

**JCOMM MANAGEMENT COMMITTEE
FIFTH SESSION**

Geneva, Switzerland, 5-7 October 2006

FINAL REPORT

JCOMM Meeting Report No. 45

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NOTE

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GENERAL SUMMARY OF THE WORK OF THE SESSION

1. OPENING OF THE SESSION

1.1 Opening

1.1.1 The Fifth Session of the Management Committee of the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) was opened at 0930 hours on Thursday, 5 October 2006, in the WMO Headquarters building in Geneva, Switzerland, by the Commission Co-president, Dr Peter Dexter. Dr Dexter welcomed the participants to the session, on behalf of Co-president Dr Jean-Louis Fellous and himself, and extended a special welcome to the new Management Committee members. Dr Dexter recalled that the present session of the Management Committee is the first formal meeting since the Second Session of the JCOMM (Halifax, Canada, September 2005), and it represented an important opportunity to allow the Committee to review the overall programme, provide guidance and assign specific tasks for each Committee member. Dr Dexter then introduced the Deputy Secretary-General of the WMO, Professor Hong Yan.

1.1.2 On behalf of the Secretary-General of the WMO, Mr Michel Jarraud, and of the Executive Secretary the IOC, Dr Patricio Bernal, Professor Hong Yan welcomed participants to the session, to the WMO Headquarters and to Geneva. Professor Yan congratulated Dr Peter Dexter and Dr Jean-Louis Fellous, JCOMM co-presidents, and the new members of the Management Committee.

1.1.3 Professor Yan informed the Committee that during the present mandate, the Secretary-General of the WMO has attempted to introduce substantial reforms as a continuing process in internal management, while enhancing the Secretariat's support to Members and the technical commissions, particularly by strengthening all the cross-cutting issues. Professor Yan also highlighted that the Marine Meteorology and Oceanography Programme, is by nature an important component of WMO's major programmes, achieving the relationship between the WMO and IOC, through JCOMM. Professor Yan recognized that this session of the Management Committee came at an important time, by addressing key issues relevant in the preparatory phase of the next WMO Strategic and Operational Plans (2008-2011).

1.1.4 Professor Yan then recalled that several natural disasters with considerable loss of life and socio-economic impacts, which have taken place since the establishment of the JCOMM, in particular the tragic tsunami in the Indian Ocean on 26 December 2004, and the severe flooding in several parts of the Caribbean, Central America and Asia in 2004 and 2005 associated with the most intense tropical cyclone seasons recorded in the Atlantic and Pacific Oceans. Professor Yan emphasized that the WMO is actively joining forces with the IOC of UNESCO, to ensure effective development of the Tsunami Warning System (TWS) in different regions of risk, in particular by facilitating significant capacity in support of the Early Warning Systems of its Members, through its Global Operating network (GOS/GDPFS/GTS). Professor Yan also pointed out that the JCOMM plays a critical role for the enhancement of capacity monitoring, detecting, and forecasting of ocean-related hazards such as severe storms, storm surge, tropical cyclones, and tsunamis through its own activities and initiation of new Inter-Commission collaboration in relevant areas.

1.1.5 Professor Yan stressed that it was important for this session of the Management Committee to be aware of, to review thoroughly, and to plan input to, a number of external activities directly relevant to the Commission and its work. These activities included, in particular, but were not limited to:

- (i) Natural Disaster Prevention and Mitigation Programme;
- (ii) The interaction between the WCRP and JCOMM and, in particular, the CLIVAR Project;
- (iii) JCOMM involvement in the tasks of the Ocean-United Forum for GEO-related activities, and GEO work plan;
- (iv) JCOMM involvement in the IPY;
- (v) The further development of the WMO Information System (WIS);

(vi) The strategy for future collaboration between the IOC and WMO.

1.1.6 Professor Yan concluded by thanking the Committee for its contribution to the WMO Members/IOC Member States in facing the challenges of improving weather forecasting, climate change detection, disaster prevention and mitigation, and the many weather and marine oceanography related application areas, or “societal benefit areas”. Professor Yan wished everyone a successful meeting and an enjoyable stay in Geneva.

1.1.7 Ms Candyce Clark, the representative of the IOC, spoke on behalf of the IOC Executive Secretary, Dr Patricio Bernal. Ms Clark reaffirmed the IOC’s strong support for the work of the JCOMM and emphasized the importance of collaboration with the WMO. Ms Clark concluded by wishing everyone a successful meeting.

1.1.8 Dr Georgi Kortchev, Director of the Applications Programme Department of the WMO, welcomed the participants to the session and to Geneva. Dr Kortchev recalled the Fifty-eighth Session of the WMO Executive Council (EC-LVIII, June 2006), and decisions and recommendations raised from this session. The Fifty-eighth Session (EC-LVIII) approved two resolutions under the WMO Marine Meteorology and Oceanography Programme (MMOP) vis-à-vis the report and recommendations arising from the Second Session of the JCOMM and ship owners and masters’ concerns with regard to VOS data exchange, respectively. Dr Kortchev also pointed out the major outcomes and follow-up actions for the MMOP, in particular that the EC-LVIII has urged WMO support to strengthen and enhance the operational marine meteorological capabilities in African countries for improving maritime safety, and has requested the JCOMM to work on ongoing priority activities, including the new area of tsunami monitoring and mitigation systems and services, in close collaboration with the IOC. The Committee noted that the EC-LVIII also stressed the need to further strengthen capacity building in developing countries to allow Members to provide better tropical cyclone, flood and storm surge forecasts and warnings, and recognized the vital importance of the working relationship between the tsunami early warning system and the existing tropical cyclone and storm surge early warning system in saving life and property in the coastal areas. Dr Kortchev concluded by ensuring that the Management Committee addresses these issues when considering the JCOMM Programme Area activities. Dr Kortchev wished everyone a successful meeting and an enjoyable stay in Geneva.

1.1.9 The list of participants in the session is provided in Annex I.

1.2 Adoption of the agenda

1.2.1 The Committee adopted its agenda for the session on the basis of the provisional agenda prepared by the Secretariat, changing the agenda item 5.2 to ‘Communications strategy’. The agenda is provided in Annex II.

1.3 Working arrangements

1.3.1 The Committee agreed upon its hours of work and other practical session arrangements. The documentation was introduced by the Secretariat.

1.3.2 The Committee agreed to break into three small working groups under the agenda item 5.5, which is as follows:

- a) Implementation Plan: Dr P. Dexter, Dr C. Donlon, Mr M. Johnson, Mr R. Keeley, Dr J. Zillman and Dr D.J. Baker;
- b) Coastal GOOS: Dr P. Dandin, Professor K. Affian, Dr R. Folorunsho, Dr R. Nuñez and Dr D.E. Harrison;
- c) Communications strategy: Dr J.-L. Fellous, Ms M. Andrioli, Dr L. Rickards and Professor W. Nowlin.

2. Reports

2.1 Report of the co-presidents

2.1.1 The Committee noted with appreciation the report by the Co-presidents of the JCOMM, Drs Peter Dexter and Jean-Louis Fellous, covering the major activities of the Commission since JCOMM-II, including in particular those in which they had been directly involved, as well as priority issues and activities for the remainder of the intersessional period. Specifically, the report covered: JCOMM-II follow-up, urgent and cross-cutting issues, external interactions, meetings of the WMO and IOC Governing Bodies, communications, outreach and strategic development, upcoming major events, priorities for the current intersessional period, as well as funding and Secretariat support. In the report, the Co-presidents placed particular stress on those issues which would require the attention of the Committee during the meeting, and also underlined the importance of all Committee members contributing, both to the debates during the meeting, and also directly to the implementation of specific work assignments during the remainder of the intersessional period. They concluded by thanking the Secretariat for its support, noting that an excellent start had been made in addressing the very large work programme agreed by the JCOMM-II.

2.2 Report of the Secretariat

2.2.1 The Committee noted that the WMO component of the joint Secretariat is now fully staffed with professional members. It also noted that relationships of the WMO Marine Meteorology and Oceanography Programme with other Programmes and Technical Commissions within WMO were strengthened following recommendations raised from the Fifty-eighth Session of the WMO Executive Council (EC-LVIII).

2.2.2 The Secretariat recalled that the JCOMM-II had defined a work plan for the current intersessional period. The Secretariat noted that the Management Committee would develop an implementation plan and during the intersessional period assign tasks for each Committee member.

3. Programme Area priorities and issues for consideration by the Committee

3.1 Observations PA, including JCOMMOPS, ship security, bulk purchase of consumables

3.1.1 The Committee noted with interest and appreciation the report of the Observations Programme Area (OPA) Coordinator, Mr Mike Johnson. This report covered the activities undertaken within the OPA. The OPA implementation is being achieved through the DBCP, the SOT, and GLOSS, and through the working relationships with other international implementation panels such as the Argo, OceanSITES, and IOCCP, which also provide important contributions to the global ocean observing system, even though they are not officially part of the JCOMM. Mr Johnson reported that the OCG has chosen to give priority attention to: (i.) achieving global coverage by the *in situ* networks, (ii.) system-wide monitoring and performance reporting, and (iii.) funding to meet implementation targets.

Achieving global coverage

3.1.2 The OPA had drafted a strategic work plan that was presented to the Committee. This plan lays out an initial strategy for implementation of the JCOMM/OPA contributions to the composite global ocean observing system as defined in the GCOS *Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC* (GCOS-92). The GCOS-92 has been endorsed by the UNFCCC, and the ocean chapter has been endorsed as the ocean backbone of the Global Earth Observation System of Systems (GEOSS). Although the backbone system specified by GCOS-92 is designed to meet climate requirements, marine services in general will be

improved greatly by implementation of the global coverage called for by this design. The system will support global weather prediction, global and coastal ocean prediction, marine-related multi-hazard warning systems, marine environmental monitoring, and many other non-climate users.

3.1.3 The Committee agreed that the OPA should be developing tide gauge stations and moored buoys for tsunami warning and storm surge as a matter of priority for the international global observing system. Following the Expert Meeting on possible JCOMM contributions to the development and maintenance of marine multi-hazard warning system in early 2006, progress has been made with regard to defining standard protocols and formats for GTS transmission of tide gauge data in real-time, and the DBCP will sponsor a technical workshop in October 2006, in conjunction with the DBCP annual meeting, at which tsunami warning buoys (DART) will be highlighted. Coordination of deep ocean mooring for tsunami detection (tsunameters) with the other data buoy operations will be a major topic of discussion at the DBCP meeting.

3.1.4 As part of the OPA strategic work plan, implementation targets have been defined and agreed upon for all of the components, with the exception of the VOS fleet and the ASAP programmes, which for practical reasons is difficult to set a target. It is estimated that approximately 56% of the observing system under the JCOMM is now completed. The drifting buoy component reached completion at the end of 2005, but as recommended by the DBCP Data Users and Technology Workshop (Reading, United Kingdom, 27-28 March 2006), efforts remain to be made (i.) to add barometers on all of the instruments, and (ii.) to record and distribute hourly SST data on the GTS. Other observing systems are nearing completion (e.g., Argo (83%), SOOPIP (82%), TIP (72%)), the tropical Pacific and moored array is completed, the Atlantic PIRATA moored array is nearly completed, plans for the extension of the Indian Ocean Array, and the VOSclim is at 60% of completion. Regarding the latter, efforts remain to be made in order to collect all required data sets from the fleet, including delayed-mode data and metadata. (**action: DMPA and OPA**). Efforts remain to be made regarding GCOS real-time sea level reference stations (40%), reference time-series stations (21%), global reference mooring network (48%), and the repeat hydrography and carbon inventory (43%). With regards to wave measurements, the Committee recommended to receive detailed requirements for the network from the ETWS and increase the number of wave measuring buoys (**action: SPA and OPA**). In this regard, the Committee noted that a questionnaire had been developed by the SPA Coordinator, and the Secretariat to document wave observation requirements that was distributed at the recent Ninth Workshop on Wave Hindcasting and Forecasting (Victoria, Canada, September 2006). This action was taken in response to an overwhelming request at the Workshop for enhanced capability for global wave observations. The Committee noted with appreciation that the deployment of hurricane drifters had become a routine exercise in the western Atlantic.

3.1.5 About 4700 VOS ships are reporting as many as 250000 observations per month on the GTS. However, the VOS fleet has been declining in recent years, and availability of the VOS ships' positions on public websites is a matter of concern to ship owners and masters. the WMO Executive Council, at its Fifty-eighth Session (EC-LVIII, Geneva, Switzerland, June 2006), adopted Resolution 7 (EC-LVIII), *Ship Owners and Masters' Concerns with Regard to VOS Data Exchange*. In particular, the resolution authorized Members to mask the ship's call signs from FM-13 SHIP reports for a trial period of one year, as long as they provide access to secured data with the ship's identification. While different approaches had been proposed and implemented by Member States, the Committee stressed that unique ship identification remains essential for quality monitoring activities, as well as for global climate studies, and that any technical solution proposed for ship masking should take into account such activities (**action: OPA**). The Committee suggested in order to enhance the value of the VOS programme, that the dialogue with the shipping industry could be broadened to include appropriate JCOMM requirements.

3.1.6 Satellite observations, sea surface temperature, sea surface height, surface vector winds, ocean colour, and sea ice are considered essential variables by the JCOMM. The value of space-based altimeter measurements of sea surface height has now been clearly demonstrated by the TOPEX/Poseidon and Jason missions. Jason follow-on altimeter missions (Ocean Surface

Topography Mission, OSTM), which are necessary for ocean forecasting and to continue the long-term sea level record.

3.1.7 Following the Fourth Management Committee (MAN-IV) recommendations, a workshop was held in Reading, United Kingdom, from 28 to 29 March 2006, and a Water Temperature Metadata Pilot Project (META-T PP) was established. Ms Elanor Gowland from the UK Met Office is currently chairing the Pilot Project Steering Team. The Pilot Project is working at establishing a global system that will permit timely collection of metadata from observing systems, providing SST and water temperature profile data (e.g., GOSUD, GTSP, Argo, DBCP, SOT, OceanSITES and ODAS). A number of user requirements are being considered, including the NWP, SST analysis and GHRSSST, ocean modelling, climate forecasts, seasonal to decadal climate variability, satellite validation, operational activities (e.g., weather forecasting and disaster response), quality assurance activities serving the above applications, and diagnostics by platform operators. The Committee noted with appreciation the offer made by the JCOMM ODAS Metadata centre (NMDIS, China), to host metadata servers for the Pilot Project. The Workshop also recommended that the OCG address the issue of metadata collection, in view of its eventual integration through the ODAS metadata centre. The National Data Buoy Center (NDBC and NOAA) also expressed its interest to participate in this pilot project by hosting a mirror server, and would investigate this feasibility.

System-wide monitoring and performance reporting

3.1.8 The Committee agreed that existing resources were not sufficient to achieve the observing system global implementation targets that the performance metrics defined, and proposed by the OCG can help in evaluating the effectiveness of the observing system and help in efforts to convince governments to provide the funding needed to meet the targets. A standard JCOMM base map has been agreed upon to show observing system status and effectiveness, compared to the global requirements. Quarterly performance reports are now available for sea surface temperature, sea surface salinity, temperature profiles, salinity profiles, and near-surface currents. Other ocean variables specified by the GOOS and GCOS will be added in due course.

3.1.9 The OPA is now routinely reporting observing system monitoring and performance metrics in cooperation with the GOOS Project Office of the IOC. A consolidated progress report with contributions by countries, lists sixty-eight countries and the European Union that maintain elements of the composite global ocean observing system, and the number of *in situ* platforms and expendables contributed by each country.

3.1.10 A web page is currently under development, that provides a single entrance portal to link to all websites being maintained by countries contributing to implementation of the global ocean observing system. This single entrance portal is intended to illustrate to users the “system of systems” that is being implemented by the JCOMM and its partners.

3.1.11 The Committee noted with appreciation the development of a new experimental near-real-time system monitoring tool for use by observing system managers. The “Observing System Monitoring Center” (OSMC) database, gathers its primary information from the GTS via the U.S. GODAE server system at Monterey, California; this allows comparison with the GTS access via Météo-France which is the primary data source for the JCOMMOPS database. Additional non-GTS data sources are in the process of being added to the OSMC. The OSMC allows users to monitor observing system status in near real-time (the database which is updated daily prevents sensitive ship locations from being displayed in real-time) and sort platform reports by country, variable, time frame, and platform type. The OSMC is intended to be publicly available via JCOMMOPS. The Committee thanked the United States for offering the OSMC to the JCOMM. It agreed that it should be endorsed as a test JCOMM tool, and that it should be advertised via JCOMMOPS and the JCOMM Newsletter, as well as featured on the main JCOMM website (**action: Secretariat**).

3.1.12 All JCOMM performance metrics and OSMC are available through the JCOMMOPS access portal at the following web address: www.jcommops.org/network_status. Members/Member States are encouraged to review the website and provide corrections and additions as needed, to: opa@jcommops.org.

JCOMMOPS roundtable discussions

3.1.13 Mr Johnson reported on the outcome of the informal JCOMMOPS Strategy Roundtable meeting which was held in Silver Spring, MD, USA, on 9 May 2006. The purpose of the meeting was to bring together representatives of the programmes that are presently using JCOMMOPS and other global programmes that could potentially benefit from using the JCOMMOPS, to do some strategic long-range brainstorming. Representatives from the OCG, DBCP, SOT, GLOSS, Argo, OceanSITES, IOCCP and POGO participated in the event. The Group generally agreed that there is an urgent need for an expanded observing programme support centre (OPSC). This should include system performance monitoring, system design evaluation, and authority to suggest deployments to improve system and efficiency and effectiveness. This could provide synergies for functions that are now distributed, and also provide a more integrated framework for the deployment and further development of ocean observing networks. The Group had discussed future staffing (seven persons required), and hosting requirements (with an operational agency preferably) for the JCOMMOPS. The Roundtable recommended that the OCG should develop a requirements specification for the centre. This was endorsed by the MAN (**action: OPA coordinator**). Based on these requirements, solicitations of support for the OPSC will be made of national operational centres, bearing in mind that final decisions on location and support for the OPSC may take several years.

Funding to meet implementation targets

3.1.14 The Committee agreed that the strategy defined by the OCG to help convince governments to provide the funding, needed to meet global implementation targets, as appropriate. This included development of easy to understand statistics and reports that the decision makers will be able to use to justify new funding.

3.1.15 The Committee recalled the Recommendation by the JCOMM-II to establish a common fund for ship consumables, in order to provide a mechanism to Members/Member States to increase the resources committed to supplying expendables for ship observations in support of international implementation plans. While the Trust Fund would initially focus on XBTs, other expendables could be added in due time. Based on similar previous experience with purchasing radio-sounding equipment on behalf of the Members/Member States, the WMO has offered to manage the Trust Fund on behalf of the SOT as soon as Members/Member States are willing to commit to it. The Committee agreed that any proposed expenditures should be authorized by way of a letter from the Chairperson of the SOT to the WMO. The expenditures would then be made by the WMO, provided that sufficient funds existed in the Trust Fund. It was further agreed that the WMO would report on the use of the Trust Fund to the SOT at its regularly scheduled meetings (**action: Secretariat and OPA**).

3.2 Services PA, including ocean products development, the SPA website, and the ocean products web portal

3.2.1 The Committee noted with interest and appreciation the report of the Services Programme Area (SPA) Coordinator, Dr Craig Donlon. This report covered the SPA work plan for the current intersessional period, key issues for the programme and SPA Expert Team developments. The Committee recalled the role of the SPA within the JCOMM, and agreed that a key challenge for the programme is the integration of science and standards into operational services supporting maritime safety, emergency response, disaster risk reduction and maritime hazards with full users' support and interaction. The Committee noted that the SPA work plan had been developed for the current intersessional period, and urged the Service Coordination Group in collaboration with Secretariat support, to further develop the work plan, and to promote interaction and integration

between the SPA Expert Teams (**action: SPA and Secretariat**). In this regard, Dr Donlon pointed out the Top Level Objectives (TLOs) for the SPA work plan, which are as follows:

- a) TLO-1: Support to maritime safety, hazard warning and disaster mitigation systems. The objective is to monitor and develop modifications to maritime safety, hazard warning and disaster mitigation systems as necessary, and to provide assistance to Members/Member States as required. Systems include: the WMO marine broadcast system for the GMDSS, as well as MPERSS; storm surges; tropical cyclones; tsunami; search and rescue; marine pollution; ice and iceberg warnings; rogue waves and dangerous sea state;
- b) TLO-2: The Importance of a User Focussed Programme. The objective is to understand and respond to present and future needs of the maritime service industry, and ensure that the services provided to users meet these requirements, including content, delivery timeliness and quality. A key priority for the JCOMM SPA is to provide mechanisms and services that engage the user community in the JCOMM discussions, plans and activities and to manage user feedback on all aspects of the JCOMM;
- c) TLO-3: Working Effectively with Members/Member States. The objective is to keep under review and to respond to the requirements of Members/Member States for guidance in the implementation of their duties and obligations with regard to marine services, in particular those specified in the WMO *Manual on Marine Meteorological Services* (WMO-No. 558);
- d) TLO-4: Pulling through scientific and technical expertise to operational systems. The objective is to build on international scientific and technical excellence, to better meet the needs of the international maritime service industry by developing the preparation and dissemination of ocean products and services;
- e) TLO-5: Communications and 'joining up' the SPA. The objective is to integrate the internal cross-programme area activities of JCOMM, with international regional/global efforts and with that of others to increase efficiency and capability, including the relevant programmes of the WMO and the IOC (e.g., DPM, WWW, WCP, GOOS and GCOS), as well as with other organizations such as the IMO, IHO, IMSO and ICS in the provision of marine services and information;
- f) TLO-6: Maintaining and monitoring international standards. The objective is to ensure that the JCOMM SPA acts as a flexible, streamlined organization capable of coordinating international maritime services;
- g) TLO-7: Building appropriate capacity within the JCOMM. The objective is to build appropriate capacity within the JCOMM to make the most of international collaboration (e.g., GOOS and GEO/GEOSS), to share marine meteorological and oceanographic knowledge, infrastructure and services for the benefit of the Maritime community.

3.2.2 In order to achieve these objectives, the Committee agreed that there is a need to re-arrange the SPA structure, focusing on the information to provide to maritime safety and search and rescue. The Committee urged the SCG to revise the ET's Terms of References (ToR) and to propose changes to be approved by upcoming JCOMM-III Session (**action: SPA**). The SPA Coordinator proposed a new structure for the SPA, which focuses all current ETs on a common theme of MetOcean Services. In addition, noting the importance of pulling through the successes of the GODAE Project into JCOMM as GODAE transitions from pilot project to operations, a new rapporteur for ocean forecasting (in particular ocean meso-scale forecasting) will be appointed to facilitate this transition. The Committee noted that ocean climate services are not reflected in the SPA work plan and urged the SCG to further develop it in order to better engage these aspects (**action: SPA**).

3.2.3 Concerning the Task Team on Ocean Products Development (TT-OPD), Dr Donlon stressed that the work of the team is extensive, and it has been difficult to find the correct membership. In this regard, the Committee agreed that the purpose of this Team would be the development of standard documents, such as Service User Requirement documents, *Observation Requirements for Services*, *Catalogue of Operational Ocean Products and Services*, *Standard Data and Metadata Formats for Ocean Products*, and the *Guide to Ocean Product Presentation, Symbology and Nomenclature*. Noting the importance of these standards/reference documents to enhance cross Program Areas (OPA and DMPA) and internal SPA coordination and communication, the Committee agreed that this work would be more effectively carried out by the SPA Coordinator working in conjunction with the OPA and DMPA Coordinators, ET Chairpersons and the Secretariat, as a Core Team (**action: PAs, SPA ETs and Secretariat**), and in close collaboration with users within the new SPA structure agreed in 3.2.2, not requiring a TT-OPD.

3.2.4 The Committee noted with appreciation that a considerable focus of effort for the Programme Area during the next two years is planning the International Maritime Metocean Services Conference in 2008 (Exeter, United Kingdom, 5-9 October 2006), with the aim of establishing and agreeing on international MetOcean Services requirements, identifying shortcomings of the present systems and reviewing long and short-term solutions. The Committee endorsed this Conference, and expressed its appreciation for efforts to put together private and public maritime application industries, system and service providers, marine scientists and engineers to improve communication and mutual understanding. A Scientific Coordination Group will be established to develop the format and content of the Conference in the next six months.

3.2.5 The Committee endorsed the work plan and key activities for the current intersessional period for each Expert Team. The major key issues for each Expert Team are as follows:

Expert Team on Maritime Safety Services (ETMSS)

- Focus output and support on MetOcean products and services in support of maritime safety systems within a new SPA structure;
- Monitor GMDSS web and graphical products to test with the IMO;
- Propose a concept paper and a PhD studentship to consider the provision of graphical products via SafetyNET (also mobile phone devices);
- Establish a Core Membership of the *ad hoc* teams (Note: *ad hoc* will never result in anything more than *ad hoc* results);
- Definitions of boundaries and responsibilities for Arctic NAV/METAREAS;
- Enhance the use of MSI related to sea state steep waves, rogue waves and surges;
- Enhance use of better ice information;
- Review tropical Cyclone scales with the WMO TC program;
- Provide appropriate MSI related to Tsunami: organisation, type, content and format of warnings (develop and review a tentative guidance scheme);
- Revise the Pub. 9 Vol. D (which is nearly completed);
- Need for more cross cutting activities and more user feedback.

Expert Team on Marine Accident Emergency Support (ETMAES)

- Focus output and support on MetOcean products and services in support of maritime safety systems within a new SPA structure;
- Establish a Core Membership of the *ad hoc* team;
- Further develop MPERSS system with graphical products to test with National agency support;
- Develop service for HABs and other bio-chemical events;
- Strengthen link to the EMSA;
- Seek closer collaboration with the IMO and IHO to avoid duplication of activities;
- Better user involvement at national level and better feedback;
- Need better outreach to promote the ETMAES initiative;
- Need to develop application community and facilitate data exchange to initiate activities as soon as possible.

Expert Team on Wind Waves and Storm Surges (ETWS)

- Focus output and support on MetOcean products and services in support of maritime safety systems within a new SPA structure;
- Develop the *Guide to Storm Surge Forecasting*;
- Develop and update the dynamic part of the *Guide to Wave Analysis and Forecasting*;
- Complete Technical Reports on assimilation of satellite data, wave climate effects on design criteria and review of boundary layer wind fields;
- Develop a statement of requirements for wave observations;
- Develop archive of extreme wave events with ETMC;
- Extend and develop the operational wave model inter-comparison project and verification project.

Expert Team on Sea Ice (ETSI)

- Focus output and support on MetOcean products and services in support of maritime safety systems within a new SPA structure;
- Provide advice, coordination and support (general and tailored) on national, regional and international levels, during and after the IPY 2007/2008;
- Finalize the updated version of the *WMO Sea Ice Nomenclature and Illustrated Glossary*;
- Cooperate with the IHO on Ice Objects Catalogue in ECDIS and with GCOS on ECV;
- Modification of SIGRID-III and data exchange;
- Be involved in cross-cutting issues, especially such as the GEO;
- Maintain strong working relationships with related groups: GDSIDB, IICWG etc.;
- Based on the JCOMM-II recommendations, summarize and develop new strategic items for the group at ETSI-III session;
- Provide sea ice observation requirements;
- Input to SPA URD process;
- Better support to MSS;
- Convene a sea ice analysis chart workshop in collaboration with OOPC (GCOS) working group on sea ice.

3.2.6 The Committee noted that several discussions have taken place between the SPA Coordinator, the ETSI Chairperson and the Chairperson of the GCOS sea ice working group relating to the inconsistency between sea ice charts due to the slightly different analysis methods and procedures at different ice centres. In order to address this issue, it was proposed to hold a workshop to compare sea ice analysis charts, methods and techniques in order to establish a common approach to sea ice charts to maintain consistency of operational sea ice charts from different centres. The Committee endorsed the proposed workshop (seeking extra-budgetary funds) (**action: ETSI**).

3.2.7 The Committee also noted with appreciation that a Storm Surge Symposium is planned for October 2007. This scientific and technical workshop will complement other international efforts including the series of capacity building workshops on storm surge and wave forecasting organized by the JCOMM and the WMO Tropical Cyclone Programme, and the JCOMM efforts into developing marine multi-hazard warning systems. The focus of the workshop will be similar to the very successful JCOMM scientific workshops in other related fields, including the International Workshop on Wave Hindcasting and Forecasting and the CLIMAR Workshop on Advances in Marine Climatology. The Committee endorsed the proposed Storm Surge Symposium (seeking extra-budgetary funds) (**action: ETWS**).

3.2.8 The Committee noted the cross-cutting activities and specific tasks assigned to the OPA and DMPA identified by the SPA coordinator, are as follows:

Observations Programme Area (OPA)

- Observation Requirements for JCOMM Services;
- Some JCOMM Services would be data driven services. There is a need to establish

- the responsibility for these services in collaboration with the OPA and DMPA;
- Work with the GTSP and the establishment of how to provide services through the SPA;
- Work with the GOSUD and the establishment of how to provide services through the SPA.

Data Management Programme Area (DMPA)

- Standard data and metadata formats for ocean products;
- *Guide to Ocean Product Presentation, Symbolology and Nomenclature*;
- Finalize the *WMO Sea Ice Nomenclature* including an Illustrated Glossary of Sea Ice Terms;
- Incorporate the comprehensive work undertaken by the experts from the CIS to extend the coding of sea ice melting to identify ice decay and the associated strength of the ice into the new *WMO Sea Ice Nomenclature* including an Illustrated Glossary of Sea Ice Terms;
- Consider table driven codes for SPA data products (present and future bio-geochemical products), e.g., those derived from ocean forecast model data sets and ocean bio-geo-chemical measurements;
- SPA must work closely with the DMPA to help develop a JCOMM Data Management Strategy jointly with the IOC/IODE and the WIS.

This issue was further discussed under the Agenda Item 3.4.

3.2.9 The Committee noted and agreed that in the case of met-ocean services, capacity needs to be developed appropriately for each Member/Member State in a manner that eventually results in a fully-functioning suite of met-ocean services satisfying national, regional and international needs. Three stages of development can be defined for which capacity building needs are very different:

- a) Stage I: Countries/Regions with little or no services, limited resources, who recognize their needs;
- b) Stage II: Countries/Regions with some infrastructure, resources and good knowledge of met-ocean requirements and limitations. These Countries/Regions are capable of implementing SPA systems;
- c) Stage III: Countries/Regions that have high-level infrastructures, resources and research and development activities. Capable of developing the next generation of JCOMM services and products through innovations (e.g., graphic products, ecosystem models, etc.)

This issue is further discussed under the Agenda Item 4.3.

3.3 Data Management PA, including the JCOMM DM strategy

3.3.1 The Committee noted with interest and appreciation the report of the Data Management Programme Area (DMPA) Coordinator, Mr Bob Keeley. The report covered the activities undertaken under the DMPA. Mr Keeley stressed the need for the DMPA to build close collaboration with the other Programme Areas. In this regard, Mr Keeley mentioned a proposed extreme wave database project between the ETWS and ETMC that will broaden the scope of the ETMC (**action: ETWS and ETMC**).

3.3.2 Mr Keeley reported that he attended an IODE Officers meeting in February 2006 to provide a JCOMM and DMPA perspective to discussions and to further cooperation. The lack of coordination between the WDCs, IODE and JCOMM was noted, and the Officers suggested a meeting of chairpersons to discuss linkages and areas of overlap. A number of issues were raised relating to metadata and the WIS, the use of OceanTeacher and of the training facilities in Ostend, and the further integration of the IODE, GOOS, and JCOMM websites.

3.3.3 Regarding capacity building, Mr Keeley called for close collaboration with the IODE's OceanTeacher programme, which comprises an online knowledge and course material resource system as well as the Ostend training centre. The JCOMM could contribute to, and benefit from the OceanTeacher by providing documentation, training materials as well as lecturers. The Committee agreed to task the DMCG with the coordination of the submission of materials to OceanTeacher (**action: DMPA**).

3.3.4 The Committee noted with appreciation the efforts that have been made by the ETDMP to meet both the IODE and JCOMM objectives.

3.3.5 Mr Keeley reported that the ETDMP is currently establishing close collaboration with the WIS. The DMPA and ETDMP Chairpersons attended the Inter-Commission Coordination Group on the WIS (ICG-WIS, Boulder, Colorado, USA, 24-27 October 2005). Mr David Thomas, acting as the main contact point on WIS matters for DMPA, represented the JCOMM at the ICG-WIS meeting (Beijing, China, 5-8 September 2006). This helped in refining the JCOMM Data Management strategy with regard to the WIS and the role of the IODE. The Committee noted with appreciation the development of the E2EDM pilot project with regard to the WIS. The E2EDM prototype (see: <http://e2edm.meteo.ru> and <http://e2edm.vliz.be/>) has already implemented a number of tasks that are required by the WIS, and it is planned that the centre in Obninsk will act as a WIS Data Centre and Product Centre (DCPC). Dr Nick Mikhlailov (ETDMP Chairperson) will attend the upcoming Technical Conference on the WIS (TECO-WIS) in Seoul, Republic of Korea, from 6 to 8 November 2006) to demonstrate the prototype.

3.3.6 The Committee noted that there was still extensive work to do on a metadata profile that meets both meteorological and oceanographic needs. Both the DMCG and the ETDMP Chairpersons are involved in this work. The location of the data discovery metadata records, and the way those records relevant to the JCOMM and/or the IODE are built, will have to be clarified by the DMCG and included in the JCOMM Data Management Strategy (**action: DMPA**).

3.3.7 In terms of metadata management the DMCG Chairperson reported that quite some progress has been made both within JCOMM (e.g., ODAS, Meta-T) and IODE's Steering Group for MEDI (SG-MEDI), but further consolidation is required and adoption of the developed standards by the relevant communities is highly needed. The IODE's SG-MEDI, Chaired by Mr Greg Reed, recently held its Third Session (11-13 September 2006). The Committee noted that the SG-MEDI and DMPA had common interests and should work more closely together (**action: DMPA**). The Committee discussed the need for a sensor workshop to identify required associated metadata. The Chairperson of the IODE informed the Meeting of such a workshop (Sensor metadata interoperability taking place in Portland, Maine, USA, 19-20 October 2006, organized by the Marine Metadata Initiative). It noted that the META-T Pilot Project was currently dealing with similar issues, although its activities were initially limited to SST and water temperature measurements. The Committee noted that META-T could be used as a model for developing metadata lists for other variables.

3.3.8 Regarding the overall role of the JCOMM within the WIS, the Committee asked the WMO Secretariat to prepare a questionnaire to Member States represented on JCOMM asking for information on potential JCOMM DCPCs for marine meteorological and oceanographic variables (**action: Secretariat and DMPA**).

3.3.9 The Committee noted with appreciation that a first draft of the JCOMM Data Management Strategy was completed and circulated to members of the DMPA, the JCOMM joint Secretariat, the IODE Chairperson, JCOMM Co-presidents and other PA Chairpersons in early July 2006. The document will be discussed at the Second Session of the Data Management Coordination Group (Geneva, Switzerland, 10-12 October 2006), and it is planned to revise and discuss these issues further with other JCOMM Programme Areas and with a wider audience after the meeting. The DMPA Coordinator is striving to have an approved version ready by the end of 2006. Mr Keeley mentioned that the strategy included a number of concrete recommendations for action. The

Committee agreed with the proposal by the DMPA Coordinator that the DMCG prepares a detailed implementation plan that will lay out a path to reach the objectives described in the strategy. The Committee also encouraged the DMPA and other Programme Areas to engage in more unified data management operations (**action: DMPA and other PAs**).

3.3.10 The Committee noted the development of an IOC Strategic Plan for Oceanographic Data and Information Management Plan, and stressed that it should be made as far as possible, consistent with the JCOMM Data Management Strategy. The Committee requested Mr Keeley to work with the IOC to accomplish this task (**action: DMPA Coordinator**). Mr Keeley further referred to links, through the JCOMM DMPA Coordinator, to the EU funded SeaDataNet project and US-IOOS DMACS initiative.

3.3.11 The DMCG Chairperson reported on other developments under the JCOMM DMPA, including: (i.) JCOMM contributions to the development and maintenance of marine multi-hazard warning systems and recommendations from the Expert Meeting (Geneva, Switzerland, 1-3 February 2006), (ii.) ET activities and appropriate tuning of their work, (iii.) capacity building and satellite issues related to data management, (iv.) quality management and JCOMM's role in the WMO Quality Management Framework, (v.) GTS coding requirements and migration to table driven code forms, (vi.) effective cooperation with GEOSS, and (vii.) linkages to large data management endeavours such as the US QARTOD, and others.

3.3.12 The DMCG Chairperson informed the Committee that the planning for CLIMAR-III was progressing well, and the Conference is expected to take place in Warsaw, Poland, from 6 to 9 May 2008. Mr Scott Woodruff (Chairperson of the ETMC) is coordinating the planning for this event (**action: ETMC**).

3.3.13 The DMCG Chairperson called attention to the need for action regarding the development of BUFR tables to enable transmission of real-time biological and chemical data. The Committee agreed that BUFR would eventually be required for coastal GOOS cooperation and that this could be achieved through the development of BUFR Master Table 10, which is dedicated to oceanographic data. However, familiarity with BUFR remains a challenge for the ocean community. After lengthy discussions stressing the need to engage concerned data providers, the Committee decided to proceed with the preparation of the BUFR tables for non-physical parameters (**action: DMPA**).

3.4 PA interactions, common issues, priorities

3.4.1 The PA Coordinators were invited to comment on possible interaction and cross-cutting issues.

3.4.2 The SPA Coordinator, Dr Craig Donlon, identified three major areas for cooperation between the PAs within the SPA work plan: (i.) observation requirements for Services, (ii.) standard data and metadata formats for ocean products (a new structure addressing the DM as a cross-cutting programme needs to be built), (iii.) capacity building implementation plan, and (iv.) user requirements. Dr Donlon also stressed the need to develop data management protocols for model outputs and satellite data including JCOMM standards. He suggested a re-structure of the JCOMM diagram to better reflect the cross-cutting role of the DMPA.

3.4.3 The DMPA Coordinator, Mr Robert Keeley, recognized that the DM programme covers all areas of the JCOMM, and in particular, he stressed that there is much to be done including Marine Climatology and Sea Ice issues. Mr Keeley also pointed out the importance of continued connecting of DM activities with the WIS through the ETDMP.

3.4.4 The OPA Coordinator, Mr Mike Johnson, highlighted the great success of the DBCP, due in large part to having a Technical Coordinator. Mr Johnson proposed that the Committee could likewise benefit from having a Technical Coordinator to assist the PAs with JCOMM-wide issues. The Committee agreed, and recommended that the Secretariat seek support for a Technical

Coordinator to assist MAN in implementing recommended technical actions and requested that the Secretariat seek extra-budgetary support for this purpose (**action: Secretariat**).

3.4.5 The Committee recognized that there is a need to better define cross-PA issues, and urged the PAs to define a strategic and implementation plan for PA cross-cutting activities and interactions (**recommendation: PAs**).

3.4.6 The Committee made note of the outstanding training facilities located at the IODE Project Office in Ostend, and agreed to take advantage of this valuable resource. In addition, the IODE's OceanTeacher offers a valuable tool for the JCOMM (see section 4.3.2 and Annex IV).

3.5 JCOMM website including MAN list-server for increased interactions within MAN, periodic updating of PA status reports, etc.

3.5.1 The Secretariat presented a strategy for building the JCOMM Information System, including its single root website and sub-websites for the Programme Areas. The Committee agreed that it would be more effective to have a single JCOMM website instead of two different websites maintained at the WMO and IOC (**action: Secretariat**). This would present a unified JCOMM source of information to its public, and would allow the Secretariat to more efficiently coordinate their work efforts. The WMO and the IOC Secretariat agreed that the requirements and the technology used behind the GOOS website could be used as a basis for building the unified JCOMM website. A database, including information on contact points, groups of people, a calendar and list of meetings, as well as various documents of interest to the JCOMM will be developed. The jcomm.info domain name has already been purchased by the Secretariat, and is already acting as a portal (<http://www.jcomm.info>) to both the WMO and the IOC websites, until the unified JCOMM website using it, is put in place (see section 5.2).

3.5.2 The Committee thanked the Secretariat for their work in this regard, but expressed concerns regarding the variety of websites associated to the JCOMM, as well as regarding the number of ways being used to present information. It agreed that they should be better integrated as part of a JCOMM information system and follows a number of guidelines yet to be defined. A high-level of coordination will be required in order to avoid duplication and conflicting information, and to enhance an appearance of belonging to the same community. The Committee recommended that some common functionalities and appearances amongst all JCOMM websites were desired, and asked the Secretariat to make specific proposals.

3.5.3 The Committee recommended that the primary JCOMM website should serve as the primary source of the most reliable information, and should include the following items:

- (i) General information about the purpose and role of the JCOMM;
- (ii) JCOMM's governing and team structure, including membership;
- (iii) Information on cross-cutting activities;
- (iv) Contact points for the Secretariat and people who lead JCOMM activities;
- (v) News;
- (vi) Information on upcoming and past meetings, preparatory documents, list of PowerPoint presentations;
- (vii) JCOMM publications including past meeting reports and key technical publications;
- (viii) Community information including presentations, brochures, and images;
- (ix) A search function;
- (x) A site map;
- (xi) Some translated pages;
- (xii) A confidential area for sharing documents;
- (xiii) Links to appropriate pages regarding:
 - a. Useful information that appear on sub-websites (see below);
 - b. Activities related to the JCOMM under the umbrella of the WMO and IOC, and associated programmes (e.g., Tsunami monitoring, Natural Disaster Prevention and Mitigation, GCOS, GOOS, etc.);

c. GEOSS.

3.5.4 The Committee agreed that in order to function as the most reliable and timely source of information, updates to the information in the databases driving the site could be performed via the web by any Member of the Secretariat (whether in Geneva or Paris) or other team leaders around the world, with appropriate user controls and limitations.

3.5.5 It further agreed that information more specific to the work of the JCOMM Programme Areas and their Expert Teams and Panels could appear on specific sub-websites. These could be less formal than the JCOMM website and include more dynamic information, including working areas for the Expert Teams. Specific websites would, for example, include information on existing and future products and services, requirements, standards and best practices, pilot projects, description of the data systems in place and how to access data. However, the Committee recommended avoiding duplication of information as much as possible by using links from the sub-websites to the root JCOMM web (e.g., overall JCOMM information, Panel and Expert Team memberships and ToRs, a list of meetings and preparatory documents, formal publications and past meeting reports).

3.5.6 The Committee agreed that the division of information and avoidance of duplication between the main JCOMM website and more specific sub-websites would need to be reviewed and revised on a continuous basis.

3.5.7 The Committee agreed that the web was now an important and necessary communication tool, and should therefore contain useful information to its potential audiences. It agreed that it was an extremely time consuming exercise to sort out all of the appropriate JCOMM information for the specific audiences and to present it in an appropriate way (e.g., providing hypertext links for defining the acronyms).

3.5.8 The Committee recommended the preparation and publishing of a Communication Strategy document, but agreed that the discussion and specific proposals on the latter could be deferred to the breakout working group the following day.

4. Cross-cutting, coordination and integration issues

4.1 OOPC requirements and recommendations to JCOMM

4.1.1 The Committee was then presented with a report by the OOPC Chairperson, Dr Ed Harrison. The OOPC serves the JCOMM by giving advice on requirements for the ocean observing system, including satellite, surface and subsurface *in situ* observing networks, data management, and the creation of products and services. The system is designed for climate monitoring, prediction, and research, but also serves as the foundation for global operational oceanography.

4.1.2 These requirements have been updated in two recent documents with broad input from the ocean community. The JCOMM-II agreed that the ocean and relevant atmospheric actions of the GCOS *Implementation Plan* (GCOS Report No. 92, November 2004) would form the basis of the work plan for the Observations Programme Area. The just-published *Systematic Observation Requirements for Satellite-based Products for Climate* (GCOS-107, September 2006) has additional details on the sustained requirements for satellite observations, and has received the attention of the satellite agencies. There have been no changes to the requirements identified in GCOS-92 thus far.

4.1.3 Particular activities suggested to JCOMM are as follows:

- Continue efforts to obtain and maintain global coverage of the *in situ* observing networks, to agreed GCOS-92 standards;

- Promote an Observing Programme Support (OPS) centre to help make global coverage as feasible and efficient as possible;
- Promote the real-time transmission of metadata, in particular the META-T Pilot Project;
- Promote standards and best practices for both real-time and delayed-mode quality control.

4.1.4 By implementing the initial recommended observing system, important lessons are constantly being learned. For example, deployment opportunities for surface drifters have been missed due to lack of support for integrated system action. Some measurements, such as the monitoring of the Atlantic Meridional Overturning Circulation (MOC), require a substantial effort while others, like the net Indonesian Through flow, have been found to be simpler than expected. Tackling a multi-use perspective has led to activities that benefit efforts to improve tsunami warning and ocean climate, through enhancing real-time high-frequency tide gauge reporting. Challenges for the VOS and SOOP are substantial. As more observations of ocean heat and carbon variability have been taken and analysed, the extent of decadal variability was uncovered; the need to continue observing efforts for many decades is becoming more evident. It has become clear that continuity in some critical ocean satellite measurements should not be assumed. The OOPC had developed an ocean climate indices website (ioc.unesco.org/oopc/ -> "State of the Ocean") as a step towards observing system evaluation, and as a tool to demonstrate the value of ocean observations, but more work is needed to identify relevant ocean subsurface indices.

4.1.5 Some specific activities were suggested to the Management Committee. These included but were not limited to:

- (i) Work towards improved availability of coastal weather and water level forecasts to all nations (**action: SPA Coordinator**);
- (ii) Continue and improve collaboration with tsunami programmes (**action: PAs and DPM Rapporteurs**);
- (iii) Continue to remind the IOC, WMO, I-GOOS, UNFCCC, and GEO that institutional arrangements at the national and international levels were not adequate to complete and sustain the initial ocean observing system (**action: Co-presidents and the Secretariat**);
- (iv) Advocate for expanded Observing Program Support (OPS), including preparation of an estimate for ship time needs to maintain global coverage of drifters and Argo (**action: Secretariat, Co-presidents and OPA**);
- (v) Consider using the ocean temperature metadata pilot project as a foundation for a real-time data management strategy (**action: DMPA**).

4.1.6 The Committee agreed that a capable OPS centre could provide a multitude of benefits (see item 3.1). The Committee also agreed that focusing on standards and quality control practices would be beneficial to all JCOMM Members. While there were some difficulties when dealing with non-physical variables, as observing communities could have different data sharing practices, the JCOMM could lay the foundation. The Committee expressed concern regarding the threats to the continuity of ocean satellite measurements, and noted that the CEOS response to GCOS-107 should be used to leverage action from the respective satellite agencies.

4.2 Satellite data requirements

4.2.1 The JCOMM OPA Ocean and Meteorological Satellite Expert from the Cross-cutting Team on Satellite Data Requirements, Dr Eric Lindstrom, joined the discussion with the Committee via a short teleconference. Dr Lindstrom reported on the remote-sensing challenges facing the implementation of the climate module of GOOS community, as well as other users of remotely-sensed data. He further called attention to the document "Systematic Observation Requirements for Satellite-based Products for Climate, Supplemental Details to the Satellite-based Component of the Implementation Plan for the Global Observing System for Climate in Support of the United Nations Framework Convention for Climate Change (UNFCCC)" that was published in September 2006 as GCOS Report Number 107.

4.2.2 Essential Climate Variables (ECVs) that are both currently feasible for global implementation and have a high impact on UNFCCC requirements have been identified by the GCOS. With regards to oceanic data, they include: sea surface temperature, sea surface salinity, sea level, sea state, sea ice, current, ocean colour (for biological activity), and carbon dioxide partial pressure. The sub-surface variables are also included, such as temperature, salinity, current, nutrients, carbon, ocean tracers, and phytoplankton.

4.2.3 With regard to remote-sensing, the ECVs have been cross-referenced with requirements in terms of following: (i.) past and current data sets, (ii.) future systems, and (iii.) satellite calibration and validation.

4.2.4 In regards to sea ice concerns, these respectively include: (i.) consolidating existing sea ice products and combining them with *in situ* records, (ii.) continuing existing series of microwave, visible, and infrared imagers, and (iii.) focusing on ice thickness and drift data sets with rigorous calibration and validation.

4.2.5 For sea level, these include the following items: (i.) reprocessing altimetry data as orbit, geoid & tides improve, (ii.) continuing series of overlapping Jason-class and planning for two ERS-class missions, and (iii.) promoting ancillary validation system as part of the missions.

4.2.6 For the SST, these include the following items: (i.) continuing support to the GHRSSST pilot project, (ii.) sustaining Infrared and microwave sensors, and (iii.) promoting the need to sustain *in situ* observations.

4.2.7 For ocean colour, these include the following items: (i.) making ocean colour products freely available through the Internet, (ii.) reprocessing sustained ocean colour records (risk of gap beyond 2007), and (iii.) improving *in situ* measurement networks for vicarious calibration.

4.2.8 For sea state, these include the following items: (i.) building a comprehensive unified record, (ii.) continuing at least the altimeter and SAR missions and exploring new techniques, and (iii.) using existing buoys for calibration.

4.2.9 For ocean analysis, these include the following items: (i.) making data available to reanalysis centres, and (ii.) establishing partnerships with reanalysis centres.

4.2.10 For sea surface salinity, these include the following items: (i.) supporting research missions (SMOS, Aquarius), and (ii.) promoting special *in situ* observing efforts to evaluate sensor performances.

4.2.11 Dr Lindstrom stressed that ocean observations from space have thus far been gathered mostly through experimental satellites and that the transition from research to operational mode, (i.e., the so called "crossing the valley of death"), remains the primary challenge to date. The Committee noted that Europe had been more successful in moving forward in this regard than the USA.

4.2.12 A summary assessment for satellite missions was presented (provide in Annex III of this document). Colour codes are currently being used to express how the requirements are being met, or will be met, considering future planned missions. The codes range from: (i.) nothing in place, then (ii.) something below GCOS ECV threshold requirement, then (iii.) at threshold (marginal), and finally to (iv.) above threshold (i.e., meets the requirements). The current assessment shows that sea level, and ocean colour requirements are below the threshold after 2006. There are potential gaps for the ocean topography mission between 2007 and 2008 (Jason-1 to Jason-2 transition), between 2010 and 2011 (ENVISAT/RA2 to Sentinel-3 transition), and between 2012 and 2013 (Jason-2 to Jason-3 transition). Assessment is below the threshold for sea state requirements between 2006 and 2012. Salinity requirements have been met marginally after 2006.

4.2.13 The Committee noted that the CEOS had been constructing a response to the GCOS Satellite Requirements for UNFCCC, which has now been submitted to the UNFCCC Subsidiary Body on Scientific and Technical Advice (SBSTA).

4.2.14 After the discussion, the Committee suggested the following **actions**:

- (i) Refresh the GCOS requirements (**action: OOPC**);
- (ii) Update the WMO CEOS database to reflect the requirements (**action: Secretariat**);
- (iii) Work towards a better integration of *in situ* and remote-sensing observing systems in the JCOMM, GCOS and CEOS, and set priorities (**action: Satellite Rapporteurs**);
- (iv) Emphasize the need for planning “end-to-end” systems for research and demonstration, operations, products and services, and technology infusion. The community should work towards a single system that meets both the operational and research requirements. This would involve tentatively combining delayed-mode and real-time data streams to research quality near real time data streams (**action: GHRSSST Project Director**);
- (v) Use of satellite technology for Natural Disaster Prevention and Mitigation (requirements are listed on the WMO DPM website at the following web address: <http://alto-stratus.wmo.ch/sat/stations/SatSystem.html>). Review the requirements and see whether future missions can meet these requirements. Research missions to be used for such applications (This is a technology challenge) (**action: Satellite Rapporteurs**).

4.2.15 The Committee cordially thanked Dr Lindstrom for his presentation and discussion.

4.3 Capacity building, including the Task Team on Resources

4.3.1 The Committee received reports on Capacity Building activities under each Programme Area and Cross-programme Areas, including plans for future CB activities. These Plans include the following:

- (i) The IODE/JCOMM ("Jamboree") Workshop (Ostend, Belgium, October 2006);
- (ii) The DBCP/IODE training course on Application and Management of the Data from *in situ* oceanographic and marine meteorological observations (Ostend, Belgium, in June 2007);
- (iii) The International PMO Workshops in the next 3-4 years, to be tentatively hosted by the USA.

4.3.2 The Committee also noted with interest the ongoing cooperation between the WMO and the IOC/IODE on integration of training materials related to marine meteorology in OceanTeacher. The Summary Report of the WMO/IODE Meeting (Ostend, Belgium, 13-14 June 2006) is reproduced in Annex IV of this document. The Committee recommended that the OceanTeacher training system should also cover remote-sensing and encouraged such development as soon as possible. The Committee noted that the UNESCO Bilko Project already provides an excellent teaching resource for marine remote-sensing, and recommended integration of these materials into OceanTeacher (**action: JCOMM/IODE Secretariat**).

4.3.3 The Committee recalled that the Task Team on Resources (TTR) had been designed to help with the development of CB proposals, including identifying potential donors and facilitating funding. It noted with concern that no action has been taken on forming this task team since JCOMM-II, and also recognized the difficulties to formulate and make such a team function properly. The Committee felt that, to identify and set up a mechanism for raising CB resources, a rigorous CB Strategic Plan should first be developed. Therefore, the Committee established an *ad hoc* Working Group, for which the Terms of Reference are provided in Annex V. (**Action: an *ad hoc* Working Group lead by Mr Peter Pissierssens, including Ms Miriam Andrioli, Mr Rudy Herman, Dr Craig Donlon, Dr Ehrlich Desa and Ms Alice Soares; timing: the report to be**

completed within three months for MAN to review, and to finalize within six months thereafter).

4.3.4 The Committee noted that the CB evaluation questionnaires had been developed and reviewed. The Committee recommended these questionnaires be revised, taking into consideration similar IODE forms which are used consistently (**Action: JCOMM/IODE Secretariats**).

4.4 Support for IPY

4.4.1 The Committee was presented with a report on the status of preparations for the International Polar Year (IPY) 2007-2008. The IPY, March 2007 - March 2009, is planned as an intense and coordinated campaign with an inter-disciplinary emphasis, and is intended to leave the legacy of an observing system in Polar Regions. The Committee noted with interest and appreciation, that in April 2006, the Joint Committee (JC) for IPY completed an evaluation of 452 full project proposals received from 31 January 2006 from various nations, to include the following topics: scientific or educational significance, consistency with the IPY themes, evidence of international collaboration, and evidence that activities proposed would contribute to an IPY legacy. Of these 452 project proposals, the JC endorsed 218 (166 scientific proposals and 52 proposals for education and outreach). The Committee was pleased to learn that there were a large number of scientific projects that focused on comprehensive studies of the atmosphere, ocean, cryosphere and hydrological cycle, ecosystems in Polar Regions, as well as in the study of climate change impact on socio-economic and living conditions of local populations. The Committee noted with appreciation that up to 60 nations are currently involved in the implementation of these projects.

4.4.2 The Committee noted that the Intercommission Task Group (ITG) on IPY, established by the Fifty-sixth Executive Council (EC-LVI) to coordinate WMO activities related to the IPY, played an active role in the process of preparation of full project proposals for the IPY. The Management Committee expressed its appreciation to Professor I. Frolov (Russian Federation) and Mr S. Pendlebury (Australia) who, as representatives of the JCOMM in the ITG, provided a substantial contribution to the preparation of full project proposals related to studies of polar oceans.

4.4.3 The Committee also noted that Sub-Committees on Observations (SCOBS), on Data Policy and Management (SCDPM), and on Education, Outreach and Communication (SCEOC) were established by the JC. The SCOBS Members, including the Co-president of JCOMM, Dr P. Dexter, were responsible for the analysis of ocean observing systems, and made a comprehensive assessment of observing systems, planned to be used in IPY projects to identify technological and institutional gaps that may be filled by use of satellite data and products. The Committee was also informed that a summary of data management requirements contained in IPY projects has been prepared and sent to the SCDPM Co-chairpersons. The SCDPM developed a draft IPY Data Policy that contained sections related to data definition, data availability and exchange, and data preservation (see www.ipy.org). The SCEOS is developing an implementation/action plan on IPY Education and Outreach. The Committee noted that the ICSU and WMO, as IPY sponsors, signed the Memorandum of Understanding on IPY in April 2006 that provided the legal basis for funding of coordination activities of the JC and its Sub-committees.

4.4.4 The Committee recalled the recommendations raised during the JCOMM-II Session, and noted the activities undertaken by the ETSI and the ETMSS. The Committee noted with appreciation that the ETSI has been developing an Ice Information Portal, hosted by the PolarView project (supported by the ESA and EC with participation by the CSA, see <http://www.polarview.org>). The Committee also noted that a special agenda item was planned at the IICWG-VII Session (Helsinki, Finland, 25-29 September 2006) in order to elaborate on the high level concept of the Portal, assemble information about the products that will be contributed from the national ice services, establish product formats and technical mechanisms for obtaining them, to agree on the principles of operation for the Portal, and to draw up an action plan to get to an operational Portal by March 2007. Therefore, the Committee endorsed this project and agreed that the JCOMM logo would be indicated on the Portal (**action: ETSI**).

4.4.5 The Committee recalled that, at present, regular meteorological forecasts and warning for shipping under the GMDSS do not extend to polar regions, because the lack of data from these areas would make such information unreliable, and also because of the absence of broadcast coverage by Inmarsat. The Committee noted that the Ice Information Portal would not address warnings for shipping on Polar Regions. In response to this issue, the Committee was informed that a joint IMO/IHO/WMO correspondence group on Maritime Safety Information Services was established to address this problem and other associated issues. This correspondence group includes representatives of all affected countries (Canada, Denmark, Iceland, Norway, Russian Federation, United Kingdom and USA) and other interested organizations (including the IMSO, Inmarsat and any other approved safety-service providers). The Committee noted that the JCOMM Expert Team on MSS is represented on this group by its Chairperson, Mr Henri Savina, and the work of this group would be summarized and reported at the Eleventh Session of the IMO Sub-committee on Radio Communications and Search and Rescue (COMSAR-XI), planned for February 2007.

4.4.6 The Committee noted that coordination for the deployment of oceanographic and meteorological observing platforms in Polar Regions (e.g., ice buoys, ice tethered platforms, and Ice Mass Balance buoys) was made through the IABP and the WCRP-SCAR IPAB. The IPY development is also being followed through these two DBCP Action Groups. Both the IABP and the IPAB participants have made submissions to the IPY. The Committee recommended the IPY SCOBs consider proposals, and requested the JCOMM Co-president, Dr P. Dexter, as member of the Sub-Committee, to support the implementation of this recommendation (**action: Co-presidents**).

4.5 Input to the GEO/GEOSS

4.5.1 The Committee received an overview on the progress in building of the Global Earth Observation System of Systems (GEOSS). The Group on Earth Observation (GEO) has developed 2006 and 2007-2009 work plans to implement the GEOSS, which sets forth a series of activities and tasks for each of the nine GEO societal benefit areas, as well as in the five "transverse" areas (crosscutting areas, capacity building and outreach). For each programme task, a detailed task sheet was agreed upon by the GEO Members and Participating Organizations indicating: (1.) their commitment and cooperation with each other to implement the task on behalf of GEO, and (2.) a willingness to mobilize the necessary resources to reach the objectives within the schedule described in the task sheet. As the GEO is an entirely voluntary and non-binding process, all such commitments are to be considered non-binding. It was agreed that the work plan would be a living document during its effective period, and that each task was continuously to be reviewed and renewed with input from the GEO Members and Participating Organizations. The Committee noted that the implementation of these tasks was up to the relevant communities to ensure that their key requirements are embedded into the GEO work plans, and to effectively fulfil those tasks, whereas the GEO Secretariat was to focus on outreach and development of the Capacity Building strategy, as well as consolidating/linking various ongoing activities.

4.5.2 The Committee then noted that, for better coordination of the ocean-related international bodies and the GEO, representatives of the GOOS, JCOMM, POGO and the IOC decided to conduct consultations through an informal forum of experts and representatives of relevant organizations/programmes including the JCOMM. An online forum was established, (named "Ocean-United". The emailing listing is as follows: ocean-united@jcommops.org), with objectives of: (1.) sharing information on GEO-related activities and plans within their organizations and programmes, (2.) contributing to the GEO through consolidated and integrated input, under the coordination of the IOC, and (3.) providing a direct link to each programme/organization to contribute to the implementation of GEOSS. The Forum has provided consolidated input to the GEO work plans, including a proposal on a pilot project on chlorophyll observation through satellite ocean-colour observations, under the umbrella of the coastal module of GOOS. The Ocean-United forum (representing ocean organizations and programmes active in the GEOSS) also set up a

liaison between the ocean community and the GEO Secretariat through Professor David Farmer, Dean of Oceanography at the University of Rhode Island (USA) with the support of the POGO.

4.5.3 The Committee noted that, in GEO work plans, the JCOMM was recognized as a contributing organization/programme in the tsunami-related task, tasks related to the GEOSS architecture and data, and tasks under the societal benefit area of climate. Amongst the tasks listed, the Committee expressed its concerns, particularly on the implementation of the GEO task CL-06-06 ("Global Ocean Observing System: enhance and improve coordination of coastal and marine climate observations"), which was postponed to 2007 due to the absence of a Task Leader. The Committee recognized significant relevance of this task with the JCOMM activities, and noted that continuous attention and interaction should be given to the JCOMM involvement to the new GEO three-year work plan. At the same time, the Committee decided to identify a small number of GEO tasks (among those continuing in 2007-2009) on which the JCOMM should focus, for productive and proactive interaction with the GEO in GEOSS implementation.

4.5.4 The Committee considered that the GEO is playing a role of high-level coordinating body, to be seen as the route of the Earth observation community to the policy level. It was further emphasized that the GEO provides a way to convey the WMO's achievements and requirements to decision makers at government levels worldwide. At the same time, the value of, and benefit from the GEO to ocean observations, should also be carefully reviewed. One benefit of having the GEO would be bringing national activities forward to the international/intergovernmental framework. The GEO/GEOSS should also ensure the sustainability of the observing system, with long-term, largely public funding – the GEO would be a value means of deciding how to transition programmes from scientific funding to long-term funding, in order to gain recognition that once science programmes demonstrate the ability to build an observing component and the value to society of that component, it needs to be transitioned into operational status.

4.6 Support for marine multi-hazard warning systems

Possible JCOMM Contributions to the Development and Maintenance of Marine Multi-Hazard Warning Systems

4.6.1 The Committee recalled Recommendation 12 (JCOMM-II), which requests the JCOMM Co-presidents, in consultation with the PA Coordinators, with relevant WMO technical commissions and subsidiary bodies of IOC, GOOS regional alliances and associations and IODE regional networks, as appropriate, to develop and implement a plan of action to contribute to the implementation and maintenance of marine multi-hazard warning systems for all ocean basins. Responding to this recommendation, an expert meeting on this subject was convened in Geneva, Switzerland, from 1 to 3 February 2006, chaired by the JCOMM Co-president, Dr P. Dexter. The Meeting developed and agreed upon a range of possible contributions of the JCOMM, through its Programme Areas and component Expert Teams, to multi-hazard warning systems, within the areas of expertise of the Commission. The Committee reviewed the status of the implementation of this action plan and urged the JCOMM PAs to continue to resolve these actions (**action: PAs**).

WMO Disaster Prevention and Mitigation Programme

4.6.2 The Committee noted that at the Fifty-eighth Session of the WMO Executive Council (EC-LVIII, June 2006) requested that the concept of a multi-hazard approach was needed to be further explored through clear demonstration projects to determine whether economies and synergies could be achieved through, building on, and complementing existing early warning system capacities, infrastructures and activities of various partners involved in different aspects of early detection and warning systems. The Committee recommended to the WMO that the word 'early' be removed from 'early warning', which will enable different temporal scales to be considered within the DPM process (**action: Secretariat and Co-presidents**).

4.6.3 The Committee also noted that the EC-LVIII had approved a cross-cutting coordination framework, for identifying the WMO DPM Programmes' strategic priorities and projects that would

be measurable with respect to their benefits and outcomes. Such cross-cutting projects would be prioritized and built upon activities of existing WMO Programmes, Technical Commissions, Regional Associations, and strategic partners, with a clear definition of roles, responsibilities and deliverables. The Committee recognized the role of the Presidents of Technical Commissions to coordinate contributions, particularly in relation to inter-commission activities.

IOC support for marine multi-hazard warning systems

4.6.4 The Committee recalled that the IOC has been mandated to develop a Global Ocean-related Hazards Early Warning and Mitigation System (GOHWMS). An *ad hoc* GOHWMS Working Group is currently preparing its Terms of Reference (ToR) for the IOC Assembly for approval in 2007, mainly addressing governance issues by involving existing or developing ocean-based systems. The JCOMM, WMO, IMO and IHO are solicited to participate in the work of the group, including a potential meeting early in 2007.

4.6.5 The Committee noted that the next meeting of the Intergovernmental Coordination Group (ICG) for the Indian Ocean is planned for February 2007 in Kenya to mainly address regional responsibilities and arrangements. The ICG for the Caribbean System would meet in March 2007 to review existing national and regional structures, and to develop a common Implementation Plan. For the Mediterranean and North-eastern Atlantic Ocean, the ICG would meet in Bonn, Germany during February 2007.

The role of JCOMM in multi-hazard warning systems

4.6.6 The Committee recognized that the JCOMM has a critical role to play in the development of marine multi-hazard warning systems, especially the WMO DPM Programme and the IOC *ad hoc* Working Group on the Framework for a Global Ocean-Related Hazards Early Warning Systems. Based on previous discussions, the Committee nominated Dr Rodrigo Nuñez and Dr Craig Donlon as JCOMM Rapporteurs on DPM-related matters (the draft Terms of Reference are provided in Annex VI of this document). The Committee urged the DPM Rapporteurs to work with other JCOMM Programme Area Coordinators on a cross-cutting programme in support of Disaster Risk Reduction (DRR), including a liaison with the DPM Rapporteurs of CBS and CHy for collaboration and strengthening of the working relationship for inter-commission activities. The Committee also requested that the DPM Rapporteurs work in collaboration the DPM Programme to clarify the meaning of 'marine multi-hazards' (**action: DPM Rapporteurs**).

4.6.8 Based on the action plan agreed for JCOMM contributions to multi-hazard warning systems, several areas/activities were identified as having a high potential interest for the cross-cutting programme. These areas/activities are as follows:

- a) Through its Cross-cutting Team on Satellite Data Requirements, to review and develop requirements for use of satellite technology for enhanced climatology and real-time detection of ocean-related hazards (<http://alto-stratus.wmo.ch/sat/stations/SatSystem.html>). The Commission noted that through the DPM's project on Hazard Database Requirements and Analysis Methodologies, the DPM Programme can forward these requirements to be considered by relevant expert teams in the CBS OPAGs for implementation (**action: Cross-cutting Team on Satellite Data Requirements**);
- b) Through the DMPA, together with CBS, to develop, agree on standards including QC, and implement the CREX code format for sea level data monitoring in support of tsunami ETWS (**action: DMPA**);
- c) Synergies should be developed between the DBCP and the International Tsunameter Partnership (**action: DBCP Vice-chairperson to act as focal point for tsunami monitoring**). Activities of interest to the two groups include the following items:

- Buoy deployment methods;
 - Instrument calibration and evaluation;
 - Quality Control and best practices;
 - Logistics required for buoy deployment and availability of ship time;
 - Satellite data telecommunication;
 - Real-time data distribution issues, including real-time GTS distribution (DBCP has experience with GTS Table driven code forms); and
 - Metadata.
- d) Through the ETWS, to finalize the *Guide to Storm Surge Forecasting*, followed by the development of a project for storm surge warnings through several Members/Member States to demonstrate effective governance, organizational and operational aspects to ensure that warnings get to at-risk population (**action: ETWS**);
- e) Through the ETWS, in conjunction with the ETMC, to enhance storm surges statistics; this would involve guidelines for storm surge historical databases and statistical techniques to enable Members to carry out statistical analysis in their respective countries. There is need for enhanced global and regional statistics on storm and surges (**action: ETWS and ETMC**);
- f) With regards to capacity development for storm surge warnings, it is necessary to strengthen collaboration with the CBS, OPAG on PWS for enhancement of public storm surge warnings, as well as with the CHy for interfacing storm surge and coastal flood models (**action: ETWS**). Note that through the WMO DPM Programme, a number of ETWS projects were being initiated, and that this presented an opportunity to include storm surge warnings as part of these projects, if relevant;
- g) To upgrade and enhance GLOSS stations for real-time ocean-related hazard warnings (**action: OPA**);
- h) To further develop CB activities as a contribution to OceanTeacher (module on applications of data to marine hazards) (**action: Cross-cutting Team on Capacity Building**);
- i) To continue with SL training events, including maintenance of gauges and use of data (archiving, access and multi-hazard applications) (**action: OPA**);
- j) To refine, publish and implement QC standards for real-time GTS transmission of SL data (**action: DMPA**);
- k) To cooperate with the IMO and the IHO in order to address the international organizations' role (IOC, WMO, IHO and IMO) in the provision of Tsunami Maritime Safety Information (warnings and related information) (**action: SPA**).

4.7 Coastal GOOS implementation and interactions with the GRAs

4.7.1 The Group reviewed a draft report of the Joint JCOMM-GSSC-GRA *ad hoc* Task Team, led by Dr Tom Malone. This report included a series of draft recommendations to the JCOMM, the GSSC and the GRAs. The Committee limited its comments to those recommendations made specifically to JCOMM, and charged the Co-president, Dr Peter Dexter, with representing the views of the Management Committee during the Third Annual GOOS Regional Forum (Cape Town, Africa, November 2006), the GSSC meeting (Seoul, Republic of Korea, March 2007) and the I-GOOS meeting (Paris, France, June 2007) (**action: Co-presidents**).

4.7.2 The Committee stated its strong preference to maintain the GSSC as its single point of contact for requirements within the GOOS, recognizing the role of the GSSC as the technical and scientific advisory body of the GOOS. The Committee also recognized the role of the GSSC in obtaining GOOS requirements regarding coastal observations, and urged that there be a mechanism for feedback and interaction within the GSSC in order to jointly decide on issues regarding priorities, feasibility of actions, etc.

4.7.3 The Committee re-stated its eagerness to assist in the implementation of coastal GOOS and to foster worldwide observations of physical and non-physical variables as well as the delivery of services relevant to these variables.

4.7.4 The Committee agreed that prerequisites to JCOMM accepting coordination responsibility for a particular variable should be that the measurement or product must be in a pre-operational phase with agreed standards and protocols for measurement, data management, and product production. Once these said prerequisites had been satisfied, action would then be taken by the JCOMM. The Committee also agreed that some of the preparatory groundwork (for example preparation for new data types and formats) could be undertaken by the Commission in the appropriate Programme Areas.

4.7.5 The Committee further noted the critical importance of coastal marine weather, wave and water level forecasts to coastal nations, and that the JCOMM could look into how access might be improved and achieved as one of the initial activities in support of coastal GOOS.

4.7.5 The Committee will provide written feedback for revision of the draft report based on the discussion during this session.

4.7.6 The Committee stressed the need for the GOOS to recognize the JCOMM's role in the implementation of the global observing system. It also invited the I-GOOS to reflect this role in GOOS policy. Recognizing this essential role, the Committee also felt that there would be two-way benefits in the coordination between the JCOMM and the GOOS if the JCOMM were to be represented on the I-GOOS Board. **(action: GOOS Member of Committee).**

4.8 Relationship with other organizations, commissions and programmes

CBS Expert Team on the Evolution of the GOS (ET-EGOS)

4.8.1 The Committee noted the outcome from the Second Session of the CBS Expert Team on the Evolution of the Global Observing System (ET-EGOS, Geneva, Switzerland, from 10 to 14 July 2006.) Prior to the meeting, the Statement of Guidance (SoG) for the JCOMM Programme Areas was reviewed and updated by the WMO Secretariat, Dr E. Lindstrom and Dr J.-L. Fellous. The Committee agreed that the SoG should be regularly reviewed by the JCOMM, thanks primarily to the designation of: (i.) a focal point for user requirements (i.e., ocean mesoscale forecasts and coastal marine services, including tsunami monitoring), and (ii.) a focal point for estimating *in situ* observing system capabilities. The Committee designated Dr Craig Donlon and Ms Hester Viola as the respective focal points. The Committee agreed that a specific section for marine services should be developed in the WMO CEOS database **(action: SPA).**

4.8.2 The Committee agreed that the JCOMM must participate more actively in the ET-EGOS Rolling Review of Requirements (RRR) process, and to make use of its Critical Review Charts while taking existing JCOMM metrics and other tools into account, and stressing observing system deficiencies. The Committee tasked the SPA to designate a focal point to liaise with the WMO Secretariat and provide input on the issue **(action: SPA).** The new SoG should be submitted by mid-2007 prior to the next ET-EGOS meeting.

4.8.3 The Management Committee agreed that the ASAP Programme should be regarded as complementary to the AMDAR Programme, as a source of *in situ* aerological profiles (AMDAR

provides for few ascents and descents over the oceans). The Committee asked the OPA and its SOT to address this issue (**action: OPA and its SOT**).

4.8.4 The Committee noted the request by the ET-EGOS to provide the JCOMM with input on requirements for satellite sea surface winds, as well as guidance regarding the impact on applications of scatterometers and microwave imagers. It asked the Cross-cutting Team on Satellite Data Requirements to provide input (**action: Cross-cutting Team on Satellite Data Requirements**).

Commission for Climatology (CCI)

4.8.5 The Committee noted that the Fourteenth Session of the Commission for Climatology (CCI) amended its structure and Terms of Reference to take into account new challenges, and to strengthen the collaboration and working relationships with other WMO Technical Commissions and Programmes. The Open Programme Area Group (OPAG) on Monitoring and Analysis of Climate Variability and Change has broadened its Terms of Reference and adapted its structure to include marine and satellite observations for climatology development and climate monitoring.

4.8.6 Explicit links between the ETMC and the CCI ET2.2 on climate monitoring, including marine and satellite observations, were made at the session. It is expected that close collaboration between the CCI and the JCOMM will develop during the intersessional period. The ET2.2 recently met in Tarragona, Spain (20-22 September 2006) for its First Session, but the Management Committee noted with concern, that the JCOMM Secretariat was unable to support the attendance of a representative from the ETMC (Mr. Scott Woodruff). This was unfortunate as the ET2.2 may not meet again, and that links must now be forged between the CCI and the JCOMM on an *ad hoc* basis (e.g., at the CLIMAR-III meeting). However Dr Craig Donlon is Member of the CCI ET2.2, and represented the JCOMM's interests at this meeting.

4.8.7 The former joint CCI/Climate Variability and Predictability (CLIVAR) project expert team within this OPAG has now become the joint CCI/CLIVAR/JCOMM Expert Team on Climate Change Detection and Indices, to provide international coordination and help organize collaboration on climate change detection and indices relevant to climate change detection. The Committee was pleased to hear that Mr Scott Woodruff, Dr Elizabeth Kent, Mr Val Swail and Mr Chris Folland have been nominated as the JCOMM Members of the Expert Team, and that they will participate in the next upcoming meeting that is planned to be held in Niagara-on-the-Lake, Canada, from 14 to 16 November 2006.

4.8.8 The CCI has noted the work that has been undertaken by the JCOMM, through the ETMC, to develop and implement a standardized format for the exchange of historical ship data digitized from national logbooks. This type of data, to be included in global archives such as the International Comprehensive Ocean-Atmosphere Data Sets (ICOADS), were of particular value in the study of climate variability and climate change. The Committee noted that the CCI has requested its president to follow the progress JCOMM makes in this work.

4.8.9 The CCI has noted that the JCOMM was currently moving to better coordinate the Marine Climatological Summaries Scheme (MCSS) with its wider ocean data management system, so as to ultimately deliver an integrated stream of marine meteorological and oceanographic data to its users. It has agreed that the work of the JCOMM in this regard should also be better coordinated with its own climate data management system, within the overall umbrella of the WIS. The CCI therefore has requested the OPAG 1 to enhance its collaboration with the DMPA of the JCOMM, including in particular its ETMC, through the Inter-Programme Task Team on the WMO Information System (WIS) and elsewhere, as appropriate. The Committee supported these recommendations.

4.8.10 The CCI has also noted the work being undertaken by the JCOMM in further developing procedures, methodologies and techniques in the application of marine climatology data. This included the preparation and maintenance of the *Guide to the Applications of Marine Climatology* (WMO-No. 781), as well as the convening of a series of international workshops on Advances in

Marine Climatology (CLIMAR), which were held in Vancouver, Canada (1999) and Brussels, Belgium (2003) and the second International Workshop on Advances in the Use of Historical Marine Climate Data (MARCDAT-II), held in Exeter, UK (2005). The CCI has agreed that this work represented an important contribution to the overall development of climate applications and services, and has requested that each OPAG develop appropriate contacts with the ETMC, with a view to possibly supporting and contributing to future CLIMAR workshops.

Commission for Atmospheric Sciences (CAS)

4.8.11 The Committee noted that the JCOMM Co-presidents had submitted a document to the Fourteenth Session of the CAS (February, 2006) regarding the following item: (i.) the current status of the marine observing systems, in support, *inter alia*, of weather forecasting and global climate studies, and (ii.) possible support from the CAS for elements of the system critical to enhanced forecast capabilities and advice to the JCOMM on a more tactical approach to ocean observations.

4.8.12 The CAS has recognized that fully-coupled ocean-atmosphere models were being increasingly developed and used for operational weather forecasting, and that the ocean component of these models involved not just the ocean surface, but more often at least the ocean mixed layer, and included variables such as upper ocean heat content, dynamic height and surface roughness. In addition, the models involved the real-time assimilation of observational ocean data, including ocean temperature profiles, surface topography and sea state. Thus, there was an increasing requirement for real-time ocean observational data to support the NWP, global weather forecasting, and associated atmospheric research programmes (**action: OPA**).

4.8.13 The CAS has recognized that the maintenance of the ocean observing systems is both expensive and complicated, in view of the lack of clearly defined national responsibilities for specific ocean areas and/or system components, and has offered its appreciation and support to the JCOMM in its efforts to coordinate system enhancements and long-term maintenance. It has stressed that key elements of the ocean observing system were of considerable importance to operational weather forecasting, as well as to atmospheric research, and therefore has urged Members to make every effort to increase their involvement in, and commitment to, marine meteorological and oceanographic observations. At the same time, the CAS has also recognized that, for some applications within its own areas of interest, a more tactical approach to such observations, rather than uniform, broad-scale coverage, might represent a more cost-effective use of available resources, and could provide the JCOMM with appropriate advice on this issue. In this context, it has agreed that a closer liaison between the CAS and JCOMM would be mutually advantageous, and it therefore requested the President of CAS to consult with the Co-presidents of JCOMM regarding the establishment of an appropriate liaison mechanism between the CAS and JCOMM. Recognizing that the ETWS has been working on an operational wave model inter-comparison, the Committee requested the SPA Coordinator in collaboration with the ETWS Chairperson, Mr Val Swail, and the CAS President, Dr Michel Beland, to establish an appropriate liaison mechanism between the CAS and JCOMM (**action: SPA Coordinator, ETWS Chairperson, and CAS President**).

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

4.8.14 The Committee noted that the I-GOOS (IOC-WMO-UNEP Intergovernmental Committee for GOOS) Officers have identified the 2007 meeting of I-GOOS (Tenth Session, Paris, France, June 2007,) as the inauguration process for sustaining the global ocean observing system. A major focus of the meeting will be to clearly identify national contributions and commitments to observing the oceans and supporting international coordination. The ensuing meeting report will serve as a widely disseminated, new, formal benchmark, which will be periodically updated, of the state of the system.

4.8.15 The Committee also noted that in order to ensure that the meeting achieves its objectives, that Dr D. James Baker, former GSSC Chairperson and former administrator of the U.S. National

Oceanic and Atmospheric Administration (NOAA), has been retained as a high-level consultant charged with the coordination, preparation and follow-up to the meeting.

4.8.16 In preparation for this meeting, all I-GOOS Member States have been requested to:

- a) Provide information on the sustained ocean observations undertaken by their country from 2005 to 2006, and planned for 2006 to 2010, as contributions to the GOOS (which will be coordinated with reporting requirements to the UNFCCC, suggested by GCOS); and
- b) Send representatives to the I-GOOS VIII and be prepared to pledge substantial support to the GOOS international coordination efforts during the 2008-2012 period.

5. JCOMM Development

5.1 Implementation plan, system-wide monitoring and business case for operational oceanography

5.1.1 The Committee recalled that the JCOMM-II had requested the Management Committee to prepare an Implementation Plan (IP) for the JCOMM, to support the strategy document adopted by the session, and to develop and implement a performance monitoring system within the JCOMM. It noted with appreciation the draft, annotated outline for such a plan, which was presented by the Co-presidents of JCOMM. In reviewing this outline, the Committee agreed that the JCOMM IP would need to fit within the general umbrella of, and directly support, the overall WMO Strategic Plan 2008-2011, and the IOC Medium Term Strategy 2008-2011, including their Top Level Objectives (TLOs) and Expected Results. The plan should also reflect the overall JCOMM implementation strategy, covering all three PAs, and should include the JCOMM expected results, drivers, constraints, performance indicators and risks; but to avoid specific requirements and details regarding work plans and action items for the PAs at this point. As such, the IP would form the basis for system-wide monitoring of the performance of the JCOMM, as well as the Commission review to be presented to the JCOMM-III. It was expected that the IP would also eventually evolve easily into the JCOMM Operating Plan, under the WMO Strategic Plan.

5.1.2 The Committee adopted an outline for the IP, as indicated in Annex VII of this document. It agreed that the full draft plan would be prepared by the GOOS/JCOMM consultant, Dr Jim Baker, in close consultation with the JCOMM Strategic Implementation Team (Agenda Item 5.4), with a view to its review by the Management Committee prior to the WMO Congress and the IOC Assembly in May/June 2007 (**action: Dr D. J. Baker and Strategic Implementation Team**). Subsequently, the draft IP should be distributed to Members/Member States for review and input, prior to its finalization in late 2007. The Committee further agreed that the plan would be updated annually, but that the first version (2007) should form the basis for the planned JCOMM review. Finally, the Committee agreed that, while the development of a business case for the GOOS (including for operational oceanography in general) was entirely appropriate, it was neither necessary nor appropriate for the JCOMM. Nevertheless, it strongly supported the work being done to develop the GOOS business case.

5.2 Communications strategy

5.2.1 The Committee identified three audience sectors that needed to be addressed within the JCOMM Communications strategy, and these items are as follows: (i.) "IN" Reach, (ii.) "OUT" Reach, and (iii.) Capacity Building. It agreed that there was a definitive need to develop an early assessment study of information needs.

5.2.2 With regard to the "IN" Reach sector (a majority of the communication requirements), the audiences need to be identified (i.e., who is the "IN"). It was noted that the website was also, in principle, open/accessible to the "OUT" Reach category, as well as Capacity Building sector. The Committee agreed that the joint Secretariat would act as webmasters, and that the information

published would be available in English only. Two approaches were identified, “pull” and “push”. The JCOMM main website (www.jcomm.info), provides the “pull” approach, and can provide links to external websites for the use of the marine and oceanographic communities such as the JCOMMOPS website. The Committee stressed that the “IN” Reach sector needs of all PAs, including the SPA, should be served through the main JCOMM website. The newsletter which provides for the “push” approach, has to date, been written by the Co-presidents and the Secretariat, and additional input was encouraged from the community including all MAN Members. Feedback from workshops, conferences, and other events of interest to the JCOMM should be communicated via the newsletter. It was emphasized that the information delivered should be clearly understood by non-experts; for example, acronyms could be explained by providing a hyper-link. Mailing lists also provide for the “push” approach, and should be developed in a proper manner (for example, the distribution of the newsletter). The Committee accepted that approximately \$5000 was needed annually to maintain the main JCOMM website (technical maintenance and upgrading).

5.2.3 With regard to the “OUT” Reach, the Committee agreed that extensive communication was already being made through the GOOS, as well as through other international, regional, and/or national programmes. However, it recognized that despite the risk of some duplication, there was a need for the JCOMM to communicate with a wider audience, including decision makers. The Committee agreed that some information could be delivered via the JCOMM main website, including general information, and that information on societal benefits, products (i.e., observations systems, data management products and services), and science and technology. On the main JCOMM website, general information should preferably be provided in the IOC and WMO working languages. Tailored brochures (e.g., industry specific) were considered useful tools; they should be simple and not longer than three-fold. These brochures are intended mainly for distribution at major conferences, and not for general mailing purposes (to avoid and limit waste of valuable resources). The present brochure is perhaps outdated, but can still be useful for targeted audiences. The Committee agreed that most of the SPA website should be designated for “OUT” Reach. It would provide links to products and services, and would be managed directly by the SPA. Articles were considered to be a cost effective communication tool, and should target specialist or professional journals in order to raise awareness of key issues. Keynote speeches to professional societies are also useful and should be pursued (**action: MAN Members**).

5.2.4 The Committee agreed that a comprehensive needs analysis for outreach audiences is required, and that a consultant should be hired contracted for conducting this analysis. This analysis would address categorization of audiences and their needs. Realizing that the audiences are diverse (e.g., representatives of the private sector, the public sector, decision makers, NGOs, and the news media), each group would be contacted for providing input. The analysis would investigate what kind of long-term support could be provided, and would make recommendations in order to avoid duplication and provide for appropriate interaction with other JCOMM-related or associated websites. The Committee agreed that extra-budgetary resources were required for conducting the study, and that invited Member/Member States to make commitments in this regard (**action: Secretariat and Co-presidents**). The Terms of Reference (ToR) are provided in the Annex VIII of this document.

5.2.5 Regarding capacity building, the Committee agreed that communication should be managed separately from the “IN” Reach and “OUT” Reach activities. For example, a separate CB website, with separate domain name could be established, with links to and from the main JCOMM website. The CB website would include information on project proposals, and existing JCOMM tools such as seminars, workshops, training courses, OceanTeacher, Bilko, etc. The Committee agreed that targeted audiences might include developing countries, potential donors, academic institutions, individual experts (JCOMM-related institutions), risk management agencies, and the scientific community. The Committee also considered that the communication situation for CB was known, and that no consultant was required to further develop it.

5.2.6 The SPA Coordinator, Dr Craig Donlon, noted that substantial commitments had been made by the UK Met Office for developing the JCOMM SPA website; the Committee thanked Dr Donlon and the UK Met Office for their contribution. Professor Worth Nowlin kindly offered to draft the JCOMM communications strategy, taking into account 5.2.1 through 5.2.6 (**action: Secretariat and Professor Worth Nowlin**).

5.3 Relationship with private sector/industry

5.3.1 The JCOMM-II recommended the establishment of an *ad hoc* task team to enhance interactions with the private sector. The GSSC and I-GOOS Board agreed to co-sponsor the task team, with an overall goal to enhance private sector involvement in the full-implementation of a sustained global ocean observing system (including advocacy to convince governments to continue to invest in the required infrastructure).

5.3.2 The first meeting of the *ad hoc* task team (consisting of representatives of the JCOMM, GOOS, and key industry sectors such as marine transportation, offshore service providers, petroleum industry, communications, meteorological forecasting and media, insurance/reinsurance, and spacecraft providers/operators), Chaired by Professor Worth Nowlin, was held in Paris, France, March 2006. A list of actions was approved, and missing requirements for the JCOMM were identified. Some of these actions (such as the JCOMM Implementation Plan, including elements of a business plan and improved metrics) are moving forward; other activities (such as enhanced communications for education and outreach, sampling standards, and data management standards and protocols) remain pressing issues for the JCOMM. The Committee recognized the challenge in engaging stakeholders, and noted that the private sector may well be able to encourage further progress in the development of standards and protocols.

5.3.3 The Committee also recognized the importance of this group for their contributions for the work of the JCOMM, and noted the team itself recommended additional members from shipping, fisheries and maritime security sectors, as well as recommending that the next meeting be planned for 2007, after further progress is made on the action list (**action: Secretariat**).

5.4 JCOMM Strategic Implementation Team

5.4.1 A JCOMM Strategic Implementation Team within the Committee to oversee the development of the Implementation Plan and to provide input to the broader WMO Strategic Plan and IOC Medium-term Strategy (to be discussed under Agenda Item 6.4) was established. The Team's membership is comprised of the Co-presidents and the three PA Coordinators.

5.5 Breakout writing groups: communication with broader JCOMM community and external; business case for operational oceanography; system-wide performance monitoring; implementation plan

5.5.1 The Committee broke into small writing groups to discuss the JCOMM Implementation Plan; the Coastal GOOS and Communications Strategy. A summary of these discussions is presented under Agenda Items 4.7, 5.1 and 5.2.

6. Programme and Budget, Organizational Planning

6.1 Regular budget allocations and programme of meetings and other work for 2006/2007

6.1.1 The Committee recalled that a JCOMM-II sessional group on budget and resources had affirmed, and that Secretariat resources would predominantly be used for coordination activities. Based on the Secretariat' budget report for 2006/2007, the Committee noted that the existing budget is inadequate for the scheduled activities.

6.2 Expectations for regular budget allocations and programme for 2008/2009

6.2.1 Under this Agenda Item, the Committee noted the budget allocations and programme for 2008/2009 are likely to be similarly inadequate as those in the present biennium.

6.3 Extra-budgetary needs, how to target and assignments

6.3.1 On the basis of the discussions under the previous agenda items, the Committee recognized that the existing budget is inadequate for the planned activities, and that extra-budgetary resources will need to be identified. The Committee agreed that a complementary budget presentation would be useful by listing Programme Areas and including expected results, and also to orient the PA work plans to the WMO cross-cutting programmes (such as the DPM, LDCs and WIS). In this regard, the Committee requested the PA Coordinators to re-design their work plans, taking into account the WMO Strategic Plan and the IOC Medium-term Strategy **(action: PA Coordinators and Secretariat)**.

6.4 JCOMM input to 7LTP and the IOC/UNESCO Medium-term Strategy

6.4.1 The Committee was presented with an overview of the WMO Strategic Planning initiative by the Director of the World Weather Watch Department and Coordinator of the WMO Coordination Group, Dr Jack Hayes, on this issue. Dr Hayes stressed that the WMO Fifty-eighth Executive Council (EC-LVIII, June, 2006) has agreed that, "...hereafter the Seventh Long-term Plan should be referred to as the WMO Strategic Plan 2008-2011, which would be a statement of strategic intent for the Organization for the period 2008-2011, corresponding with the fifteenth financial period."

6.4.2 Dr Hayes further explained the planning process, focussing on the Expected Results and Deliverables. The Committee noted that Executive Council agreed that the Strategic Plan should be linked to the performance of the Organization and its Programmes through a set of Key Performance Targets (KPTs) and Key Performance Indicators (KPIs). The WMO has three Top Level Objectives (TLOs):

- To produce more accurate, timely and reliable forecasts and warnings of weather, climate, water, and related environmental parameters;
- To improve the delivery of weather, climate, water, and related environmental information and services to the public, governments and other users;
- To provide scientific and technical expertise and advice in support of policy and decision-making and implementation of the agreed international development goals and multilateral agreements.

6.4.4 The IOC/UNESCO Representative, Ms Candyce Clark, presented the draft IOC Medium-term Strategy for 2008-2013. The Committee noted that the Thirty-ninth Session of the IOC Executive Council (June 2006), adopted a Resolution on the draft Strategy, which identifies four high-level objectives to be pursued by the IOC over the 2008–2013 period:

- Prevention and reduction of the impact of natural hazards;
- Mitigation of the impact and adaptation to climate change and variability;
- Safeguarding the health of ocean ecosystems;
- Management procedures and policies leading to the sustainability of coastal and ocean environment and resources;

6.4.5 The Committee agreed to provide their comments on both the WMO Strategic Plan and the IOC Medium-term Strategy to the JCOMM Co-presidents who would compile and submit them to the WMO and IOC Secretariat (**action: Co-presidents**).

6.5 JCOMM input to WMO Congress Cg-XV and IOC Assembly 24

6.5.1 The Committee considered input to be provided to the next WMO Congress. It noted that the deadline for submitting the JCOMM input was January 2007, and that the report size will be limited to 2000 words, including the resolution. The Committee agreed that the report was an opportunity to increase appreciation of the JCOMM work by the WMO Congress and that it should focus on priorities and address issues related to WMO priority action areas. The Committee asked the Co-Presidents to work with the WMO Secretariat for the preparation of the report and to submit a draft to the Committee Members before December 2006 (**action: Co-presidents and Secretariat**).

6.5.2 Regarding the next IOC Assembly, the Committee agreed that it was preferable to submit a separate JCOMM document. It noted that the deadline for submitting the Action Paper was March 2007, and April 2007 for submitting the document. The Committee agreed that more time was desired for the JCOMM to present its activities to the Assembly, and asked the IOC Secretariat to investigate feasibility (**action: Co-presidents and Secretariat**). The Committee noted that scientific lectures will be given in conjunction with the Assembly and this would be an opportunity to present operational forecasting activities. The JCOMM Programme Area Observations Coordinator, Mr Mike Johnson, noted that the composite ocean observing system has made a number of scientific discoveries, and that this occasion could also be an excellent opportunity to advertise these findings. The Committee invited the Members/Member States to provide input for posters (**action: Secretariat**).

6.5.3 The Committee recommended that national delegations should be briefed prior to the WMO Congress and the IOC Assembly regarding JCOMM achievements and usefulness in order for them to make appropriate interventions and raise the delegates' awareness when discussing JCOMM issues.

7. Work plan for MAN

7.1 The Committee asked the Secretariat to compile a coherent version of the work plan, based on the different work plans that have been produced thus far. The Co-presidents will work in collaboration with the Secretariat in this regard to ensure that tasks are assigned to Committee Members. The list of action items are provided in Annex IX of this document.

8. Formal issues for decision by MAN

8.1 The Committee agreed that there were no additional formal issues to consider under this agenda item.

9. Closure of the session

9.1 Date and place of MAN-VI

9.1.1 The Committee agreed that running Management Committee meetings was an expensive exercise. It was considered at some point to organize the meetings every two years in order to save costs. However, after lengthy discussions, the Committee agreed that in order to provide for quality "management", it should continue to hold the meetings yearly. To combine Committee meetings with other regularly scheduled sessions could also be an option to investigate in order to save costs and resources; the Secretariat was asked to explore this option. The Committee also considered that 2.5 days were not sufficient for the agenda, and recommended that meetings should now be extended to four days to meet all of the agenda items to be covered during the sessions. This would allow appropriate time to address issues such as oceanographic services,

cross-cutting issues and coastal issues. The Committee asked the Co-presidents and the Secretariat to consider how the Management Committee could work more efficiently, and how savings could be made for future meetings. The Committee agreed that once strategic issues are clarified, then it could consider meeting less often, but to consider this at the moment was premature.

9.1.2 The Management Committee decided to hold its next meeting in September or early October 2007, and suggested that Paris, France could be an appropriate venue.

9.2 Adoption of the report

9.2.1 Dr Craig Donlon suggested that it might be appropriate and eventually more efficient to restructure the SPA. Dr Donlon proposed to establish a top level Met-ocean Services group that would be the umbrella for all the SPA Expert Teams. The Committee agreed with this proposal, and suggested that following the example of the integration that took place under the SOT, a single SPA meeting could be organized to include all of the Expert Teams meeting in conjunction with it. The Committee also agreed with another proposal by the SPA Coordinator to nominate a GODAE Rapporteur to provide input to the SPA, such as guidance on standards and product intercomparisons. The Committee, while noting that GODAE experimental phase will come to an end, agreed that it should consider the establishment of a new group to deal with "Ocean Mesoscale Forecasts".

9.2.2 Chairperson of the GCOS Steering Committee, Dr John Zilman, suggested that the JCOMM should be more pro-active in providing materials and guidance for the development of marine services at the national level, especially in developing countries. The WMO example could be followed with regard to the development of public weather services. The Committee agreed that efforts should be made in this regard, especially by updating existing guides and re-focusing them on new applications such as tourism and leisure. The Committee also noted that model source codes are now becoming available as OpenSource (which is free of charge), and that these could be used as a basis for developing marine services in developing countries (**action: PAs, Co-presidents and Secretariat**).

9.2.3 The Committee tasked the Secretariat, mainly in liaison with the SPA, as well as with the DMPA, to design a questionnaire for the JCOMM Member/Member States to identify the marine services that are in place nationally (**action: Secretariat and PA Coordinators**). It agreed that the questionnaire could be sent via a JCOMM Circular Letter, coordinated with the I-GOOS and the GCOS. Based on the results from the study, an interactive global map could be produced to provide the details of what is currently in place nationally.

9.2.4 The Committee reviewed and approved the final report of the meeting.

9.3 Closure

9.3.1 In closing the meeting, the Co-presidents expressed their appreciation to all participants for their very positive and valuable input to the discussions, and to the work of the JCOMM in general. They concluded by expressing, on behalf of all participants, their appreciation to the Secretariat for its support.

9.3.2 The Fifth Session of the JCOMM Management Committee (MAN-V) closed at 14.00 on Saturday, 7 October 2006.

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AGENDA

1. Opening of the session

- 1.1 Opening
- 1.2 Adoption of the agenda
- 1.3 Working arrangements

2. Reports

- 2.1 Report by the Co-presidents
- 2.2 Report by the joint Secretariat

3. Programme area priorities and issues for consideration by the Committee

- 3.1 Observations PA, including the JCOMMOPS, ship security, bulk purchase of consumables
- 3.2 Services PA, including ocean products development, the SPA website, and the ocean products web portal
- 3.3 Data Management PA, including the JCOMM DM Strategy
- 3.6 PA interactions, common issues, priorities
- 3.7 JCOMM website, including MAN list-server for increased interactions within the MAN, periodic updating of PA status reports, etc.

4. Cross-cutting, coordination and integration issues

- 4.1 OOPC requirements and recommendations to the JCOMM
- 4.2 Satellite data requirements
- 4.9 Capacity building, including the Task Team on Resources
- 4.10 Support for IPY
- 4.11 Input to GEO/GEOSS
- 4.12 Support for marine multi-hazard warning systems
- 4.13 Coastal GOOS implementation and interactions with the GRAs
- 4.14 Relationship with other organizations, commissions and programmes

5. JCOMM Development

- 5.1 Implementation plan, system-wide monitoring and business case for operational oceanography
- 5.2 Communications strategy
- 5.6 Relationship with private sector/industry
- 5.7 JCOMM Strategic Implementation Team
- 5.5 Breakout writing groups: communication with broader JCOMM community and external; business case for operational oceanography; system-wide performance monitoring; implementation plan

6. Programme and Budget, Organizational Planning

- 6.1 Regular budget allocations and programme of meetings and other work for 2006/2007
- 6.6 Expectations for regular budget allocations and programme for 2008/2009
- 6.7 Extra-budgetary needs, how to target and assignments
- 6.8 JCOMM input to 7LTP and IOC/UNESCO medium-term strategy
- 6.9 JCOMM input to WMO Congress Cg-XV and IOC Assembly 24

7. Work plan for MAN

8. Formal issues for decision by MAN

9. Closure of the session

9.4 Date and place of MAN-VI

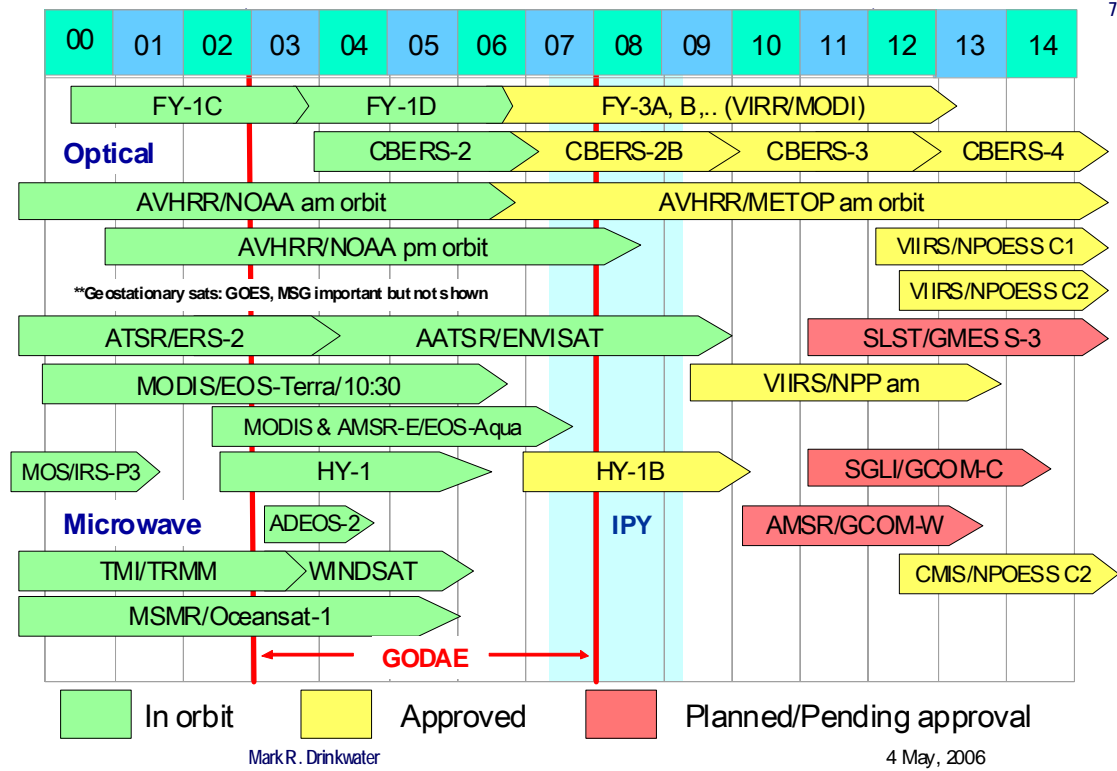
9.5 Adoption of the report

9.6 Closure

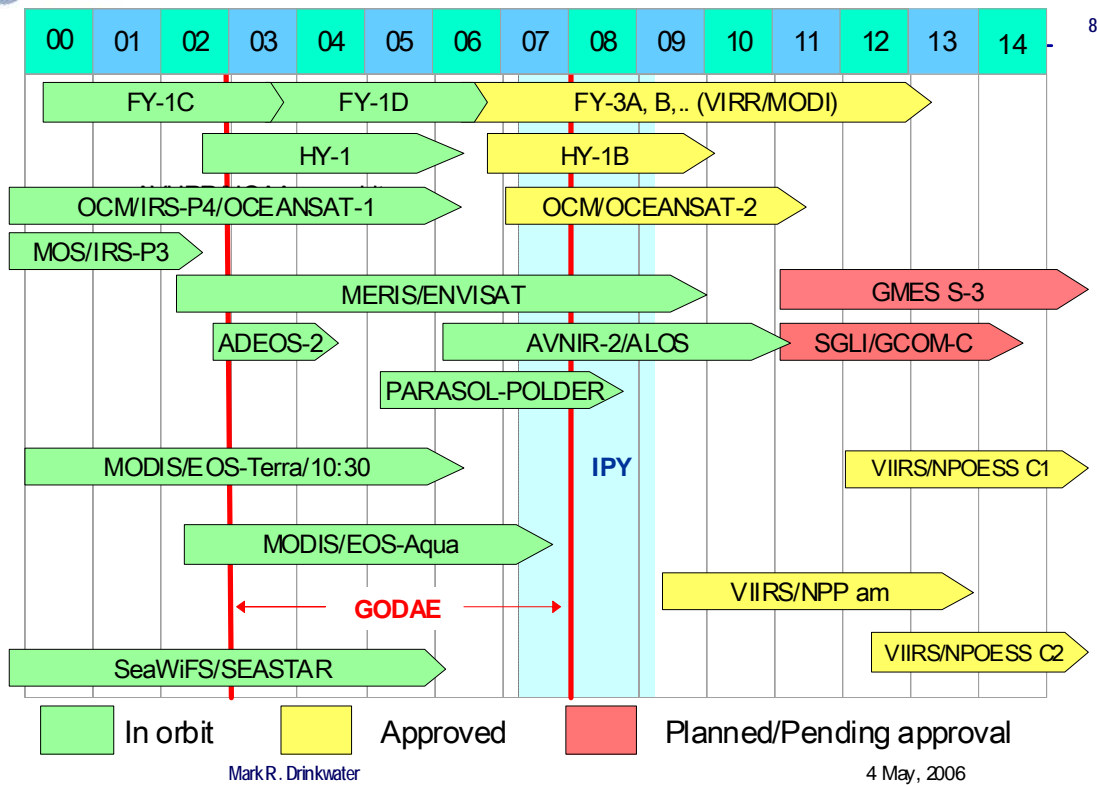
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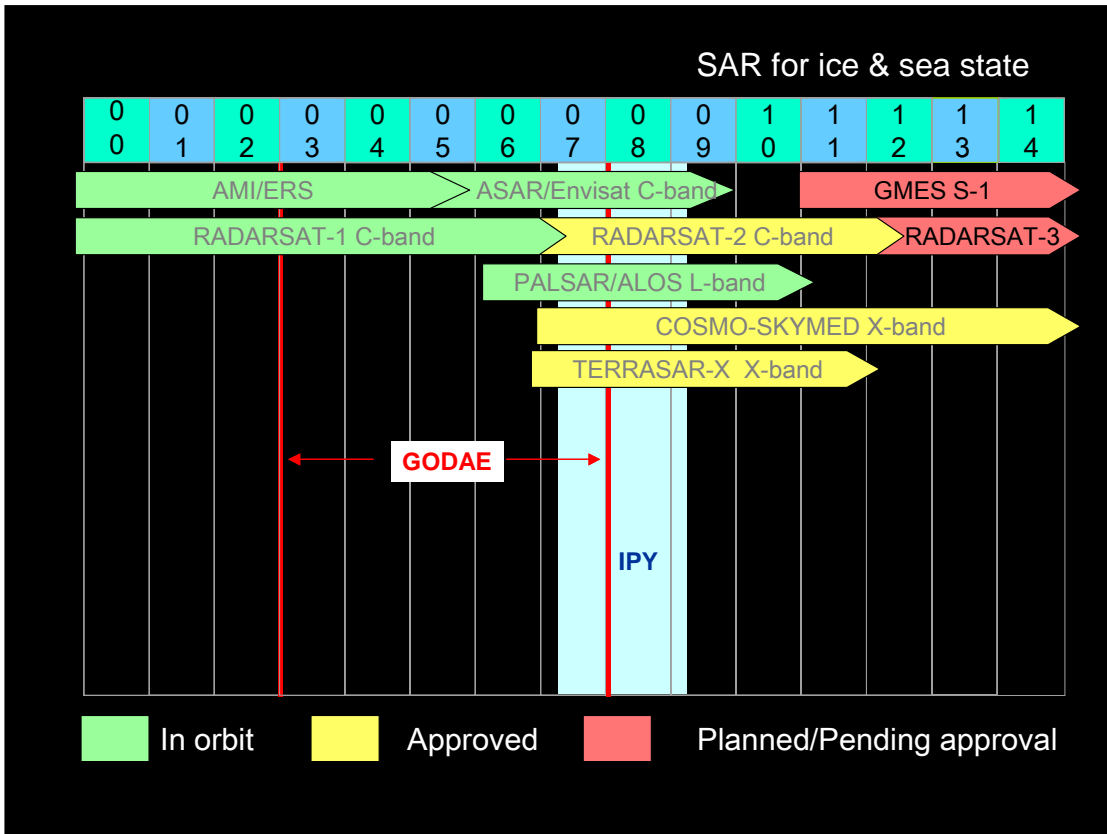


Sea & Ice Surface Temperature

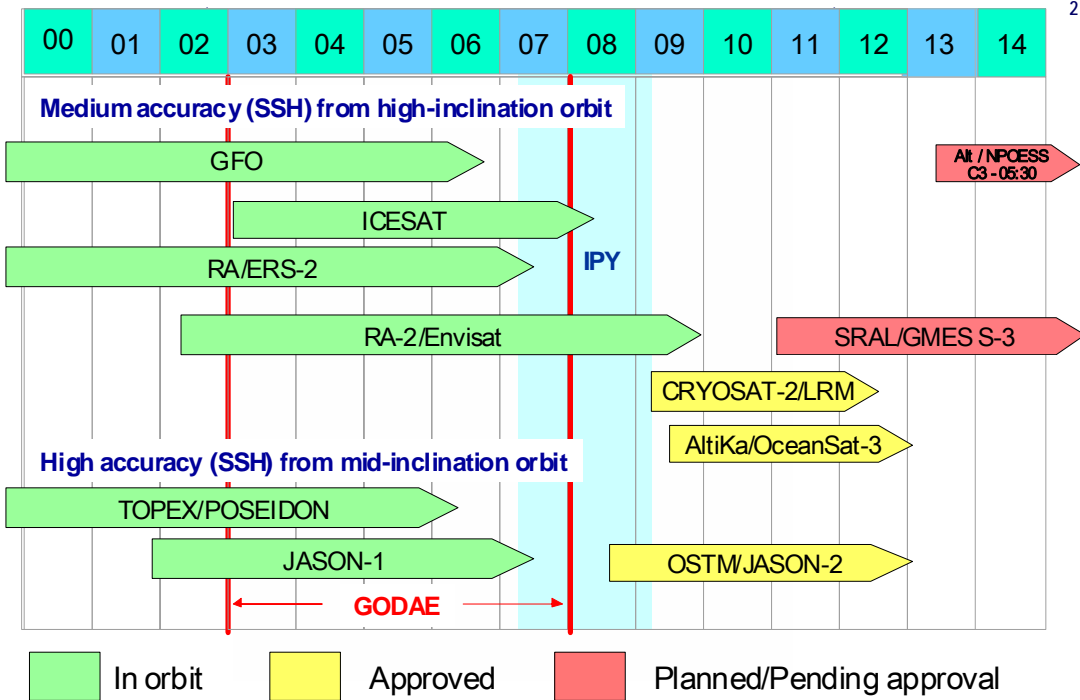


Ocean Colour

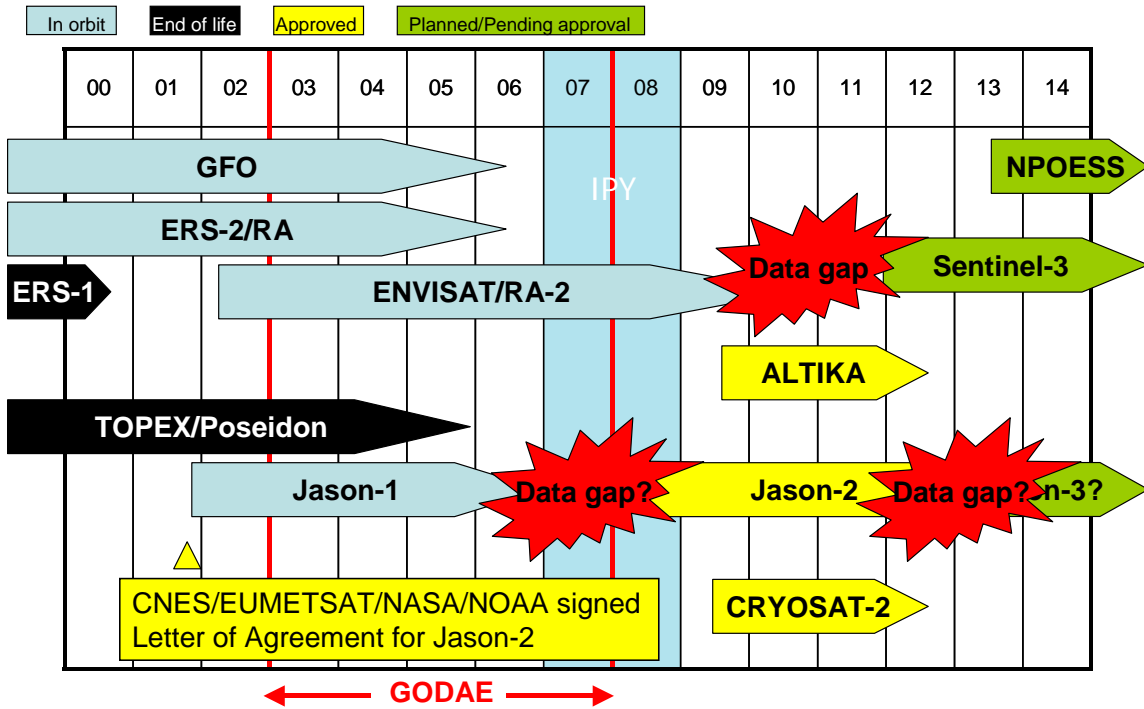




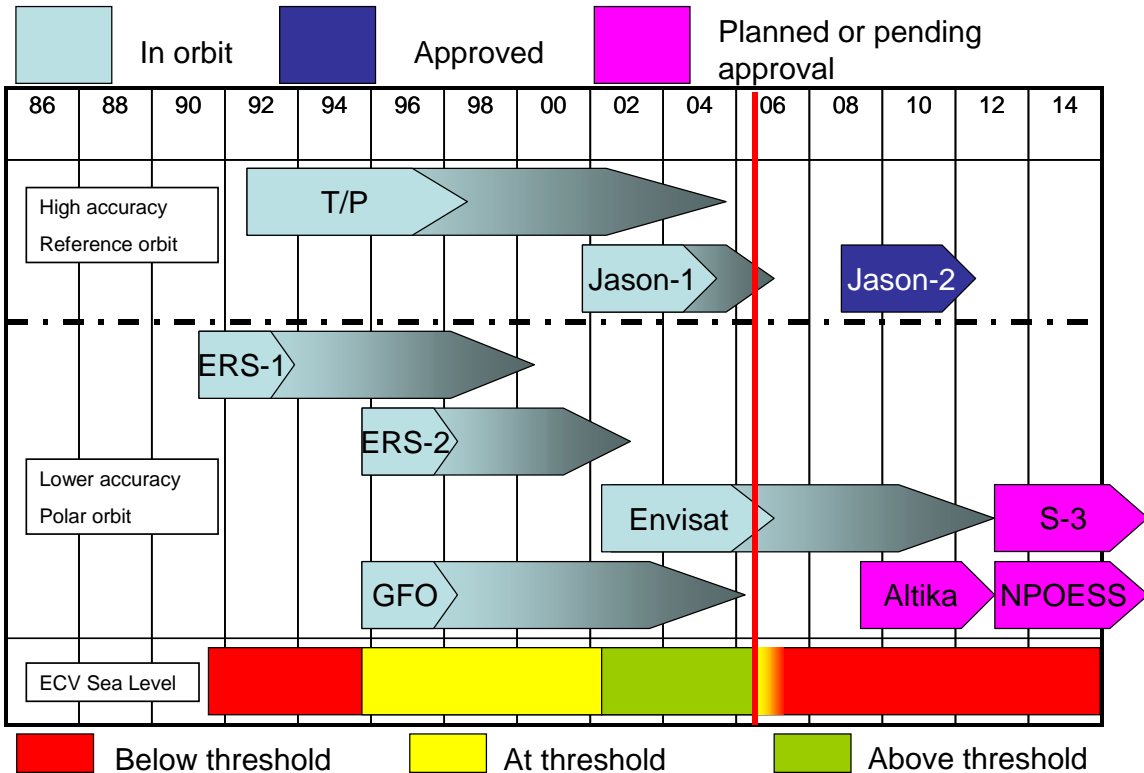
Ocean Surface Topography



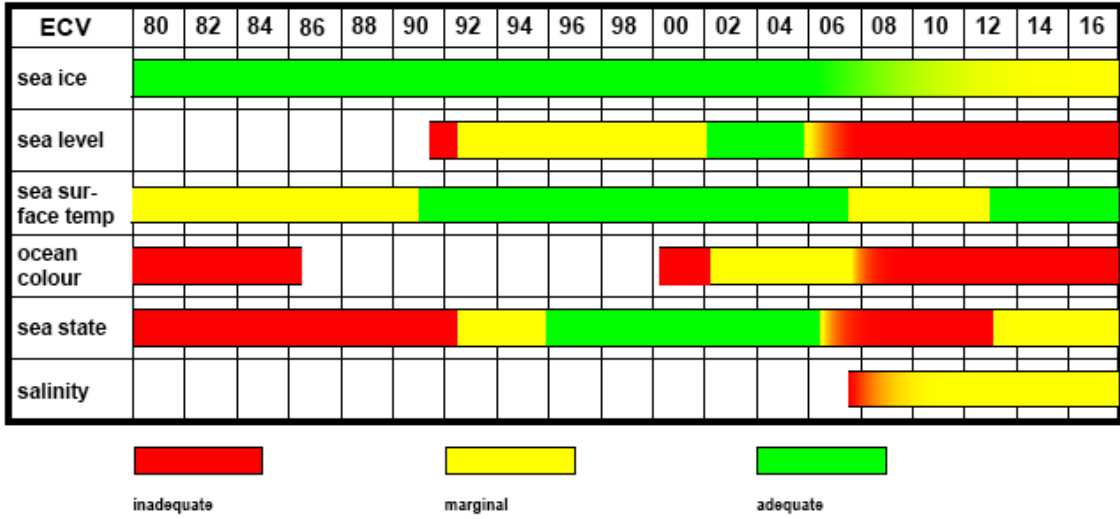
"KNOWN" FUTURE ALTIMETRY MISSIONS



Example - ECV Sea Level



Oceanic Domain ECV Status as of Mid-2006



The Meeting on Cooperation Between the WMO and IOC/IODE on Training Materials for Marine Meteorology

The Meeting on Cooperation between the WMO and IOC/IODE on Training Materials for Marine Meteorology was held in Ostend, Belgium, from 13 to 14, June 2006, at the IOC Project Office for the IODE. The Meeting was attended by representatives from the IOC Project Office for IODE and WMO Secretariat.

The Meeting discussed possible cooperation between the WMO and IODE in the development of training materials related to marine meteorology, and making use of the IODE OceanTeacher system. Both OceanTeacher and WMO Education and Training Programme (ETRP) activities and marine meteorology tools were presented. The Meeting discussed possible actions for the way forward, and agreed that the WMO would prepare a development and implementation plan, as well as the Terms of Reference of such cooperation between the WMO and the IOC/IODE on Training Materials for Marine Meteorology.

Based on Meeting's discussion, as well as several JCOMM Management Committee and JCOMM-II recommendations, an appropriate articulation between the Marine Meteorology and Oceanography Programme (MMOP) and ETRP was recommended and required in order to reach these goals. The MMOP and ETRP have been working in close collaboration to address these issues.

The following actions were agreed by the WMO Secretary-General, based on the information on OceanTeacher, provided by the IOC Project Office for IODE, and discussions with both the MMOP and the ETRP:

- Use the OceanTeacher tool, and slightly modify its identity to clearly indicate that the tool is addressing both the oceanography and marine meteorology communities;
- WMO (MMOP and ETRP) to prepare and define the Terms of Reference of the Cooperation between the WMO and the IOC/IODE, and to develop a medium-term work plan on Training Materials for Marine Meteorology, including both references and lectures;
- Use the WMO-No. 364, Vol. II - Part III (Marine Meteorology) and WMO-No. 434 to be used as Marine Meteorology background information, and to include them in OceanTeacher;
- Taking into consideration the current visibility of OceanTeacher, it is proposed not to change the name of the tool, but rather advertise the tool as "OceanTeacher: a training resource for Oceanography and Marine Meteorology" on the website. The homepage should also include the WMO logo to demonstrate the integrated and collaborative character of the tool. It is also proposed that a second domain name should be reserved that would be easily recognizable by the marine meteorology community. For example: www.marinemeteteacher.org or www.marinemetetrainer.org

List of Actions

- The WMO and IOC/IODE will prepare the Terms of Reference of such collaboration; (action by: the WMO and IOC/IODE by 15 August 2006);
FOLLOW-UP: It is currently being prepared by ETRP and MMOP; to be discussed with the IODE by middle of October 2006.
- The WMO and IODE to keep informed about training activities related to marine meteorology and oceanography organized by both the WMO and IODE;
FOLLOW-UP: training activities of the IODE are advertised on IODE project office website. Information about ETRP training events on marine meteorology is available under the WMO ETRP website.
- The WMO to formally contact the IOC Executive-Secretary, proposing an agreement to collaborate on marine meteorology training through OceanTeacher, based on the Terms of Reference discussed; (action by: the WMO by 1 September 2006);
FOLLOW-UP: The Terms of Reference is to be finalized with exchange of letters by end October 2006.
- The WMO to send a Circular Letter to the WMO NMHSs to introduce OceanTeacher, and to announce the collaboration between the IOC/IODE and WMO in marine meteorology training;
FOLLOW-UP: To be completed after the previous action.
- Preparation of trial video/PPT presentation (action by: the IODE Project Office; the WMO to identify topic and lecturer – deadline 1 September 2006);
FOLLOW-UP: The IODE PO has prepared sample videos; the WMO is preparing a list of possible lecturers and will invite them soon to prepare a presentation.
- The WMO to send a Circular Letter to relevant experts in marine meteorology inviting them to provide training material and collaboration in making video/PPT (action by: the WMO by 15 September 2006);
FOLLOW-UP: To be completed after the previous action.
- The WMO to provide revised guides and other documentation by electronic format to the IODE for inclusion in OceanTeacher (action by: the WMO by end of 2006)
FOLLOW-UP: Guides are currently under revision.
- The WMO and the IODE to agree on table of contents for the OceanTeacher digital library related to marine meteorology (action by the WMO/IOC: possibly through expert meeting at Project Office involving M. Brown and relevant WMO expert(s) – by end of 2006);
FOLLOW-UP: To be completed after the previous action.

Terms of Reference for *ad hoc* group to consider Capacity Building Strategic Plan

The Intersessional Working Group on Capacity Building will be tasked to prepare the following:

1. A JCOMM Strategic Plan, taking into consideration, *inter alia*:
 - (i) The JCOMM CB structure, as adopted by JCOMM-II;
 - (ii) The interaction if the Cross-cutting Team on CB with the Pas, as described in the ToRs of the JCOMM CB Rapporteurs, adopted by the JCOMM-II;
 - (iii) The need for interaction between the JCOMM, WMO and IOC CB activities;
 - (iv) The need for a mechanism, and guidelines to receive, review and adopt CB proposals;
 - (v) The need for a mechanism and guidelines to review and evaluate the JCOMM CB activities;
2. Guidance on a JCOMM CB Implementation Plan

Terms of Reference of the JCOMM DPM Rapporteur

To establish a Rapporteur for Natural Disaster Prevention and Mitigation (DPM) activities of the Commission with the following Terms of Reference:

- a) To coordinate Commission activities, across its relevant PAs and ETs, related to the DPM, and to advise the Commission members on activities that will contribute fully to the WMO DPM Programme;
- b) To provide the Commission's Management Committee with appropriate information and recommendations on the Commission's DPM-related activities;
- c) To interact with the DPM Rapporteurs of other relevant Commissions and the WMO Secretariat, to identify joint areas of activities and mechanism for inter-commission, inter-programme collaboration, and to provide appropriate information and progress for consideration of the JCOMM Management Committee;
- d) To interact with the WMO Secretariat on JCOMM's DPM-related activities;
- e) To participate in the WMO DPM Coordination meetings organized by the WMO Secretariat to brief on the Commission's activities and to discuss inter-commission issues, priorities and mechanisms that would strengthen collaboration with WMO Technical Commissions and Regional Associations.

JCOMM IMPLEMENTATION PLAN

Draft Outline

Executive Summary

1. Introduction

History, background, WMO and IOC policy objectives and broad programme context

Programme IP

High-Level Objectives WMO/IOC

Expected Results WMO/IOC

JCOMM High Level Objectives

- Properly functioning and fully implemented GOOS
- High-quality and widely used marine met and ocean services addressing GEO and GCOS societal benefits

JCOMM Expected Results (map onto the WMO/IOC above)

JCOMM overall deliverables

Reproduce history and background from strategy document, updated with recent developments, including the results from the JCOMM-II. The WMO and IOC high-level objectives and expected results extracted from the relevant planning documents, such as the WMO Strategic Plan to be adopted at Fifth Session of the WMO Congress, and the IOC/UNESCO Medium-Term Strategy to be adopted at the Twenty-Fourth Session of IOC Assembly.

2. The JCOMM Vision

Basic vision statement

Again, reproduce from the strategy document.

3. Drivers and Benefits

Governance arrangements, overall work summary to achieve objectives, success criteria, existing and potential future drivers, benefits statement, involvement of and benefits for Member States.

Existing drivers include the GOOS, GCOS, WWW, SOLAS, and a range of other international treaties and agreements. The benefits statement needs to be drafted, and should reflect similar benefits analyses and statements for the GOOS, GCOS, WWW and the other drivers, as well as those for the WMO and IOC, in general. It is also important to explicitly define here, both the essential role of Member States in JCOMM implementation, and also the benefits they will derive from such implementation at the national and regional level.

4. Management and Cross-cutting (programme management, strategic development, communications and outreach, capacity building and satellites)

Funding and other resources required (people, skills, materials and facilities)

Risk management (including technology issues)

Stakeholder engagement

Quality assurance, performance indicators and evaluation

These sub-sections of sections 4-7 are fairly standard components of implementation plans, and templates/guidance exist for all of them. The JCOMM Co-president, Dr P. Dexter, can provide this in an Australian context, but there may also be similar guidance in the UN system. The drafter of the JCOMM IP (consultant) will need to work closely with the JCOMM Strategic Planning Team in

developing portions of this material, especially for Section 4, which deals with overall with JCOMM and cross-cutting issues. We should also use Section 4 to lay out the overall JCOMM IP structure, into which the following sections will feed. Stakeholder engagement must include a clear outline of the mechanisms for receiving, incorporating and acting on guidance from the external drivers such as the GOOS, GCOS and the WWW.

A key operational area where the JCOMM is expected to play a leading role is in the development and maintenance of standards, including inter-comparisons and inter-calibration, and across all programme areas. The IP must explicitly include this work in sections 4-7.

It is envisaged that the PA Coordinators will have a large role to play in drafting their respective sections 5-7. For some issues, this will be relatively easy; e.g. Mr M. Johnson already has the basis for the OPA IP. There seems to be no reason why each of the PAs should not address each of the subsections in some way. Since the PAs constitute the core business of the JCOMM, these three sections are obviously critical to the IP. Details include there will contribute directly to the broader programme planning and evaluation process in the WMO and the IOC. It is also essential that each of sections 5-7 should explicitly acknowledge capacity building requirements and actions to address these issues.

5. Observations

Funding and other resources required (people, skills, materials and facilities)
Risk management (including technology issues)
Stakeholder engagement
Quality assurance, performance indicators and evaluation

6. Data Management

Funding and other resources required (people, skills, materials and facilities)
Risk management (including technology issues)
Stakeholder engagement
Quality assurance, performance indicators and evaluation

7. Services

Funding and other resources required (people, skills, materials and facilities)
Risk management (including technology issues)
Stakeholder engagement
Quality assurance, performance indicators and evaluation

8. An Integrated Approach

Inter-operability of the JCOMM PAs
Global integration
Agents for implementation

A section on integration and cross-cutting issues that join up the JCOMM PA structure are included. For example, a JCOMM service may be the provision of a data set to an agency; services need to take advice and give advice on data formats, etc. The JCOMM explicitly aims to integrate data and product delivery streams at the global-level in response to the external drivers and user requirements. There are many areas that could be use to show what the integrating and cross-cutting issues are for a fully-functioning the JCOMM structure.

9. External Interactions

Input to the WMO and IOC budget and planning process
Subsidiary bodies of the WMO and IOC

GEO/GEOSS

Other governmental and non-governmental global bodies

Regional bodies

Science programmes

The private sector

Incorporation of external requirements and guidance

The structure of sections 9 and 10 reflect similar sections in the strategy document. The IP needs to detail how we go about implementing these components of the work. For some, we will be able to put milestones, performance indicators, etc. (e.g., for the input to the Organizations' planning processes, other subsidiary and regional bodies); for others the actions will be more *ad hoc* (e.g., interactions with science programmes). Nevertheless, we must try to be as specific as possible, (e.g., the private sector section should at least reflect the action items agreed at the March meeting, with timelines and deliverables).

For the incorporation of new elements in Section 9 (essentially pilot projects to operations), we can be precise with some such as the GODAE, where we already have a work programme and some timelines agreed at JCOMM-II, but will need to be more nuanced with others, such as Argo. This sub-section should also explicitly acknowledge the willingness of the JCOMM to take on the oversight and coordination of non-physical observations, data management and services, as well as the conditions under which it will do this.

The JCOMM review process is clear cut, but for the structural evolution process, while it has milestones of at least each Commission session, we cannot be too prescriptive at this stage, except to detail the process of assessing the requirements for change and the steps to achieve this. Sections 4-7 should already include recognition of technological developments within their risk-assessment and risk-management sub-sections, but it is worth re-stating and further detailing this issue as part of section 10.

10. Evolution

Evolution of technology and methodology

Incorporation of new elements

Structural evolution

JCOMM review

Annexes: Terms of Reference, JCOMM Structure, References, Acronyms

TERMS OF REFERENCES FOR ASSESSMENT STUDY

A consultant should be hired to:

- (i) Contact the audiences who would use the outreach web: decision makers, private sector, government agencies, NGOs and news media;
- (ii) Contact the audiences who would use the capacity building web: donor agencies, individual experts and training groups;
- (iii) Suggest types of information that these audiences need;
- (iv) Prepare an initial description for the web.

LIST OF ACTIONS FOR THE MANAGEMENT COMMITTEE
(decisions from MAN-V)

Ref.	Action	By whom	When
3.1 Observations Programme Area			
MAN-V 3.1.5	Provide ship identification for quality monitoring activities and for global climate studies	OPA	Ongoing
MAN-V 3.1.11	Endorse the OSMC as a test JCOMM tool, and advertise it via JCOMMOPS and the JCOMM Newsletter as well as featured on the main JCOMM website	Secretariat	Ongoing
MAN-V 3.1.13	Develop a requirements specification for the JCOMMOPS centre	OPA Coordinator	ASAP
MAN-V 3.1.15	Report on the use of the Trust Fund on shipboard expendables to the SOT at its regular meetings	Secretariat and OPA	Continuing
3.2 Services Programme Area			
MAN-V 3.2.1	Further develop the SPA work plan, and to Promote interaction and integration between the SPA Expert Teams.	SPA and Secretariat	2006
MAN-V 3.2.2	Revise the SPA ET's Terms of References (ToR) and to propose changes, as appropriate	SPA	JCOMM-III
MAN-V 3.2.2	Include ocean climate services in SPA work plan	SPA	2006
MAN-V 3.2.6	Hold a workshop to compare sea ice charts, methods and techniques	ETSI	2008
MAN-V 3.2.7	Hold a Storm Surge Symposium	ETWS	2007
3.3 Data Management Programme Area			
MAN-V 3.3.1	Develop an extreme wave database	ETWS and ETMC	2007
MAN-V 3.3.3	Contribute material to OceanTeacher	DMPA	Continuing
MAN-V 3.3.6	Improve metadata records (to be included in the JCOMM Data Management Strategy)	DMPA	ASAP
MAN-V 3.3.7	Consolidate and adopt standards for metadata management; work more closely with relevant communities (especially SG-MEDI)	DMPA	ASAP
MAN-V 3.3.8	Prepare a questionnaire to the Member States represented on JCOMM, asking for information on potential JCOMM DCPCs for marine meteorological and oceanographic variables	Secretariat and DMPA	ASAP
MAN-V 3.3.10	Work to ensure consistency between the JCOMM DM Strategy and relevant IOC plans	DMPA coordinator	ASAP
MAN-V 3.3.12	Hold CLIMAR-III	ETMC	2008
MAN-V 3.3.13	Prepare BUFR tables for non-physical parameters	DMPA	Ongoing
3.4 Programme Area interactions and common issues			
MAN-V 3.1.4	Collect all required data sets from the fleet, including delayed-mode data and metadata, from the fleet	DMPA and OPA	Continuing

Ref.	Action	By whom	When
MAN-V 3.1.4	Get detailed requirements for the wave measurements network from the ETWS and increase the number of wave measuring buoys	SPA and OPA	ASAP
MAN-V 3.2.3	To develop standards/reference documents	PAs, SPA ETs and Secretariat	JCOMM-III
MAN-V 3.4.4	Seek extra-budgetary support for a Technical Coordinator to assist MAN in implementing recommended technical actions	Secretariat	ASAP
MAN-V 3.3.9	Engage in more unified data management operations	DMPA and other PAs	Continuing
MAN-V 3.4.5	Define a strategic and implementation plan for PA cross-cutting activities and interactions	PAs and Secretariat	ASAP
MAN-V 9.2.3	Design a questionnaire targeting the JCOMM Member/Member States, in order to identify the marine services that are in place nationally	Secretariat and PAs Coordinators	ASAP
3.5 JCOMM website			
MAN-V 3.5	Develop and revise, as necessary, a consolidated JCOMM website that is integrated across the PAs and non-duplicative	Secretariats	Continuing
4.1 OOPC requirements and recommendations			
MAN-V 4.1.5 (i)	Work towards improved availability of coastal weather and water level forecasts to all nations	SPA Coordinator	Ongoing
MAN-V 4.1.5 (ii)	Continue and improve collaboration with tsunami programmes	PAs and DPM rapporteurs	Continuing
MAN-V 4.1.5 (iii)	Continue to remind the IOC, WMO, I-GOOS, UNFCCC, and GEO that institutional arrangements at the national and international levels were not adequate to complete and sustain the initial ocean observing system	Co-presidents and Secretariat	Continuing
MAN-V 4.1.5 (iv)	Advocate for expanded Observing Program Support (OPS), including preparation of an estimate for ship time needs to maintain global coverage of drifters and Argo	Secretariat, Co-presidents and OPA	ASAP
MAN-V 4.1.5 (v)	Consider using the ocean temperature metadata pilot project as a foundation for a real-time data management strategy	DMPA	2007
4.2 Satellite data requirements			
MAN-V 4.2.1 (i)	Refresh the GCOS requirements	OOPC	2007
MAN-V 4.2.1 (ii)	Update the WMO CEOS database to reflect the requirements	Secretariat	2007
MAN-V 4.2.1 (iii)	Work towards a better integration of <i>in situ</i> and remote-sensing observing systems in the JCOMM, GCOS and CEOS, and set priorities	Satellite Rapporteurs	2007
MAN-V 4.2.1 (iv)	Emphasize the need for planning "end-to-end" systems for research and demonstration, operations, products and services, and technology infusion	GHRSSST Project Director	2007
MAN-V 4.2.1 (v) and 4.6.8 a)	Review and develop requirements for use of satellite technology for enhanced climatology and real-time detection of ocean-related hazards	Satellite Rapporteurs	2007
4.3 Capacity building			

Ref.	Action	By whom	When
MAN-V 4.3.2	Integrate the UNESCO Bilko materials into OceanTeacher	JCOMM/IODE Secretariat	2007
MAN-V 4.3.3	Develop a CB strategic plan and guidance on an implementation plan	<i>Ad hoc</i> group on CB	March 2007
MAN-V 4.3.4	Revise and use CB evaluation questionnaires	JCOMM/IODE Secretariats	ASAP
MAN-V 3.5.8	Prepare a JCOMM Communication Strategy	Secretariats, Co-presidents and PA Coordinators	ASAP
4.4 IPY			
MAN-V 4.4.4	Develop the PolarView website and include the JCOMM logo	ETSI	March 2007
MAN-V 4.4.6	Support the implementation of the IABP and IPAB projects proposals	Co-presidents	March 2007
4.6 Marine multi-hazard warning systems			
MAN-V 4.6.1	Continue to implement the action plan of JCOMM contributions to marine multi-hazard warning systems	PAs	Ongoing
MAN-V 4.6.2	Recommend to the WMO that the word 'early' be removed from 'early warning', which will enable different temporal scales to be considered within the DPM process	Secretariat and Co-presidents	ASAP
MAN-V 4.6.7	To work with relevant partners on the JCOMM role in development of marine multi-hazard warning systems, and to clarify the meaning of 'marine multi-hazards'	DPM Rapporteurs	ASAP
MAN-V 4.6.8 a)	Review and develop requirements for use of satellite technology for enhanced climatology and real-time detection of ocean-related hazards	Cross-cutting Team on Satellite Data Requirements	ASA
MAN-V 4.6.8 b)	Develop and agree on standards, including QC, and implement the CREX code format for sea level data monitoring in support of tsunami EWS	DMPA	2006
MAN-V 4.6.8 c)	Develop synergies between the DBCP and the International Tsunameter Partnership	DBCP Vice-chairperson	Continuing
MAN-V 4.6.8 d)	Finalize the <i>Guide to Storm Surge Forecasting</i> and to develop a demonstrate project for storm surge warnings	ETWS	2007
MAN-V 4.6.8 e)	Enhance storm surges statistics	ETWS and ETMC	2007
MAN-V 4.6.8 f)	Strengthen linkages with the CBS OPAG on PWS, for enhancement of public storm surge warnings; and with CHy for interfacing storm surge and coastal flood model	ETWS	2007
MAN-V 4.6.8 g)	Upgrade and enhance the GLOSS stations for real-time ocean-related hazard warnings	OPA	Ongoing
MAN-V 4.6.8 h)	Develop CB activities as a contribution to OceanTeacher (module on applications of data to marine hazards)	Cross-cutting Team on CB	2007
MAN-V 4.6.8 i)	Continue with SL training events, including maintenance of gauges and use of data (archiving, access and multi-hazard applications)	OPA	Continuing

Ref.	Action	By whom	When
MAN-V 4.6.8 j)	Refine, publish and implement QC standards for real-time GTS transmission of SL data	DMPA	Early 2007
MAN-V 4.6.8 k)	Cooperate with the IMO and IHO in order to address the international organizations' role (IOC, WMO, IHO and IMO) in the provision of Tsunami Maritime Safety Information (warnings and related information)	SPA	Early 2007
4.7 Coastal GOOS			
MAN-V 4.7.1	To represent the views of the JCOMM Management Committee during the Third GOOS Regional Forum, GSSC-X and I-GOOS-VIII	Co-presidents	2006
MAN-V 4.7.7	To continue the coordination between the JCOMM and the GOOS	GOOS member of MAN	Continuing
4.8 Relationship with others			
MAN-V 4.8.1	Develop a specific section for marine services in the WMO CEOS database	SPA	2007
MAN-V 4.8.2	Designate a focal point to liaise with the WMO Secretariat and provide input on the ET-EGOS Rolling Review of Requirements (RRR) process	SPA	2007
MAN-V 4.8.3	Ensure collaboration of ASAP and AMDAR Programmes as a source of <i>in situ</i> aerological profiles	OPA and its SOT	Continuing
MAN-V 4.8.4	Provide input on requirements for satellite sea surface winds, as well as guidance regarding the impact on applications of scatterometers and microwave imagers	Cross-cutting Team on Satellite Data Requirements	2007
MAN-V 4.8.12	Increase real-time ocean observational data to support the NWP, global weather forecasting, and associated atmospheric research programmes	OPA	Continuing
MAN-V 4.8.13	To establish an appropriate liaison mechanism between the CAS and JCOMM	SPA Coordinator, ETWS Chairperson and CAS President	ASAP
5.1 Implementation plan			
MAN-V 5.1.2	To prepare a draft implementation plan, with a view to its review by MAN prior to the WMO Congress and the IOC Assembly in May/June 2007	Dr D.J. Baker and Strategic Implementation Team	May/June 2007
5.2 Communications strategy			
MAN-V 5.2.3	Encourage MAN members to make keynote speeches to professional societies	MAN Members	Continuing
MAN-V 5.2.4	Develop a comprehensive needs analysis for outreach audiences; seek extra-budgetary resources	Secretariat, Co-presidents and a Consultant	ASAP
MAN-V 5.2.6	To draft a JCOMM communications strategy	Secretariat and Professor Worth Nowlin	2007
5.3 Private sector			
MAN-V 5.3.3	Hold a follow-up meeting with private sector/industry after progress made on the action list agreed during the first meeting	Secretariat	2007

Ref.	Action	By whom	When
6.3 Extra-budgetary needs			
MAN-V 6.3.1	Redesign PA work plans, taking into account the WMO Strategic Plan and the IOC Medium-term Strategy	PAs Coordinators and Secretariat	ASAP
6.4 WMO 7LTP and IOC/UNESCO medium-term strategy			
MAN-V 6.4.5	Consolidate MAN Members' comments on both the WMO Strategic Plan and the IOC Medium-term Strategy and submit it to the WMO and IOC Secretariats	Co-presidents	ASAP
6.5 WMO Congress (Cg-XV) and IOC Assembly (XXIV)			
MAN-V 6.5.1	Prepare and circulate a draft JCOMM document for WMO Congress	Co-presidents and Secretariat	
MAN-V 6.5.2	Present JCOMM activities to the IOC Assembly and the IOC Secretariat to investigate feasibility of additional time allocation	Co-presidents and Secretariat	June 2007
MAN-V 6.5.2	Invite Members/Member States to provide input for posters to be presented at both the WMO Congress and the IOC Assembly	Secretariat	Early 2007
MAN-V 9.2.2	Promote OpenSource codes, and use them as a basis for developing marine services in developing countries	PAs, Co-presidents and Secretariat	Continuing

ACRONYMS AND OTHER ABBREVIATIONS

AMDAR	Aircraft Meteorological Data Reporting
Argo	Array for Real-time Geostrophic Oceanography programme
ASAP	Automated Shipboard Aerological Programme
BUFR	Binary Universal Form for Representation of meteorological data
CAS	Commission for Atmospheric Sciences
CB	Capacity Building
CBCG	Capacity Building Coordination Group (JCOMM)
CBS	Commission for Basic Systems (WMO)
CCI	Commission for Climatology
CEOS	Committee on Earth Observation Satellites
CG	WMO Congress
CHY	Commission for Hydrology
CIS	Canadian Ice Service
CLIMAR	International Workshop on Advances in Marine Climatology
CLIVAR	Climate Variability and Predictability (WCRP)
COMSAR	IMO Sub-Committee on Radio Communications and Search and Rescue
CSA	Canadian Space Agency
DART	Deep-ocean Assessment and Reporting of Tsunamis
DBCP	Data Buoy Cooperation Panel (OPA)
DCPC	WIS Data Collection Product Centre
DM	Data Management
DMCG	Data Management Coordination Group (JCOMM)
DMPA	Data Management Programme Area (JCOMM)
DPM	Disaster Prevention and Mitigation
DRR	Disaster Risk Reduction
E2EDM	End-to-End Data Management
EC	European Commission
EC	Executive Council
ECDIS	Electronic Chart Display Information System
ECV	Essential Climate Variables
EMSA	European Maritime Safety Agency
ENVISAT	Environmental Satellite
ERS	European Remote Sensing
ESA	European Space Agency
ET	Expert Team
ET2.2	CCI Expert Team on Climate Monitoring including use of Satellite and Marine Data and Products
ET-EGOS	CBS Expert Team on the Evolution of the GOS
ETDMP	Expert Team on Data Management Practices (DMPA)
ETMAES	Expert Team on Marine Accident Emergency Support (SPA)
ETMC	Expert Team on Marine Climatology (DMPA)
ETMSS	Expert Team on Maritime Safety Services (SPA)
ETRP	WMO Education and Training Department
ETSI	Expert Team on Sea Ice (SPA)
ETWS	Expert Team on Wind Waves and Storm Surges (SPA)
EWS	Early Warning System
GCOS	Global Climate Observing System
GDPFS	Global Data Processing and Forecasting System (CBS)
GDSIDB	Global Digital Sea Ice Data Bank
GEO	Group on Earth Observation
GEOSS	Global Earth Observation System of Systems
GHRSSST	GODAE High Resolution SST
GLOSS	Global Sea-level Observing System

GMDSS	Global Maritime Distress and Safety System (IMO)
GODAE	Global Ocean Data Assimilation Experiment
GOOS	Global Ocean Observing System
GOS	Global Observing System (WWW)
GOSUD	Global Ocean Surface Underway Data
GRA	GOSS Regional Alliance
GSC	GOOS Steering Committee
GSSC	GOOS Scientific Steering Committee
GTS	Global Telecommunication System (WWW)
GTSP	Global Temperature-Salinity Pilot Project
HAB	Harmful Algal Bloom
I-GOOS	Intergovernmental Committee for GOOS (GOOS)
IABP	International Arctic Buoy Programme
ICG	Inter-Commission Coordination Group
ICG/ITSU	International Coordination Group for ITSU (IOC)
ICADS	International Comprehensive Ocean-Atmosphere Data Sets
ICS	International Chamber of Shipping
IHO	International Hydrographic Organization
IICWG	International Ice Charting Working Group
IMO	International Maritime Organization
IMSO	International Mobile Satellite Organization
INMARSAT	International Mobile Satellite Organization
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
IOCCP	International Ocean Carbon Coordination Project
IODE	International Oceanographic Data and Information Exchange (IOC)
IOTWS	Indian Ocean Tsunami Warning and Mitigation System
IP	Implementation Plan
IPAB	International Programme for Antarctic Buoys
IPY	International Polar Year
ITG	Inter-commission Task Group
ITSU	International Coordination Group for the Tsunami Warning System in the Pacific
JAMBOREE	IODE/GOOS/JCOMM Combined Modelling and Data Management Training Workshop
JASON	Altimeter Satellite (TOPEX follow-on)
JC	Joint Committee
JCOMM	Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology
JCOMMOPS	JCOMM <i>in situ</i> Observing Platform Support Centre
KPI	Key Performance Indicator
KPT	Key Performance Target
LDC	Least Developed Country
MAN	Management Committee (JCOMM)
MARCDAT	International Workshop on Advances in the Use of Historical Marine Climate Data
MCSS	Marine Climatological Summaries Scheme
MEDI	Marine Environmental Data Information Referral Service
META-T	Water Temperature Metadata Pilot Project
MMOP	Marine Meteorology and Oceanography Programme (WMO)
MOC	Atlantic Meridional Overturning Circulation
MPERSS	Marine Pollution Emergency Response Support System (JCOMM)
MSI	Maritime Safety Information
MSS	Maritime Safety Services
NGO	Non-governmental Organization
NMHS	National Meteorological (and Hydrological) Service (WMO)
NOAA	National Oceanic and Atmospheric Administration (US)
NWP	Numerical Weather Prediction

OceanSITES	Ocean Sustained Interdisciplinary Timeseries Environment observation System
OCG	Observations Coordination Group (JCOMM)
ODAS	Ocean Data Acquisition Systems, Aids and Devices
OOPC	Ocean Observations Panel for Climate
OPA	Observations Programme Area (JCOMM)
OPAG	Open Programme Area Group
OPS	Observing Programme Support
OPSC	Observing Programme Support Center
OSMC	Observing System Monitoring Center
OSTM	Ocean Surface Topography Mission
PA	Programme Area (JCOMM)
PIRATA	Pilot Research Moored Array in the Tropical Atlantic
PMO	Port Meteorological Officer
POGO	Partnership for Observation of the Global Oceans
PP	Pilot project
PWS	Public Weather Service
QARTOD	Quality Assurance of Real-Time Oceanographic Data
QC	Quality Control
RA	Radar Altimeter
RRR	Rolling Review of Requirements
SAR	Synthetic Aperture Radar
SCAR	Scientific Committee on Antarctic Research
SCDPM	Sub-Committee on Data Policy and Management
SCEOS	Sub-Committee on Education, Outreach and Communication
SCG	Services Coordination Group (JCOMM)
SCOBS	Sub-Committee on Observations
SIGRID	Format for the archival and exchange of sea-ice data in digital form
SG	Steering Group
SMOS	ESA's Soil Moisture and Ocean Salinity
SOG	Statement of Guidance
SOT	Ship Observations Team (OPA)
SOLAS	International Convention for the Safety of Life at Sea
SOOP	Ship Of Opportunity Programme
SOOPIP	JCOMM Ship-of-Opportunity Programme Implementation Panel
SPA	Services Programme Area (JCOMM)
SST	Sea Surface Temperature
TC	Tropical Cyclone
TECO-WIS	Technical Conference on WIS
TIP	Tropical Moored Buoys Implementation Panel
TLO	Top Level Objectives
TOPEX	Ocean Topography Experiment
TOR	Terms of Reference
TT	Task Team
TT-OPD	Task Team on Ocean Products Development (SPA)
TTR	Task Team on Resources
TWS	Tsunami Warning System
UN	United Nations
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
URD	User Requirement Document (SPA)
VOS	Voluntary Observing Ship
VOSclim	Voluntary Observing Ships Climate Subset Project
WCP	World Climate Programme
WCRP	World Climate Research Programme (WMO/IOC/ICSU)
WDC	World Data Centre

WIS	WMO Information System
WMO	World Meteorological Organization (UN)
WWW	World Weather Watch (WMO)
XBT	Expendable Bathy-Thermograph