel noted that written reports were received from Australia, Canada, China, France, Iceland, Japan, Netherlands, New Zealand, South Africa, United Kingdom and United States, in addition to the already quoted reports by its action groups. The panel requested that these reports, as well as others received in standard format, be included as usual in an annex to its Annual Report.

6. CO-ORDINATION ACTIVITIES

6.1 QUALITY CONTROL OF BUOY DATA

54 The technical co-ordinator reported on Quality Control guidelines for GTS distribution of buoy data which were implemented by the panel in January 1992. Level of participation from Principal Meteorological or Oceanographic Centres (PMOC) responsible for quality control of GTS buoy data remained similar as for previous intersessional periods. For a total of 1498 buoys that reported on GTS during the period 1 June 1995 to 31 May 1996, following 496 status change proposals from PMOCs related to 318 buoys, 210 buoys (i.e. 15.6%) had their status changed accordingly. Twelve PMOCs from 9 countries are now participating. Twenty three centres or Principal GTS Co-ordinators (PGC) are registered on the **BUOY-QC@VEDUR.IS** Internet mailing list, routinely receiving QC messages as posted by PMOCs.

55 In order to spare working time spent on other DBCP issues, the technical co-ordinator partly automated his work related to the QC guidelines. This involves automatically redirecting QC messages from PMOCs to the PGCs according to the WMO number as included in the standardized subject line, provided that PGCs have e-mail addresses. PGCs not connected to Internet receive these messages directly from the TC by fax or other available media. Automation permits a saving of 50% of the time the TC spends on the matter (about 15% of his time). He informed the panel that this new procedure does not permit to respect the recommended 7 day-delay before a QC message is supposed to be forwarded to a PGC (automatic messages are forwarded immediately). This delay was initially proposed in order to allow other PMOCs to comment on the quality of the data of a particular buoy when another PMOCs already commented before. The panel agreed that there was no need to maintain that recommendation, not only for the reason stated above, but also because the practice showed that either (i) other PMOCs do not necessarily comment on a problem already reported, and (ii) when they do, they usually confirm the initial statement regarding the buoy data quality. It therefore asked the TC to update the QC Guidelines accordingly. The updated guidelines are attached as Annex VI.

56 QC messages as posted by PMOCs and buoy monitoring statistics are archived and available via the DBCP World Wide Web server. The RNODC/DB at MEDS also archives the PMOC messages in its meta-data-base.

57 The technical co-ordinator stressed that DBCP efforts in increasing the quality of buoy data, particularly through the DBCP guidelines, proved successful since for example mean RMS of air pressure observation minus first guess field per month for all drifting buoy data on GTS decreased from a level of approximately 3 hPa in 1987 to about 1.6 hPa in 1996 (see Annex II).

6.2 THE DBCP SERVER ON INTERNET AND RELATED MATTERS

58 The DBCP World Wide Web (W3) Internet server home page is maintained at the NOAA National Ocean Service (NOS) since February 1995 and is accessible via the following address: **http://dbcp.nos.noaa.gov/**. It has been substantially upgraded during the last intersessional period through co-operation between the TC and NOS:

* more attractive home page;
* new links to other W3 servers (e.g. EGOS, IBPIO, GDP, TAO, WMO, IOC ...);
* hosting home pages for two DBCP action groups (ISABP and IPAB);
* monthly status maps for all ocean basins;
* a questionnaire to buoy deployers;
* a list of drifting buoy manufacturers;
* a list of meetings of interest to the buoy community.

59 Improvements can still be implemented particularly concerning status maps, meta data on buoys, data flow control, specific tools for assisting the action groups in refining deployment strategies. The panel requested the TC to investigate feasibility of such improvements in conjunction with NOS and to report at the next panel session.

6.3 CODE MATTERS

Requirements for GTS distribution of buoy data (BUFR)

60 At its previous session in Pretoria, the panel established a Working Group comprising Pierre Blouch, David Gilhousen and the technical co-ordinator to precisely define requirements for GTS distribution of buoy data, especially in the context of possibly using the BUFR code in the future. The WG met in Geneva, 2-3 May 1996, together with other code experts, namely Cliff Dey (NCEP), Madeleine Céron (Météo-France), and Bob Keeley (MEDS). It clearly and precisely defined requirements which were incorporated in the meeting's report and presented at this panel session.

61 The panel reviewed the requirements expressed by the WG and basically agreed that these should reflect formal DBCP views on the subject and should eventually be submitted to the CBS WG on Data Management. It decided to maintain the DBCP WG for amending the document according to (i) details expressed by panel members at the session (e.g. defining station height as mean sea level for buoys, adding a drogue on/off flag, considering hydrophone type wind speed sensors, etc.), and (ii) amendments possibly expressed by panel members by 31 December 1996.

BUOY code

62 The panel considered the issue of changing the interpretation of the Ql indicator of Section 0 of BUOY reports to reflect current usage and availability of the Argos Location Quality Index (0>1500m, 1<1500m, 2<500m, 3<250m, and to code it "/" if this information is not available, e.g. for LUTs) which is more meaningful that the present interpretation of that field (0 not checked, 1:good, 2:inconsistent, 3:doubtful,

4:wrong, 5:data changed). The field was actually always coded 1 since bad or doubtful locations are not supposedly being disseminated on GTS.

63 The panel agreed that the practice should be changed and implemented as of 1 January 1997. It therefore requested CLS/Service Argos and Local User Terminals to take adequate steps to implement this new practice, and requested the WMO Secretariat to advertise this change by means of the World Weather Watch Operational Newsletter.

6.4 ARGOS GTS PROCESSING SUB-SYSTEM

64 During the last intersessional period, a few improvements had been implemented within the GTS sub-system, e.g. incorporation of data processing of the CLS XBT systems into the GTS sub-system, and implementation of a dedicated software module to deal with salinity sensors. New developments might also be required in the future according to new requirements expressed by buoy users. This issue would be discussed under DBCP agenda item number 6.9.

65 The TC informed the panel that, although the system had been operated properly on both sides with no major problem or bug detected, problems arose when Service Argos switched the systems in Toulouse to new Digital Equipment Alpha processors: (i) updates between centres could not be operated normally for a while, and consequently (ii) when Landover was switched in backup mode while Toulouse was stopped to upgrade the systems, the GTS description data base used in the United States was not up-to-date, leading to inconsistent data being disseminated onto the GTS for a substantial number of platforms during the transition period (e.g. removed platforms or sensors were on). At another occasion, a similar problem arose, this time when Toulouse was placed in backup mode because of system upgrades in Landover. The TC stressed that update of the GTS data base between the two Argos Global Processing Centres should be reliable enough to keep the bases consistent at any time. The panel urged Service Argos to improve reliability of the system to that level.

66 panel members mentioned that CLS and Service Argos Inc. relied very much upon the TC for dealing with implementation of new complicated types of platforms in the GTS sub-system, or programming of new software modules (e.g. salinity/conductivity sensors). Considering that the TC is often absent from his office at CLS due to missions abroad or spending time at Meteo France or otherwise, that he is in any case not necessarily responsible for such tasks, which are rather the responsibility of Service Argos, and that Service Argos had not, for the time being, acquired sufficient competence to react quickly enough to such user requests when the TC is absent, the panel proposed that the TC organizes a training session in Toulouse of about one week for CLS and Service Argos Inc. personnel, in order for Service Argos to acquire the necessary competence and subsequently be able to directly deal with such issues in future.

6.5 COMBINED METEOROLOGICAL/OCEANOGRAPHIC DRIFTING BUOYS

67 The panel recognized that the SVP-B drifter had now become an established and largely reliable technology, and was already in widespread use. It welcomed this situation, urged continuing analysis and refinement of the drifter, and also urged that meteorologists and oceanographers should cooperate in the use of the platform wherever possible, to the benefit of all programme requirements. At the same time, the panel noted from the preceding technical workshop the development work now underway to obtain other types of data, such as wind speed and direction, from the SVP-B drifter. It expressed considerable interest in this work, in view of the potential value to operational meteorology and global climate studies, urged that it should continue and requested that an update on the work should be provided to DBCP-XIII.

6.6 FORMATION OF OTHER ACTION GROUPS

International Buoy Programme for the Indian Ocean

68 The panel was informed by its chairman of the formation of an International Buoy Programme for the Indian Ocean (IBPIO). A first preparatory meeting was held in Goa, India, in February 1996, followed

by a second preparatory meeting and the first Programme meeting in La Réunion, France, in September 1996. Mr Pierre Blouch, France, programme co-ordinator of the new programme, gave an oral report on these meetings. In La Réunion the following organisations were represented: the Australian Bureau of Meteorology; the Atlantic Oceanographic and Meteorological Laboratories, United States; Météo-France; the Indian National Institute of Oceanography; the South African Weather Bureau; the DBCP; CLS/Argos and WMO.

69 The primary objective of the IBPIO is to establish and maintain a network of platforms in the Indian Ocean to provide meteorological and oceanographic data for both real time and research purposes. Mr Blouch noted that the successful inauguration of the programme was largely due to the efficient work of its interim co-ordinator, Mr Eugene Burger, South Africa, who is also the programme co-ordinator of the ISABP.

70 Mr Graham Jones, Australia, and Dr L V Gangadhara Rao, India, were elected as chairman and vice-chairman, respectively, of the programme committee. Included in the agreed work programme as a priority task for the programme co-ordinator is the requirement to canvas for additional participants, especially those organisations in the region that might contribute logistic facilities to the programme. Web pages for the IBPIO have already been set up at **http://www.shom.fr/meteo/ibpio** (also accessible via the DBCP server). It is expected that letters of intent (the formal means of accession to the IBPIO) will be signed by the participants in a few weeks.

71 The participants in the First Programme meeting agreed that the IBPIO should apply to become an action group of the DBCP and to this end the chairman of the programme committee had written to the chairman of the DBCP requesting formal recognition of the IBPIO as an action group of the DBCP. The panel accepted this request with pleasure and requested its chairman to write to the chairman of the IBPIO accordingly.

Global Implementation Programme

72 Also under this agenda item, the panel recalled its discussions at DBCP-XI concerning a possible Global Implementation Programme, and in this connection reviewed a detailed proposal for such an activity, which had been prepared by the vice-chairman, Mr W. Woodward, and the technical co-ordinator during the intersessional period. It agreed with the underlying concepts of the proposal, in particular with regard to the future development of global deployment strategies to implement requirements from programmes such as GCOS and GOOS as they emerge; the maintenance of a database of programme information; the identification of possible areas of collaboration among programmes; and the provision of assistance to deployment programmes as required. At the same time, however, reservations were expressed concerning the formation of another "programme", with its implications of yet more committees and groups and additional bureaucracy.

73 Recognizing that this certainly was not the intent of the proposal, and also that the activities proposed would take some time to develop properly, the panel therefore agreed to proceed slowly with the concept, with a first step being a reorganization of the agenda for DBCP-XIII to clearly separate technical from administrative issues and highlight the central functions agreed under the proposal. The outline for the agenda was therefore adopted as given in Annex VII.

6.7 CO-OPERATION BETWEEN OPERATIONAL AND RESEARCH PROGRAMMES

74 Under this agenda item, the panel first recalled that at DBCP-XI it had requested that further studies should be considered on the impact of buoy data on operational meteorological analyses and forecasts. In this context it noted with appreciation the study which had been undertaken on its behalf by NCEP, NOAA, United States, involving parallel runs of its global atmospheric model, with and without buoy data, for specific months. The study had shown overall no significant negative or positive impact of the buoy data on the 1000 hPa and 500 hPa heights, which was a not unexpected result and similar to that for other observational data, including from satellites, under the same conditions. The panel considered that more realistic impact studies should rather involve specific case studies of severe events, when observational data were likely to be critical

to the analyses, and cited as an example the study presented by the United Kingdom Meteorological office to the preceding workshop. It therefore requested the Secretariats and the technical coordinator to again approach meteorological centres in this regard, and proposed that a session at the DBCP-XIII workshop should include case studies specifically for the southern hemisphere. The panel also expressed its appreciation to NCEP for the study already made, and requested the chairman and Secretariats to convey this appreciation to the persons concerned.

75 The panel noted with appreciation the proposal from the Global Drifter Programme (GDP), formerly the TOGA/WOCE Surface Velocity Programme (SVP), that it should be formally associated in some way with the DBCP. It wholeheartedly welcomed the proposal, which it recognized as the culmination of several years of efforts by both itself and the oceanographic research community to more closely coordinate and integrate their activities, to mutual benefit, and agreed in principle that the GDP should become an action group of the DBCP. It therefore requested the GDP, once its Operating Principles and Committee structure had been finalized, to formally apply to the chairman of the DBCP for adoption, according to the agreed procedures, and authorized the chairman to accept the application on its behalf.

6.8 NEW COMMUNICATIONS TECHNIQUES AND FACILITIES

76 At the Technical Workshop immediately preceding the formal panel meeting, a special session had been devoted to the opportunities afforded by new satellite communications systems. Service providers who had presented their systems to the panel had included ORBCOMM, STARSYS, ICO/Inmarsat, IRIS, SAFIR and OCEAN-NET, as well as CLS/Service Argos. An updated table summarising these and other satellite services is attached as Annex VIII, and the panel requested that Mr D Meldrum report on continuing developments in this field at its next session. Of the new systems described, only ORBCOMM and SAFIR currently had satellites in orbit and ground segments in place, although it was anticipated that the other systems would come on line well before the end of the century. In no case was the cost structure sufficiently clear for direct and meaningful comparisons to be made with the costs associated with using Argos, nor was it evident that data buoy users would be other than a small minority user group for these other systems, or that data distribution issues had been adequately addressed. The panel therefore felt that potential users of these systems should proceed cautiously before committing themselves to any of the new services.

77 However, it was apparent that the technical advantages offered by some of the new systems, such as two-way communication and higher data rates, already made them very attractive to data buoy operators. The panel considered that as much practical experience as possible should be obtained regarding the merits of such alternative systems in data buoy applications. It therefore asked its chairman to write to ORBCOMM and SAFIR to request that they sponsor pilot studies of their systems in data buoys. These studies would be undertaken, with ORBCOMM's and SAFIR's assistance, by panel members, and the results reported to the next session. Several organizations expressed their willingness to participate in these studies through the fitting and deployment of transmitters on buoys. In this context, the panel noted that Mr Rex Fleming had already made arrangements for tests of ORBCOMM to be conducted within NOAA, and asked that they be kept informed of the progress of these trials. Similar requests for pilot study sponsorship would also be directed to other service providers as they came on line.

78 In addition to their paper at the Technical Workshop, CLS/Service Argos made a brief presentation on Argos location accuracies, as concerns had been expressed regarding the precision being claimed for the system. It was shown that oscillator frequency drift during an overpass could result in the nominal accuracy for a given class of location not being attained. There was at present no way for this drift to be detected or compensated for by the location algorithm, and users should therefore be aware that location class is only a reliable indicator of location accuracy for transmitters that fully meet the Argos specification. The panel thanked CLS/Service Argos for its work in this regard, and urged it to continue its efforts to improve the reliability of the results of the location algorithm. It also requested CLS/Service Argos to include within its publicity and technical material a more explicit statement of the accuracies that may be expected from the system, for example by quoting Circular Error Probable (CEP) values alongside the single-axis 1-sigma figures currently stated. In this context it was noted that, for Argos, the CEP at the 95% confidence level - a

figure of merit that is widely used in assessing location systems - is roughly three times the figure quoted in Argos documentation.

6.9 OTHER CO-ORDINATION ACTIVITIES

Proposal for large buoy programmes under the JTA

79 The panel noted with interest the proposal from the GDP for a special tariff arrangement for programmes deploying large numbers of relatively standard buoys, as well as an adaptation of this proposal within the JTA put forward by CLS/Service Argos, following consultation with the chairman of the JTA. The panel was sympathetic to the basic concept behind the proposal, and also very mindful of the financial constraints being experienced by most deployment agencies and the limitations being imposed on programme expansion by platform location and data processing services costs. At the same time, it recognized that the proposal had much wider implications for the whole JTA, and therefore did not feel competent to make recommendations on the proposal as a whole. The panel did, however, consider that it could make recommendations concerning the general requirements of buoy programmes, which might be taken into consideration in future discussions on the JTA structure. It therefore requested its chairman to convey the following recommendations to JTA-XVI:

(i) **Operational meteorological and oceanographic requirements are such that buoys should report full-time rather than on a one-third duty cycle. The DBCP therefore recommends as a top priority that a new tariff structure be arranged which will encourage full-time data collection with a minimal impact on data collection costs.**

(ii) **The DBCP encourages the GDP to co-ordinate efforts to create common data formats and platform standards, to gain benefits available from economies of scale. The DBCP recommends to the JTA to consider the provision of favourable tariffs for programmes that have both large numbers of platforms as well as common objectives for well-defined ocean-atmosphere missions, and operate over a long period to provide real-time data for GTS distribution.**

Technical co-ordinator and CLS/Service Argos

80 The panel noted with interest a proposal from CLS/Service Argos, whereby Argos would take over some of the routine monitoring and related work now performed by the technical co-ordinator, in exchange for which the co-ordinator would work on Argos development projects of direct concern to the panel. It considered that the proposal had some merit, with potential benefit to buoy users, while at the same time being mindful of complications in areas such as supervision and management of the work programme of the TC. The panel therefore requested CLS to prepare a detailed written version of the proposal outlined, to be sent to the chairman by the end of November 1996. The chairman would in turn consult with the vice-chairmen and other panel members on the matter, with a view to putting in place any possible new working arrangements during the current intersessional period.

Technical co-ordinator user survey

81 The Fifteenth Meeting on Argos Joint Tariff Agreement (Pretoria, October 1995) requested the technical co-ordinator to compile a list of Argos user requirements. On the one hand, the TC conducted a survey on buoy user requirements as far as Argos data processing and location service is concerned. A limited set of buoy users representing individual agencies (400 buoys) and co-operative programmes (1015 buoys, e.g. GDP, Action Groups) and deploying an important number of buoys were contacted. All replied and expressed precise requirements. On the other hand, Service Argos conducted another survey on future Argos enhancements. Results of these surveys permitted to identify new features which were strongly being requested by the users and to propose a related development project. The TC presented these requirements in detail to the panel.

82 Initial discussions with Service Argos permitted to set down a priority list taking into account (i) the expressed wishes of the users and (ii) the feasibility of particular developments. The proposed list, by priority order, follows:

1. Increase the size of the Argos data base (e.g. to 14 days).
2. Access to the other Argos Global Processing Centre (as opposed to using the so called dual processing mode).
3. On-line access to the GTS Technical File.
4. Data flow control facilities (provided that adequate tools can also be developed at Meteo France and at the NOAA National Weather Service, United States), with participation of the RNODC/buoys
5. Data sharing facilities (e.g. ftp site for co-operative programmes).
6. Access to Argos data using DAT tapes.
7. On-line and up to date Argos documentation.
8. Improved delays (e.g. using new LUTs).
9. Access to Argos data using CD ROMS.
10. Compressed Argos DS data files.
11. On-line access to the Argos Technical File.
12. On-line access to the ADS Technical File.
13. Argos enhancements, management of Argos ID numbers, Error detection/correction codes (ADEOS).

83 The panel reviewed these requirements and strongly recommended to the Sixteenth Meeting on the JTA that these proposed developments be included in the Argos development programme.

7. SCIENTIFIC AND TECHNICAL PRESENTATIONS

84 The panel considered that the Technical Workshop preceding the present session had been a significant success in encouraging the exchange of information relating to data buoy activities, and in stimulating new developments in buoy and communications technology. A total of 23 speakers, several from new communications service providers, had given papers, which will in due course be published in the DBCP Technical Document series. The panel warmly thanked the speakers and the session organizer, Mr D Meldrum (United Kingdom), for their efforts.

85 The panel was unanimous in wishing to continue to hold such workshops, and gratefully accepted the offers of Mr P. Le Roux (RSA) to organize the next workshop, to take place in conjunction with the panel thirteenth session, and of Prof P. Niiler (United States) to co-ordinate the ocean science input. It was agreed that the agenda for the workshop should focus on the following topics:

(i) buoy technical developments, including communications;

(ii) applications of buoy data to ocean science ;

(iii) applications of buoy data to atmospheric science, including impact studies.

As it was anticipated that the next session of the panel would be held in the southern hemisphere, it was further agreed that presentations should have an austral theme, if at all possible. panel members were urged to bring this workshop to the attention of potential participants without delay, so that contributions might be identified as soon as possible and the scope and duration of the workshop determined.

8. PUBLICATIONS

The DBCP Technical Documents series

86 The panel recalled that, at its tenth session, it had established its own Technical Documents series, self-funded and incorporating a distinctive cover with the DBCP logo. Since its eleventh session, the following reports in the DBCP Technical Document series had been published:

. No. 4 WOCE Surface Velocity Programme Barometer Drifter Construction Manual (1995)

. No. 5 Surface Velocity Programme (SVP) - DBCP/SIO Workshop on SVP Barometer Drifter Evaluation

. No. 6 Annual Report of the DBCP for 1995

. No. 7 Developments in Buoy Technology and Enabling Methods - Technical presentations made at the eleventh session of the DBCP.

87 The next documents to be published in the series would be:

. No. 8 Annual Report of the DBCP for 1996

. No. 9 Proceedings of the 1996 DBCP Technical Workshop.

As far as the Annual Report was concerned, the panel agreed on the proposed draft table of contents, as well as on the proposed schedule, viz the deadline for submission of material for the report to the WMO Secretariat by 1 December 1996 and finalization of the report by 1 February 1997, before its publication by WMO.

Guide to Moored Buoys and Other ODAS

88 As agreed at DBCP-XI, a complete revision and updating of this publication had being undertaken by Mr Eric Meindl (United States) on behalf of the panel. A questionnaire relating to this updating was issued by the WMO Secretariat on behalf of Mr Meindl in late December 1995 and subsequent follow-up enquiries with a number of major buoy deployers were made directly by Mr Meindl in mid-1996. The panel had before it the results of this work and expressed its thanks to Mr. Meindl for the work accomplished. It agreed that any comments should reach the author by 30 November at the latest, when the document would be finalized to be published as No. 10 in the DBCP TD series as early as possible in 1997.

Other publications

89 Under this agenda item, the panel considered the possibility and desirability to publish a brochure, as a means of publicizing the panel and its action groups. The brochure would be mainly oriented towards the use of buoy data and would appear as a A4 three-folding leaflet, possibly encompassing smaller leaflets relating to the action groups.

90 The panel agreed with the proposal and adopted the following tentative schedule for the preparation of the brochure:

(i) drafting of text, compilation of illustrations and preparation of draft layout by TC/DBCP, chairman, vice-chairmen and Secretariats; deadline mid-1997;

(ii) preparation of brochure by WMO graphics artist (DBCP funding), for approval by DBCP-XIII;

(iii) publication of the brochure by a panel Member State as a contribution in kind, late 1997.

It was made clear that all submissions to the brochure content should be in electronic form.

9. REVIEW OF THE PANEL'S OPERATING PROCEDURES AND OF THE TECHNICAL CO-ORDINATOR'S TASKS

91 The panel first reviewed its operating procedures as agreed at its first session. It had not noted any need to amend them and therefore decided to retain them for the next intersessional period. The panel's operating procedures are reproduced in Annex IX.

92 The panel next reviewed its workplan as adopted at its eleventh session. In the light of discussions under previous agenda items, of achievements during the past intersessional period and of future expected developments, it decided to modify and/or eliminate some items listed in the workplan and to introduce new ones. The revised workplan is given in Annex X.

10. ELECTION OF THE CHAIRMAN AND THE VICE-CHAIRMEN OF THE PANEL

93 The panel unanimously re-elected Mr. Graeme Brough as its chairman to hold office during the next intersessional period. It further re-elected Messrs. David Meldrum and William E. Woodward as its vice-chairmen.

11. DATE AND PLACE OF THE NEXT SESSION

94 The representative of France reiterated the offer made at the eleventh panel session to host the thirteenth session in La Reunion. The panel accepted with appreciation this kind offer and decided, subject to agreement by the sixteenth meeting on Argos Joint Agreement, to hold its thirteenth session from Tuesday 14 October to Friday 17 October 1997. In so doing, it recalled its decision (see agenda item 7) to hold a technical workshop just prior to the session, viz on Monday 13 - Tuesday 14 October 1997, and to remain flexible about the adopted dates and times.

12. CLOSURE OF THE SESSION

95 In closing the session, the chairman expressed the view that the session had been both productive and enjoyable, thanks in particular to the efforts of the hosts, the United Kingdom Meteorological Office and the NERC. He thanked all participants for their support and contributions to deliberations.

96 The Twelfth Session of the Data Buoy Co-operation Panel closed at 12.00 hours on Friday 25 October 1996.

ANNEX I

AGENDA

1. ORGANIZATION OF THE SESSION

1.1 OPENING OF THE SESSION
1.2 ADOPTION OF THE AGENDA
1.3 WORKING ARRANGEMENTS

2. REPORTS

2.1 REPORT BY THE CHAIRMAN OF THE DATA BUOY CO-OPERATION PANEL
2.2 REPORT BY THE TECHNICAL CO-ORDINATOR
2.3 REPORT BY THE SECRETARIATS
2.4 REPORTS BY THE ACTION GROUPS OF THE PANEL

3. FINANCIAL AND ADMINISTRATIVE MATTERS

3.1 FINANCIAL SITUATION
3.2 REVIEW OF CONTRACTS
3.3 FUTURE EMPLOYMENT STATUS OF THE TECHNICAL CO-ORDINATOR AND COMMITMENTS FOR FUTURE FUNDING

4. RELATIONSHIP WITH INTERNATIONAL PROGRAMMES/ORGANIZATIONS

4.1 WORLD CLIMATE RESEARCH PROGRAMME (WCRP)
4.2 WORLD WEATHER WATCH (WWW)
4.3 INTEGRATED GLOBAL OCEAN SERVICES SYSTEM (IGOSS) AND INTERNATIONAL OCEANOGRAPHIC DATA AND INFORMATION EXCHANGE (IODE)
4.4 GLOBAL OCEAN OBSERVING SYSTEM (GOOS) AND GLOBAL CLIMATE OBSERVING SYSTEM (GCOS)

5. REPORTS ON CURRENT AND PLANNED DATA BUOY PROGRAMMES

6. CO-ORDINATION ACTIVITIES

6.1 QUALITY CONTROL OF BUOY DATA
6.2 THE DBCP SERVER ON INTERNET AND RELATED MATTERS
6.3 CODE MATTERS
6.4 ARGOS GTS PROCESSING SUB-SYSTEM
6.5 COMBINED METEOROLOGICAL/OCEANOGRAPHIC DRIFTING BUOYS
6.6 FORMATION OF OTHER ACTION GROUPS
6.7 CO-OPERATION BETWEEN OPERATIONAL AND RESEARCH PROGRAMMES
6.8 NEW COMMUNICATION TECHNIQUES AND FACILITIES
6.9 OTHER CO-ORDINATION ACTIVITIES

7. SCIENTIFIC AND TECHNICAL PRESENTATIONS

8. PUBLICATIONS

9. REVIEW OF THE PANEL'S OPERATING PROCEDURES AND OF THE TECHNICAL CO-ORDINATOR'S TASKS

10. ELECTION OF THE CHAIRMAN AND THE VICE-CHAIRMEN OF THE PANEL

11. DATE AND PLACE OF THE NEXT SESSION

12. CLOSURE OF THE SESSION

ANNEX II

REPORT BY THE TECHNICAL CO-ORDINATOR

1. Introduction

This report covers the period 1 October 1995 to 30 September 1996. During this period the Technical Co-ordinator (TC) of the Data Buoy Co-operation Panel (DBCP) was based in Toulouse at CLS, Service Argos, and was employed by the United Nations Educational, Scientific and Cultural Organisation (UNESCO). The time the TC DBCP spent on his tasks could be estimated as following:

Topic	days	%
Missions, Travel	44	16,9
User assistance	42	16,2
Monitoring, Quality Control Guideleines	25	9,6
Vacation, holidays	24	9,2
Météo France (self training, tools, monitoring, impact studies)	24	9,2
Preparation of missions (including DBCP sessions)	20	7,7
TC monthly report, stats., regular letters (e.g. WMO list)	10	3,8
GTS Sub-System (small improvements, XBT, New processors)	8	3,1
Survey on buoy users' requirements for Argos service	7	2,7
QC Automation	7	2,7
Miscellaneous DBCP	5	1,9
Requests for GTS	5	1,9
Action Groups	4	1,5
Publications (DBCP techn. session report, articles in Argos bull...)	4	1,5
BUFR	3	1,2
Questionnaire to buoy users	3	1,2
Combined Oceano-Meteo drifting buoys (e.g. SVPB msg. format)	3	1,2
DB Quarterly report	3	1,2
DBCP web server (mission excluded)	3	1,2
Argos monthly report	3	1,2
Proposed DBCP Global Implementation Programme	3	1,2
DBCP Document Package to Argos users	2	0,8
GDP Argos Tariff Proposal	2	0,8
TC Tools	2	0,8
Misc. Administrative	2	0,8
AWS in SYNOP and Ships in SHIP	1	0,4
Anemo. Heights, misc. rationalisation	1	0,4
Total (52 weeks)	**260**	**100,0**

Compared to the previous intersessional period, I spent more time on User assistance and in missions and less on monitoring, QC and other topics. As of March 1996, I am spending one day a week at Météo France.

The following paragraphs describe in detail the various activities of the TC DBCP during the period. Paragraph 2 describes specific tasks undertaken during the considered period while paragraph 3 describes tasks normally undertaken during any intersessional period.

2. Specific tasks undertaken during the intersessional period

2.1 Missions, Visits, Meetings

Dates indicated are affective meeting dates, i.e. not including travel time.

2.1.1) 21-22 September 1995, Cambridge, United Kingdom, Argos UK users conference. The meeting was held at the British Antarctic Survey (BAS) in Cambridge. This was an Argos Users conference so many attendees like animal trackers are not involved in drifting buoy activities. I did a presentation on the low cost barometer drifter. I also presented the Argos GTS sub-system

2.1.2) 16 October 1995, Pretoria, South Africa, 2nd meeting of the International South Atlantic Buoy Programme.

2.1.3) 17-20 October 1995, Pretoria, South Africa, 11th session of the Data Buoy Co-operation Panel.

2.1.4) 23-25 October 1995, Pretoria, South Africa, 15th session of the Argos Joint Tariff Agreement.

2.1.5) 16-17 January 1996, Copenhagen, Denmark, EGOS Management Committee and Technical Sub-Group meetings.

2.1.6) 22-26 Jan 96, USA. 22 Jan, New Orleans: At NDBC we had a meeting with NDBC staff and discussed GTS distribution of NDBC buoy data issues. It was also discussed how such issues can be co-ordinated between NDBC, SAI, and myself. A lot of technical questions have been raised and solved at this meeting. 23 and 25-26 Jan , Landover: At Service Argos, Inc. I trained Service Argos, Inc. Staff on the GTS sub-system. 24 Jan, Silver Spring: At NOAA/NOS, I upgraded the DBCP server. NOS provided me with access authorisation on-line from Toulouse so that I can then update the server from my office. I had a discussion with Bill Woodward regarding the proposed DBCP Global Programme. Bill then wrote a paper on the proposed programme. We also discussed what hardware would be required for the TC at Météo France since NOS offered to provide me with a terminal.

2.1.7) 12-14 February 1996, Goa, India, First Preparatory Meeting for an International Buoy Programme for the Indian Ocean. The meeting has been very successful since the participants (India, USA, Australia, France, and South Africa) agreed in principle for the creation of such a programme. The meeting elected an interim steering group which includes Dr. Rao (Chairman, India), Pierre Blouch (France), Graham Brough (Australia), Mark Bushnell (USA), and Piet Le Roux (South Africa). Eugene Burger of the South African Weather Bureau has been designated as interim Co-ordinator for the programme. Formal creation should take place during the next meeting planned in La Reunion island in September 1996.

2.1.8) 2-3 May 1996, Geneva, Switzerland, meeting of the DBCP sub-group on BUFR code. We studied in depth requirements for GTS distribution of buoy data and identified a large number of required modifications in BUFR Tables (particularly Table B). A comprehensive document is available and will be presented at DBCP-12.

2.1.9) 14-17 May 1996, Bonas, France, SVP-8 meeting. A very successful meeting with about 50 participants. A large number of scientific presentations had been made. Over 800 drifters are presently at sea including more than 100 equipped with a barometer. I presented the DBCP proposal for a GIP. The SVP is now terminated and being replaced by the Global Drifter Program (GDP). The GDP is placed under DBCP umbrella.

2.1.10) 4-7 June 1996, Bracknell, United Kingdom, IABP (4-7 June) and EGOS (4-6 June) meetings. The two meetings had joint technical sessions. This was an excellent opportunity to exchange ideas on buoy Technology and for the participants to make contacts. I presented the DBCP proposal for a DBCP Global Implementation Programme (GIP) to both meetings. The proposal has been discussed in depth and both DBCP action groups eventually supported the idea with small amendments.

2.1.11) 1-3 August 1996, Cambridge, United Kingdom, IPAB meeting. The IPAB is continuing for a further 2 years with substantial new deployments planned in the Antarctic sea ice zone. IPAB strongly supported the DBCP proposal for a GIP which I presented on behalf of the DBCP.

2.1.12) 26-28 August 1996, Toulouse, France, COSNA CGC-7 meeting. The Co-ordinating Group for COSNA (CGC) discussed the future of a Composite Observing System for the North Atlantic (COSNA) possibly as part of EUMETNET and discussed observing systems required (e.g. radio sondes, ASAP, data buoys) for the planned FASTEX experiment which observing period will take place in January and February 1997. I stressed the potential for co-operation with oceanographers for having more sea level pressure data on GTS from drifting buoys.

2.1.13) 23-25 September 1996, La Reunion Island, First meeting of the IBPIO. At the time of writing this report, the meeting has not taken place yet.

2.2. GTS

2.2.1. GTS sub system

The specific work of the Technical Co-ordinator concerning the Argos GTS Sub-System is mostly related to the following topics:

- The GTS sub-system has been upgraded to deal with CLS, Service Argos XBT systems Before this upgrade, these systems had been processed through a specific " XBT sub-system ". Integration within the GTS sub-system permits more consistent and reliable data processing of the CLS XBT systems. Statistics are sent to the XBT operators on a monthly basis.

- CLS, Service Argos switches the systems to new Digital Equipment Alpha processors. The GTS sub system had to be entirely recompiled and a few modifications had to be done to the source code. Hence the system had to be tested again and then closely monitored once operational. I participated in the tests and monitoring. Some problems occurred which are reported in the related DBCP preparatory document.

- I wrote dedicated software modules for specific types of sensors (e.g. SAL78 for computation of water salinity based on conductivity and temperature).

- Making sure that specific types of platforms can be handled by the GTS sub-system (e.g. new SVPB message format).

- Development and/or modification of several tools to access the system and make modifications on the description data base.

Refer to DBCP session agenda item number 6.4 (Argos GTS processing sub-system) for details.

2.2.2. BUFR

At its eleventh session, the DBCP decided to establish a sub-group for studying and making recommendations regarding requirements for GTS distribution of buoy data, including in BUFR. The sub-group which includes David Gilhousen (NDBC), Pierre Blouch (Météo France), Etienne Charpentier (TC DBCP) met in Geneva, 2-3 May, at WMO headquarters with other experts, namely Cliff Dey (NCEP), Bob Keeley (MEDS), and Madeleine Céron (Météo France). The final report of the sub-group which is attached with the DBCP preparatory document dealing with this issue includes a number of requirements and recommendations for GTS distribution of buoy data, particularly in BUFR code.

Refer to DBCP session agenda item number 6.(Code matters) for details.

2.2.3. Land stations reporting in SYNOP. The TC DBCP continued spending time to convince owners of Argos land stations (e.g. Antarctica) to make these report on GTS using the adequate code format (i.e. SYNOP). 43 of these stations are presently doing so (14 last year).

2.3. Quality Control guidelines

I developed tools for automating TC DBCP work regarding QC guidelines. PMOC messages received from the BUOY-QC mailing list are now systematically processed at CLS, Service Argos and automatically forwarded to the Principal GTS Co-ordinators (PGCs) when identified. When the PGC is not identified, the message is copied to the TC DBCP who can then process it manually. This new procedure now permits to save time for the TC DBCP.

Refer to DBCP session agenda item number 6.1 (Quality Control of buoy data) for details.

2.4. DBCP World wide Web Server

The DBCP server has been updated to reflect the changes in DBCP Chairmanship. Many links to other servers have been introduced (e.g. TAO, NDBC, WMO, IOC, GOOS, GCOS, EGOS, IABP). Simple host pages for some of the DBCP action groups have been created (i.e. ISABP, IPAB). A list of meetings has been added. Status maps by ocean basin showing buoys on GTS and equipped sensors are now available. General presentation (look) and other topics have been improved. The DBCP questionnaire to buoy program managers is now available electronically on the server..

The address of the server is : http://dbcp.nos.noaa.gov/

Refer to DBCP session agenda item number 6.2 (the DBCP server on Internet and related matters) for details.

2.5. Global and regional actions

2.5.1. DBCP-GIP Proposal

I worked with Bill Woodward on the DBCP proposal for a Global Implementation Programme. Bill eventually wrote the proposal. This proposal has been presented to the DBCP Action Groups which I attended (i.e. EGOS, IABP, IPAB) and to the Global Drifter Program (SVP-8). It received good support and proposed amendments had been considered for the version which is being discussed at DBCP-12.

2.5.2. Global Drifter Program (GDP)

At its 8th session, the Surface Velocity Program terminated itself and then was reborn into the Global Drifter Program. The GDP is placed under the DBCP umbrella.

2.5.1.1. The GDP initiated an action for restructuring the Argos Tariff. A proposal was written by Jeff Paduan and circulated for comments. I discussed it with DBCP officials and replied accordingly to Jeff. This proposal will be submitted by GDP to the JTA.

2.5.1.2. Global Lagrangian Drifter with a Barometer (GLDB, named SVPB before)

The work of the Technical Co-ordinator concerning the Global Lagrangian Drifter equipped with a Barometer is mostly related to the following topics:

- Follow the development and tests on an air pressure port mounted on GLDB. Closely monitor the quality of these drifters.
- Define a new standard Argos message format for the GLDB in conjunction with the designated sub-group (Pierre Blouch, Andy Sybrandy and myself). Make sure that the GTS sub-system can handle SVP Barometer drifter (SVPB) data especially in the context of creating this new format.
- Keep track of QC information and monitoring statistics regarding SVPBs and provide the Global Drifter Center (GDC) with graphs showing the quality of the GLDB pressure data based the statistics.
- Liaise with Peter Dexter (WMO) regarding possible impact study regarding SVPBs and options on duty cycles.
- Attend the DBCP-SIO workshop on the evaluation of the SVPB (October 1995, Pretoria).

Advertise the GLDB among buoy users and DBCP action groups.

Refer to DBCP session agenda item number 6.5 (Combined Meteorological/Oceanographic drifting buoys) for details.

2.5.3. DBCP Action Groups

I attended the DBCP action group sessions of EGOS, IABP, IPAB, and newly established IBPIO. I could not attend the ISABP meeting in Rio de Janeiro (September 96). At these sessions, I particularly advertised the proposed DBCP-GIP which eventually received good support. I created two simple World Wide Web home pages for the ISABP and the IPAB. These two pages are hosted by the NOAA National Ocean Service.

2.6. DBCP

2.6.1. DBCP-11 Technical session report. I collected papers from the DBCP-11 technical session (developments in buoy technology and enabling methods) and compiled these into DBCP Technical Document No. 7 which is now officially available as such.

2.6.2. Document Package. As requested at DBCP-11, I distributed to every Argos program manager potentially authorising GTS distribution of his Argos PTT data (i.e. moored buoys, drifting buoys, ships, land stations), a document package which included :

- A letter from the Chairman of the DBCP encouraging GTS distribution of the data ;
- A letter from the Technical Co-ordinator of the DBCP asking buoy operators to reply a DBCP questionnaire ;
- The Argos GTS sub system reference guide (DBCP Doc. No. 2) ;
- The DBCP guide to data collection and location services using Service Argos (DBCP Doc. No. 3) ;
- A summary on the Argos GTS sub-system ;
- The dedicated technical file.

2.6.3. Survey on buoy user requirements

At its 15e session in Pretoria, October 1995, the Argos Joint Tariff Agreement requested the Technical Co-ordinator of the Data Buoy Co-operation Panel (DBCP) to compile a list of Argos user requirements. The Technical Co-ordinator of the DBCP conducted a survey on buoy user requirements as far as Argos data processing and location service is concerned. Service Argos conducted another survey on future Argos Enhancements. Results of these surveys permit to identify new features which are strongly requested by the users and to propose a related development project. Based of the results from this survey, I compiled an analysis document which implies new possible developments within the Argos system. This issue may be discussed under DBCP-12 agenda item number 6.9 (other co-ordinating activities).

2.6.4. DBCP Questionnaire

I prepared and sent a questionnaire to every Argos buoy user. It is seeking information regarding every buoy programme such as confidentiality of the data, authorisation for GTS distribution, number of buoys planned for 1996 and 1997, list of sensors installed, etc.
Unfortunately, most of the replies were for buoy programmes which I know fairly well. I am therefore still continuing this action via direct contacts in order to get information concerning less known programmes for which I received *no reply* to the questionnaire.

2.7. Météo France

At its eleventh session, the Panel discussed the issue of the Technical Co-ordinator of the DBCP working part time at Météo France for the DBCP. It agreed that this would be in the best interest of the DBCP, of WMO and IOC, and of all Member States, in particular in facilitating monitoring and simulation studies by the Technical Co-ordinator using data in the Météo France data banks. Since early February 1996 this is a reality. Météo France offered the TC DBCP an office

with full computer access. The NOAA National Ocean Service offered a Personal Computer for realising this access (90 MHz Pentium PC). I received the PC in mid March 1996 and since then am basically spending every Tuesday at Météo France (i.e. about 20% of my time). I spent, and am still spending some time in training myself to the Météo France systems since these are very different from those used at Service Argos (Unix systems versus Digital Equipment systems respectively). I developed tools which are now available for accessing buoy data. I am therefore presently capable of " buoy monitoring activities " at Météo France where all GTS buoy data are available including those from Local User Terminals. I also initiated discussions with Météo France experts, including Jean Pailleux (Chairman of COSNA-SEG) for making specific impact studies on buoy data.

3. Regular or normal tasks

3.1 Monitoring

Below are detailed the different monitoring activities that the TC DBCP undertook during this intersessional period:

3.1.1. Quality Control Guidelines

3.1.1.1. To read the QC messages from the BUOY-QC Internet mailing list as posted by the Principal Meteorological or Oceanographic Centres responsible for buoy data quality control (PMOC). For rationalisation purposes, all the proposals are stored and archived in a data base.

3.1.1.2. To contact the PGCs: After normally waiting for 7 days for each proposal, the TC DBCP contacts the Principal GTS Co-ordinator (PGC), and then suggests him to implement the proposed change. The PGC should normally contact Service Argos and/or Local User Terminal (LUT) operators and request implementation of the proposed change. In case the PGC disagrees, the TC DBCP immediately deposits a denial message on the bulletin board.

3.1.1.3. To check Argos files and/or GTS data in order to ascertain whether suggested modifications have actually been implemented or not.

3.1.1.4. Feed back. Possibly to deposit feed back information on the bulletin board on behalf of Service Argos for sensors actually recalibrated.

3.1.2. Specific problems. To resolve specific problems related to GTS for given buoys, such as looking carefully at the data and the transfer functions. For example, I could be investigating why no or only a few messages are received at Meteorological Centres...

3.1.3. TC DBCP files. To update TC files: list of the operational platforms and programs (on GTS or not), new programs, WMO numbers, monitoring statistics...

3.2. User assistance

As usual, I answered specific questions and resolved specific problems as needed or requested by users. I spent about 16% of my time working on user assistance issues.

3.2.1. Principal Investigators (PI) or buoy programme managers:
PIs regularly requested the TC DBCP to look at specific problems regarding their buoy data or requested assistance for GTS distribution of the data. In that regard I studied in detail Argos message formats and sensor transfer functions. At several occasions, I obtained WMO numbers on their behalf.

3.2.2. Local User Terminals (LUT): From time to time, LUT operators asked me to provide them with the transfer functions used with specific platforms so that they can also report to the GTS via their LUT.

3.2.3. Meteorological Centres contacted me when they needed information on given platforms drifting in an area of interest.

3.2.4. Secretariats: Upon request, I provided WMO or IOC secretariats with graphs and documentation.

3.2.5. Focal point. Directly or through the BUOY-QC Internet mailing list, I acted as a focal point between the Meteorological Centres and the Principal Investigators when a specific action was required for a buoy reporting onto the GTS (e.g. remove the data from the GTS, recalibrate a sensor...).

3.2.6. Investigate various data loss problems.

3.3. Drifting Buoy Quarterly Report

The Drifting Buoy Quarterly Report was issued , and distributed widely by CLS, Service Argos.

3.4. Global Telecommunication System (GTS)

3.4.1. Status for drifting buoys reporting onto the GTS:

- In July 1991, 718 drifting buoys were operational, 264 of these reporting on GTS (i.e. 36.8%).
- In July 1992, 1162 drifting buoys were operational, 474 of these reporting on GTS (i.e. 40.8%).
- In early August 1993, 1269 drifting buoys were operational, 548 of these reporting on GTS (i.e. 43.2%).
- In early September 1994, 1246 drifting buoys were operational, 587 of these reporting on GTS (i.e. 47.1%).
- In early September 1995, 1429 drifting buoys were operational, 631 of these reporting on GTS (i.e. 44.2 %).
- In early September 1996, 1180 drifting buoys were operational, 638 of these reporting on GTS (i.e. 54.1%).

=> Although the number of drifting buoys reached a maximum in 1995, the total number of buoys on GTS never ceased increasing to reach a present number of 638. The percentage of buoys reporting on GTS also reached a record this year with 54.1%.

See also figure 2 (distribution of active buoys by country), figure 5 (evolution of the number of buoy GTS air pressure reports since 1987), and figure 6 (evolution of mean RMS (Obs.-FG) for GTS air pressure data since 1987.

Météo-France provided me with Data Availability Index Maps on a monthly basis. The maps are useful to identify the data sparse ocean area for each kind of geo-physical variable and therefore to assist the various data buoy programmes in adjusting deployment strategies. A set of these maps valid for August 1996 is shown in figure 1. The maps show clearly the impact of the TAO array ATLAS moored buoys (wind) or of DBCP regional action groups such as the ISABP (air pressure).

3.4.2. GTS bulletin headers:

All Local User Terminal sources comply with WMO regulations regarding GTS bulletin headers.

See Table 1 for a complete list of GTS bulletin headers used to date.

3.4.3. Quality Control.

The work of the TC DBCP concerning Buoy data Quality Control was related to the following topics:

Actually monitor the Internet Mailing List, and contact PGCs accordingly.

While the Technical Co-ordinator was in mission or in vacation the following PMOCs could replace him very effectively on a rotating basis:

The Centre de Météorologie Marine (CMM), Brest.

The Ocean Products Center (OPC).
The National Data Buoy Center (NDBC).

Refer to DBCP session agenda item number 6.1 (Quality Control of buoy data) for details.

3.4.4. Non-standard wind sensor heights:

A list of drifting buoys making wing measurements and reporting on GTS using the BUOY code was prepared in September 1996 and later published in the WWW Operational Newsletter. This list is kept up to date by the Technical Co-ordinator and can be issued regularly. The list includes the WMO and Argos ID numbers, the height of the anemometers and whether or not a correction to 10 meters is applied.

3.4.5. Non-standard air pressure measurements for stations in altitude.

Since it was not possible to convince every owner of Argos land station to use SYNOP, some of the stations continued to report in BUOY format (12 stations).

Hence the list of fixed stations reporting Air Pressure data at station level using the BUOY code was also prepared in September 1996 for later publication in a following issue of the WWW operational newsletter. This list includes the WMO, and Argos ID numbers, the Position and Altitude of the stations and whether or not Air Pressure is reduced to sea level.

3.4.6. New buoys on GTS. I regularly contacted buoy programme managers of new programmes in order (i) to convince them to authorise GTS distribution of their buoy data, and (ii) to offer assistance for that purpose. I have also been directly contacted by programme managers who spontaneously authorised GTS distribution of their buoy data but still required assistance from the TC DBCP.

The new GTS sub-system permits to process the data provided that adequate information is precisely implemented in the system. I therefore studied in details technical files of buoys with complicated Argos message format. In some instances I obtained WMO numbers from National Focal Points or WMO secretariat on behalf of the programme managers. Many buoys can now transmit the back hour and the synoptic data on GTS.

3.5. Argos GTS Sub-System

The regular work of the Technical Co-ordinator concerning the Argos GTS Sub-System is mostly related to the following topics:

- Monitor the system and look for possible problems.
- Make sure the problems are corrected.
- Training of the Argos Users' Guidance Office and work in conjunction with it regarding complex problems.

Refer to DBCP session agenda item number 6.4 (Argos GTS processing sub-system) for details.

3.6. DBCP World Wide Web Internet server

The regular work of the Technical Co-ordinator concerning the newly established DBCP World Wide Web (W3) server is mostly related to the following topics:

- Provide NOS with documentation for inclusion within the DBCP server. When required, provide NOS with regular updates.
- Make sure the W3 products developed by other agencies concerning buoy data Quality Control are accessible via the DBCP server (Icelandic Meteorological Office, Météo-France).

Refer to DBCP session agenda item number 6.1 (Quality Control of buoy data) for details.

3.7. TC statistics and graphs.

3.7.1. Active drifting buoys. Using Argos files and data provided by LUT operators, I computed on a monthly basis, by country and by organisation, graphs showing the distribution of active GTS and non-GTS drifting buoys. It is particularly useful to see the evolution of the total number of drifting buoys deployed by the various countries involved, and the percentage of these reporting to the GTS. See figure 2 (distribution of active buoys by country) and figure 5 (evolution of the number of buoy air pressure data distributed on GTS since 1987).

3.7.2. Quality of air pressure. I Computed on a monthly basis, the graph showing the distribution of the RMS (of Observation minus First Guess Field) of Air Pressure data according to ECMWF monthly monitoring statistics. This graph, which uses 6 months of data, gives a good estimate of the quality of the drifting buoy Air Pressure data. The graph is included in the TC monthly report. See figure 3. See also figure 6 (evolution of mean RMS (Obs. - FG) for GTS air pressure data since 1987.

3.7.3. Air pressure from drifting buoy life time. I Computed the graphs showing the distribution of life times of Air Pressure measurements, using the ECMWF monitoring statistics. See figure 4.

3.8. Action Groups, Regional actions.

3.8.1) EGOS: I attended the EGOS Management Committee and Technical Sub-group meetings and particularly assisted the program in the following topics:

- Liaise with the EGOS Technical Secretariat (i.e. Thor Kvinge and then Lars Golmen) regarding QC issues;

3.8.2) IABP: I attended the 6th annual meeting of the International Arctic Buoy Programme in Bracknell, 4-7 June 1996. I assisted the Program in the following topics:

- Quality Control in conjunction with the Principal Investigators;
- Double check the Program status map issued by Roger Colony.

3.8.3) IPAB: International Program for Antarctic Buoys. I provided assistance for GTS distribution of the data. I attended the 1st session of the IPAB, 1-3 august 1996 in Cambridge.

3.8.4) ISABP I attended the 2nd meeting of the International South Atlantic Buoy Programme, 16 October 1995, Pretoria, and provided assistance in the following topics:

- Liaise with Eugene Burger, the ISABP Co-ordinator ;
- Monitor ISABP buoys and assist participants in placing the buoys on GTS.

3.8.5) COSNA

I attended the 6th session of the Co-ordinating Group for COSNA (CGC) on behalf of the DBCP, 26-28 August 1996, Toulouse.

3.9. Miscellaneous

3.9.1. Drifting Buoy Quarterly Report. I checked the Quarterly Report on Drifting Buoy and gave approval before CLS could send it to WMO and IOC.

3.9.2. Argos monthly status report. I checked the Argos monthly status report to WMO which was prepared by CLS, Service Argos.

3.9.3. TC DBCP files. I updated my files on a PC, using a data base management system (Paradox) and getting the data from Argos files and various status reports. I kept up to date an history file on each Argos drifting buoy programme (contacts with PIs, PI authorising GTS distribution, information on types of sensor installed, etc.).

3.9.4. WMO/Argos number cross reference list and PGC list. I issued, on a monthly basis, the WMO/Argos number cross reference list, and sent it via the BUOY-QC mailing list to various Meteorological Centres and interested individuals. The list no more distributed by regular mail. The list also includes the WMO numbers managed by the Oslo and Edmonton Local User Terminals (LUT) and indicates for each WMO number, the Argos number, the drifting buoy owner, and the dates the WMO numbers have been introduced and removed from the system (Argos or LUT). Attached to it is also included the list of Principal GTS Co-ordinators (PGC) designated by Principal Investigators for asking Service Argos to implement status changes on buoys reporting onto the GTS.

3.9.5. TC DBCP bimonthly report. I provided the Chairman of the DBCP as well as the WMO and IOC Secretariats with my bimonthly report.

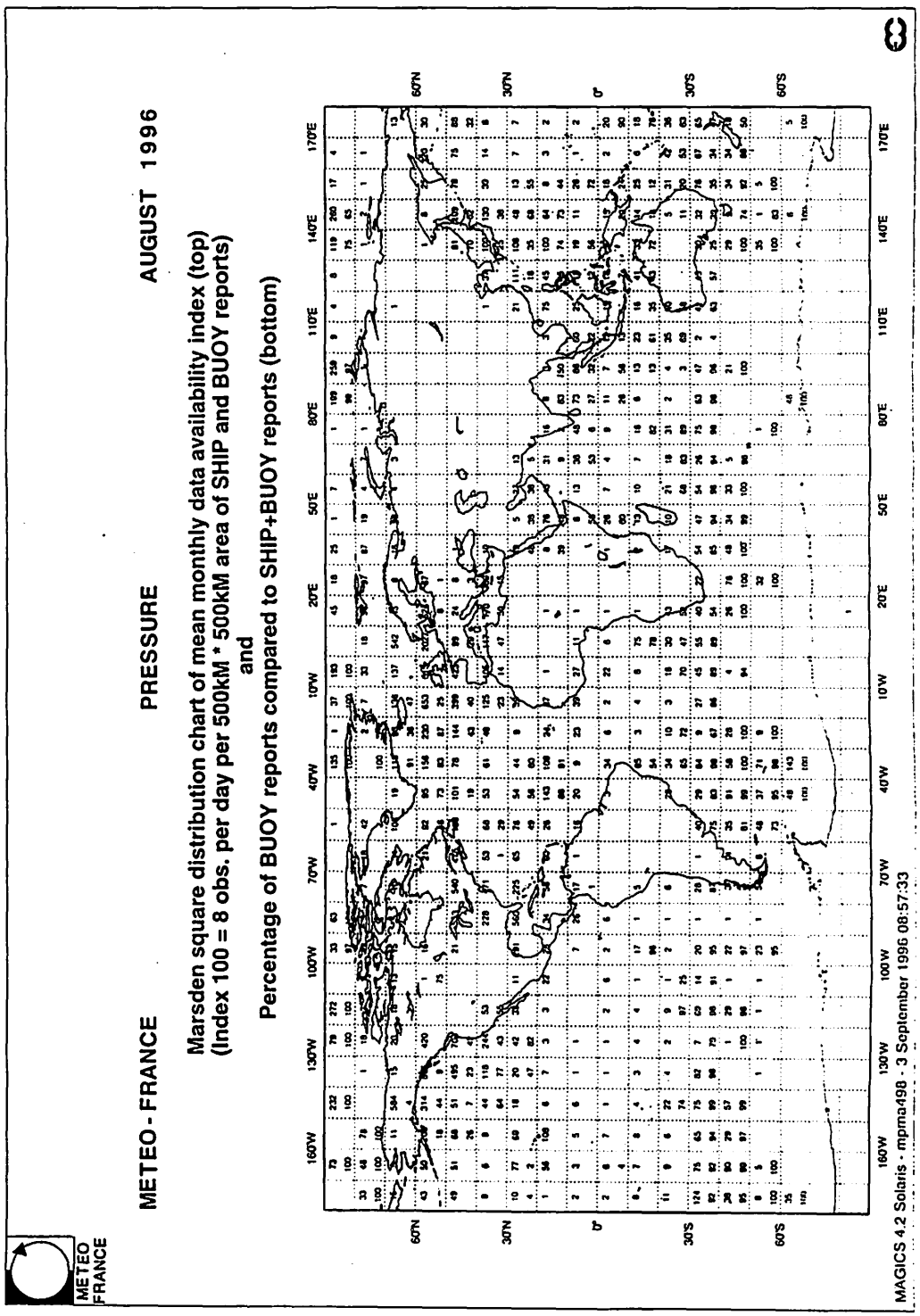
3.9.6. Documentation, assistance. I provided users with documentation or status reports concerning specific programs or experiments; I answered specific questions regarding the Argos System.

3.9.7. TC DBCP missions. I prepared the various missions or meetings I had to attend.

3.9.8. Preparation of the DBCP session. I prepared specific documents and the TC report for the DBCP XII session:

- Report of the Technical Co-ordinator;
- Report on drifting buoy data Quality Control;
- Report on the New Argos GTS Sub-System;
- Code matters (BUFR);
- DBCP W3 Internet server.
- Survey on user requirements

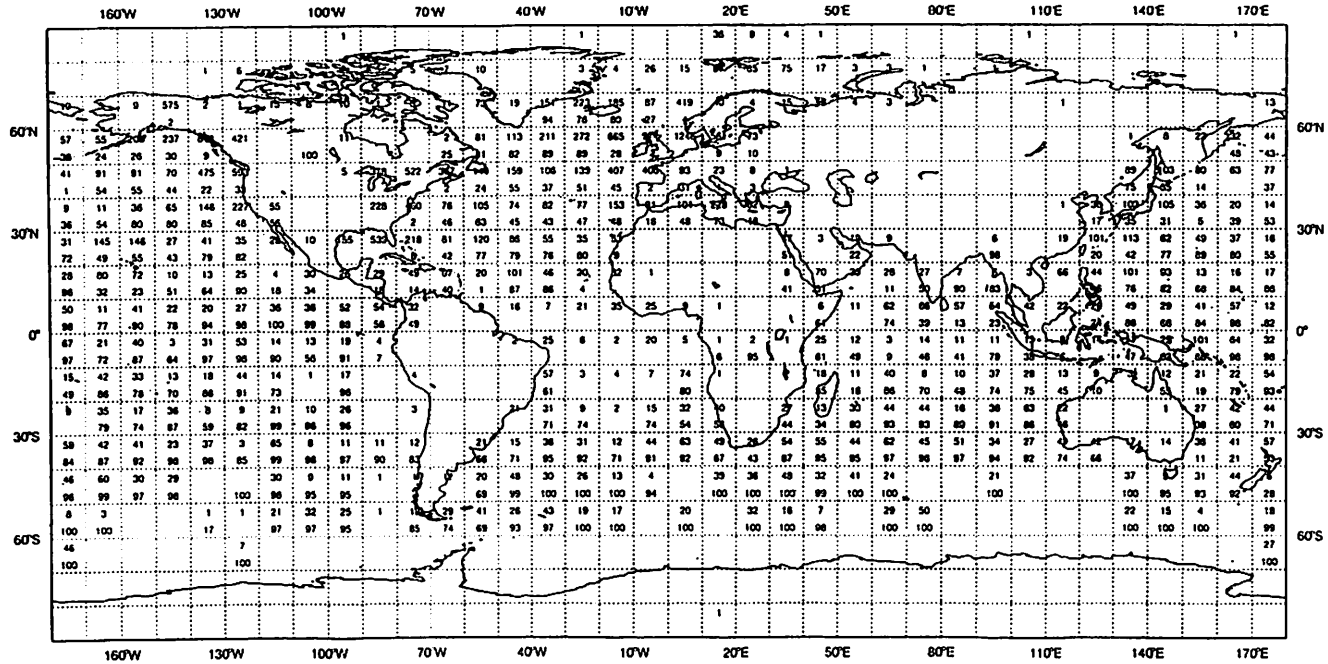
Figure 1. Météo France August 1996 data availability Index maps by geophysical variable for SHIP and BUOY GTS reports (Air Pressure, Air Temperature, Sea Surface Temperature, Wind)



METEO FRANCE

METEO-FRANCE SEA SURFACE TEMPERATURE AUGUST 1996

Marsden square distribution chart of mean monthly data availability index (top)
(Index 100 = 8 obs. per day per 500kM * 500kM area of SHIP and BUOY reports)
and
Percentage of BUOY reports compared to SHIP+BUOY reports (bottom)

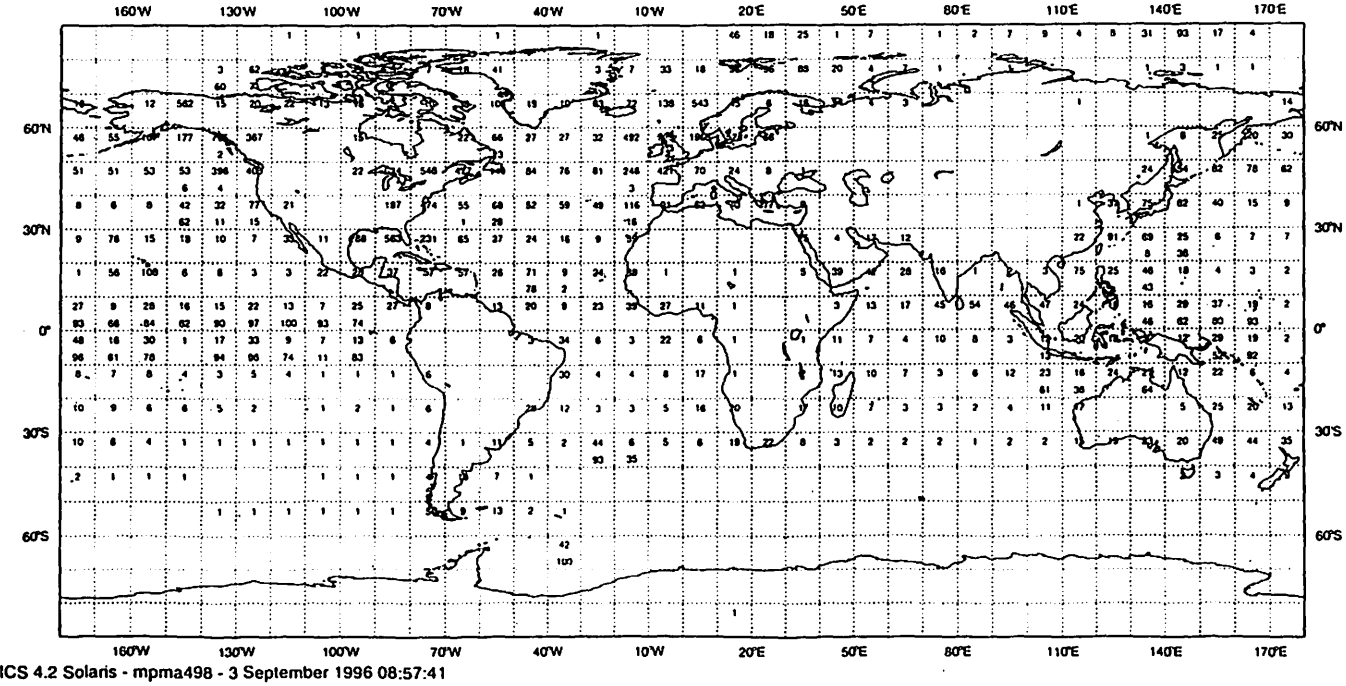


MAGICS 4.2 Solaris - mpma498 - 3 September 1996 08:57:37

METEO FRANCE

METEO - FRANCE WIND AUGUST 1996

Marsden square distribution chart of mean monthly data availability index (top)
(Index 100 = 8 obs. per day per 500kM * 500kM area of SHIP and BUOY reports)
and
Percentage of BUOY reports compared to SHIP+BUOY reports (bottom)



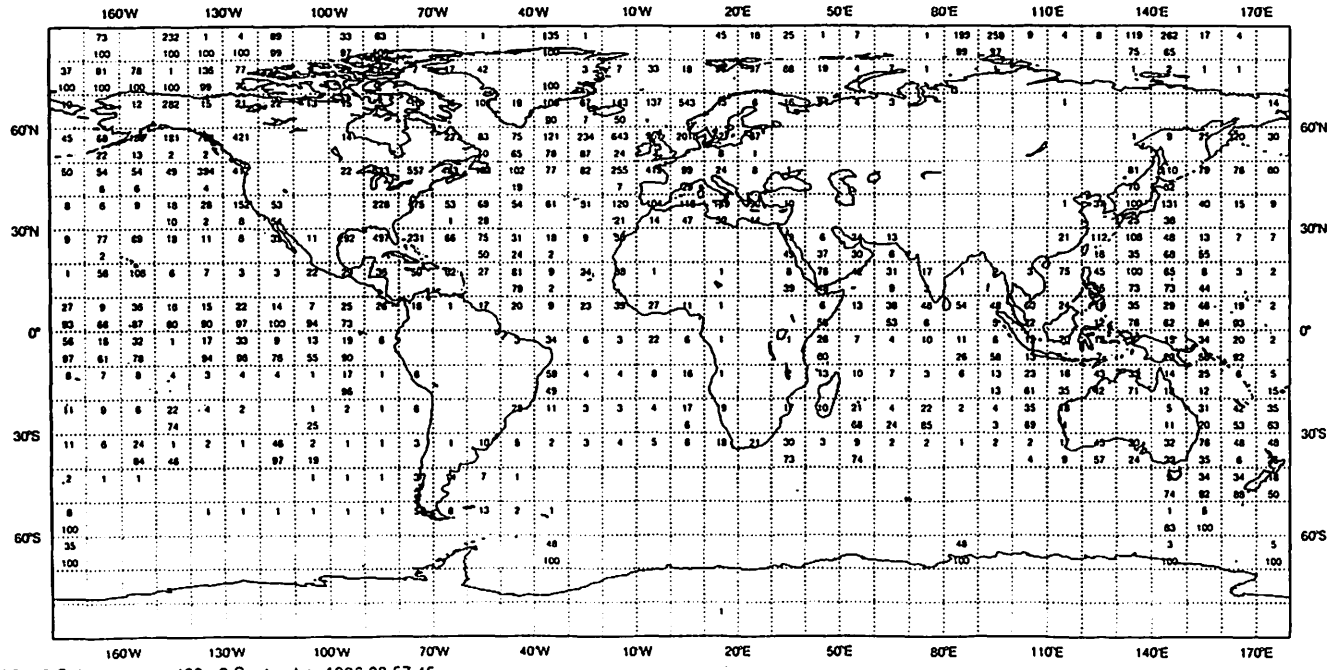
MAGICS 4.2 Solaris - mpma498 - 3 September 1996 08:57:41

8

METEO FRANCE

METEO - FRANCE **TEMPERATURE** **AUGUST 1996**

Marsden square distribution chart of mean monthly data availability index (top)
(Index 100 = 8 obs. per day per 500kM * 500kM area of SHIP and BUOY reports)
and
Percentage of BUOY reports compared to SHIP+BUOY reports (bottom)

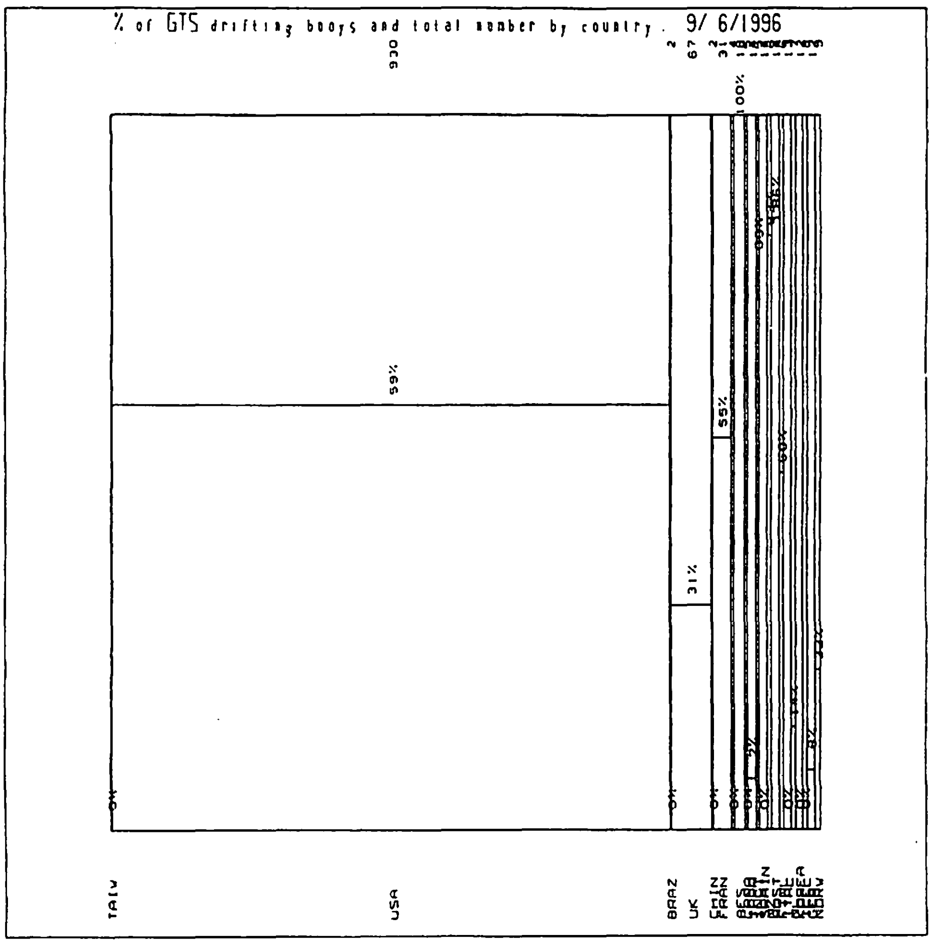


MAGICS 4 2 Solaris - mpma498 - 3 September 1996 08:57:45

Table 1. List of GTS bulletin headers being used for drifting buoy data.

T,T,A,A,ii	Approximate region of deployment or Programme
USGPC (Service Argos Inc., Landover, USA):	
SSVX04 KARS	North Atlantic Ocean;
SSVX06 KARS	Northern Hemisphere;
SSVX10 KARS	Southern Hemisphere;
SSVX12 KARS	Arctic Ocean;
SSVX14 KARS	Antarctic area;
SSVX16 KARS	Specific experiments. Buoys from various ocean area;
SSVX18 KARS	NWS GLDB drifters for NE Pacific Ocean ;
SSVX40 KARS	ATLAS moored buoys in the Equatorial Pacific Ocean;
SSVX96 KARS	Specific experiment conducted by the NDBC.
QC by NDBC (Mississippi, USA) based on data from the USGPC:	
SSVX02 KWBC	Southern Hemisphere;
SSVX08 KWBC	Northern Hemisphere.
JIC (Washington-DC, USA) based on data received from the USGPC:	
SSVX18 KWBC	Arctic Ocean.
FRGPC, (CLS, Service Argos, Toulouse, France):	
SSVX01 LFPW	North Atlantic Ocean;
SSVX03 LFPW	Southern Hemisphere;
SSVX05 LFPW	Northern Hemisphere;
SSVX07 LFPW	Arctic Ocean;
SSVX09 LFPW	Antarctic area;
Oslo LUT (NMI, Oslo, Norway):	
SSVX01 ENMI	North Atlantic Ocean (for the EGOS Programme);
Sondre Stromfjord LUT (DMI, Greenland):	
SSVX01 BGSF	North Atlantic Ocean (for the EGOS programme);
Halifax LUT (Environment Canada):	
SSVX01 CWHX	North-West Atlantic Ocean.
Edmonton LUT (Environment Canada):	
SSVX02 CWEG	Arctic Ocean;
SSVX03 CWEG	Hudson Bay;
SSVX04 CWEG	North-East Pacific Ocean.

Figure 2. Distribution of GTS and non-GTS platforms by country:



Total number of drifting buoys: 1180

Total number of drifting buoys reporting to the GTS: 638= 54.1%

Figure 3. Distribution of RMS (Obs. - First Guess Field. for Air Pressure data:

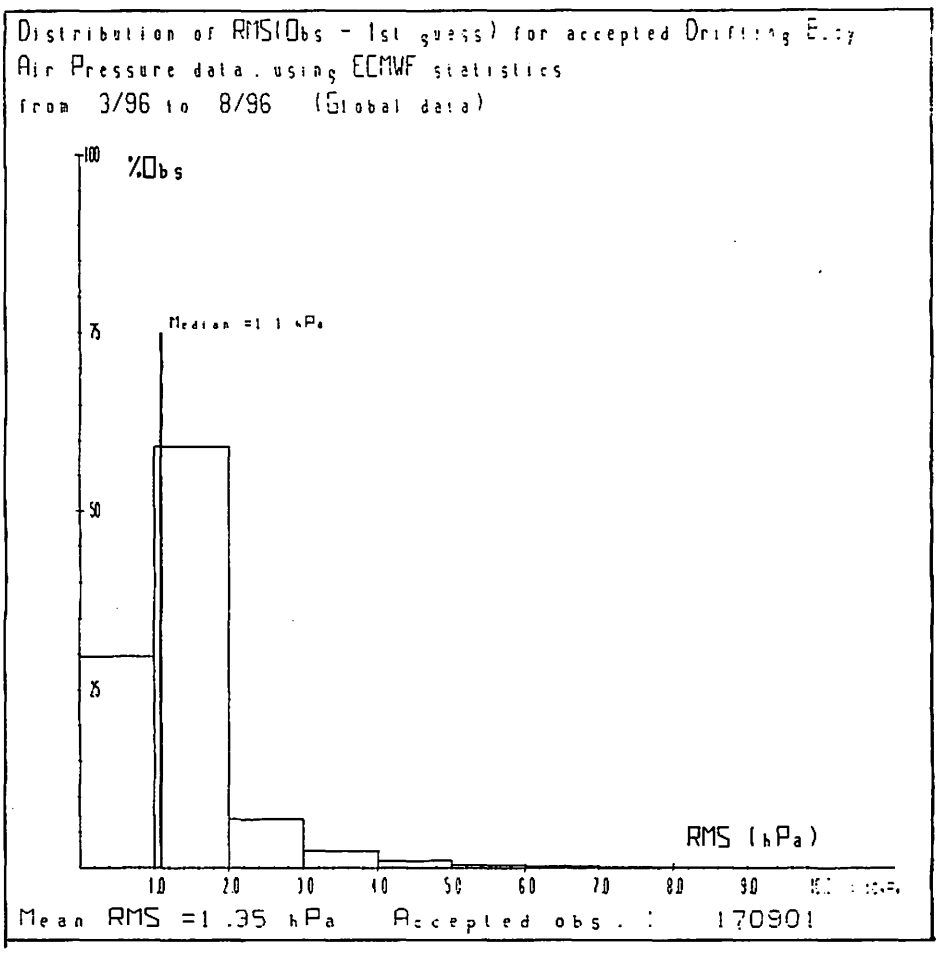


Figure 4. Distribution of the Life Time of the Air Pressure sensor:

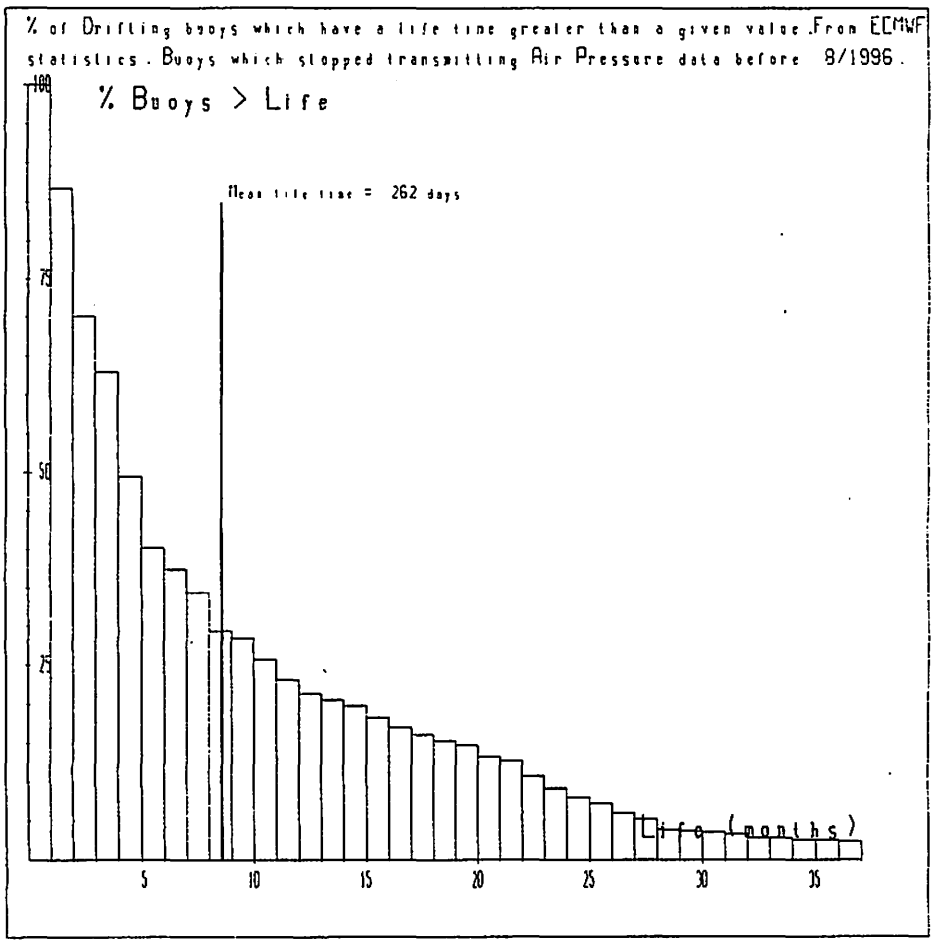


Figure 5. Evolution of the number of air pressure GTS reports by month since 1987 (from ECMWF statistics)

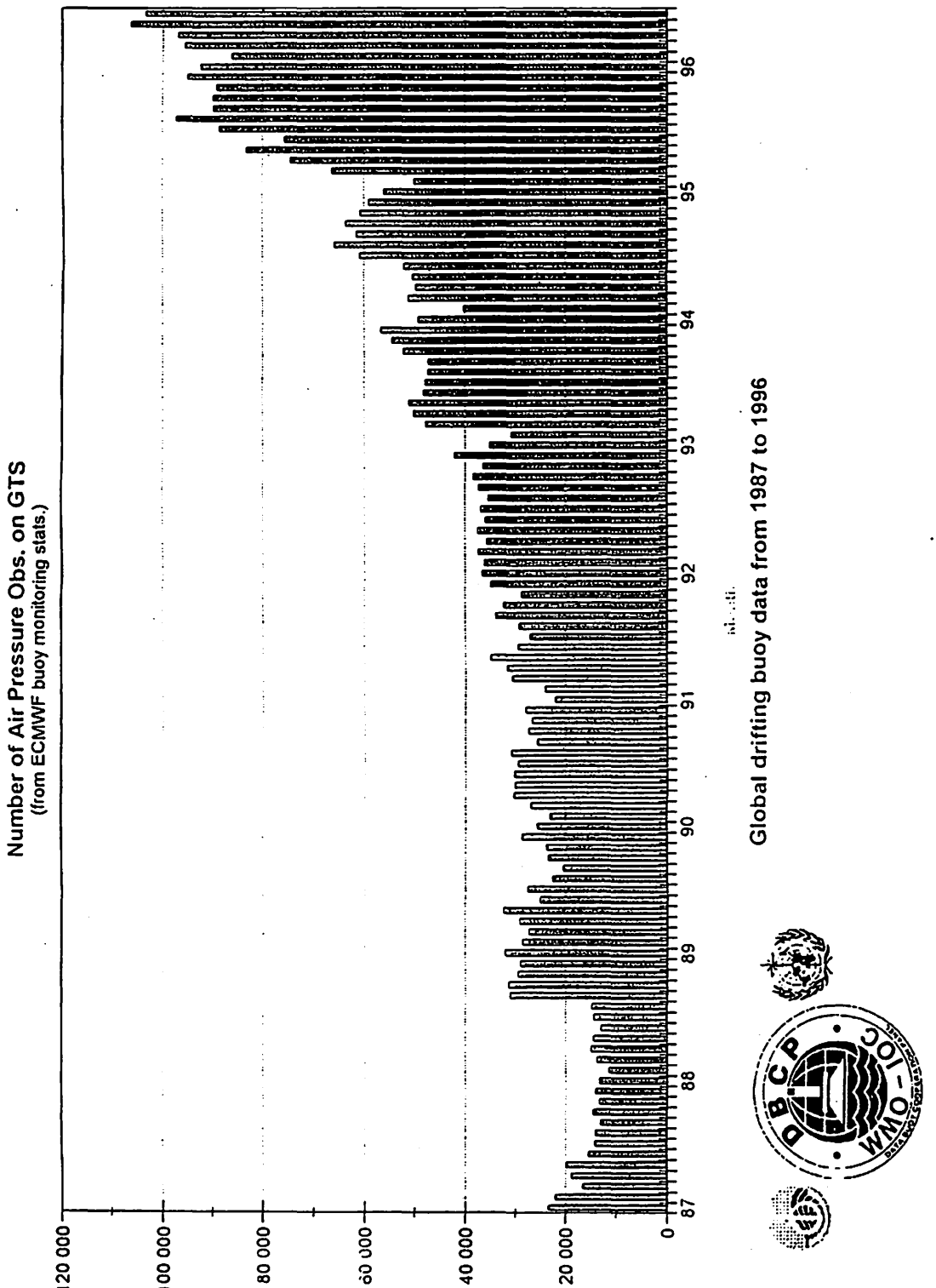
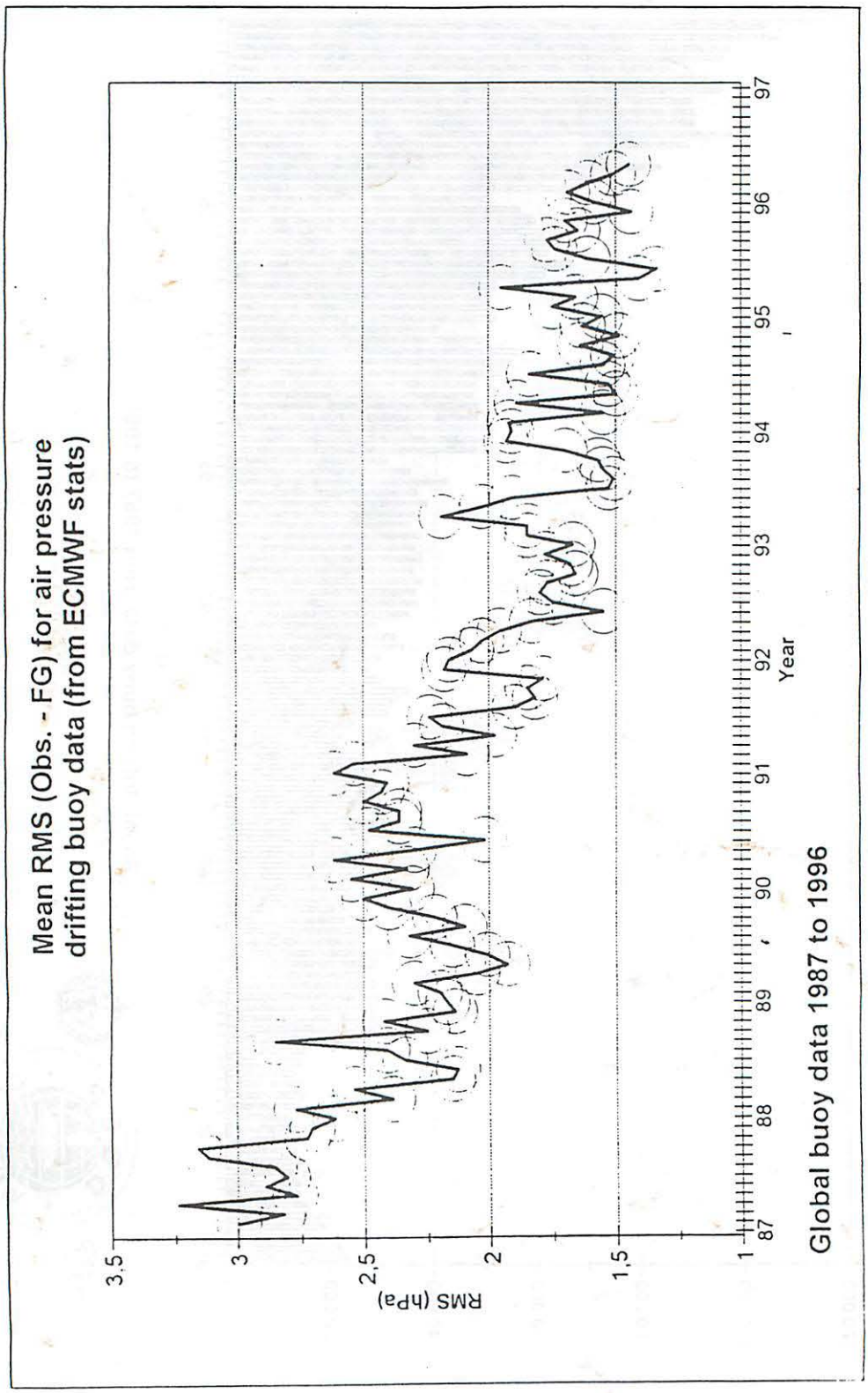


Figure 6. Evolution of mean RMS (Obs. - FG) by month for air pressure GTS data since 1987 (from ECMWF statistics)



ANNEX III

FINANCIAL STATEMENTS

Financial Statement by IOC for the year 1 June 1995 to 31 May 1996

(all amounts in US $ unless otherwise specified)

BALANCE (from previous year)			**$ 18 554**
FUNDS TRANSFERRED FROM WMO (relevant to the period)			
90 000	(04.05.95)		
15 000	(09.08.95)		**$ 105 000**
FF 79 000	(21.12.95)		**FF 79 000**
	TOTAL RECEIPTS		**$ 123 554** **FF 79 000**
EXPENDITURES			
Technical Co-ordinator's employment:			
	- Salary:	69 600	
	- Allowances:	14 517	
	- Relocation (yearly provision)	3 400	**$ 87 517**
Technical Co-ordinator's missions:			
	- Bergen (7-8 June 1995):	1 793	
	- Kiel (27-28 June 1995):	1 917	
	- Cambridge (21-22 September 1995):	1 462	
	- Pretoria (16-26 October 1995):	3 317	
	- Copenhagen (15-17 January 1996):	1 335	
	- New Orleans/Washington (19-26 January 1996):	2 786	
	- Goa (10-16 February 1996):	2 359	
	- Geneva (1-3 May 1996):	1 307	
	- Bonas (14-17 May 1996):	490	**$ 16 766**
Contract with CLS/Service Argos:			**FF 79 000**
	TOTAL EXPENDITURES		**$ 104 283** **FF 79 000**
BALANCE (at 1 June 1996)			**$ 19 271**

World Meteorological Organization

Data Buoy Co-operation Panel
Interim Account as at 31 August 1996

	US$	US$
Balance from 1995		21'349
Contributions Paid for Current Biennium		133'918
Total Funds Available		155'267
Obligations Incurred		
Technical Co-ordinator	120'936	
Experts	4'774	
Chairman's travel	5'352	
Reports	1'217	
Administration direct	0	
		132'280
Balance of Fund		US $ 22'987
Represented by.		
Cash at Bank		22'987
Unliquidated obligations		(1)
		US $ 22'987

Contributions	Received 1996
Australia	12'500
Canada	15'000
France	15'000
Greece	2'200
Iceland	1'500
Ireland	1'568
Netherlands	1'575
New Zealand	
Norway	1'575
South Africa	
UK	15'000
USA	68'000
TOTAL	133'918

(1) Commitments totalling approximately $3,200 for publication of Technical Documents Nos. 6 and 7 are yet to be included in the account.

Provisional estimate of income and expenditure until 31 may 1997

		USD
Income		
Balance of fund from interim account		22,987
Total		22,987
Expenditure		
Publications	*Existing obligations*	3,200
	New publications	5,000
Travel of chairman/vice-chairmen		5,000
Travel of experts		2,000
Total		15,200
Anticipated balance to transfer to 1997/98 account		7,787

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ANNEX IV

ESTIMATES OF EXPENDITURES AND INCOME FOR 1997-1998

Expenditures	**USD**
IOC salary	90,000
Travel of technical coodinator	15,000
CLS/Service Argos	15,000
WMO costs	100
Travel of chairman/vice-chairmen	10,000
Publications	9,000
Consultancies and other small items	3,000
Contingencies	1,037
TOTAL	**143,137**

Income	
Contributions	136,350
Carry-over 1996-1997	7,787
	143,137

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ANNEX V

TABLE OF PROVISIONAL CONTRIBUTIONS 1997-1998

	1996- 1997	1997-1998
AUSTRALIA	12,500	12,500
CANADA	15,000	15,000
FRANCE	15,000 (FRF75,000)	14,000 (FRF70,000)
GREECE	2,200	2,200
ICELAND	1,500	1,500
IRELAND	1,500 (IR£1,000)	1,500 (IR£1,000)
NETHERLANDS	1,575	1,575
NEW ZEALAND	500	500
NORWAY	1,575	1,575
SOUTH AFRICA	-	3000
UNITED KINGDOM	15,000	15,000
USA	68,000	68,000
TOTAL	**134,350**	**136,350**

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ANNEX VI

Quality Control Guidelines for GTS buoy data

(As of November 1996)

At its seventh session (Toulouse, October 1991), in order to rationalise and speed up status change process of buoys reporting bad data onto the GTS, the Data Buoy Co-operation Panel decided to implement on a trial basis Quality Control Guidelines for buoy data. The guidelines worked effectively on 20 January 1992. It formally endorsed these at its following session (Paris, October 1992).

At the tenth session of CBS (Geneva, November 1992), the Guidelines were formally incorporated as part of the World Weather Watch (WWW).

The scheme is based on an Internet distribution list (i.e. mailing list) used by all actors involved in the process. Particularly, when felt necessary, and according to quality control procedures they undertake on their own, Principal Meteorological or Oceanographic Centres (PMOC) responsible for Buoy data Quality Control can make status change proposals by the mean of an Internet mailing list (BUOY-QC@VEDUR.IS). The meteorological centres are indeed in the best position to undertake Quality Control procedures. The Technical Co-ordinator of the DBCP, acting as a focal point between these centres and the owners of the buoys forwards the proposals to them. In addition, monthly buoy monitoring statistics produced by PMOCs and WMO/Argos list of identification numbers as well as the list of Principal GTS Co-ordinators are available via the mailing list.

The following PMOCs are presently participating actively in the Guidelines:

- The Australian Bureau Of Meteorology (ABOM),
- Environment Canada (AES),
- The European Centre for Medium-Range Weather Forecasts (ECMWF),
- The Icelandic Meteorological Office (IMO),
- The Japan Meteorological Agency (JMA),
- Météo France (CMM, Centre de Météorologie Marine),
- The Meteorological Service of New Zealand, Ldt. (NZMS),
- The National Data Buoy Center (NDBC of NOAA, USA),
- The National Center for Environmental Protection (NCEP of NOAA, USA),
- The Pacific Marine Environmental Laboratory (PMEL of NOAA, USA),
- The South African Weather Bureau (SAWB),
- The United Kingdom Meteorological Office (UKMO).

Full description of the Guidelines is given in Appendix A. Information regarding the mailing list and how to register is given in Appendix B.

For Internet mailing list matters, you can contact Ms. Halla-Bjorg Baldursdottir of the Icelandic Meteorological Office directly:

Email: halla@vedur.is
Telephone: (+354) 560 06 00
Fax: (+354) 552 81 21.

For details regarding the DBCP QC Guidelines, you can contact Etienne Charpentier, Technical Co-ordinator of the DBCP:

Email: charpentier@atlas.cnes.fr
Telephone: (+33) 5 61 39 47 82
Fax: (+33) 5 61 75 10 14

APPENDIX A

Quality Control Guidelines for GTS buoy data

These are the principles adopted during previous DBCP sessions:

(i) Meteorological Centres are in the best position to undertake data Quality Control (DBCP VI).

(ii) Principal Investigators and Meteorological Centres share the responsibility of data Quality Control (DBCP- VI).

(iii) The Technical Co-ordinator is in the best position to act as a focal point between GTS users and Principal Investigators (DBCP-V, VI).

(iv) Argos is responsible for assuring that gross errors are automatically eliminated from reports distributed on GTS (DBCP-VI).

In order to realise these principles, the following operating procedures or actions are proposed:

1. PGCs

Each Principal Investigator (PI) of an Argos buoy programme reporting data on GTS, designates a person responsible for making changes on PTT or sensor information present in the Argos GTS sub-system. This person is named the Programme GTS Co-ordinator (PGC). The PGC can, of course, be the PI himself but could also be a designated programme Technical Co-ordinator, as is done for the EGOS programme. If such a person does not exist as yet, for a given Argos Programme, the Technical Co-ordinator of the DBCP would contact the Principal Investigator and discuss the issue in order to find one. In a few cases, when a PI allows his platforms being distributed on GTS but does not want to be involved in the process, the Technical Co-ordinator could act as a PGC (i.e. the Technical Co-ordinator of the DBCP can directly ask Argos to make status changes).

2. PMOCs

The DBCP requests one or more Agencies or Institutions to volunteer for acting as Principal Meteorological or Oceanographic Centre responsible for deferred time GTS buoy data Quality Control (PMOC). PMOCs work on an operational basis, for given physical variables, either regionally or globally. The following centres are presently acting as PMOCs:

- The Australian Bureau Of Meteorology (BOM, Melbourne, Australia);
- Environment Canada (AES, Edmonton, Canada);
- The European Centre for Medium Range Weather Forecasts (ECMWF, Reading, United Kingdom);
- The Icelandic Meteorological Office (IMO, Reykjavik, Iceland);
- The Japan Meteorological Agency (JMA, Tokyo, Japan);
- Météo-France (the Centre de Météorologie Marine, Brest, France);
- The Meteorological Service of New Zealand, Ltd. (NZMS, Wellington ,New Zealand);
- The National Data Buoy Center (NOAA/NDBC, Stennis Space Center, Mississippi, USA);

- The National Center for Environmental Prediction (NOAA/NCEP, Camp Spring, Maryland, USA);
- The Pacific Marine Environmental Laboratory (NOAA/PMEL, Seattle, Washington, USA);
- The United Kingdom Meteorological Office (UKMO, Bracknell, UK).
- The South African Weather Bureau (SAWB, Pretoria, South Africa).

National Focal Points for Drifting Buoy Programmes are requested to designate National PMOCs, and possibly to act themselves as PMOCs.

3. INTERNET distribution list (mailing list).

It is proposed that the mechanism for exchanging QC information among the Guidelines Participants shall be an INTERNET distribution list. PMOCs send the proposed messages to a unique INTERNET address which name is BUOY-QC@node_path. "node_path" depends upon who actually operates the distribution list. The full INTERNET address of the Distribution List shall be circulated among the Guidelines participants.

To date the Icelandic Meteorological Office is operating the distribution list server and the Internet address is:

BUOY-QC@VEDUR.IS

The messages are then automatically forwarded to all the individual addresses from a maintained distribution list. Adding, reading, modifying, or deleting a name form the list can be done via INTERNET messages according to an agreed format.

3.1 ECMWF, NOAA/NCEP/NCO, METEO FRANCE, and UKMO monitoring statistics are delivered onto the INTERNET Distribution List.

3.2 Any suggestion for modification (i.e. recalibrate or remove sensor from GTS) or any problem noticed (e.g. bad location) on a drifting buoy reporting data on GTS should be placed on the Distribution List. Meteorological Centres are encouraged to make such suggestions.

3.3 Any feed back available on a recalibration actually implemented shall be placed on the distribution list.

4. Operating Procedures for dealing with Potential Problems on GTS (Drifting and Moored Buoy data)

4.1 PMOCs noticing potential problems on GTS can suggest an action via the INTERNET Distribution List. A standardised, telegraphic format is proposed (see Attachment): one message per platform or per sensor, showing the WMO number and the proposed change, directly in the "subject" line, with additional comments appearing in the text itself, using a free format if felt necessary by the PMOC (see example in Attachment).

4.2 PMOCs noticing bad location or bad sensor data episodically appearing on GTS message can copy the message on the INTERNET Distribution List, indicating from which source the message was transmitted. Although it is recommended that LUT operators access to the INTERNET Distribution List as well, if not possible, the Technical Co-ordinator of the DBCP or the responsible PGC or a designated PMOC (see paragraph 4.7.2) would keep them informed by telefax or another mean.

4.3 The Technical Co-ordinator of the DBCP can immediately (including using automated tools) contact the Principal GTS Co-ordinator (usually the person in charge of the buoy programme) and forward the PMOC message to him. It is recommended that the PGC waits for a few days before taking any action unless he/she is confident enough in the quality status of the data. Other meteorological centres may therefore have an opportunity to also comment on a particular problem. Other data users who are on the INTERNET Distribution List are encouraged to check the received messages regularly.

4.4 Then, if the PGC accepts the modification, he requests the adequate Argos centre (i.e. CLS or SAI) to make the change. In order to keep the GTS user community informed, Service Argos announces the change as soon as possible by means of the INTERNET Distribution List (a standardised message is proposed in the Attachment) and also effects the change as prescribed. It is recommended that the PGC also requests appropriate LUTs to implement the same changes.

4.5 If the PGC is not willing to go ahead with a proposed change, the Technical Co-ordinator of the DBCP deposits a standardised message on the INTERNET Distribution List (see Attachment) in order to inform PMOCs.

4.6 Local User Terminals are urged to adopt these Quality Control Operating Guidelines.

4.6.1 It is desirable that LUTs not willing to participate should distribute drifting buoy data on GTS only to local users (i.e. no global GTS distribution).

4.6.2 LUT operators participating and registered on the INTERNET Distribution List are encouraged to inform the participants back by the mean of the Distribution List each time a change is implemented, using the same format as Argos (see paragraph 4.4). If LUTs are not on the Distribution List, they would be encouraged to inform the Technical Co-ordinator of the DBCP of actual changes so that he can forward adequate messages onto the Distribution List.

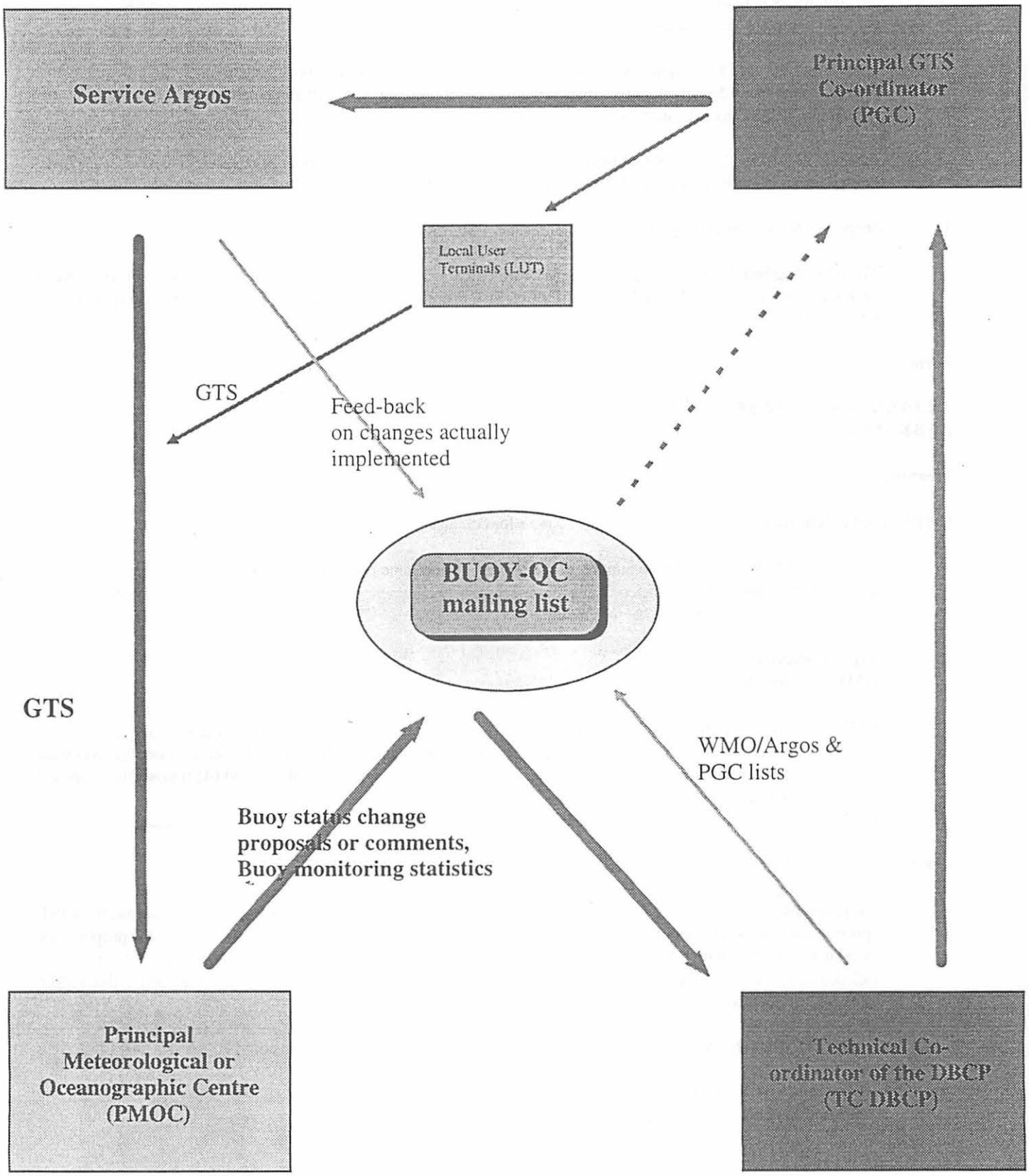
5. List of PGCs

This list is published by the Technical Co-ordinator of the DBCP on a monthly basis. It is forwarded onto the INTERNET Distribution List and sent by regular mail.

6. DBCP, WMO and IOC Secretariats

They will promote these Quality Control operating guidelines and encourage participation in this scheme.

Operating QC Guidelines for buoy data



APPENDIX A - ATTACHMENT

Standardized Format for Information Deposited on the INTERNET Distribution List

Notations:

-1- UPPERCASES in **bold** are constant field values and will appear "as shown" in the subject line; e.g. **ASK** will appear as the 3 characters 'ASK' in the subject line.

-2- Lowercases are used to designate variable data fields; If the name of the field is on 5 characters, then the field value must be coded using 5 characters (completed with spaces if necessary); e.g. ttt can be coded as '**AP** ' to indicate Air Pressure or as '**SST**' to indicate Sea Surface Temperature.

-3- The line 12345678901234567890123456789012 is just here to indicate the number of characters used (32 maxi) and their position; It has no other specific meaning.

1. **Proposals for status change** (by Meteo Centres, i.e. PMOCs):

When detecting bad data circulating on GTS, Meteorological Centres can propose changes on buoy status (remove or recalibrate sensor) via the INTERNET Distribution List. Proposals are done using a standardised telegraphic format in the subject line. Comments can be added in the body text.

Format:

```
12345678901234567890123456
hASK ttt wmo## ppp ovalue
```

Meaning:

It is proposed to remove or recalibrate one or more sensors for one given buoy.

h : One figure, **1** to **9**, to indicate the number of the request for the same buoy, for example, the first proposal would be coded **1ASK**..., and if another Meteo Centre feels necessary to comment on the same proposal, it can suggest another action and name it **2ASK**, etc...

ttt : Type of proposal:

- **RMV** : for removing sensor data from GTS
- **REC** : for recalibrating a sensor
- **CHK** : for checking data carefully; in that case, it is recommended to add in the body text of the message: (1) Example(s) of the suspicious or erroneous GTS message(s), (2) the GTS bulletin header that was used (i.e. originating centre for the bulletin), (3) a description of the problem and (4) if possible, proposed action to solve it.
- **COM** : for commenting on a particular problem. Explanation is givenin the body text of the message.

wmo## : WMO number of the buoy ($A_1b_2n_3n_4n_5$) or **LIST** if more than one buoy are concerned.

It is preferable to make status change proposals for different buoys on distinct messages. However, in case the **LIST** option is used, proposals can be detailed in the body text of the message: it is recommended to state the proposal for each buoy by starting with a line encoded according to the standard format followed by the comments on a few lines included inside brackets; then the next proposal can be listed etc.. General comments can be included in free format after the last proposal.

Example for the body text in case more than one proposal are included (subject line could be 1ASK CHK LIST AP):

1ASK CHK 61412 AP
(this buoy has been transmitting erroneous data in the last 2 week)

1ASK CHK 54814 AP
(this buoy shows strong departure of Air Pressure from the first guess field)
...
Mr. W. Xyz., National Meteorological Service.

ppp : Physical variable (sensor) to consider:

- **AP** : Air Pressure (coded as '**AP** ')
- **AT** : Air Temperature (coded as '**AT** ')
- **SST** : Sea Surface Temperature
- **WD** : Wind Direction (codes as '**WD** ')
- **WS** : Wind Speed (coded as '**WS** ')
- **APT** : Air Pressure Tendency
- **POS** : Position of the buoy
- **TZ** : Subsurface temperatures (coded as '**TZ** '): The depths of the probes and proposed actions should be placed in the body text, not in the subject line (not enough room)
- **ALL** : All buoy sensors (e.g. remove all buoy data from GTS)
- Blank : (coded as 3 space characters, i.e. ' ') Informations are detailed in the body text.

o : Operator to use for proposed recalibration (mandatory and used only when ttt='**REC**'):

- \+ : Add the following value to the calibration function
- \- : Subtract the following value from the calibration function
- * : Multiply the calibration function by the following value (e.g. rate for recalibrating wind speed sensor)

value : Value to use for proposed recalibration (mandatory and used only when ttt='**REC**'); the value is coded on 5 characters and completed with space characters if necessary. It is provided using the following physical units:

Air Pressure :	Hecto Pascal
Temperatures :	Celsius degrees
Wind speed :	m/s
Wind Direction :	Degrees
Air Pressure Tendency :	Hecto Pascal
Positions :	Degree + Hundredth
Rate :	No unit

Examples:

```
From                                Date          Subject

FLETCHER@METDP1.MET.CO.NZ           10-Oct-1994 1ASK REC 17804 AP  +2.2
ARADFORD@EMAIL.METO.GOVT.UK         11-Oct-1994 1ASK RMV 62501 ALL
BLOUCH@IFREMER.FR                   11-Oct-1994 2ASK REC 17804 AP  +2.4
MBURDETTE@NDBC.NOAA.GOV             11-Oct-1994 1ASK CHK 44532 POS
GXB@ORVILLE.HO.BOM.GOV.AU           12-Oct-1994 1ASK REC 44704 WS  *1.5
```

Message1: NZMS proposes to recalibrate Air Pressure sensor of buoy 17804 by adding 2.2 hPa.

Message2: UKMO proposes to remove buoy 62501 from GTS distribution. Explanations are given in the body text.

Message3: Météo France comments (**2ASK**) on NZMS proposal for recalibrating air pressure sensor of buoy 17804. Météo France suggests to add +2.4 hPa instead of +2.2 hPa. Argumentation is provided in the body text.

Message4: NDBC suggests to check positions of buoy 44532. Details are given in the body text, including copy of one suspicious GTS message, the GTS bulletin header, and a description of the error.

Message5: BOM proposes to recalibrate Wind speed sensor of buoy 44704, by multiplying data by 1.5.

2. Argos or LUT answer for changes actually implemented

When a change is implemented on GTS platforms, a message is normally forwarded to the INTERNET Distribution List, by Argos or the considered LUT, no later than 24 hours after the change was implemented. All the information is encoded in the subject line, the body text is empty. The format of the subject line is as follow:

Format:

```
123456789012345678901234567890123456
cccc ttt wmo## ppp ovalue yymmddhhmm
```

Meaning:
Argos (i.e. the French Global Processing Center of Toulouse (FRGPC) or the US Global Processing Center of Landover (USGPC)) or Local User Terminals (LUT) inform the INTERNET Distribution List each time a change is actually implemented on a buoy status.

cccc : Originating Center:

LFPW	=	FRGPC, Toulouse
KARS	=	USGPC, Landover
ENMI	=	Oslo LUT
BGSF	=	Sondre Stromfjord LUT
CWEG	=	Edmonton LUT

ttt, wmo##, ppp, ovalue: Same as for paragraph 1. In addition, for recalibrations, when the transfer function has been completely modified, ovalue can be coded as a question mark followed by 5 space characters, i.e. '? ', to indicate that the change is not as simple as a +X, -X or *X transformation.

yymmddhhmm: UTC time the change was implemented: Format=Year (2 digits), Month (2 digits), Day of the month (2 digits), Hour (2 digits), and Minutes (2 digits).

Example:

```
From                      Date         Subject
GTS@GTSVAX.ARGOSINC.COM   14-Oct-1994  KARS REC 17804 AP  +2.3 9410141216
GTS@GTSVAX.ARGOSINC.COM   14-Oct-1994  KARS REC 33809 AP  ?    9410141306
```

Message6: Buoy 17804 Air Pressure sensor was recalibrated by adding +2.3 hPa. the change was implemented at 12h16 UTC the 14 October 1994. As you may notice, two proposal had been made for this buoy: NZMS proposed +2.2 hPa and Météo France proposed 2.4 hPa. The Technical Co-ordinator of the DBCP contacted both agencies and it was then decided to apply a 2.3 hPa correction.

Message7: Buoy 33809 Air Pressure sensor was recalibrated. The change was implemented at 13h06UTC the 14 October 1994. The question mark '? ' indicates that the transfer function was completely modified.

3. PGC Answer if the proposal was denied

Format:

```
123456789012345678901234 56
DENI ttt wmo## ppp ovalue
```

Meaning:
The proposal was denied by the Principal GTS Co-ordinator (PGC) of the drifting buoy programme. No action was taken. Complementary information can be included in the body text.

ttt, wmo##, ppp, ovalue: same meaning as in paragraph 1. ovalue is mandatory and used only when ttt='**REC**'.

Example :

```
From                 Date         Subject
BLOUCH@IFREMER.FR    15-Oct-1994  DENI RMV 62501 ALL
```

Message8: In the body text: Data were sent on GTS before deployment by mistake. The buoy is now deployed and data look good. There is therefore no need for removing data from GTS distribution.

4. Monitoring Statistics

Format:

```
123456789012345678901234567890
STAT center ppp year mm dd
```

Meaning:
The monitoring statistics are available in the body text. Format is free for the moments but it is recommended that each center uses the same format all the time.

center: Name of the center producing the statistics, e.g.
- **ECMWF** = European Center for Medium Range Weather Forecasts
- **NCO** = NOAA NCEP Central Operations
- **CMM** = Météo France, Centre de Météorologie Marine
- **UKMO** = United Kingdom Meteorological Office

ppp: Type of physical variable concerned or **ALL** if many variables are included. Same as for paragraph 1 (i.e. **AP**, **AT**, **WD**, **WS**, **SST** ...)

year: Year concerned (e.g. **1994**)

mm: Month concerned (e.g. **08** for August)

dd: Last day of the 1-month period concerned. It is optional and used only if the 1-month period does not end on the last day of the month. For example dd=**15** if the 1-month period concerned is 16 July to 15 August.

Example :

```
From                 Date          Subject
BLOUCH@IFREMER.FR    02-Oct-1994   STAT CMM ALL 1994 09
```

Message9: The September 1994 monitoring statistics for many geo-physical variable and produced by the Centre de Météorologie Marine of Météo France are available in the body text.

5. WMO/Argos cross reference list

Format:

```
12345678901234
WMOS year mm
```

Meaning:
The WMO/Argos cross reference list sorted by WMO numbers is available in the body text.

year: Year concerned (e.g. **1994**)

mm: Month concerned (e.g. **08** for August)

Example :

```
From                          Date          Subject
CHARPENTIER@ATLAS.CNES.FR     02-Oct-1994   WMOS 1994 09
```

Message10: The September 1994 WMO/Argos cross reference list is available in the body text.

6. Principal GTS Co-ordinators (PGC) list

Format:

```
12345678901234
PGCS year mm
```

Meaning:
The list of Principal GTS Co-ordinators (PGC) sorted by Argos program number is available in the body text. The Principal GTS Co-ordinators are designated by the owners of the buoys for being responsible to request Service Argos and/or LUT operators to implement required status changes.

year: Year concerned (e.g. **1994**)

mm: Month concerned (e.g. **08** for August)

Example :

```
From                          Date          Subject
CHARPENTIER@ATLAS.CNES.FR     02-Oct-1994   PGCS 1994 09
```

Message11: The September 1994 list of Principal GTS Co-ordinators is available in the body text.

7. Information message

Format:

```
12345678901234567890123456789
INFO subject...
```

Meaning:
An information message in free format is included in the body text.

subject...: Subject of the message (free format)

Example :

```
From                          Date         Subject
CHARPENTIER@ATLAS.CNES.FR     02-Oct-1994  INFO: New on DBCP W3 server
```

Message12: This message is to indicate that new products or information are available from the DBCP World Wide Web (W3) server. Details are given in the body text.

APPENDIX B

DBCP QC Guidelines distribution list (mailing list)

Once registered on the mailing list, you will automatically receive any message posted by anybody onto the mailing list. For posting messages onto the mailing list, just send an Email to the following address:

BUOY-QC@VEDUR.IS

To be included in the BUOY-QC@VEDUR.IS Internet mailing list you can automatically assign to it by sending a message to the following Internet address : BUOY-QC-REQUEST@VEDUR.IS

The messages in the body of your mail must comply with the syntax detailed below. You must send your commands in the body of a mail message. Subject lines in mail messages are ignored.

The following commands can be handled automatically through the -Request interface:

SUBSCRIBE	- to subscribe to a mailing list
SIGNOFF	- to remove yourself from a mailing list
REVIEW	- to get a list of subscribers
QUERY	- to get the status of your entry on the list
SET NOMAIL	- to remain on the list but not receive mail
SET MAIL	- to reverse the NOMAIL setting
SET CONCEAL	- to conceal yourself from REVIEW listings
SET NOCONCEAL	- to reverse the CONCEAL setting
SET NOREPRO	- to prevent the list from sending you your own postings
SET REPRO	- to reverse the NOREPRO setting
LIST	- to get a list of mailing lists available on this host
HELP	- to receive a help file

The syntax of these commands is:

Syntax	Example
SUBSCRIBE {list-name}	SUBSCRIBE BUOY-QC
SIGNOFF {list-name}	SIGNOFF BUOY-QC
REVIEW {list-name}	REVIEW BUOY-QC
QUERY {list-name}	QUERY BUOY-QC
SET {list-name} [NO]MAIL	SET BUOY-QC NOMAIL
SET {list-name} [NO]CONCEAL	SET BUOY-QC CONCEAL
SET {list-name} [NO]REPRO	SET BUOY-QC NOREPRO
LIST	LIST
HELP	HELP

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ANNEX VII

DBCP-XIII

Draft Outline Agenda

0. Opening

A **Implementation Component**

A1 Reports (action groups, GDP, national, etc). **Action:** programme coordinators

A2 Requirements (WWW, GCOS/GOOS, WCRP, etc). **Action:** WMO

A3 Implementation strategies. **Action:** chairman

A4 Impact studies. **Action:** Panel members and meteorological services

A5 Information exchange/data bases. **Action:** TC and data management centres

A6 Technical issues (codes, QC, etc). **Action:** TC

A7 Technical workplan. **Action:** vice-chairmen and TC

B **Administrative Component**

B1 Reports (chairman, vice-chairmen, TC, Secretariats).

B2 Financial matters.

B3 Publications.

B4 Workplan for DBCP.

B5 Elections.

B6 Next session.

B7 Closure.

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ANNEX VIII

SUMMARY OF FUTURE SATELLITE COMMUNICATIONS SYSTEMS

Introduction

Mobile satellite systems (MSS) may be classified according to orbit altitude as follows:

- GEO - geostationary earth orbit, approx altitude: 35 000 km
- MEO - mid-altitude earth orbit, approx altitude: 10 000 km
- LEO - low earth orbit, approx altitude: <1 000 km

A large percentage of the recent commercial activity in MSS is focused on the use of LEO satellites as a personal communication tool. These satellites can be separated into Big LEO and Little LEO categories. Big LEOs will offer voice, fax, telex, paging and data capability. Little LEOs will offer data capability only, either on a real-time direct readout ('bent pipe') basis, or as a store-and-forward service. Since the satellite footprint decreases in size as the orbit gets lower, LEO and MEO systems require larger constellations than GEO satellites to achieve global coverage and avoid data delays. Less energy is, however, required for LEO and MEO satellite transmissions because of the shorter average distance between transmitter and satellite.

Some satellite communication systems will primarily focus on land masses and centres of population. This suggests that some configurations will not be acceptable for global ocean monitoring. Several MSS currently under development will be inter-operable with existing public switched telephone and cellular networks. This structure will serve as an extension and enhancement to existing networks, and may include additional charges if data are channelled to these networks. While the technical capabilities for these new MSS currently exist, delays must be expected due to government licensing, company financing, and availability of launch vehicles. It is also important to consider the infrastructure that will necessary to disseminate the data received using these MSS on to the GTS.

Some systems will offer significantly enhanced capabilities compared with existing methods. Potential advantages from these emerging MSS include two-way communication, more timely observations, and greater data rates and volumes. Some systems may also prove to be considerably less expensive than existing channels, although this is as yet unclear. Potential dangers will exist for data buoy users of most MSS, in that they will generally be small minority users of the system, with consequent lack of influence in regard to pricing. The arrangements for data distribution are also unlikely to be tailored towards data buoy applications, in particular those that require data insertion on the GTS.

A number of systems (including Argos, ORBCOMM, STARSYS, ICO/Inmarsat, IRIS, SAFIR and OCEAN-NET) were presented to the Technical Workshop that immediately preceded DBCP XII. Full details will be given in the Proceedings of the Workshop, to be published in the DBCP Technical Document series. These and other systems are summarised below.

Little LEOs - current status

ARGOS. Planned enhancements to the Argos system include increased bandwidth, **two-way** communication, enhanced sensitivity and improved ground station coverage. Future Argos equipment will fly on the Japanese ADEOS-II and European METOPS satellites, in addition to a continuing programme of launches on board NOAA satellites. The system is one of the few that offers true global coverage, and has no commercial requirement to recover the cost of the launch or space segment equipment.

ORBCOMM. This company was awarded the first FCC Little-LEO licence in late 1994. Two

satellites were launched into polar orbit during 1995, using a Pegasus rocket piggy-backed on to a Lockheed L-1011 aircraft. Both satellites, which are discs about one metre in diameter prior to deployment of solar panels and antenna, suffered from initial problems, but the company reports that these have been overcome, and that it will continue with the completion of its 26-satellite network. Two further satellites are scheduled for launch into polar orbit in April 1997; susequent launches will be at lower inclinations. The system will offer both bent-pipe and store-and-forward two-way messaging capabilities, operating in the VHF band. The message structure currently consists of packets transmitted at 2400 bps (scheduled to rise to 4800 bps), and coverage will be global and near-continuous when the full constellation is in place. Messages are acknowledged by the system when correctly received. The platform position is determined, if required, using propagation delay data and doppler shift, or by an on-board GPS receiver. Position accuracy without GPS is expected to be similar to that offered by Argos.

A limited commercial service is now available. Global availability is forecast to be in place by 1999. Many operational details, and the costs of using the system, which will be available to users through service providers ('resellers'), are only now becoming known. The company maintains a World-Wide Web page at **http://www.orbcomm.net/**

SAFIR. This is a two-way store-and-forward communication system comprising a number of LEO satellites. One satellite has been in orbit for nearly twelve months, but no operational experience has been reported. Two types of platforms were initially offered: a microstation communicating at 300 bps, and a macrostation permitting transfer rates of 9600 bps. The microstation has since been withdrawn. Position determination is achieved by analysis of doppler shift data at the processing centre, or by inclusion of a GPS receiver. Data transfer takes place in response to a command from the satellite, and is unique in that the capability exists for transfers between platforms. For example, one platform may be incorporated within a data buoy, while the other is sited at the operator's home institute. PTT costs will be similar to those for Argos, and data transfer costs will be of the order of USD 15 per kbyte for medium volume users. There is no explicit limitation on message length.

STARSYS. This system is broadly similar to ORBCOMM, except that no store-and-forward capability is planned, which may well limit its usefulness to coastal areas. The system is at an advanced planning stage, and it is understood that the majority of the financial backing has been secured. Location will use both doppler and ranging information. CLS/Service Argos are involved in the financing and development of the system. The orbits are configured to optimize coverage over populated areas: only limited polar capablity will be available.

IRIS/LLMS. This appears to be similar to Argos, using two polar-orbiting satellites with store-and-forward capability. However, terminals are alerted by the satellite downlink signal, and two-way communications and message acknowledgement are supported. Location is by doppler and ranging, and message lengths of up to a few kilobytes are permitted. Some provision is planned for terminal-terminal communication within the satellite footprint. The first launch is scheduled for late 1997.

EYESAT. The system comprises microsatellites weighing 12.5 kg which operate a 9600 bps transponder service, primarily for radio amateurs. Further satellites are planned.

GEMSAT/VITASAT. The first satellite suffered launch failure in August 1995 - no other launches have been reported.

Other systems (MEOs, big LEOs)

These include Iridium, Globalstar, ICO (formerly Inmarsat-P), Ellipso, Odyssey, Teledesic and Constellation (formerly Aries), as well as the existing geostationary communications satellites such as Intelsat. All are aimed at the personal or mass communications market, and none of the new systems is yet flying. They may well be attractive to buoy operators, but no detailed technical assessment has yet been performed by this author. Two systems were, however, presented to the Technical Workshop:

ICO. This system, using a constellation of 12 MEO satellites backed by a 12-station ground segment, will provide a truly global voice, fax, data and messaging service. The aim is to complement and be inter-operable with existing digital cellular telephone networks. Initial launches are planned for late 1998, with constellation completion scheduled for the year 2000. Thenceforth, two satellites will always be visible from any point on the earth's surface. Data rate will be 9600 bps, and costs are expected to be in the region of USD 1 - 3 per minute of connect time, which may well prove attractive for data buoy operators who require to transfer more than a few kilobytes of data per day.

OCEAN-NET Jointly developed by the Harbor Branch Oceanographic Institution and the Harris Corporation of the USA, this system intends to permit marine users to lease bandwidth on broadband links which will be established between a number of large, moored data buoys and the Intelsat geostationary communications satellite. Data rates of up to 2 Mbps will be supported, and users will connect their equipment to the buoys' data systems using pre-defined protocols. Initial trials are planned in the Gulf of Mexico, where the buoy infrastructure is being established to extend the Federal Aviation Authority VHF voice communications network.

Further information

Useful World-Wide Web sources of information include:

A tabulated overview of big LEOs	**http://www.itu.ch/special/wwwfiles/tel_satel.html**
New Space Newsletter	**http://www.isso.org**
The Satellite Encyclopedia	**http://www.u-net.com/arrowe/tse**
ORBCOMM home page	**http://www.orbcomm.net/**

The following table is partially updated from that published in last year's DBCP Annual Report. It should be noted that it has not been possible to re-verify all of the information presented.

System	Implementation	Orbit type	Buoy position	Message type	Terminal size	Power (watts)	Estimated unit cost	Estimated service cost	Comments
ARGOS	Operational	LEO	Doppler shift	data: 32 bytes	handheld	1	$500-900	see JTA	various enhancements, incl 2-way messaging, are scheduled
EYETEL/EYESAT	Planned 1995+	Little LEO	GPS required	data: 60 bytes	handheld	5	$500-1,500	TBD	1 satellite 1995 5 satellites 1996+
Final Analysis (FAISAT)	Planned 1996+	Little LEO	GPS required	data: 128 bytes	handheld	10	$100-500	$.25 per msg; service fee TBD	26 satellites 2000+
Globalstar	Planned 1997+	Big LEO	GPS required	voice/data: no maximum	handheld	1	$750	$.30/min; service fee TBD	48 satellites 1998+
INMARSAT-C	Operational	GEO	GPS required	data: no maximum	5.5 kg	15	$4,000	$.28 per 32 bytes	steered antenna not required
ICO/INMARSAT-P	Planned 1998+	MEO	GPS required	voice/data: no maximum	handheld	1	TBD	TBD	
Iridium	Planned 1998+	Big LEO	GPS required	voice/data: no maximum	handheld	1	$3,000	$3/min + $50/mo	66 satellites 1998+
IRIS	Planned 1997+	Little LEO	Doppler + ranging	data: up to few kbytes	handheld	1	$900	$.1 per msg + $30/mo	2 satellites 1997+
OCEAN-NET	Planned	GEO	Moored	no maximum	large		leased bandwidth	TBD	uses moored buoys + Intelsat
Odyssey	Planned 1998+	MEO	GPS required	voice/data: no maximum	handheld	1	$300	$.65/min; service fee TBD	12 satellites 1998+
ORBCOMM	Pre-operational	Little LEO	Doppler shift	data: no maximum	handheld	5	$100-400	$.25 per msg + $.007/byte + $30/mo	2 satellites 1995 26 satellites 1996+ 36 satellites 1997+
Starsys	Planned 1997+	Little LEO	Doppler + ranging	data: 27 bytes multiple msgs	handheld	2	$50-200	$.15 per msg ($.45/msg+loc) + $25 reg + $6/mo	12 satellites 1998+ 24 satellites 2000+
SAFIR	Pre-operational	Little LEO	Doppler or GPS	data: no maximum	handheld	0.5 - 5	$1200-2000	$15 per kbyte + $20/mo	1 satellite 1995 1 satellite 1996+
VITASAT/ GEMSAT	Planned 1996+	Little LEO	GPS required	data: no maximum	'laptop'	10	$2,000	$1 per kilobyte + $250/year	1st satellite 1995+ 3 satellites by 1997+

ANNEX IX

OPERATING PROCEDURES FOR THE DATA BUOY CO-OPERATION PANEL

1. To the extent that the panel is a formally established body of the WMO and IOC, the panel members will be the representatives of Members of WMO or Member States of IOC which expressed a willingness to participate in the panel's activities.

2. The panel will meet annually. Representatives of any institution or programme actively involved in the use, development or deployment of data buoys, or which specifically require buoy data, may participate in the meetings.

3. The panel will elect a chairman and two vice-chairmen, from among the panel members, to carry out the work of the panel between sessions. The chairman will prepare reports for WMO and IOC, as required, and act as the focal point for communications amongst the panel members.

4. The chairman may call on individual panel members for assistance in matters such as representing the panel at meetings of other bodies, preparing of reports on specific topics, etc.

5. The panel requires the support of a full-time technical co-ordinator. The costs associated with this position will be supported through voluntary contributions to a trust fund specifically designated as being for the purpose. These arrangements will be reviewed annually.

6. The panel requires support from the Secretariats of WMO and IOC in the dissemination of invitations to panel meetings and the preparation of documents and reports related to meetings.

7. The terms of reference for the panel are those given in WMO Executive Council Resolution 9 (EC-XLV) and IOC Assembly Resolution XVII-6. The panel also adopts as terms of reference for its technical co-ordinator those suggested by the WMO Executive Council in Resolution 9 (EC-XLV) and the IOC Assembly in Resolution XVII-6.

8. The working language of the panel, including for correspondence, will be English.

9. The panel's operating procedures will be revised as required at the annual meeting. The chairman will prepare recommendations to be distributed before the meeting .

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ANNEX X

DATA BUOY CO-OPERATION PANEL WORKPLAN AND OBJECTIVES FOR THE TWELFTH YEAR

PART A - Summary of tasks

1. Maintain summary of requirements for buoy data to meet expressed needs of the international meteorological and oceanographic communities.

2. Maintain a catalogue of existing ongoing ocean data buoy programmes

3. Maintain a list of national contact points for the DBCP and within other relevant bodies with potential for involvement in DBCP activities.

4. Identify sources of buoy data not currently reported on the GTS and determine the reason for their non-availability.

5. If deemed necessary, make proposals for co-ordination activity as a result of the above actions to address items 2 to 6 in the terms of reference of the DBCP.

6. Arrange for the circulation of information on the Panel's activities, current and planned buoy programmes and related technical development/evaluations, including via distribution of existing DBCP publications to potential Argos GTS users.

7. Monitor the operation of the Argos GTS processing sub-system and arrange for modifications as necessary.

8. Continue the arrangements (including finance) to secure the services of a technical co-ordinator.

9. Review programme and establish working priorities of the technical co-ordinator.

10. Prepare annual report of the DBCP.

11. Support, as required, existing DBCP action groups (EGOS, IABP,IPAB, ISABP, IBPIO, GDP) and, on request provide assistance to other internationally co-ordinated buoy programme developments.

12. Investigate requirements for initiating new co-ordinated buoy deployments in other ocean areas.

13. Assist in the planning and implementation, as appropriate, of the ocean data buoy component of GOOS, GCOS and CLIVAR.

14. Keep up-to-date with the latest buoy technical developments.

15. Amend DBCP quality control guidelines as decided at this Panel session, distribute the new guidelines to PMOCs and make them available via the DBCP World Wide Web Server.

16. Co-ordinate operation of DBPC QC guidelines.

17. Update and amend, as necessary, the DBCP World Wide Web server; especially study feasibility of adding new products such as status maps, meta data on buoys or specific tools for assisting DBCP action groups in refining deployment strategies.

18. Investigate new developments in communication technologies and facilities, relevant to the collection of sensor and/or location data from buoys.

19. Finalize and publish the Guide to Moored Buoys and other ODAS.

20. Develop and implement co-operative buoy deployment strategies, in particular with the GDP, to provide buoy networks which serve both research and operational applications.

21. Organize workshop at DBCP-XIII.

22. Approach meteorological centres for conducting specific case studies of buoy data impacts during severe events, especially in the southern hemisphere, and report at the next Panel workshop.

23. Collect views from Panel members and finalize the document expressing formal DBCP views regarding design of BUFR tables for dealing with buoy data. Submit that document to the CBS WG/DM.

24. Follow the issue of implementing an LUT in the South Atlantic region.

25. Prepare a tabulated assessment of the likely impacts of future budget reductions and of possible scenarios to deal with these, while maintaining the required technical support.

26. Make every effort to recruit new contributors to the trust fund.

27. Define specific actions and proposals from the DBCP to present to the next session of the OOPC (Capetown February 1997).

28. Write to the Chairman OOPC, expressing DBCP appreciation for his comments and interest, as well as the desire of the Panel to work closely in the future with OOPC in implementing requirements for buoy data for global climate studies.

29. Change interpretation of the QI indicator of section 0 of BUOY reports and advertise it widely.

30. Improve reliability of GTS data base updates between the two Argos centres.

31. Organize a training session in Toulouse regarding the GTS sub-system with CLS and SAI staff.

32. Follow up and possibly assist in implementing requirements expressed by the buoy users within the Argos system.

33. Compile and finalize DBCP publication No. 9 (1996 Workshop proceedings).

34. Draft a DBCP brochure.

35. GDP to formally apply as an action group of the Panel.

36 Write to ORBCOM and SAPHIR to request they support pilot studies.

37. Document location accuracy of Argos system (e.g. Circular Error Probable values).

38. Prepare a formal proposal relating to a possible new working relationship between CLS/Service Argos and the technical co-ordinator.

PART B

TASK	CARRIED OUT BY*	SUPPORTED/ASSISTED BY	REPORTED TO/ACTION BY	RELEVANT TOR OF THE PANEL
1	Technical co-ordinator (1, 8)	Panel members and Secretariats	Chairman for presentation to the panel	1, 2
2	Technical co-ordinator (1,.3, 8)	Panel members and Secretariats	Chairman and panel for information	1, 2
3	Secretariats	Panel members	Chairman and panel for information	1, 2, 8
4	Technical co-ordinator (1, 7), CLS/Service Argos	Panel members and Secretariats	Chairman and panel for information	6
5	Chairman and technical co-ordinator (1, 3, 4, 5, 8, 9)	Secretariats and others as appropriate	To Panel for consideration and appropriate action or for direct action by chairman	1, 2, 3, 5
6	Technical co-ordinator (1, 3, 4, 5, 8, 9)	Chairman, Secretariats and CLS/Service Argos	Wide circulation by Secretariats and CLS/Service Argos	7, 8
7	Technical co-ordinator (1, 2, 3, 7) and chairman	Secretariats	Panel and users	1, 2, 6
8	Chairman and sub-committee	Secretariats	Secretariats	9
9	Panel/chairman		Panel (at next session)	9
10	Chairman and Secretariats	Technical co-ordinator (1, 7, 8)	Executive Councils of WMO and IOC	10
11	Chairman and Secretariats	Technical co-ordinator (1, 5, 8)	Panel	1
12	Chairman and Secretariats	Panel members	Panel	4
13	Chairman and technical co-ordinator (1, 4, 5, 8)	Panel members	Panel	7, 8
14	Operational services, chairman, vice-chairmen and technical co-ordinator (1, 4, 5, 8)	Panel members	Panel	1, 2, 3, 7. 8
15	Technical co-ordinator (1, 2)		Panel	2, 3, 6
16	Technical co-ordinator (1, 2)	Panel members and operational services	Panel	2, 3, 6
17	NOAA/NOS and technical co-ordinator (1, 3, 8)		Panel	7, 8
18	Vice-chairman (Meldrum) and technical co-ordinator (1, 7, 8)	Chairman and Panel members	Panel	1, 2, 6, 7
19	E. Meindl	WMO Secretariat	Panel	7
20	Regional action groups, GDC	Panel members, Technical co-ordinator (5)	Panel, GDP	1, 2, 3
21	P. Le Roux, P. Niiler	Secretariats	Panel	7
22	Technical co-ordinator (5, 7), WMO Secretariat, National Meteorological Services	Chairman	Panel	2, 6
23	Working group	Technical co-ordinator (7), WMO Secretariat	CBS WG on Data Representation	6
24	ISABP, CLS/Service Argos		Panel, JTA meeting	1, 2, 4, 6
25	Secretariats	chairman	Panel	9
26	Secretariats, Panel members		Panel	9

TASK	CARRIED OUT BY*	SUPPORTED/ASSISTED BY	REPORTED TO/ACTION BY	RELEVANT TOR OF THE PANEL
27	Vice-chairman (Woodward) and technical co-ordinator (1, 8)	Action groups, Secretariats	OOPC	1, 2, 3, 4, 6, 8
28	Vice-chairman (Woodward)		Chairman OOPC	1, 2, 3, 4, 6, 8
29	CLS/Service Argos, LUTs, technical coordinator	WMO Secretariat	Panel	6
30	CLS/Service Argos	Technical co-ordinator (1, 6)	Panel	2, 6
31	Technical co-ordinator (1, 6, 7)	CLS/Service Argos	Panel	6
32	CLS/Service Argos	Technical co-ordinator (1, 6)	Panel, meeting on JTA	6, 7
33	Vice-chairman (Meldrum)	WMO Secretariat	Panel	7, 8
34	Technical co-ordinator (1, 8), chairman, vice-chairmen	Secretariats	Panel	7, 8
35	GDP		Chairman	2, 3, 4
36	Chairman, vice-chairman (Meldrum)	Vice-chairman, Secretariats	ORBCOMM and SAPHIR	2, 6, 7
37	CLS/Service Argos		Panel	2, 7
38	CLS/Service Argos		Chairman	9

* When the technical co-ordinator is involved in carrying out a task, the figures in parenthesis relate to the terms of reference for the technical co-ordinator

ANNEX XI

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ANNEX XII

LIST OF ACRONYMS AND OTHER ABBREVIATIONS

ADEOS	Advanced Earth Observing Satellite (Japan)
ADS	Automatic Distribution System (Argos)
BUFR	Binary Universal Form for Representation of meteorological data
BUOY	Report of a Buoy Observation
CBS	Commission for Basic Systems (WMO)
CD ROM	Compact Disk - Read Only Memory
CEP	Circular Error Probable
CLS	Collecte-Localisation-Satellites
DAT	Digital Audio Tape
DBCP	Data Buoy Co-operation Panel (IOC & WMO)
DS	Dispose Files (Argos)
EGOS	European Group on Ocean Stations
GCOS	Global Climate Observing System
GDP	Global Drifter Programme
GIP	Global Implementation Programme (DBCP)
GOOS	Global Ocean Observing System
GTS	Global Telecommunication System
hPa	hectoPascal
I-GOOS	Intergovernmental Committee for GOOS (IOC, WMO, UNEP)
IBPIO	International Buoy Programme for the Indian Ocean
ICO/Inmarsat	ICO Global Communications / International Maritime Satellite Organisation
ID	Identity number (CLS/Service Argos)
IGOSS	Integrated Global Ocean Services System (IOC & WMO)
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
IODE	International Oceanographic Data and Information Exchange (IOC)
IPAB	International Programme for Antarctic Buoys
IRIS	Intercontinental Retrieval of Information via Satellite
ISABP	International South Atlantic Buoy Programme
J-GOOS	Joint Scientific and Technical Committee for GOOS (IOC, WMO, ICSU)
JAMSTEC	Japanese Marine Science and Technology Centre
JTA	Joint Tariff Agreement (CLS/Service Argos)
LUT	Local user Terminal (CLS/Service Argos)
MEDS	Marine Environmental Data Service (Canada)
NCEP	National Center for Environmental Protection (NOAA)
NERC	Natural Environment Research Council (UK)
NOAA	Natrional Oceanographic and Atmospheric Administration (USA)
NOS	National Ocean Service (NOAA)
OCEAN-NET	OCEAN-NET
ODAS	Ocean Data Acquisition Systems, Aids and Devices
OOPC	Ocean Observing Panel for Climate
ORBCOMM	Orbital Communications Corporation
PGC	Principal GTS Co-ordinator (DBCP)
PI	Principal Investigator
PMOC	Principal Meteorological or Oceanographic Centre (DBCP)
QC	Quality Control
RMS	Root Mean Square
RNODC	Responsible National Oceanographic Data Centre (IODE)
SAFIR	Satellite For Information Relay
SCEM	Service central d'exploitation de la météorologie (France)
SIO	Scripps Institute of Oceanography (USA)
SOC	Specialized oceanographic Centre (IGOSS)

SSC	Strategy Sub-committee (of I-GOOS)
STARSYS	STARSYS Global Positioning Inc.
SVP	Surface Velocity Programme (TOGA & WOCE)
SVP-B	SVP "barometer" drifter
TAO	Tropical Atmosphere Ocean Array
TC	Technical Co-ordinator (DBCP)
TOGA	Tropical Ocean and Global Atmosphere experiment (WCRP)
UNESCO	United Nations Educational, Scientific and Cultural Organization
W3	World Wide Web
WCRP	World Climate Research Programme (WMO, IOC, ICSU)
WG	Working Group
WHOI	Woods Hole Oceanographic Institute (USA)
WMO	World Meteorological Organization
WOCE	World Ocean Circulation Experiment (WCRP)
WWW	World Weather Watch (WMO)
XBT	Expendable Bathythermograph