



SOT Implementation Strategy

Version 2.1, December, 2021

NOTES

WMO DISCLAIMER

Regulation 42

Recommendations of working groups shall have no status within the Organization until they have been approved by the responsible constituent body. In the case of joint working groups the recommendations must be concurred with by the presidents of the constituent bodies concerned before being submitted to the designated constituent body.

Regulation 43

In the case of a recommendation made by a working group between sessions of the responsible constituent body, either in a session of a working group or by correspondence, the president of the body may, as an exceptional measure, approve the recommendation on behalf of the constituent body when the matter is, in his opinion, urgent, and does not appear to imply new obligations for Members. He may then submit this recommendation for adoption by the Executive Council or to the President of the Organization for action in accordance with Regulation 9(5).

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RECORD OF CHANGES

| Date | Page(s) affected | Reason for change | Author |
|----------------|------------------|---|---|
| December, 2021 | Various | Removal of JCOMM and JCOMMOPS references, web link updates, added references to WMO Technical Commissions, transition of ASAP from a task team to a panel, and other miscellaneous updates and wording changes. | David Berry, S.T. Chan, Rebecca Cowley, Darin Figurskey, Champika Gallage, Henry Kleta, Martin Kramp, Lisa Krummel, Sarah North, Emma Steventon |
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SOT Implementation Strategy – Version 2.1, December, 2021
FOREWORD

The Ship Observations Team (SOT) was established in 2001, jointly by the World Meteorological Organization (WMO) and the Intergovernmental Oceanographic Commission (IOC) of UNESCO, to build on synergies between the three Panels involved in coordinating global ship-based observing programmes, i.e. the Voluntary Observing Ship (VOS) Scheme, the Ship-of-Opportunity Programme (SOOP), and the Automated Shipboard Aerological Programme (ASAP), with a view to a possible full-integration of ship-based observing systems on commercial and research vessels.

In recognition of these developments and expanded requirements, and in the context also of the implementation plans and requirements of the Global Ocean Observing System (GOOS), the Global Climate Observing System (GCOS), the WMO Integrated Global Observing System (WIGOS), and the Global Framework for Climate Services (GFCS), the SOT agreed in 2011 at its sixth Session on the need for an SOT Implementation Strategy, which would provide an overall framework for the Team's work, and at the same time enable it and its members to react appropriately to future developments. The first SOT Implementation Strategy was published in JCOMM Technical Report No. 61 in March, 2014.

This Implementation Strategy continues to provide the rationale for the SOT mission, along with the vision, structure, and work flow of SOT and its core panels. The SOT terms of reference (Annex I) express the mission of the SOT to respond to requirements for ship-based observation data/metadata, coordinate actions among associated programs, liaise and coordinate as necessary with other program areas and expert teams, seek opportunities to improve the quality and quantity of data/metadata, assess the work of the SOT, perform outreach and capacity development as agreed by participating members and member states, develop improved real-time feedback, and promote greater Port Meteorological Officer (PMO) collaboration including support of other networks. The SOT will regularly review its mission and terms of reference, both for the entire SOT and its task teams, making updates to this implementation strategy as appropriate. This implementation strategy is meant to provide a succinct view of the strategic objectives of the SOT, through which the SOT will foster greater international coordination between entities involved in marine observing programs.

Darin Figurskey
(United States of America)
(Chairperson of the SOT)

1. IMPLEMENTATION STRATEGY

1.1 Structure

- 1.1.1 The Ship Observations Team (SOT) consists of a group of enduring and successful observing and data collection programmes under the GOOS Observations Coordination Group (OCG), comprising:
 - 1.1.1.1 The Voluntary Observing Ship (VOS) scheme;
 - 1.1.1.2 The Ship of Opportunity Programme (SOOP); and,
 - 1.1.1.3 The Automated Shipboard Aerological Programme (ASAP).
- 1.1.2 The SOT has a governance structure of an Executive Board. Terms of reference for the Executive Board are found in Annex II.

1.2 Objectives

- 1.2.1 To manage, coordinate and, wherever possible, integrate these programmes to support a range of well-defined operational and research applications, with a priority to maintain and increase the quantity and quality of ship-based environmental observations.
- 1.2.2 To participate in, liaise and coordinate as necessary with GOOS expert groups and expert teams and the Joint WMO-IOC Collaborative Board (JCB), especially but not limited to the OCG, along with WMO Technical Commissions and their Standing Committees, Study Groups and Expert Teams, the WMO Research Board and Regional Associations, the Global Climate Observing System (GCOS), interested parties such as the International Maritime Organization (IMO), other relevant international organizations, and industry and manufacturers as appropriate, to provide increased maritime observational opportunities.
- 1.2.3 To foster greater national and international coordination between agencies involved in similar or related marine observing programmes to leverage resources, technology, and innovation, and to maintain and increase the quantity and quality of ship observations, along with reducing the number of visitors to ships with sampling programme requests.
- 1.2.4 To establish greater cooperation with groups that use ships as observing stations / platforms and/or for deploying autonomous instruments, to raise the awareness of:
 - 1.2.4.1 Data and metadata standards;
 - 1.2.4.2 Station / platform identification standards;
 - 1.2.4.3 Minimum observational metadata;
 - 1.2.4.4 Equipment and communications standards;
 - 1.2.4.5 Equipment calibration;
 - 1.2.4.6 Data processing methods, including quality control and quality monitoring;
 - 1.2.4.7 Data reporting methods; and,
 - 1.2.4.8 The need for comprehensive observer/operator training and retraining.

1.3 Working Arrangements

- 1.3.1 SOT meets approximately every 2 years and incorporates separate, but plenary sessions of:
 - 1.3.1.1 The Voluntary Observing Ship Panel (VOSP);
 - 1.3.1.2 The Ship-of-Opportunity Programme Implementation Panel (SOOPIP); and,
 - 1.3.1.3 The Automated Shipboard Aerological Programme (ASAP) Panel.
- 1.3.2 Issues and reports that are of interest to all programmes are addressed during the Common Session of SOT.
- 1.3.3 The Common Session of SOT is presided over by the chairperson of SOT.
- 1.3.4 Issues and reports that are relevant to a particular programme or special project are addressed during the appropriate Panel Session.
- 1.3.5 The Panel Sessions are presided over by the chairpersons of VOSP, SOOPIP, and ASAP as appropriate.
- 1.3.6 Much of the work of SOT is achieved during the intersessional period by the SOT Executive Board (SOT-EB), and the task teams established to examine and make recommendations about specific issues. Task Teams work predominantly by email and report at SOT sessions. Contributions by the entire SOT are encouraged. SOT-EB meeting notes can be found at <https://www.ocean-ops.org/sot/index.html>
- 1.3.7 Scientific advice and guidance to SOT is provided by panels and bodies for climate and operational meteorology including, but not limited to, national meteorological and hydrological services (NMHS), the WMO Scientific Advisory Panel, the Atmospheric Observation Panel for Climate (AOPC), the Ocean Observations Physics and Climate Panel (OOPC), etc. (Also reference section 3).

1.4 Vision

The mission of the Ship Observations Team is to:

- 1.4.1 Promote the free and unrestricted exchange of quality ship-based weather and ocean observations for a better understanding and prediction of the marine environment and to support safety of life at sea.
- 1.4.2 Develop and maintain a process for ships from commercial, private, and research fleets to register their instrumentation.
- 1.4.3 Improve the coordination of observations between nations, standardize and advance observational and metadata methods and quality assurance and quality control, and ensure consistent data management.
- 1.4.4 Increase sampling in under-sampled regions of the world oceans, increase the frequency of observations even along well-travelled shipping lanes, and measure multiple parameters simultaneously on a single ship.
- 1.4.5 In cooperation with other networks and the OCG, develop a unified data management for shipboard observations and metadata, with real-time and delayed-mode delivery approaches, that meets the needs of a diverse user community.
- 1.4.6 Foster greater international capacity for the VOS programme, SOOP, and ASAP, including, but not limited to, developing nations.
- 1.4.7 Foster regional and gender balance among the SOT leadership.

- 1.4.8 Raise the technology readiness level of automated sensors for autonomous shipboard observation and ship-to-shore data communications.
- 1.4.9 Ensure adequate representation of SOT programmes in GOOS panels, WMO Technical Commissions, and expert task teams such as the OCG.
- 1.4.10 Work among the OCG networks to harmonize metadata, develop performance indicators, and coordinate recruitment, promotion, and training activities.
- 1.4.11 Ensure financial planning and budgetary situational awareness meets the SOT vision.

2. BACKGROUND

- 2.1 The Ship Observations Team (SOT) was established by the former WMO/IOC Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM) at its first session (JCOMM-I, Akureyri, Iceland, June, 2001). It was created to build on synergies between the panels involved in coordinating global ship-based observing programmes addressing observational requirements of WMO and IOC applications, with a view to an eventual possible full-integration of ship-based observing systems on commercial and research vessels. The panels include the Voluntary Observing Ship (VOS) Scheme, the Ship-of-Opportunity Programme (SOOP), and the Automated Shipboard Aerological Programme (ASAP).
- 2.2 Ships participating in the VOS volunteer to take surface meteorological and surface oceanographic observations while ASAP vessels acquire upper air observations over ocean areas by means of radiosonde systems. Similarly, the SOOP involves volunteer merchant and scientific ships that acquire oceanographic measurements using one or more scientific instruments such as Expendable Bathythermographs (XBTs) and thermosalinographs.
- 2.3 Membership to the Team is open, and comprises operators of VOS, SOOP and ASAP, as well as representatives from other groups (hereafter called SOT associated programmes) using ships to host observing stations / platforms. It also includes representatives from: monitoring centres; data management centres and bodies; operators of satellite communication systems; ship, observing systems, or communications systems manufacturers; scientific advisory bodies; and, other interested parties as appropriate.
- 2.4 The terms of reference of the SOT are given in Annex I. Subsequent annexes contain the terms of reference of the SOT panels, and links to terms of reference for task teams.
- 2.5 The SOT will regularly review its mission in the light of changing research, new technology and innovation, and organizational and operational imperatives, and will update this document and terms of reference as appropriate. The SOT will continue to explore ways to expand its membership, in particular through enhanced links with countries operating ship observing fleets supporting WMO and IOC applications.

3. **RATIONALE AND USER REQUIREMENTS**

- 3.1 Neither global programmes such as the WMO-IOC-UNEP-ICSU Global Climate Observing System (GCOS), the IOC-WMO-UNEP-ISC sponsored Global Ocean Observing System (GOOS), or the WMO World Weather Watch (WWW), nor the SOT and its panels (i.e. the VOS Panel – VOSP–, the SOOP Implementation Panel – SOOPIP, and the Automated Shipboard Aerological Programme Panel (ASAP), currently operate as funding bodies for observational networks. Instead, all commitments for the implementation of these networks are made nationally to address the requirements of these global programmes, including through the VOSP, SOOPIP, ASAP and SOT associated programmes. SOT must attempt to reconcile the needs and aspirations of the global programmes with those of the ship-based observation operators and funders, and align with the WMO and IOC Strategic Planning.
- 3.2 Although this strategy is restricted to ship-based observations, the SOT recognizes that drifting buoys, moored buoys, sub-surface floats and profilers also play a fundamental role as in situ stations / platforms in any observing network. The SOT assists in the coordination between different observational programmes to help ensure multiple requests do not adversely impact the core mission of any vessel. The SOT also assists in cross-network coordination for standardizing observational methods and quality assessment/control, and ensuring consistent data management.
- 3.3 There are six major met-ocean application areas that critically depend on highly accurate observations of met-ocean parameters: (a) Safety of Life at Sea (SOLAS); (b) Numerical Weather Prediction (NWP); (c) Climate monitoring (such as undertaken through GCOS); (d) Seasonal to Inter-annual Forecasts (SIAF); (e) Met-Ocean forecasts and services (MOFS), including marine services and ocean mesoscale forecasting; and, (f) Marine and ocean research.
- 3.4 Climate monitoring requirements have been endorsed and developed by GCOS and the United Nations Framework Convention on Climate Change (UNFCCC) and fall within the remit of the Group on Earth Observations (GEO), established by the Earth Observation Summit in 2003. Climate aspects are detailed in the Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC (GCOS-92, October, 2004), and its 2010 update (GCOS-138).
- 3.5 By addressing climate monitoring requirements while at the same time recognizing the need of operational applications for real-time data, it is believed that most of the requirements of targeted WMO and IOC applications, along with consideration of additional requirements, are derived from the WMO Rolling Review of Requirements (RRR).
 - 3.5.1 The WMO RRR is an exercise to develop a consensus view on the design and implementation of composite observing systems, in particular where the need and implementation occur on global or regional scales.
- 3.6 The WMO Integrated Global Observing System (WIGOS) is a major contribution of the

World Meteorological Organization (WMO) to address the need for more extensive and advanced information for WMO Members so that they can continue to improve service quality and service delivery. To meet the demands of the future, WMO Members must continue their legacy of contributions by taking full advantage of advances in observation and telecommunication technologies and to increase our science-based understanding of Earth and its environment. The end result will be better prediction and assessment of potential impacts of weather and climate-related events to provide the required information for the public and policy and decision makers.

- 3.7 The WMO Fifteenth Congress (Cg-XV, Geneva, Switzerland, 7-25 May 2007) therefore decided that the enhanced integration of the WMO observing system should be pursued as a strategic objective of the WMO. Through Resolution 50 (Cg-XVI), the WMO Sixteenth Congress (Cg-XVI, Geneva, Switzerland, 16 May – 3 June 2011) decided to implement WIGOS during the period 2012 to 2015. WIGOS will establish an integrated, comprehensive and coordinated observing system to satisfy in a cost-effective and sustained manner the evolving observing requirements of WMO Members and will enhance coordination of WMO observing systems with those of partner organizations, such as the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization (UNESCO), for the benefit of society.
- 3.8 Following the legacy recommendations of the JCOMM Pilot Project for WIGOS, the SOT agreed to support the WIGOS Implementation Phase (2012-2015), and continued WIGOS implementation activities, to achieve better integration of marine meteorological and other appropriate oceanographic observations into WIGOS.

4. SHIP FLEETS

- 4.1 In general, most current operational ship fleets contributing marine meteorological and oceanographic observations to WMO and IOC applications fall within the scope of the Voluntary Observing Ship (VOS) Panel (VOSP), the Ship of Opportunity Programme (SOOP) Implementation Panel (SOOPIP), or the Automated Shipboard Aerological Programme (ASAP) Panel.
- 4.2 Appropriate spatial distribution of ship observations over the global ocean must be achieved in complement to other types of observing stations / platforms and requires smart and coordinated vessel recruitment strategies.
- 4.3 The SOT will support ship recruitment strategies which optimize the expenditure of available resources, and which allow accurate and credible prediction of future resource requirements, and their relation to declared objectives.
- 4.4 The SOT will support technology developments to increase the impact, amount, and cost effectiveness of ship observations.
- 4.5 The Voluntary Observing Ship (VOS) Scheme's primary responsibility is to fulfill marine meteorological and climate data requirements expressed by the World Weather Watch (WWW) and the Global Climate Observing System (AOPC and OOPC), respectively, and to contribute to the WMO Earth System Monitoring in terms of observational marine data that can be obtained from voluntary observing ships.
- 4.6 The Ship of Opportunity Programme's (SOOP) primary responsibility is to fulfill upper ocean data requirements expressed by the Ocean Observations Physics and Climate Panel (OOPC) of GOOS and GCOS in terms of observational oceanographic data that can be obtained from ships of opportunity.
- 4.7 The Automated Shipboard Aerological Programme (ASAP) provides data that are of vital importance to numerical weather prediction and is a cost-effective source of baseline upper-air data from the ocean. As part of the global observing system, ASAP data can be used to support many applications, including global climate studies.

5. DATA FLOW

- 5.1 The SOT promotes the free and unrestricted exchange of the ship-based observations collected through the VOS, ASAP, and SOOP, in compliance with the WMO data policy (Res. 40 – Cg-XII) and/or the IOC oceanographic data exchange policy (Resolution IOC-XXII-630). The SOT works with the associated programmes to make their data available to the WMO and IOC applications in both real-time and delayed-mode.
- 5.2 More details can be found in “An Oceanographer’s and Marine Meteorologist’s Cookbook for Submitting Data and Metadata in Realtime and Delayed-Mode”, JCOMM Technical Report No. 72. This document is in the process of being updated.

Data flow diagrams, the cookbook, and other related background documents are available from the SOT documents section at: <https://www.ocean-ops.org/sot/documents.html>

6. METADATA

- 6.1 The SOT is committed to collect and share station/platform metadata concerning observations made from ships.
- 6.2 The SOT promotes observational metadata and a sophisticated metadata catalog that allows for detailed and standardized quality monitoring of individual vessels and instruments, as well as the health of the networks and vessels.
- 6.3 The SOT advocates for a central metadata repository, such as that provided by OceanOPS, to maintain historical vessel/station/platform metadata and lineage, and to allow data users to assess data usefulness for their operational or research goals.
- 6.4 The SOT recognizes the need for the archival of both observations and metadata, which are critical for real-time and delayed-mode applications of the observations, and collaborates with the MCDS, its functionally connected bodies, and responsible world data centers.
- 6.5 The SOT emphasizes the importance of the rescue of historical metadata, which may be at risk of permanent loss due to such things as media degradation and organizational changes, to support marine climate research and services, and invites its members and other networks to make sure that metadata are properly rescued.

ANNEX I

SOT Terms of Reference

The Ship Observations Team shall:

- (a) Respond to requirements for ship-based observational data and metadata expressed by relevant international programmes and/or systems in support of marine services, and coordinate actions to implement and maintain the networks to satisfy these requirements;
- (b) Provide continuing assessment of the extent to which those requirements are being met;
- (c) Oversee and monitor the implementation of methodologies as determined by the scientific and operational communities for constantly controlling and improving the quality of data;
- (d) Review marine telecommunication facilities and procedures for observational data collection, as well as technology and techniques for data processing and transmission, and propose actions as necessary for improvements and enhanced application;
- (e) Coordinate Port Meteorological Officer (PMO) operations globally, propose actions to enhance PMO standards and operations, and organize PMO and observers training, and greater PMO collaboration;
- (f) Review, maintain and update as necessary technical guidance material relating to ship observations and PMOs;
- (g) Liaise and coordinate as necessary with relevant expert teams, WMO Technical Commissions executive bodies, working groups, the Global Climate Observing System (GCOS), the Global Ocean Observing System (GOOS) and its Observation Coordination Group (OCG), as well as with other interested parties, such as the International Maritime Organization (IMO), the International Hydrographic Organization (IHO) and other relevant international organizations;
- (h) Participate in the planning activities of the appropriate observing system experiments and major international research programmes as the specialist group on meteorological and oceanographic observations based onboard ships;
- (i) Seek new opportunities for deploying and/or recovering various kinds of measuring devices as recommended by the relevant panels and widely publicize those opportunities;
- (j) Develop as necessary new pilot projects and/or operational activities and establish new specialized panels as required;
- (k) Carry out outreach, capacity development and other activities as agreed by participating Members/Member States to implement and operate the SOT observing programmes and to promote and expand them internationally, seek collection of third party data from

ships, and collaborate with the industry in the view to enhance the collection of data from ships;

- (l) Develop improved real-time feedback to volunteer ships regarding the quantity and quality of the observations that they submit and that are inserted on the GTS; and,
- (m) The SOT Executive Board (EB) executes SOT business during SOT intersessional period.

ANNEX II

SOT Executive Board Terms of Reference

The Terms of Reference of the SOT EB shall be:

- a. To seek guidance from the SOT at its regular sessions regarding specific issues to be addressed by the SOT EB, panels, and task teams during the intersessional period;
- b. To act promptly to deal with any SOT-related administrative, financial, and planning issues and opportunities that might arise, within the guidelines established and reviewed regularly by the team;
- c. To authorize the chairperson or the vice-chairperson as delegated, to commit any expenditure necessary for the resolution of these issues and the promotion of the team's aims and objectives, up to the maximum amounts that might be agreed in advance by the SOT EB, by the SOT at regular session, or by the availability of funds;
- d. To assist the chairperson with regard to continuing the arrangements, including financial arrangements, to secure the services of a technical coordinator;
- e. To set working priorities for the technical coordinator according to the SOT at its regular sessions, and provide further guidance during the intersessional period;
- f. Confer by electronic mail, with a minimum of four EB teleconferences held annually, and at least two of those including the Chairs and vice-Chairs of the SOT Task Teams or their representatives;
- g. To exploit opportunities to confer at other meetings face-to-face;
- h. To conduct regular team meetings biennially, following an agenda developed by the SOT EB;
- i. To consult with SOT members, task team chairpersons, the technical coordinator, and secretariats during the intersessional period as required; and,
- j. To report its activities to the SOT at its regular session, and throughout the intersessional period as appropriate.

Membership

The membership of SOT EB shall be constituted by:

- a. The SOT Chair;

- b. The SOT vice-Chair;
- c. The VOS Panel Chair(s);
- d. The VOS Panel vice-Chair(s);
- e. The SOOP Implementation Panel Chair(s);
- f. The SOOP Implementation Panel vice-Chair(s);
- g. The SOT Technical Coordinator (ex officio);
- h. A representative from the IOC Secretariat (ex officio); and,
- i. A representative from the WMO Secretariat (ex officio).

Working procedures

- a. A quorum of the SOT EB will be at least three members, including the SOT Chair or a designee, VOS Panel Chair(s) or designee(s), and SOOP Implementation Panel Chair(s) or designee(s).
- b. Any SOT member can attend SOT EB meetings as an observer, subject to availability of virtual or actual meeting room space. If required, the chairperson will make a final decision as to which observers may attend. The chairperson may also invite other persons to attend at the chairperson's discretion.
- c. A summary of each EB meeting will be made available for the SOT.
- d. The term of SOT EB members is for two years (equal to the intersessional period between SOT meetings). They shall be eligible for re-election in their respective capacities, but would serve in principle for no more than three consecutive terms in that capacity. Elections will be decided by a simple majority if a quorum of SOT members is present during the regular biennial meeting. Nominations for vacant positions on the EB will be made prior to, or at, the meeting so that a vote can be taken at the end of the meeting.

A quorum of a biennial meeting will consist of at least seven SOT members, with one member per WMO Member State/Territory or IOC Member State represented. If more than one member representing one WMO and/or IOC Member State/Territory is attending, the representatives from that particular State/Territory have to decide whose vote shall be counted. If a quorum is not present at the meeting, elections shall be by unanimous vote. If a unanimous vote cannot be achieved, membership shall be determined by the Secretariats.

- e. In principle, EB membership should assure regional and gender balance as far as possible.
- f. The SOT EB may establish time-bound substructures for the discharge of specific tasks during an intersessional period. The cost shall not exceed the availability of funds. Such temporary substructures shall be discontinued at the end of every intersessional period unless agreed to continue by the SOT members at the biennial meeting.

ANNEX III

VOSP Terms of Reference

The Voluntary Observing Ship (VOS) Panel shall:

- (a) Review, recommend and coordinate the implementation of new and improved specialized shipboard meteorological instrumentation, siting and observing practices, as well as of associated software;
- (b) Support the development and maintenance of new pilot projects;
- (c) Oversee and encourage members to upgrade their VOS to report according to standards meeting climate user requirements, including reporting the required climate and ship parameters in both real time (GTS) and in delayed mode (via VOS GDAC);
- (d) Develop and implement activities to optimize ship inspections and recruitment, including promotional material;
- (e) Prepare annually a report on the status of VOS operations, data availability and data quality.

ANNEX IV

SOOPIP Terms of Reference

The Ship-of-Opportunity Implementation Panel (SOOPIP) coordinates the installation and deployment of instrumentation from Ships of Opportunity that travel in fixed transects, and in particular coordinates the implementation of regional and basin-wide instrumentation that measure physical, chemical and biological parameters, such as XBTs, TSGs, and CPR. Its terms of reference are to:

- (a) Implement, maintain, and monitor specialized shipboard instrumentation and observing practices relevant to the SOOPIP;
- (b) Coordinate the exchange of recommended practices, and technical and developmental information about oceanographic instrumentation relevant to the SOOPIP;
- (c) Ensure the distribution of available programme resources to ships to meet the recommended sampling network in the most efficient way;
- (d) Ensure the transmission of SOOP data to the GTS and relevant data centres is carried out according to operational and scientific requirements;
- (e) Provide guidance and assistance to the SOT chairperson and SOT Technical Coordinator to produce, appropriate inventories, monitoring reports and analyses, performance indicators, implementation plans and information exchange facilities;
- (f) Where relevant, serve as a platform for other observational programmes;
- (g) Maintain close communications with the scientific community and periodically meet and discuss ongoing research performed with observations relevant to SOOPIP.

ANNEX V
ASAP Panel Terms of Reference

The Automated Shipboard Aerological Programme (ASAP) Panel shall:

- (a) Coordinate and encourage the overall implementation of the ASAP, including recommending routes and monitoring the overall performance of the programme, both operationally and in respect of the quality of the ASAP system data processing
- (b) Coordinate the exchange of technical information on relevant meteorological equipment and expendables, development, functionality, reliability and accuracy, and survey new developments in instrumentation technology and recommended practices;
- (d) Review all relevant publications to make sure they are kept up to date and comply with Quality Management terminology;
- (e) Prepare annually a report on the status of ASAP operations, data availability and data quality.

ANNEX VI
Task Team Terms of Reference

Terms of reference for the SOT Task Teams can be found with the individual task team links at:

https://goosocean.org/index.php?option=com_oe&task=viewGroupRecord&groupID=106

ANNEX VII

List of Acronyms

| | |
|-----------|---|
| AODN | Australian Ocean Data Network |
| AOPC | Atmospheric Observation Panel for Climate |
| ASAP | Automated Shipboard Aerological Programme |
| ASCII | American Standard Code for Information Interchange |
| BUFR | Binary Universal Form for the Representation of meteorological data |
| CM | Contributing Member |
| CMOC | Centre for Marine, Meteorological and Oceanographic Climate Data |
| CPR | Continuous Plankton Recorder |
| DAC | Data Assembly Center |
| EB | Executive Board |
| ECMWF | European Centre for Medium-Range Weather Forecasts |
| E-SURFMAR | Surface Marine programme of the Network of European Meteorological Services |
| GCC | Global Collecting Centre |
| GCOS | Global Climate Observing System |
| GDAC | Global Data Assembly Centre |
| GEO | Group on Earth Observations |
| GFCS | Global Framework for Climate Services |
| GOOS | Global Ocean Observing System |
| GTS | Global Telecommunication System |
| GTSP | Global Temperature-Salinity Profile Program |
| ICODS | International Comprehensive Ocean-Atmosphere Data Set |
| ICSU | International Council for Science |
| IGRA | Integrated Global Radiosonde Archive |
| IHO | International Hydrographic Organization |
| IMMT | International Maritime Meteorological Tape |
| IMO | International Maritime Organization |
| IOC | Intergovernmental Oceanographic Commission (of UNESCO) |
| ISC | International Science Council |
| JCB | Joint WMO-IOC Collaborative Board |
| JCOMM | Joint Technical Commission for Oceanography and Marine Meteorology |
| MCDS | Marine Climate Data System |
| MOFS | Met-Ocean Forecasts and Services |
| NetCDF | Network Common Data Form |
| NMHS | National Meteorological and Hydrological Services |
| NWP | Numerical Weather Prediction |
| OCG | Observations Coordination Group |
| OOPC | Ocean Observations Physics and Climate Panel |
| PMO | Port Meteorological Officer |
| RSMC | Regional Specialized Meteorological Centre |
| RTMC | Real-Time Monitoring Centre |
| SAC | Special Access Code |
| SIAF | Seasonal to Inter-annual Forecasts |
| SOLAS | Safety of Life at Sea |

| | |
|---------|--|
| SOOP | Ship of Opportunity Programme |
| SOOPIP | Ship of Opportunity Programme Implementation Panel |
| SOT | Ship Observations Team |
| SOT-EB | SOT Executive Board |
| TSG | Thermosalinograph |
| UNEP | United Nations Environment Program |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UNFCCC | United Nations Framework Convention on Climate Change |
| VOS | Voluntary Observing Ship |
| VOSP | Voluntary Observing Ship Panel |
| WIGOS | WMO Integrated Global Observing System |
| WMO | World Meteorological Organization |
| WMO RRR | WMO Rolling Review of Requirements |
| WOD | World Ocean Database (United States) |
| WWW | WMO World Weather Watch |
| XBT | Expendable Bathythermograph |
| XCTD | Expendable Conductivity/Temperature/Depth |