Department of Commerce • National Oceanic & Atmospheric Administration • National Weather Service

NATIONAL WEATHER SERVICE INSTRUCTION 10-2301
APRIL 18, 2024
Operations and Services
Marine Observation Program, NWSPD 10-23

VOLUNTARY OBSERVING SHIP PROGRAM

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Type of Issuance: Routine

SUMMARY OF REVISIONS: This instruction supersedes NWSI 10-2301, "Voluntary Observing Ship Program", dated February 22, 2013.

Changes with this update include:

1. Acronyms were moved to Appendix A.
2. Section 2 - Updated mission statement and supporting text
3. Section 3 - Port Meteorological Officer is now Section 4
4. Section 3.1 - Deleted unnecessary text
5. Section 3.2 - Removed WMO publication 47 standards is being changed, made format changes
6. Section 3.2 - Ship Selection and Recruitment moved out of the Section 3 and is now Section 5
7. Section 4 - Data Quality and Participation is now Section 6
8. Section 5 - Ship Classification deleted, does not apply with current tracking
9. Section 6 - Minor wording changes
10. Section 6.3 - Visit Routine removed
11. Section 7 - Instrument Quality Checks was removed
12. Section 7.1.1 - Explanation of Use of NWS Forecast Services is now Section 7.3
13. Section 7.1.2 - Visitation Services to Foreign Ships was removed
14. Section 7.1.3 - Visitation Services to U.S Government and Private Research Ship is now Section 7.4
15. Section 8 - NWS Instruments Installed Aboard Ships was removed
16. Section 9 - Observational Aids and Marine Publications Provided to Voluntary Observing Ships was moved to section 8
17. Section 10 - Observation Procedures and Transmission and Disposition of NWS Forms by ships was removed (does not apply to current VOS Program)
18. Section 10.1 - Observation Procedures Onboard Voluntary Observing Ships was removed

19. Section 10.2 - VOS Observation is now Section 3 with minor adjustments
20. Section 10.3 - Disposition of Weather Records by Ships was removed
21. Section 10.4 - Call sign Masking Security was removed
22. Section 11 - PMO Liaison Activities is now Section 9 and the subsections followed
23. Section 12 - Familiarization Trips was removed.
24. Section 13 - Awards for Voluntary Observing Ship was removed

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Voluntary Observing Ship Program

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Appendix A ACRONYMS A-1

1 Purpose

The Voluntary Observing Ship (VOS) program is one of the National Weather Service's (NWS) sources of marine weather data from coastal, offshore, high-seas areas, and the Great Lakes.

2 Mission

The mission of the VOS program is two-fold: To manage the collection and transmission of high-quality real-time marine surface weather observations from research, commercial, and other government ships to fulfill national marine surface observation needs and international agreements supporting commerce, for numerical weather prediction, forecasts, warnings, and Impact-based Decision Support Services protecting the Safety Of Life At Sea (SOLAS) worldwide, and to provide marine surface observations to measure extreme weather events,

climate variability trends, and long-term climate changes.

3 VOS Observations

VOS Observations made in accordance with National Weather Service Observing Handbook No. 1, Marine Surface Weather Observations, should include, whenever possible, the meteorological measurements of wind speed, wind direction, and barometric pressure as well as the ocean measurements of wave height, wave direction, wave period, air temperature, and sea surface temperature. Other surface weather observations in support of weather and climate can be taken depending on resources and the interest of the volunteer. Each vessel should use the standard logging and encoding software to record observations.

4 Port Meteorological Officer (PMOs)

PMOs are responsible for:

- Recruiting ships into the VOS Program.
- Training ships' officers in weather observing procedures and practices.
- Updating equipment firmware, and checking/adjusting the shipboard instrumentation.
- Maintaining and training the ships' officers on using the collection software.
- Maintaining the quality of ships' observations using Quality Control (QC) practices.
- Organizing and maintaining liaison with maritime interests.
- Partnering with NOAA's Office of Oceanic and Atmospheric Research.
- Collect and maintain ship METADatat in accordance with VOS Standards

4.1 PMO Training

PMOs inspect and service NWS equipment aboard voluntary reporting vessels. They enter, and transit cargo yards, marine terminals, remote docks, and refineries to perform their work. Ships include but are not limited to tankers, cargo ships, bulk carriers, research vessels, fishing vessels, commercial cruise liners, NOAA vessels, US Coast Guard vessels, and tugs. PMOs face the same hazards as longshoremen, crew members, and dock workers.

The PMO's work environment is unique in that the NWS neither creates, nor controls the hazards of the workplace. Each PMO will be provided with a pair of standard boots (standard: ASTM F2412-05), a hard hat (standard: ANSI Z.89.1-2003), and a reflective vest as PPE. Any repairs or replacements need to be coordinated through the NDBC. The regions can order this PPE equipment directly from the NLSC (ASN 060-P16-KIT, or 060-P-17).

Newly hired PMOs will receive on-the-job training from a veteran PMO within the first 60 days of being hired. The training will cover general port safety awareness, possible hazards while working on board ships and in port areas, and proper use of PPE. Within the first year of being hired, the region/Weather Forecast Office (WFO) will be responsible for sending the newly hired PMO to a Maritime Standards Safety Course such as OSHA #5410 "OCCUPATIONAL SAFETY AND HEALTH STANDARDS FOR THE MARITIME INDUSTRY".

5 Ship Selection and Recruitment

Ships enrolled in the United States VOS program provide a broad distribution of observations across the marine environment. The following U.S. VOS program priorities should be considered when recruiting a ship. Does the ship:

- Operate in areas where NWS has forecast, alert, watch, and warning responsibilities.
- Add significant value to the numerical weather prediction models.
- Belong to a shipping company or organization already participating in the VOS program.
- Frequently visit U.S. Ports/waters supported by U.S. VOS PMOs.
- Traverse data-sparse areas with limited observations with high value.
- Often work outside standard shipping routes.
- Satisfy a specific request from a division under the NWS, such as NHC, OPC, TAFB, or a Region.
- Satisfy a specific request from other divisions under Commerce, NOAA, or other Government Agencies.

5.1 Recruitment and Collaboration with non-U.S. VOS Programs

The international VOS program is a collaboration with over 26 VOS Country Programs. In order to prevent duplication of effort, and to ensure proper tracking of ship and equipment metadata, all ships are assigned to a VOS program. This is managed and tracked under the OceanOps system (https://www.ocean-ops.org/board. Before beginning the recruitment process it is the PMOs responsibility to confirm that the ship is not already participating in a non-U.S. VOS program using the OceanOPS system.

5.2 Transfer of U.S.-supported ships to another VOS Program

U.S. VOS ships may also be requested to be transferred to another VOS Program. This should be a formal request created by the PMO that provides the benefit and impact of the transfer out of the U.S. VOS program. The request should include an understanding of the equipment on the vessel and the recovery process, along with any cost savings. The PMO should take no action to transfer the ship until the recommendation is approved by the VOS Operations and/or Program Manager.

5.3 Recruitment of Ships Accessible to the PMO

PMOs should focus recruitment efforts on ships that traverse waters important to the NWS areas of forecast and warning responsibility. When possible, the recruited ships should call on a U.S. port accessible to a PMO. This will allow the PMO to visit the ship to train new crew members, update software, collect Metadaa, and perform equipment maintenance.

5.4 Newly Recruited Ships and Metadata Collection

Newly recruited ships will only begin submitting observations after the observing equipment has been adjusted, and the PMO collects and documents WMO metadata in the iVOS database.

5.5 Newly Recruited Ships and Equipment Distribution

NWS equipment will be supplied to newly recruited ships at the discretion of the VOS Program. The PMOs in each region are responsible for working with their supervisors or regional representatives to provide a recommended list of the ships for recruitment. This list will then be provided to the VOS Operations and/or Program Manager to determine the equipment distribution. The regional recruitment list should be maintained and updated regularly as equipment is deployed and new ships are identified.

5.6 NWS Equipment

NWS equipment will only be supplied to newly recruited ships at the discretion of the VOS Operations and/or Program Manager, and should only be loaned to vessels that can be visited by a U.S. PMO at least once every six months. This ensures loaned equipment can be retrieved if the ship is decommissioned, transferred to another route, or fails to adequately participate in the U.S. VOS program. The PMO will only install NDBC-approved equipment. PMOs will not make any modifications to a ship without the approval of the company or ship captain.

6 Data Quality

Data quality is a critical component of the VOS program as VOS observations support local, regional, and global forecast and warning services and numerical weather prediction systems.

To ensure the quality of data, PMOs and NDBC data analysts will run quality control of the vessel's observations once weekly. This may be accomplished with software by comparing ship observations to nearby quality-controlled observations or other means. Additional observing quality control checks can be accomplished using the web-based Surface Marine Monthly Statistics https://www.nco.ncep.noaa.gov/pmb/qap/smstats/, the Météo-France's Marine Observation Monitoring Quality Control Tools https://esurfmar.meteo.fr/qctools/, or any of the tools or links provided in iVOS.

If unacceptable discrepancies in the observations are found, the PMO will contact the ship so adjustments in the equipment or observing practices can be instituted in a timely manner to ensure the highest possible quality of data. The PMO will coordinate with the vessel to visit at the earliest opportunity. Adjustments will occur within one month of the first PMO contact for the vessel to be considered in good standing with the U.S. VOS Program.

To maintain good standing with the U.S. VOS Program, the vessel should participate adequately. This means the vessel making manual observations should submit a minimum of 300 observations per year or, in the judgment of the PMO (with concurrence from the Regional VOS Program Manager), is submitting a sufficient number of observations consistent with the vessel's type of operations, and operating area (including seasonal limitations). It is the responsibility of the assigned PMO to ensure the vessel is meeting participation standards, and that NWS-owned equipment is properly tracked and retrieved from ships that are not meeting participation requirements.

7 Ship Visitation and Support

This function requires the greatest amount of the PMO's time. Proper management of this activity is essential to the VOS program. The PMO plans routine visits to:

- Recruit new ships into the VOS program
- Inspect meteorological equipment and provide observing instructions to ships already in the VOS program
- Replace or adjust previously installed NWS equipment
- Instruct observers and provide necessary meteorological equipment to newly recruited ships
- Make courtesy calls on domestic and foreign VOS ships
- Coordinate with the PMO designated as responsible for the ship at earliest convenience

The ship visit begins with a request from the company/captain to visit their vessel or a request by the PMO to the captain/officer explaining the purpose of the visit and requesting permission to board the ship. Ship visitation and support will be classified as the physical face-to-face meeting onboard the ship, and remote support will be classified as either by email, video conferencing, telephone, radio, postal mail, or contact through an office and/or agent.

7.1 Timing of Visits

Ship visits should be planned for times when the greatest number of weather-observing personnel can be reached to discuss observing procedures and the use of NWS services, information, and products.

7.2 Purpose of Visits

Ship visitations are made primarily to:

- Expand the existing VOS program.
- Maintain the quality of weather observation programs aboard ships.
- Furnish observing and reporting instructions and supplies.
- Inform ships' personnel about the availability and use of NWS forecast and warning broadcasts.
- Download any archived observational data for submission to the National Center for Environmental Information (NCEI) for data archiving.

7.3 Explanation of Use of NWS Forecast Services

Discussion of radio facsimile broadcast schedules and products, as well as radio broadcasts of forecasts, synopses, warnings, and analyses, Global Maritime Distress and Safety System (GMDSS), should be brought to the attention of the ship's officers. If necessary, shipboard personnel should be provided information (and instructions, if needed) regarding NWS forecast services and internet websites as well as the instructions on the interpretation and use of these NWS forecast products.

7.4 Visitation Services to U.S. Government and Private Research Ships

Every effort should be made to encourage the cooperation of ships that sail under the following Government-sponsored programs:

- NOAA Fleet
- Ships engaged in Government-funded research

Visitation services should be offered to all ships in the various categories listed above. Services to NOAA ships should be coordinated through the Office of Marine and Aviation Operations (OMAO) Marine Operations Center and National Marine Fisheries Service Research Centers and Laboratories. The U.S. Navy supports Military Sealift Command (MSC) ships operationally and logistically, as their observation reports are not publicly releasable.

8 Observation Aids and Marine Publications Provided to Voluntary Observing Ships

Forms, aids, and publications provided to VOS vessels may include:

- Mariner's Tropical Cyclone Guide" updated in 2023 by Dylan. Flynn: (https://www.nhc.noaa.gov/marinersguide.pdf).
- National Weather Service Observing Handbook No. 1, Marine Surface Weather Observations.
- Turbowin logging and encoding software.
- Guide to Sea State, Wind and Clouds.
- Worldwide Marine Radiofacsimile Broadcast Schedule.
- Determining Cloud Type Poster.
- Beaufort Wind Speed Scale Poster.

9 PMO Liaison Activities

PMOs will maintain close liaison with shipping company officials, the U.S. Coast Guard, and other marine-oriented organizations.

Through these contacts, the PMOs can gain support for the VOS program and determine the local marine communities' requirements for weather services. They maintain relationships with shipping company management in Operations, Safety and Information Technology and work with the Captains and Crew on various types of ships. The PMOs help provide information on NWS products and provide training and guidance as required.

9.1 Marine Weather Training Provided by PMOs

The PMOs will provide training in weather observing techniques for shipboard weather observers. The purpose of the training is to provide the ship's officers with practical assistance in observing techniques and use of the meteorological services available to the ships. Basic meteorology necessary for weather map analysis and interpretation should be included in the training, if requested.

9.2 Merchant Marine Schools

Since the majority of cadets at merchant marine academy and maritime schools will eventually serve onboard ships participating in the VOS program, the U.S. VOS Program should provide, coordinate, and facilitate training on a regular basis. This training includes but is not limited to on-site facility training, at-sea observer training, basic meteorology fundamentals, Radiofax chart training, and other NWS products, and provides information and services available to the mariner when requested.

Appendix A

ACRONYMS

Acronym	Definition
AIS	USCG Automatic Identification System
AMVER	Automated Mutual-assistance Vessel Rescue
AT	Air Temperature
GCC	Global Collection Centers
GOOS	Global Ocean Observing System
GMDSS	Global Maritime Distress and Safety System
IMMT	International Maritime Meteorological Tape
IMOP	Instruments and Methods of Observation Programme
INMARSAT	International Maritime Satellites
MIC	Meteorologist In Charge
MSC	Military Sealift Command
NAVTEX	Navigation Telex Radio
NESDIS	National Environmental Satellite, Data, and Information Service
NDBC	National Data Buoy Center
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NWS	National Weather Service
NWSI	NWS Instruction
NWSPD	NWS Policy Directive
NWSTG	NWS Telecommunications Gateway
OPC	Ocean Prediction Center
OSHA	Occupational Safety & Health Administration
PMO	Port Meteorological Officer
PORTS	Physical Oceanographic Real-Time System
PPE	Personal Protective Equipment
QC	Quality Control
SEAS	SEAS Electronic Logbook Software
SLL	Summer Load Line
SLP	Sea Level Pressure
SOLAS	Safety Of Life At Sea
SST	Sea Surface Temperature

USCG	U.S. Coast Guard
VOS	Voluntary Observing Ship
WFO	Weather Forecast Office
WMO	World Meteorological Organization