SOT-12 Actions and Recommendations

Strategic Goal 1 (SG-1) – Global leadership in data and metadata requirements and coordination

Strategic Goal 2 (SG-2) – Expand the world's ship observations in space and number

Strategic Goal 3 (SG-3) – People and culture

Strategic Goal 4 (SG-4)– Environmental and financial responsibility

***1. Action 2/8**: Work with WMO to update XBT BUFR sequence template to include salinity data from XCTD probes. (SOOP-EXB, Dec 2023) (SG-2)*

***2. Action 2/9**: Appoint (additional) SOOP members for metadata and KPI TTs with the aim to set up and maintain missing items in the OceanOPS environment, including tools, targets, and reference tables, based on recommendations of the XBT Science Team but not limited to the XBT network. [find volunteers] (SOOPIP co-Chairs, Dec. 2023) (SG-1)*

***3. Action 3/1:** VOS operators are requested to review and keep up-to-date VOS metadata in the OceanOps metadata database and automatically-generated national reports to ensure accurate data. Report any inconsistencies of the data in national reports to the OceanOPS TC (VOS operators, July 2023) (SG-1)*

***4. Action 3/2:** VOS operators are requested to provide quarterly delayed mode data to the VOS GDACs. (VOS operators, quarterly and ongoing) (SG-2)*

***5. Action 3/4:** SOT station platforms operators (in particular VOS) to migrate to SOT-ID in data submission (immediately for new stations, encouraged asap for existing stations) (VOS operators, SOT-13) (SG-1)*

***6. Action 3/6:** TT-ISSC to review the OceanOPS QC relay tool (TT-ISSC, SOT-13) (SG-1)*

***7. Action 3/7:** Encourage and facilitate the participation of VOS donation project participants in next PMO workshop (TT-RPT and SOT-EB, July 2023) (SG-3)*

***8. Action 3/8:** Foster partnerships with the ocean racing community with the aim of increasing the data coverage in data-sparse ocean areas (SOT-TC, SOT-13) (SG-3)*

***9. Action 3/9:** Members still using Pub47 bulk uploads to start using the reference tables of the new format (e.g. model), and migrate to the new format as soon as possible (VOS Operators; SOT-13) (SG-1)*

***10. Action 3/10**: VOS Panel to investigate the installation of one lidar on a recruited vessel and report findings to the SOT (VOS Panel, SOT-13) (SG-2)*

***11. Action 5/1**: In collaboration with EUMETNET and WMO, SOT to stimulate provision of funding from the global community, including NMS's, to support the development of a next generation TurboWin. (SOT members, SOT-13)(SG-4)*

***12. Action 5/2**: VOS Panel to start working with Turbowin partner board on requirements and analysis for next-generation TurboWin (VOS Panel, SOT-13) (SG-1)*

13. Action 6/1: *Operators of ASAP stations to maintain metadata in OceanOPS, updated including contacts (ASAP operators, SOT-13) (SG-1)*

14. Action 6/2: *TC and relevant TTs to continue ASAP project with SOI, as a pilot for similar projects with other entities (TC, TT EICO, TT RPT, SOT-13) (SG-2)*

15. Action 6/3: *Operators of ASAP stations to migrate to BUFR and use SOT-IDs if not done yet (ASAP operators, SOT-13) (SG-1)*

16. Action 6/4: *ASAP is requested to connect with GCOS as GCOS Implementation Plan action D2 aims to identify observations that don't have archives (ASAP, SOT-13) (SG-2)*

17. Action 6/5: *ASAP to develop a plan to archive all their data. This can be accomplished through a GDAC. Suggest checking the possibilities with GRUAN network data archival (ASAP, SOT-13) (SG-2)*

18. Action 9.2/1: *NMHSs that participate in the SOT and its panels are strongly recommended to actively join the Turbowin Partner Board to coordinate future Turbowin requirements and to ensure the long-term sustainability of Turbowin through shared responsibility, including funding of the software's maintenance and development (NMHSs, SOT-13) (SG-1)*

19. Action 9.2/2: *At least five individuals from across the globe, including at least one each from the continents of Africa, South America and Asia, become new, active members in SOT task teams (SOT-EB, SOT-13) (SG-3)*

20. Action 9.3/1: *Members of the SOT to investigate if (better) financial support of OceanOPS is possible and report to the SOT-EB (SOT members, September 2023) (SG-4)*

21. Action 9.3/2: *Members to report recommendations/feedback for the 2023 Report Card to Editorial Board Member Liz Kent (SOT members, May 2023) (SG-1, SG-2)*

22. Action 9.3/3: *The SOT, through its EB/EC, to review if a stronger cooperation with IHO on collection of bathymetry data could be possible now, taking into account outcomes of the first, and aims of the second WMO-IMO symposium on extreme maritime weather, and application of UNCLOS (SOT-EC, Dec 2023)(SG-2)*

23. Action 9.3/4: *The SOT TT-RPT to investigate with WMO MMOP if a joint publication could be possible that comprises ship recruiting needs, potentially beyond SOT (e.g. Argo, DBCP), as an alternative to the existing, outdated VOS brochure (TT-RPT, Dec 2023)(SG-2, SG-3)*

24. Action 9.3/5: *TT EICO / ISSC to continue discussions with working groups led by Roberta Weisbrod and Damian Foxall on data submission by AIS, including ship-to-ship reporting, and aiming to streamline observation/submission efforts performed by ship officers (TT EICO /TT- ISSC, SOT-13) (SG-1, SG-2)*

25. Action 9.3/6: *SOT EB to develop a recommendation with respect to SAILDRONES as part of the SOT, and if required, involve the OCG (SOT-EB, OCG 14)(SG-3)*

26. Action 9.3/8: *TT-KPI to review existing indicators and maps for the SOT and make recommendations to the EC for re-design or new products if required (and potentially parameter-based beyond SOT) (TT-KPI, Oct 2023)(SG-2)*

27. Action 9.3/9: *TT-RPT to make a concept with the Panel Chairs for an overhaul of static websites and SOT-EB to discuss with OceanOPS a way forward (TT-RPT, April 2024) (SG-3)*

28. Action 9.4/1: *Members to familiarize with the new protocol for National Reports and make corresponding corrections in the pre-compiled documents (SOT members, May 2023) (SG-1)*

29. Action 9.5/2: *In preparation for ocean integration into GBON and for SIDS and LDCs to receive SOFF assistance, countries without PMOs are urged to establish a national PMO network. (VOS members with the assistance from TT-RPT, SOT-13) (SG-2)*

30. Action 10/1: *Invite ship masters to the next SOT sessions to increase awareness of their contribution to the weather, climate and other related products (SOT-EB, SOT-13)(SG-3)*

31. Action 10/2: *Create promotional material to provide to ships to show their contribution for the global good (TT-RPT, SOT-13) (SG-3)*

32. Action11.1/1: *Create a quick reference document for Turbowin+ (setup, use, download log files, etc.) (TT-RPT, September 2023) (SG-2)*

33. Action11.1/2: *Arrange the 7th PMO workshop with a focus on the South Pacific area. (TT-RPT, September 2023) (SG-3)*

34. Action11.1/3: *Create a guidance documentation for the VOS Donation program which will accompany the instrumentation. (TT-RPT, July 2023) (SG-2)*

35. Action11.1/4: *Update VOS Brochure with SOT activities and with OceanOPS details. (TT-RPT, September 2023) (SG-3)*

36. Action11.1/5: *Create a quick reference document for Turbowin¦ (setup, use, download, log files, etc.) (TT-RPT, September 2023) (SG-2)*

37. Action11.1/6: *Review member lists (NFP, PMO, TT membership and ensure current lists are maintained and available from the SOT website (TT-RPT, 30 September 2023)(SG-3)*

38. Action 11.2/1*: Prepare instructions for how users can request to add a new sensor to OceanOPS reference tables (TT-Metadata, September 2023) (SG-1, SG-2)*

39. Action 11.2/2: *Produce a user guide for how to use the OceanOPS system to extract/export metadata (TT-Metadata, September 2023) (SG-2, SG-3)*

40. Action 11.2/3*: Work with Turbowin Partner Board to discuss requirements for integrating the new OceanOPS metadata format for SOT within the next generation TurboWin software (TT-Metadata, December 2023) (SG-1)*

41. Action 11.2/5*: All users to have migrated to using the new OceanOPS metadata format for SOT and submitting their metadata via the OceanOPS interface by the end of migration phase 2, noting that the OceanOPS to Pub47 export will end by Dec 2024 (SOT operators, December 2024) (SG-1, SG-2)*

42. Action 11.2/6*: Metadata migration Phase 3 to end December 2026, at which point WMO. Pub47 metadata submission is no longer possible. Any users still providing metadata in Pub47 format are requested to have migrated to the new SOT metadata format by December 2024. (SOT operators, December 2026) (SG-1, SG-2)*

43. Action 11.2/7: *Prepare a service note on Pub47 retirement with timelines and publish it in WMO Service Note (TT-Metadata, Dec 2023) (SG-3)*

44. Action 11.2/8: *TT-Metadata to work with delayed mode data providers, including ICOADS, on a protocol regarding the availability of detailed ship information from vessels for which the "hide ship details" option is activated in OceanOPS (TT-Metadata, Dec 2023) (SG-1, SG-2)*

45. Action 11.3/1: *Members to update their metadata in OceanOPS database and clean inconsistencies (SOT members; Dec 2023) (SG-1)*

46. Action 11.3/2: *Centers that are sending both FM13 and BUFR to the GTS are encouraged to stop FM13 dissemination (SOT members; SOT-13) (SG-1)*

47. Action 11.3/3: *Centers that are converting BUFR back to FM13 are asked to stop sending these FM13 to the GTS (SOT members; December 2024) (SG-1)*

48. Action11.3/4: *Incorporate SOOP program into the TT-ISSC with analysis of the GTS data for SOOP vessels. Include Rebecca Cowley and Lisa Krummel in the TT to support the incorporation (TT-ISSC, SOT-13) (SG-1, SG-2)*

49. Action 11.4/1: *Further develop metrics on spatiotemporal coverage, relating those metrics to the requirements as specified in the WMOs RRR (in coordination with the GOOS OCG/networks, GCOS AOPC and OOPC, and other relevant groups). (TT-KPI; Dec 2023) (SG-1, SG-2)*

50. Action 11.4/2: *Further enhance metrics on:*

- *data flow (to include monitoring the use of the latest BUFR sequences for marine data);*
- *quality of observations (particularly linking to the MeteoFrance QC tools, blacklisting and error statistics -mean error and RMSE);*
- *and the percentage of VOS in a particular class reporting the parameters required to meet that classification. (TT-KPI; Dec 2023) (SG-1, SG-2)*

51. Action 11.4/3: *Review monthly-OceanOPS products, including static maps, in liaison with the TT- KPI and adjust those as necessary. (SOT-TC, TT-KPI; by September 2023) (SG-1, SG-2)*

52. Action 11.4/4: *Consider the development of a single, integrated KPI for all SOT (and OCG) networks (TT-KPI, SOT-TC, (& OCG); June 2023) (SG-1, SG-2)*

53. Action 11.5/1: *Inform the TT-EICO of coordination and resource opportunities for the Open Access to GTS Project (Open-GTS Project) as an endorsed action forming part of the UN Decade of Ocean Science for Sustainable Development 2021-2030 (SOT, SOT-13) (SG-4)*

54. Action 11.5/2: *Complete a guidance document for third-party data, to include the recommendation, and a possible method, for specific quality controls for the data, preferably before GTS ingestion (TT-EICO, SOT-13) (SG-1)*

55. Action 11.5/3: *Initiate coordination with a prospective DAC or GDACs including developing a business case and agreements (TT-EICO, SOT-13) (SG-1)*

56. Action 11.6/1: *Data Acquisition Centres (DACs) that did not submit data during 2022 should do so in 2023 or alternatively contact a VOS-GDAC for advice (DACs; end of 2023) (SG-1, SG-2)*

57. Action 11.6/2: *Support the migration of former Contributing Members (CMs) to VOS-DACs in the new MCDS (TT-VOS-DMD, 2024) (SG-1, SG-2)*

58. Action 11.6/3: *The VOS-GDACs should proactively contact DACs that have not submitted data for a number of years to offer assistance and encourage submission of data (VOS-GDACs, end of 2023) (SG-1, SG-2)*

59. Action 11.6/5: *Data/metadata management and exchange to be considered in the development process of TurboWin replacement (TT-DM, SOT-13) (SG-1, SG-2)*

60. Action 11.6/6:
The IMMT format and the MQCS need to be revised in order to:

- *be compatible with parameters, flags, and accuracies provided in the BUFR format;*
- *be flexible for future changes in other fields, such as the IMO number;*
- *maintain compatibility with OceanOPS metadata structure (e.g. new VOS Classes);*
- *provide accurate quality flags for all relevant parameters.*

(TT-VOS-DMD, SOT-14) (SG-1, SG-2)

61. Action 11/1: *All TT chairs are requested to recruit early career scientists/experts to each task team and also consider the gender and regional balance in those new recruitments as part of succession planning and capacity development. (TT-Chairs, SOT-13) (SG-3)*

62. Action 12.6/1: *To continue providing Science Research on Commercial Ships (RoCS)with recommendations, procedures, and documentation on how to provide real-time weather and ocean observations (and associated metadata) to meet the needs of SOT members as new vessels are recruited. (VOSP Chair, SOOP Chair, SOT13) (SG-3)*

6. Action 12.8/1: *TT-ISSC is requested to focus on improving the total standard uncertainty in measured ship SSTdepth supplied to the GTS to be less than 0.2 K, to improve the quality of SST analyses and climate data records (TT- ISSC, SOT-13) (SG-2)*

634. Action 13:1/1: *SOT is requested to assist DBCP with deployment opportunities, especially in the Indian Ocean and in the Southern Ocean. (SOT operators, SOT-13) (SG-3)*

65. Action13.1/2: *SOT is invited to discuss possibilities of joint capacity development activities (i.e., Port Meteorological Officers training) with the DBCP Task Team on Capacity Development. (TT-RPT, December 2023) (SG-3)*

66. Action 13.1/3: *SOT members are requested to complete the Environmental Stewardship Survey and join the workshop planned by the DBCP Task Team on Environmental Stewardship. (SOT members, December 2023) (SG-4)*

67. Action 14.1/1: *The SOT should assess the value of developing and consider whether or not it has the capacity to develop a concise implementation strategy for the tenets in the SOT Strategy. (SOT-EB, SOT-13) (SG-1)*

68. Action 14.1/2: *The SOT should focus on achieving specific milestones through the actions from SOT-12 and mapping those actions to the Strategy. (SOT-EB, SOT-13) (SG-4)*

69. Action 14.3/1: *SOT members are requested to contribute financially towards SOT activities. (SOT members, SOT-13) (SG-4)*

70. Action 16/1: *SOT Chair to investigate having the next SOT-13 in a region/area underrepresented in SOT membership (SOT EXB, May 2025) (SG-3)*

Ongoing Action Items

1. Action 2/1*: Continue the application/development of new technologies for data acquisition and transmission (data recorders, antennas) (SOOPIP participating institutions, Ongoing) (SG-2)*

2. Action 2/2*: Continue the development and maintenance of a flexible XBT data management system that meets all the community requirements for data dissemination and applications. (SOOPIP participating institutions and any group doing data distribution in real-time and delayed-mode, Ongoing) (SG-1, SG-2)*

3. Action 2/3*: Highlight the importance of the SOOP network for science (in scientific publications, presentations in meetings and workshop, seminars) and other areas such as NWP (Members of the SOOPIP panel also participating in the XBT Science Team, Ongoing) (SG-3)*

4. Action 2/4*: Work with other ocean observing platforms and end users to enhance SOOP data usage (in scientific publications, research and collaborative projects) (Members of the SOOPIP panel also participating in the XBT Science Team, Ongoing) (SG-2)*

5. Action 2/5*: Review the network annually to meet the needs of the community (SOOPIP co-Chairs and vice-Chairs in partnership with the XBT Science Team Chairs, ongoing) (SG-2)*

6. Action 2/6*: Enhance partnerships with other programs like Argo, drifting buoys, VOS etc (SOOPIP participating institutions, Ongoing) (SG-3)*

7. Action 2/7*: Continue the work with the TSG, pCO2, Ferrybox, CTD andCPR community in operational and data management efforts within those groups (SOOPIP members, Ongoing) (SG-3)*

8. Action 3/3: *VOS operators to review and update their VOS metadata in the OceanOPS metadata database and report issues to the TC or dedicated GitHub (VOS operators, ongoing) (SG-1)*

9. Action 3/5: *SOT Station/Platform operators (in particular VOS) to consult ship metadata in OceanOPS before any recruiting activity, avoid duplication and consult other existing/preceding users of the ship (SOT members, ongoing) (SG-1)*

10. Action 4/1: *SOT operators to familiarize with the structure of the new SOT metadata format, and to communicate tutorials and instructions with regard to ship/station/cruise metadata and identifiers in their organizations as appropriate (SOT operators, ongoing) (SG-1)*

11. Action 9.3/7: *Members to keep the OceanOPS database updated, including ship, station, contact and program metadata (SOT members, ongoing) (SG-1)*

12. Action 9.5/1*: As identified in the WMO data policy, Annex 1 section 6, SOT members are urged to share core and recommended in-situ data in real-time using the recommended data formats (SOT members, ongoing) (SG-1, SG-2)*

13. Action 11.2/4*: Regularly review the OceanOPS SOT Github repository for updating metadata reference table values and issues regarding the OceanOPS tool (TT-Metadata, Ongoing) (SG-1, SG-2)*

14. Action 11.6/4: *SOT to keep/establish contact with relevant WMO bodies to promote the clarification responsibilities regarding relevant regulatory documents. (SOT-EB, ongoing) (SG-3)*

15. Action 11.6/7: *Countries not yet registered a DAC are encouraged to register a DAC and contribute their data (VOS data contributors, ongoing) (SG-1)*

16. Action 11.6/8: *DACs should submit their observations only once. If there is a requirement to resubmit data (e.g. quality improvements) then the VOS-GDACs should be made aware of this (VOS DACs, ongoing) (SG-1, SG-2)*

17. Action 11.6/9: *All DACs should submit data files in a single IMMT format version,– preferably IMMT-5, and quality checked using MQCS-7, making use of its increased coding capabilities. (VOS DACs, ongoing) (SG-1, SG-2)*

18. Action 11.6/10: *DACs not able to submit their data because of issues with digitizing or converting into the IMMT format, should contact VOS-GDACs for advice (VOS DACs, ongoing) (SG-1, SG-2)*

19. Action 11.6/11: *VOS DACs should apply MQCS to data prior to submission. This can assist in identifying and solving significant problems, in particular issues within date/time and position (VOS DACs, ongoing) (SG-1, SG-2)*

20. Action 11.6/12: *DACs are encouraged to convert and submit AWS data to the GDACs (VOS DACs, ongoing) (SG-1, SG-2)*

21. Action 11.6/13: *VOS operators are urged to include all data/metadata required for complete IMMT datasets (VOS operators, ongoing) (SG-1, SG-2)*

22. Action 11.6/14: *If possible, DACs should ensure all masked call signs (i.e. 'SHIP') are converted back to the original ID prior to submitting to the GDCS (VOS DACs, ongoing) (SG-1, SG-2)*

23. Action13.1/4: *DBCP requested SOT-EB to have regular communications on collaboration opportunities between the two groups (SOT-EB, ongoing) (SG-3)*

Recommendations

1.Recommendation 2/1: *WMO to implement the XBT recommendation to adjust the template TM315004 (SG-1, SG-2)*

2. Recommendation 2/2*: Investigate the possibility of issuing a letter from IOC that can be used by SOOP recruiters/organizers as a template to satisfy indemnification. This letter is to reassure these shipping companies that technical personnel conducting observations will be careful to be out of the way of normal ship operations, will not cause delays or any issues for normal ship operations, and will collect data that will help these same companies by improving weather forecasts, safety at sea, etc. (SOOP Chairs with IOC, December 2023) (SG-3)*

3. Recommendation 3/1: *Content in the legacy JCOMM website (jcomm.info) is not correctly redirected to access historical information. IOC/IODE is requested to investigate how a more suitable situation could be obtained for the legacy JCOMM information access. (IODE, Dec 2023) (SG-3)*

4. Recommendation 4/1: *OceanOPS to optimize Ship Name Queries in the sense that present and former name(s) are retained (OceanOPS) (SG-1)*

5. Recommendation 4/2: *OceanOPS to cooperate with AIS tracking companies for a comprehensive set of ship metadata, and identification of target ships (OceanOPS) (SG-1)*

6. Recommendation 9.2/1: *OCG is strongly recommended to continue participating in efforts toward and furthering solution spaces as suggested by the GOOS Ocean Observations in Areas under National Jurisdiction (OONJ) Workshop (OCG, SOT-13) (SG-1)*

7. Recommendation 9.3/1: *OceanOPS to continue playing a leading and coordinating role in high-level partnership agreements with the shipping industry, including harmonized 3rd party instrument standards and funding of instruments/data processing by the partners (ongoing) (SG-1, SG-2)*

8. Recommendation 9.3/2: *OceanOPS to report to the SOT EB on progress with QR code pilot projects in other OCG networks, and the EB to make a corresponding recommendation for the SOT (SOT-13) (SG-1)*

9. Recommendation 10/1: *India has prohibited "usage of Thuraya, Iridium and other such Satellite Communication in Indian Waters" through DGS Order No. 02 of 2012. In 2019, the IMSO approved Iridium as a provider of GMDSS (Global Maritime Distress and Safety System). This has created uncertainties, especially on ships equipped with Iridium transmission systems entering Indian waters from international waters. This results in the loss of important real-time data needed for weather models. To eliminate further data loss from this already data-sparse area, WMO is requested to send a letter to the PR of India requesting to take action on this matter. (WMO, Dec 2023) (SG-2, SG-3)*

10. Recommendation 11.3/1: *DWD to filter inaccurate/bad 3rd party data received from MAERSK ships before GTS insertion (DWD GDAC) (SG-1)*

11. Recommendation 12.1/1: *The SAMOS initiative seeks recommendations from WMO regarding how the initiative may approach serving data via WIS2.0, if such a service is useful to the community. (WMO Secretariat, SOT-13) (SG-1)*

12. Recommendation12.4/1*: Requested to have a member from Ferrybox, community to join the TT-Metadata (FerryBox)(SG-3)*

13. Recommendation 13.1/1: *Ms. Helen Briggs requested DBCP to confirm the resolution and accuracy of the SST measurements from drifting buoys to GHRSST (DBCP Chair, Dec 2023) (SG-1)*