WIGOS PILOT PROJECT FOR JCOMM, PROJECT PLAN
(as of 6 November 2008)

INTEGRATION OF MARINE METEOROLOGICAL AND OTHER APPROPRIATE OCEANIC OBSERVATIONS INTO THE WMO GLOBAL OBSERVING SYSTEMS

1. BACKGROUND

Assisted by fifteenth WMO Congress (Cg-XV), the high-level WIGOS-WIS goal is to establish a comprehensive, coordinated, and sustainable system of observing systems with ensured access to its component observing systems' data and products through interoperable arrangements. WIGOS, the WMO sponsored system of observing systems and the WMO sponsored Information System (WIS) provides the access through the interoperable arrangements. WIGOS-WIS will address all WMO Programme requirements, ensure availability of required information, meet data quality standards, and facilitate access to real / quasi-real-time data as well as to archived information. The WIGOS Pilot Project for JCOMM will make an important contribution in the development of WIGOS-WIS.

2. SCOPE AND DELIVERABLES

2.1 Scope

2.1.1 Following guidance from the WMO Executive Council Working Group on the WMO Integrated Global Observing System (WIGOS) and the WMO Information System (WIS) (EC WG WIGOS-WIS), this Project Plan recommends a Steering Group to coordinate and facilitate the development and implementation of the WIGOS Pilot Project for JCOMM (including relevant WIS items) as well as the International Oceanographic Data and Information Exchange (IODE) Ocean Data Portal (ODP).

2.1.2 The Pilot Project will be required to coordinate with appropriate WMO Technical Commissions and Expert Teams:

- The WMO Commission for Basic Systems (CBS) is responsible, in particular, for the cooperation with Members, other technical commissions and relevant bodies in the development and operation of integrated systems for observing, data-processing, telecommunications, and data management in response to requirements of all WMO Programmes and opportunities provided by technological developments. The development of the WIS is undertaken in the framework of the CBS. The WIS will be at the heart of the Pilot Project as the development interoperability between ocean data management systems and the WIS will be one of the key Pilot Project deliverables. The development of the WIS is coordinated through the Inter Commission Coordination Group on WIS (ICT-WIS). Three Expert Teams have also been established by the CBS to undertake specific aspects of the WIS development and are as follows: (i) the Inter - Programme Expert Team on Metadata Implementation (IPET-MI); (ii) the Expert Team on Global Information System Centres (GISC) and Data Collection and Production Centres (DCPC); and (iii) the Expert Team on WIS-GTS, Communication Techniques and Structures (ET-CTS). Liaison with these Expert Teams will be developed further in the future. (See further details listed under 3.5.); and

- The WMO Commission for Instruments and Methods of Observation (CIMO) is responsible for matters relating to international standardization and compatibility of instruments and methods of observation of meteorological, related geophysical, and environmental variables. The work of CIMO relates directly to one of the deliverables of the Pilot Project, (i.e. documenting and integrating best practices and standards being used amongst the marine meteorological and oceanographic communities). As standards and best practices have in some cases been

developed separately between the meteorological (via CIMO) and oceanographic (via IOC and its IODE) communities, enhanced coordination between the two will be required. (See further details listed under 3.5.).

2.1.3 In addition, this will require coordination with:

- The JCOMM Management Committee (MAN) with regard to the overall development of the Pilot Project, and JCOMM cross cutting issues;

- The JCOMM Observations Programme Area (OPA) and its Observations Panels, in collaboration with CIMO, to assist in the development of best practices and standards, and ensure that the flow of real-time and delayed-mode observations will eventually be provided through the WIS and partner ocean data systems;

- The JCOMM Data Management Programme Area (DMPA) will assist in the development of standards through it's standards development and accreditation process, as well as to facilitate the development of interoperable arrangements between the ocean data systems and the WIS;

- The IOC of UNESCO, through the IODE committee, will assist in the development of standards through it's standards development and accreditation process, to coordinate the development of interoperable arrangements between the ocean data systems and the WIS, to ensure a sufficient level of compatibility between the Marine Community Metadata profile (MCP) and the WMO Core Profile, as well as to connect IODE National Oceanographic Data Centres (NODC) and the ODP with the WIS; and

- The IOC-WMO-ICSU-UNEP Global Ocean Observing System (GOOS) and the GOOS Scientific Steering Committee (GSSC) will also be required to ensure that the standards and best practices developed meet their expressed requirements. Through linkages between NODCs and World Data Centres (WDC) of ICSU, the project will endeavour to engage at least one WDC Oceanography.

2.1.4 Progress will be reported to the JCOMM MAN and to the WMO EC Working Group on WIGOS-WIS by the JCOMM Pilot Project representative at their regular Sessions.

2.2 Deliverables

2.2.1 The Pilot Project will promote the following: (i) documentation and integration of best practices and standards among the marine meteorological and oceanographic communities; (ii) interoperability of marine data systems with the WIS in close cooperation with the IOC ocean community; and (iii) establish compliance with the WMO Quality Management Framework (QMF). This will be realized according to the following guidelines.

2.2.2 Document and integrate instrument best practices and related standards

2.2.2.1 The goal is to define and agree on common standards for instruments and methods of observation as well as subsequent organization and handling of the data and information to deliver consistent and better quality data to both the broad user and modelling communities. Data records must be traceable to standards. Maintenance and calibration are critical for ensuring stability and sustainability of systems. To understand system and component performance, a thorough documentation of observing platform siting and history as well as the recording and updating of metadata are critical in the elimination of inhomogeneities in data records. For example, one of the challenges proposed by the climate community was to conduct instrument intercomparisons over a long enough period, usually on the order of about 10 years. Best practices and standards have sometimes been developed separately between the oceanographic (e.g., sea level) and the marine meteorological (e.g., voluntary observing ships) communities when there was no clear connection.

However, there are instances where these have been developed in common between the WMO and IOC (e.g., ships of opportunity and data buoys). Still, much work remains to be undertaken.

2.2.2.2 Some documentation of instrument related standards already exists. The Pilot Project will identify instrument standards and best practices that are relevant to WIGOS, identify those publications that need updating, and make recommendations for updating them. Updating existing standards or developing new ones will be made in a way consistent with the process that has been developed jointly by JCOMM and IODE under the new ET-DMP Pilot Project.

2.2.2.3 To achieve integration of instrument best practices, the Project Plan will be promoting the establishment of instrument centres dedicated to marine and other appropriate oceanographic instruments. Such centres will facilitate having all WIGOS observational data and metadata and processed observational products to adhere to WIGOS standards for instruments and methods of observation as well as standard observing network practices and procedures. This effort will assist in the exchange of data via WIS using agreed upon data and metadata representation forms and formats. They will be essential for monitoring instrument performance, calibration procedures, providing assistance with regard to intercomparisons, as well as providing for appropriate training facilities that would complement what the manufacturers are currently providing. Invited ocean experts will be in a position to provide required training. CIMO has experience in this regard and will be assisting the Pilot Project in the establishment of such centres (http://www.wmo.int/pages/prog/www/IMOP/IMOP-home.html). Links will be established with the climate community as climate instrument centres have also been developed. The Pilot Project will also cooperate with the Association of Hydro-Meteorological Equipment Industry (HMEI) – who will be invited to participate in the Pilot Project - for evaluating instrument performances and documenting them.

2.2.2.4 The WIGOS CONOPS recommends that all WIGOS observational data and metadata (including platform / instrument metadata and discovery metadata) should adhere to WIGOS standards and be exchanged via WIS using agreed upon data and metadata representation forms and formats. Within JCOMM DMPA, there is the Water Temperature platform / instrument Metadata (META-T) Project. One of the META-T's objectives is the consolidation of instrument and other metadata to describe sea temperature measurements. There are two centres contributing infrastructure to this project, one in the United States and the other in China. The ODP-WIGOS Pilot Project for IODE and JCOMM should consider how to include this work, as well as propose a strategy for including variables other than Sea Surface Temperature and water temperature profiles in the platform / instrument metadata collection, distribution, and archiving system being developed.

2.2.3 Build marine data systems that are interoperable with the WIS

2.2.3.1 The goal is to provide access to marine meteorological and oceanographic data and information to serve a number of applications, including climate, in an integrated way via the WIS and thereby facilitating access to well documented and standardized data. Despite WMO Resolution 40, which designates marine data as essential, currently it is difficult for the oceanographic community to access the Global Telecommunication System (GTS) in order to obtain marine observations in real-time or delayed mode as well as providing data for circulation on the GTS.

2.2.3.2 The WIS was designed as an overarching, integrated system meeting the requirements for data exchange of all WMO Programmes, affiliated international organizations and programmes, as well as relevant national non-NMHS users such as disaster prevention and mitigation agencies and research facilities. The main functional components of WIS are the National Centres (NC), Data Collection or Product Centres (DCPC), Global Information System Centres (GISC) and data communication networks connecting the components. The WIS provides for: (i) routine collection and automated dissemination of operation-critical data; (ii) timely delivery of high-volume data and processed products ("push"); (iii) discovery, access, retrieval services for data from WMO

Programmes and Co-sponsored programmes ("pull"); and (iv) common procedures for real- and non-real-time data exchange and standardized data formats and metadata.

2.2.3.3 At the same time, the ocean community has real-time and delayed-mode data systems that will need to be interoperable. Work has already begun with the development of (i) the JCOMM / IODE End-To-End Data Management technology, and the DCPC prototype developed at the Russian Federation NODC in Obninsk and (ii) the ODP at the data discovery level. Much work remains to develop the interoperability between the two communities at both the data discovery (metadata) and data level (compatible formats). The Pilot Project will address these two aspects.

2.2.4 Promote Quality Management and standards

2.2.4.1 The goal is to coordinate the development of cost-effective Quality Management System (QMS) by Members and to propose practical solutions or examples. At different steps of the data production line, it is expected that improved quality management will provide the following benefits:

(i) more quality data to meet the requirements of a broad and varied community of users;

(ii) the data quality and the conditions under which the measurements are made will be known;

(iii) data quality will improve as well as their consistency due to the wider acceptance of documented standards;

(iv) data will be more timely in reaching their targeted applications and data assimilation systems;

(v) data duplication will be avoided and the origin of the data identified;

(vi) over time users will develop an increased trust in the data; and finally; and

(vii) products and services using these data will improve.

2.2.4.2 These benefits will be achieved through the following:

(i) The development and implementation of the QMS that complies with the WMO and IOC quality policies should be promoted in the context of the Pilot Project with the recommendation to compile, at the national level, regulatory documentation produced in a way consistent with the eight Quality Management Principles developed under ISO / TC176 / SC2 / WG15 (User / customers focus, Leadership, Involvement of people, Process approach, System approach to management, Continual improvements, Factual approach for decision making, and Mutually beneficial supplier relationships). This may lead in some instances to the certification of such QMS related to the products using the observational data. ISO 9001 certification will be not be mandatory, as some of the meteorological and / or oceanographic services participating in the Pilot Project might wish to comply with other standards than ISO;

(ii) Better access to data will be achieved through: (i) interoperability arrangements between the ocean and meteorological communities (deliverable 2); (ii) establishing procedures to manage duplicate data and methods for avoiding them; and (iii) collection and distribution of instrument / platform metadata (part of deliverable 1);

(iii) The IODE-JCOMM Standards process will also provide a framework for the Pilot

Project to further the development of appropriate widely accepted quality management standards to address issues such as instrument best practices, real-time and delayed-mode quality control procedures (automatic and / or manual), data collection and exchange formats, and products using the observational data; it must be noted that this item also relates to deliverable 1 but is not limited to instrument best practices and standards;

(iv) The Pilot Project will assist in the production of a catalogue on JCOMM best practices and standards to be published as a JCOMM Technical Document. The Pilot Project will use both the IODE OceanTeacher training facility and the new WIGOS web site to share appropriate documentation;

(v) Quality Management issues related to instrument best practices are being addressed under deliverable 1.

3. PILOT PROJECT APPROACH, ROLES AND RESPONSIBILITIES

3.1 Cooperation with the ocean community

3.1.1 Operational models of the interior of the oceans have been significantly improved with the success of the Argo Pilot Project deploying an increasing number of instruments and having now attained the 3000 float target. A number of countries are engaged in combining multi-level atmospheric and oceanographic models and installing real-time modelling functions. With this ability, the oceanographic community is seeing important advantages to becoming involved in making, reporting and using ocean observations in real-time. The ocean observing components of JCOMM that are not currently reporting by way of the GTS will be encouraged to submit their data in real-time through the WIS.

3.1.2 It is expected that the importance of historical data to modelling will increase. Historical data are valuable as tests of the ability of models to reproduce past conditions and so provide confidence that they can also make reliable predictions. As well as providing higher-resolution, high-quality delayed-mode data that reach data centres in the ocean community will be important for hind casting conditions in areas that have been poorly sampled in the past by improving the forecasts of operational models that use real-time data only.

3.1.3 The following aspects will be considered for the Pilot Project:

(i) Providing access, through the WIS, to historical and recent data holdings in ocean data centres. This work will exploit the prototype JCOMM End-To-End Data Management (E2EDM) effort, which has already begun. However, substantial effort remains to integrate the various sources of in situ and satellite data (e.g., Argo, OceanSITES, GHRSST, XBT, Ocean carbon, sea level stations, satellite altimetry data, etc.). The Pilot Project will consider prioritization for the integration of these different components. Managers of the data systems involved in these programmes will be approached to encourage them to install the necessary software infrastructure to support data exchange. Those systems for which data exchange is a relatively simple process will be converted first;

(ii) At the same time that marine data managers are being approached to provide access to their data, they will also be encouraged to join the efforts in developing documentation in the form of discovery metadata, and standards and best practices for such data. This will result in more consistent processing thus, making documentation available for users explaining where the data can be found and the processes through which the data have gone.

(iii) The Ocean Community is developing the Ocean Data Portal under the auspices of

the IODE. The ODP operates on a standards-based infrastructure that provides for the integration of marine data and information from a network of distributed IODE NODCs. The key principle behind the ODP is its interoperability with existing systems and resources. The ODP will require IODE data centres to generate discovery metadata about their datasets for data search and retrieval. The OPD will periodically harvest these metadata, monitor the accessibility of a remote data source and update the portal metadata catalogue. Hence, users will be able to search for single or multiple data types from a distributed set of sources. The ocean community will contribute to the Pilot Project through interoperability arrangements of the ODP with the WIS; and

(iv) To recognize ownership of both the WMO and IOC marine and oceanographic observing systems, the development of marine and oceanographic instrument centres will be created within the framework of JCOMM. Such instrument centres will be hosted by either a National Meteorological and Hydrological Services (NMHS) or an oceanographic institute.

3.2 Benefits

3.2.1 There are clear advantages for the ocean community to participate in the Pilot Project and provide interoperability with the WIS. These include:

- Improving their visibility with NMHSs while keeping their independence regarding parallel data systems they have put in place;

- Gaining better access to meteorological data input for ocean modelling and research applications regarding ocean-atmosphere interactions, climate data input for ocean modelling, and hydrological data related to river discharges into the oceans through direct WIS access. Currently, it is more difficult to access some of these data outside of the scope of the Pilot Project;

- Solidifying links between meteorological and oceanographic data centres by providing time-critical and delayed-mode ocean data to the WIS and accessing multi-disciplinary data from the WIS;

- Accessing more data of known quality obtained through consistent, coherent, and traceable instrumentation that meet standards agreed upon between both the meteorological and oceanographic communities. This will permit a better use of data for the production of consistent quality products as well as facilitating observational data intercomparisons, and data quality monitoring; and

- Enhancing the development of operational oceanography nationally and globally for delivery of products and services that better serve the end-users.

3.2.2 At the same time, there will be advantages for the WMO and NMHS, including:

- Gaining better access to oceanographic data to feed into operational and research applications;

- WIS will provide for multi-disciplinary access to data; and

- Enhancing NMHS cooperation with the oceanographic centres nationally or globally for delivering products and services that better serve the end users (weather forecasts, marine services, marine climatology, climate monitoring and prediction).

3.3 Joint Steering Group for the IODE Ocean Data Portal and the WIGOS Pilot Project for JCOMM

3.3.1 The development of the WIGOS Pilot Project for JCOMM and the IODE Ocean Data Portal will be coordinated by a joint Steering Group, providing liaison with appropriate WMO and IOC Programmes and subsidiary bodies. The Terms of Reference (ToR) for the Steering Group are provided in Appendix A.

3.3.2 The Members of the Steering Group are:

- IODE Representative (Co-chairperson) - *Mr Greg Reed;*
- CIMO Representative (Co-chairperson) - *Mr Rainer Dombrowsky;*
- JCOMM DMPA Co-ordinator - *Mr Robert Keeley;*
- JCOMM OPA Representative - *Ms Candyce Clark;*
- JCOMM ET-DMP Chairperson - *Mr Nikolay Mikhaylov;*
- WIS Representative - *Mr Eliot Christian;*
- US-IOOS Representative - *Dr Jack Harlan;*
- US NODC Representative - *Ms Margarita Gregg; and*
- MCSS and GCC Representative - *Ms Nicola Scott.*

3.4 Participants in the Pilot Project

3.4.1 The following organizations and programmes have indicated their commitment as partners in the Pilot Project:

- US NODC:
  - World Ocean Atlas;
  - World Ocean Database; and
  - US NODC GTSPP;
- Surface currents from HF radar;
- Russian Federation NODC:
  - End-to-End prototype technology (Russian Federation);
- GTS operational database, marine surface climatology (air T, SST, sub-sal, oxygen);
- Canada, ISDM:
  - Upper-ocean T & S gridded in situ fields; and
  - Ocean currents derived from surface drifters;
- Permanent Service for Mean-Sea Level (PSMSL);

- Marine Climatological Summaries and Global Collecting Centres (GCCs) (UK Met Office or DWD via Virtual GISC);
- Blended-quality climatology products (e.g., ICOADS); and
- Global High-Resolution Sea Surface Temperature Pilot Project (GHRSST-PP).

3.4.2 The following organizations and programmes have been identified as potential partners and will be approached to confirm their commitment to the Pilot Project:

- In situ data sets from the JCOMM Observations Programme Area such as:
  - Profiling floats (Argo);
  - Deep ocean time-series reference stations (OceanSITES);
  - Tropical moorings (TAO);
  - Drifters (DBCP);
  - Ship-based observations in the SOT (ASAP, VOS, XBTs);
  - Tide gauges (GLOSS);
  - Water temperature and salinity profiles (GTSPP);
  - Surface underway data (GOSUD); and
  - Ocean carbon (IOCCP), etc.
- Model output fields (e.g., GODAE);
- Metadata about the platforms / instruments (e.g., META-T);
- Integrated data systems (e.g., SeaDataNet, DMAC);
- ODINs (Provision of datasets, by way of the ODP, to the WIS);
- Fast delivery sea level data (University of Hawaii Sea Level Center);
- Instrument Centres; and
- Ocean current data from VOS.

3.4.3 While the Steering Group will be relatively small and focus on the project plan, a more comprehensive list of individuals is proposed in parallel as “participants”. The participants include the following:

- Members of the IODE / JCOMM ET-DMP Task Team for Ocean Data Portal and the WIGOS Pilot Project for JCOMM regular meetings required; financial implications are estimated at a level of about $15K per year;
- Members of the IODE / JCOMM ET-DMP Task Team for Standards Process (functions mainly by email; financial implications are low);

- Committed partners listed above and not belonging to the ad hoc Steering Group (i.e., Messrs Terry Tielking, Scott Woodruff, and Mrs Leslie Rickards);
- JCOMM DBCP Chairperson - Mr David Meldrum;
- JCOMM SOT Chairperson - Mr Graeme Ball; and
- Other participant, as required.

3.5 Roles

The following table lists the bodies that will have a direct role in working with the Pilot Project Steering Group

Body:	Role(s):
EC WG WIGOS-WIS	The WMO Executive Council Working Group on WIGOS and WIS (EC WG WIGOS-WIS) provides for the overall vision and guidance.
SG-WIGOS	The Sub-Group on the WIGOS (SG-WIGOS-WIS) of the EC WG WIGOS-WIS provides overall technical guidance, assistance and support for the implementation of the WIGOS concept. The Sub-Group works with each WIGOS component, proposes new components and coordinates agreed inter-actions with other partners (e.g., co-sponsored systems, international initiatives' systems, etc.). It refines the concept of WIGOS operations, including its basic definitions. It coordinates the WIGOS planning phases and implementation (including the Pilot Projects) according to the over-arching WIGOS and WIS Development and Implementation Plans.
JCOMM OPA	The JCOMM Observations Coordination Group (OCG) coordinates and promotes the development, documentation, and integration of best practices and QMS. It ensures the flow of the data to the WIS.
JCOMM DMPA	The JCOMM Data Management Coordination Group (DMCG) coordinates and promotes the development of interoperability arrangements. It coordinates and promotes the development, the documentation, and the integration of data management best practices and QMS.
JCOMM ET-DMP	The JCOMM / IODE Expert Team on Data Management Practices (ET-DMP) proposes practical steps regarding the development of interoperability arrangements and implementation of QMS. It also administers the process by which standards and best practices are agreed to between JCOMM and IODE (Task Team of the Pilot Project on the IODE / JCOMM Standards Process). The ET-DMP provides guidance to the Steering Group of the IODE Ocean Data Portal and the WIGOS Pilot Project for JCOMM.
JCOMM ET-MC	The JCOMM Expert Team on Marine Climatology (ET-MC) coordinates and promotes the development, the documentation, and the integration of QMS regarding delayed-mode marine data and Marine Climatological Summaries.
CIMO	The WMO Commission for Instruments and Methods of Observation (CIMO) will consider JCOMM requirements in terms of standards and best practices. It will assist with the inclusion of appropriate best practices or references to best practices in the WMO Publication No. 8, *Guide on Instruments and Methods of Observation*.
IODE	The International Oceanographic Data and Information Exchange (IODE) programme of IOC will assist in the development of interoperability arrangements, assist in the integration of best practices, and assist in the

	development and integration of QMS.
Members	Members will provide expertise and commit resources to the Pilot Project. They will continue to develop, implement, and sustain the observing systems in a coordinated way and following recommended best practices and provide the observational data through the WIS. Implement QMS at required levels of the data production line.

4. SCHEDULE

4.1 Proposed Schedule and Actions (depending on resources allocation):

i. September 2008. Pilot Project Steering Group meeting to monitor progress, make adjustments and refine targets for the next year, and propose a formal Steering Group;

ii. October 2008. Discussion with the Data Buoy Co-operation Panel at its twenty-fourth session (South Africa). Expected outcome: progress regarding integration of best practices and standards regarding buoy observations;

iii. December 2008. Progress report to the seventh session of the JCOMM Management Committee;

iv. April 2009. Discussion with the JCOMM Ship Observations Team at its fifth session. Expected outcome: progress regarding integration of best practices and standards regarding ship observations;

v. May 2009. Twentieth session of IODE. Expected outcome: formal endorsement from IODE and Resolution;

vi. June 2009. Reporting to the sixty-first session of the WMO EC (EC-LXI);

vii. November 2009. Third session of JCOMM. Expected outcome: formal endorsement from JCOMM and Resolution; and

viii. Implement the projects by November 2010 reporting to the JCOMM Management Committee and EC WG and finally Cg-XVI (May 2011).

4.2 Completed Schedule and Actions:

i. 3-6 December 2007. Sixth session of the JCOMM Management Committee. Draft proposal presented for discussion;

ii. 21-25 January 2008. IODE / JCOMM Forum on Oceanographic Data Management and Exchange Standards, Ostend, Belgium. Draft proposal presented for discussion;

iii. 26-28 March 2008. Third session of the JCOMM Data Management Coordination Group, Ostend, Belgium. Draft proposal presented for discussion;

iv. 29 March 2008. Ad hoc planning meeting for the Pilot Project, Ostend, Belgium. Finalizing Project Plan, Business Plan, identified potential participants and data sources, and proposed Steering Group Terms of Reference and membership;

v. 3-4 April 2008. SeaDataNet, Athens, Greece. Presentation of the Pilot Project at the SeaDataNet annual plenary meeting;

vi. April 2008. Consultations with the ad hoc Steering Group, the JCOMM Management Committee, and the IODE Officers, and reports on progress and proposed strategy by the Pilot Project. Consolidated report by the WMO Secretariat for review by the Sub-Group of the EC WG WIGOS-WIS;

vii. 9-13 June 2008. Ninth meeting of the GHRSST Pilot Project Science Team, Perros-Guirrec, Brittany, France. Presentation of the Pilot Project;

5. ESTIMATED COSTS

5.1 The Pilot Project Steering Group will have to meet at least once a year during three years. Experts will have to attend specific meetings in order to promote the Pilot Project (e.g., SeaDataNET, DMAC, IODE and DBCP). Experts will have to visit key data centres in order to explain the Pilot Project requirements and provide assistance regarding the implementation of the interoperability arrangements. A consultant will be required to assist in the production of relevant documentation for the Pilot Project.

Item:	**Yearly:**	**Total 3 years:**
Meetings of the Steering Group (10 people meeting once a year)	CHF 20.000	CHF 60.000
Experts attending specific meetings or visiting data centres on behalf of the Pilot Project (5 missions per year)	CHF 10.000	CHF 30.000
Consultant (one person x month per year)	CHF 10.000	CHF 30.000
Total	**CHF 40.000**	**CHF 120.000**

5.2 It is important to note that the estimates outlined above do not cover software, hardware or personnel costs that will be required by individual contributors. In the end, it is the identification and use of such funds that will allow the linking of data collections across organizations to accomplish the goals of the Pilot. Costs to individual organizations to take part in this Pilot Project will vary depending on their present computing capabilities. It is expected that more than a one cost solution will be proposed to organizations in order to reduce the impact of funding.

ANNEX I

TERMS OF REFERENCE FOR THE JOINT STEERING GROUP FOR THE IODE OCEAN DATA PORTAL AND THE WIGOS PILOT PROJECT FOR JCOMM

The development of the WIGOS Pilot Project for JCOMM and the IODE Ocean Data Portal will be coordinated by a joint Steering Group, providing liaison with appropriate WMO and IOC Programmes and subsidiary bodies. The Steering Group will be responsible for:

a) Producing the respective Pilot Project Plans in a coherent and consistent way;

b) Liaising with the EC-WG/WIGOS-WIS Sub-Group on WIGOS (SG-WIGOS) regarding the development of the Pilot Project and refinement of the WIGOS Concept of Operations (CONOPS);

c) Liaising with the IODE Officers regarding the development of the ODP;

d) Promoting the continued development and implementation of a system that provides data and information from a sustained and coordinated global ocean observing system;

e) Coordinating and promoting the development, documentation, and integration of best practices for the different components of the marine observing and data systems;

f) Coordinating and promoting the development of interoperability arrangements between different components of the marine data system, and the provision of the real-time and delayed mode observational data through the WIS and ODP;

g) Coordinating and promoting the development, documentation, and integration of QMS at the required levels of the data production line from marine observations to the delivery of data and products;

h) Coordinate its activities with the other WIGOS Pilot Projects as well as the WIGOS Demonstration Projects;

i) Seeking resources to be committed to the Pilot Project; and

j) Guiding the implementation of the Project Plan and working with the WMO and IOC Secretariats to facilitate its implementation.

The Steering Group will report to the WMO EC-WG/WIGOS-WIS Sub-Group on WIGOS (SG-WIGOS) and to the IOC International Oceanographic Data and Information Exchange (IODE) Committee. Reporting will also be provided to the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM).

ANNEX II

ACRONYM LIST

ASAP	Automated Shipboard Aerological Programme
CBS	WMO Commission for Basic Systems
CIMO	WMO Commission on Instruments and Methods of Observation
CONOPS	WIGOS Concept of Operations
DBCP	Data Buoy Co-operation Panel
DCPC	Data Collection and Production Centre (of WIS)
DMAC	IOOS Data Management and Communications (USA)
DMCG	JCOMM Data Management Coordination Group
DMPA	JCOMM Data Management Programme Area
DWD	Deutscher Wetterdienst
E2EDM	End-to-End Data Management Pilot Project
EC	WMO Executive Council
EC-WG	Executive Council Working Group
ET-CTS	Expert Team on WIS-GTS, Communication Techniques and Structures
ET-DMP	JCOMM Expert Team on Data Management Practices
ET-MC	JCOMM Expert Team on Marine Climatology
GCC	Global Collecting Centre
GHRSST	GODAE High Resolution SST Pilot Project
GISC	Global Information System Centres (of WIS)
GLOSS	JCOMM Global Sea-level Observing System
GODAE	Global Ocean Data Assimilation Experiment
GOOS	IOC-WMO-UNEP-ICSU Global Ocean Observing System
GOSUD	Global Ocean Surface Underway Data Pilot Project
GSSC	GOOS Scientific Steering Committee
GTS	Global Telecommunication System
GTSPP	Global Temperature and Salinity Profile Programme
HMEI	Association of Hydro-Meteorological Equipment Industry
ICOADS	International Comprehensive Ocean-Atmosphere Data Set
ICSU	International Council for Science
ICT-WIS	Inter Commission Coordination Group on WIS
IOC	Intergovernmental Oceanographic Commission
IOOS	Integrated Ocean Observing System (USA)
IOCCP	IOC International Ocean Carbon Coordination Project
IODE	IOC International Oceanographic Data and Information Exchange Programme
IPET-MI	CBS Inter Programme Expert Team on Metadata Implementation
ISDM	Integrated Science Data Management (Canada)
ISO	International Organization for Standardization
JCOMM	Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology
MAN	JCOMM Management Committee
MCP	Marine Community Metadata Profile
MCSS	Marine Climatological Summaries Scheme
META-T	Water Temperature Metadata Pilot Project
NC	National Centres
NMHS	National Meteorological and Hydrographic Service
NODC	IODE National Oceanographic Data Centre
OceanSITES	Ocean Sustained Interdisciplinary Timeseries Environment observation System
OCG	JCOMM Observations Coordination Group
ODIN	IODE Ocean Data and Information Network
ODP	IODE Ocean Data Portal
OPA	JCOMM Observations Programme Area
PO	Project Office
PSMSL	Permanent Service for Mean Sea Level

QMF	WMO Quality Management Framework
QMS	Quality Management System
SeaDataNet	Pan-European infrastructure for Ocean & Marine Data Management
SOT	JCOMM Ship Observations Team
SST	Sea Surface Temperature
TAO	Tropical Atmosphere Ocean network of tropical moorings
VOS	Voluntary Observing Ship
WDC	ICSU World Data Centre
WIGOS	WMO Integrated Global Observing Systems
WIS	WMO Information System
WMO	World Meteorological Organization
XBT	Expendable Bathythermograph