

AMSA Recommendation III(A)

International Voluntary Observing Ships (VOS) Scheme

US Report prepared for the PAME II-2012 Meeting 18-20 Sep

Background

AMSA Recommendation III(A) provides:

That the Arctic states should recognize that improvements in Arctic marine infrastructure are needed to enhance safety and environmental protection in support of sustainable development. Examples of infrastructure where critical improvements are needed include: ice navigation training; navigational charts; communications systems; port services, including reception facilities for ship-generated waste; accurate and timely ice information (ice centers); places of refuge; and icebreakers to assist in response.

The PAME I-2012 meeting adopted a record of decision (ROD) reflecting the United States offer to submit a report to PAME II-2012 to educate member governments on the [International Voluntary Observing Ships \(VOS\) Scheme](#) and how it supports AMSA Recommendation III(A) and other PAME strategic goals.

U.S. Response

The VOS Scheme is an international program comprising member countries of the World Meteorological Organization (WMO) that recruit ships to take, record and transmit marine meteorological and oceanographic observations while at sea. The VOS Scheme consists of national VOS fleets, each of which consists of a mix of commercial, research, fishing, passenger and private vessels.¹ The VOS Scheme is coordinated by the Ship Observation Team (SOT) in the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM), a partnership between the WMO and the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization (UNESCO). In addition to the VOS Scheme, there are several supplementary ship data collection programs that share common features with the VOS Scheme.²

¹ Vessels participating in the VOS Scheme are generally classified into one of four major categories. “Selected Ships” carry out a complete program of meteorological observations and utilize the full WMO SHIP code for relay of their reports; “VOSclim” ships provide higher quality data and more detailed information about the observations for climate applications; “Supplementary Ships” undertake a somewhat reduced observational program and use an abbreviated code form; and any vessel travelling through a data-sparse region may be recruited into a fourth category, known as “Auxiliary Ships”, and requested to supply limited observations.

² For more information on supplementary programs, visit the JCOMM Ship Observations Team (SOT) website at <http://www.jcommops.org/sot/>.

VOS observations contribute to marine safety and efficiency by providing real-time reports for weather forecasting and historical data for planning and design. VOS data support a wide range of applications, including: the analysis of weather systems and storm tracking; the provision of high-quality maritime safety services; national and local weather forecasts; ground-truthing of satellite derived data; validating coastal and island observations; climate research, modeling and forecasts; and gathering Arctic ice information. In addition, VOS data supplement other data collection methods (satellites, drifting buoys and floats, radar) and includes certain measurements not yet obtainable by other means.³ VOS data also support other industries and users including: fishing, transport, coastal engineering, search and rescue, marine pollution, offshore drilling and mining.

The VOS Scheme is supported by Port Meteorological Officers (PMOs)⁴ who provide free training to participating vessels, both in weather observing and in the use of WMO codes, while essential meteorological supplies are provided by participating National Meteorological Services (NMSs). The type of data collected and the measurement instruments provided vary depending on the class of ship. The program generally operates at no direct cost to participating vessels.

Table 1: VOS Program Statistics⁵

<ul style="list-style-type: none"> • 1,400,000 observations per year • 4,000 ships actively participating • 800 – 1,000 ships report daily • 1,200-1,500 ships report weekly • 26 nations support VOS
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Global VOS Participation

All eight Arctic Council member governments participate in the VOS Scheme either directly, by providing ships to the program, or indirectly by providing funding and/or data. Twenty other countries⁶ have VOS programs that support the VOS Scheme. The below table summarizes Arctic Council member government contribution to the VOS Scheme:

³ E.g. air temperature and dew point.

⁴ Port Meteorological Officers (PMOs) are responsible for recruitment of new VOS vessels as observers, training crew members, and ensuring the quality of observations from vessels actively participating in the program.

⁵ Source: WMO/IOC, provided by Mr. John Wasserman, VOS Program Lead, NOAA National Data Buoy Center.

⁶ Japan, UK/Northern Ireland, Ireland, Germany, France, Australia, Netherlands, New Zealand, Spain, Greece, Hong Kong, Korea, Malaysia, Poland, South Africa, [Eumetnet](#), Croatia, Brazil, The Gambia, Indonesia, and Thailand.

Table 2: Arctic Council Members' VOS Program Contribution⁷

	Number of Actively Participating Vessels	Number of VOS Observations per year (2011)	Number of ship reports (weekly/daily)
United States	1,000	350,000	1,750/250
Sweden ⁸	27	8,400	812/116
Canada ⁹	225	-	-
Russia			
Norway ¹⁰	5	30,650	-
Finland ¹¹			
Iceland ¹²	4	1,660	
Denmark/Greenland /Faroe Islands ¹³			
Total	4,000	1,400,000	2,500+/375+

U.S. VOS Participation

The United States participates in the VOS Scheme through the National Oceanic and Atmospheric Administration's (NOAA) [National Data Buoy Center](#). NOAA's Port Meteorological Officers recruit, support and provide training for crewmembers of ships that

⁷ EUMETNET'S [E-SURFMAR](#) (The Surface Marine Observation Programme) delivers marine observations from VOS operated by EUMETNET members, including five Arctic Council members (Norway, Sweden, Denmark, Iceland, and Finland).

⁸ Source: Swedish Meteorological and Hydrological Institute (SMHI), Port Metrological Officer Johan Svalmark (Data current as of June 11, 2012).

⁹ The Meteorological Service of Canada (MSC) aims to recruit an additional 15-20 vessels over the next 3-5 years, with at least 15 that are focused on operating in Arctic waters. Source: MSC, Ms. Gerie Lynn Lavigne (March 29, 2012).

¹⁰ Norway operates a fleet of five automated weather stations on their research vessels. In 2011, these vessels reported 30,650 observations. About 630 were supplemented by visual parameters: visibility, waves, present and past weather, clouds (Source: E-SURFMAR Project Administrator Pierre Blouch (June 19, 2012).

¹¹ Finland does not have a VOS program but the Finnish Meteorological Institute (FMI) financially supports E-SURFMAR.

¹² Source: E-SURFMAR Project Administrator Pierre Blouch (June 19, 2012)

¹³ Denmark/Greenland/Faroe Islands has no VOS program but the Danish Meteorological Institute (DMI) financially supports E-SURFMAR and installed four automated weather stations funded by E-SURFMAR on Danish-flagged ships plying between Denmark and Greenland (Royal Arctic Line). These stations reported 18,300 observations in 2011 (Source: E-SURFMAR Project Administrator Pierre Blouch (June 19, 2012)

participate in the VOS program as part of the United States’ international commitment to SOLAS and are located in seventeen domestic offices.

How to Participate in the International VOS Scheme

Countries interested in participating in the International VOS Scheme are advised to contact their National Meteorological Service (NMS), their local [PMO](#), or a [VOS Panel](#) representative to learn about the participation requirements. Ship operators interested in participating are advised to contact their NMS or a local PMO to nominate their ship for recruitment into the VOS Scheme.

One possible future method of VOS Scheme participation is through the Drifting Buoy Donation Program, a new initiative proposed at the December 2010 International PMO conference. Countries that are interested in starting a VOS program would be assigned a U.S. partner as a point of contact and could receive a drifting buoy to mount onboard a VOS ship. Discussions on expanding this program were further discussed at the 6th Meeting of the Ship Observing Team (SOT-VI) that took place in Hobart, Australia 11-15 April 2011.¹⁴

Benefits of VOS program participation and how it supports AMSA recommendation III(A)

Table 3: Benefits of International VOS Program Participation¹⁵

Benefit	Examples based on United States Experience
<p><i>Enhances marine safety</i></p> <ul style="list-style-type: none"> • <i>Ship observations provide valuable data for forecasting weather at sea, which helps mariners stay informed of severe weather.</i> • <i>Provides real-time reports which can be used immediately in services for the mariner.</i> • <i>Provides ice information to icebreakers and other ships assisting in emergency responses.</i> 	<p>NOAA collaboration with U.S. Coast Guard’s Automated Mutual-Assistance Vessel Rescue System (AMVER)¹⁶</p> <ul style="list-style-type: none"> • Ship observations are also collected by the U.S. Coast Guard so in case of a marine emergency, the Coast Guard knows the last position of the ship in danger and the positions of nearby ships that may be able to render assistance.
<p><i>Enhances environmental protection</i></p> <ul style="list-style-type: none"> • <i>VOS meteorological data gathering equipment supports improvements in communication system infrastructure that helps enhance safety and environmental</i> 	

¹⁴ The Final Report of this meeting is available at http://www.bom.gov.au/jcomm/vos/documents/sot6_report.pdf.

¹⁵ items in *italics* directly support AMSA Recommendation III(A)

¹⁶ AMVER, sponsored by the U.S. Coast Guard, is a computer-based voluntary global ship reporting system used worldwide by search and rescue authorities to arrange for assistance to persons in distress at sea. More information at <http://www.amver.com/>.

<i>protection in support of sustainable development.</i>	
<p><i>Supports infrastructure improvements in ship design, oil rig construction and coastal engineering</i></p> <ul style="list-style-type: none"> • <i>Historical records of VOS observations contribute design statistics used in ship and oil rig construction, coastal engineering and construction of appropriate port service facilities.</i> 	<ul style="list-style-type: none"> • NOAA VOS data support historical records of VOS observations.
<p><i>Provides collection of accurate and timely ice information</i></p> <ul style="list-style-type: none"> • <i>Many VOS ships report data on ice thickness and flows, enabling mariners to navigate the Arctic more safely and efficiently and providing researchers with data to monitor Arctic ice coverage.</i> 	<ul style="list-style-type: none"> • NOAA VOS participants provide ice information that improves Arctic ice monitoring capabilities.
<p><i>Supports infrastructure improvements in navigational charts and communications systems</i></p> <ul style="list-style-type: none"> • <i>VOS observations support the development of more accurate navigational charts.</i> • <i>Installation of and training on VOS data collection equipment improves vessels' communication systems and ability to transmit meteorological data.</i> 	<ul style="list-style-type: none"> • NOAA PMOs install and provide crew training on VOS data collection equipment.
<p><i>Improves data quality for mariners, governments, researchers and other stakeholders</i></p> <ul style="list-style-type: none"> • <i>Supplements gaps in meteorological data collected by other means.</i> • <i>Improves ocean data availability from 'data sparse areas' such as the Arctic.</i> • <i>Data used in preparation of forecasts and warnings, including those for the Global Maritime Distress and Safety System (GMDSS).</i> • <i>Data used to create long-range climate forecasts and monitor climatic change.</i> 	<p>VOS data helps NOAA's National Weather Service create more accurate weather forecasts and climate models</p> <ul style="list-style-type: none"> • NOAA compares real-time VOS weather observations with the predictions of its weather prediction models.
<p><i>Cost-effective data collection mechanism</i></p> <ul style="list-style-type: none"> • <i>VOS operates at no direct cost to participating vessels.</i> • <i>Communication charges, observing equipment and reporting supplies are furnished by participating NWS.</i> 	<p>NOAA PMOs provide free training in weather observing practices, the use of electronic logbook software, as well as observing equipment and reporting supplies.</p>

<p><i>Supports Safety of Life at Sea (SOLAS) Convention</i></p> <ul style="list-style-type: none"> • “[SOLAS] Contracting Governments undertake to encourage the collection of meteorological data by ships at sea and to arrange for their examination, dissemination and exchange in the manner most suitable for the purpose of aiding navigation.”¹⁷ 	<p>Part of the mission of the U.S. VOS Program is “to fulfill National needs and International agreements supporting commerce, forecasts and warning programs, and the Safety Of Life At Sea (SOLAS) worldwide”.</p>
<p><i>Promotes strategic goals and actions of the Arctic Marine Strategic Plan (AMSP), including:</i></p> <ul style="list-style-type: none"> • <i>Reducing and preventing pollution in the Arctic marine environment, conserving Arctic marine biodiversity and ecosystem functions, promoting the health and prosperity of all Arctic inhabitants and advancing sustainable Arctic marine resource use.</i>¹⁸ 	
<p><i>PMOs provide valuable training to ship crews on weather data collection/reporting, and use of weather collection technology.</i></p>	<p>NOAA PMOs provide crew training to VOS program participants.</p>
<p><i>Supports public-private partnerships (between WMO/governments and privately-owned vessels)</i></p>	<p>The U.S. and other governments participating in the International VOS Scheme are part of a public-private partnership that improves stakeholder information sharing and decision making on Arctic issues.</p>

Recommendations

As next steps, the United States recommends:

- That PAME encourage Arctic Council member governments to join - or increase their level of participation in - the VOS Scheme and promote VOS program participation by their flag vessels.

¹⁷ General Regulations determined by the International Conference on Safety of Life at Sea, London, 1960, Regulation 4(a), Chapter 5.

¹⁸ VOS specifically supports AMSP strategic actions 7.1, 7.2, 7.4, 7.5 and 7.6. The AMSP available at <http://www.pame.is/index.php/arctic-marine-strategic-plan>.

- That PAME support the VOS Scheme by promoting it to member governments via the internet (for example, via web page on PAME site that lists all VOS programs, participation benefits, how to participate, etc.).
- That PAME encourage Arctic Council member governments to foster participation in the VOS Scheme by private companies and shipping trade associations by notifying them of the benefits of VOS program participation and how they can join. Outreach could be done via a letter from PAME to key trade associations (e.g., International Chamber of Shipping, Cruise Lines International Association, Association of Arctic Expedition Cruise Operators), web site, by an information paper submitted by one or more PAME member governments to the International Maritime Organization.¹⁹

APPENDIX

JCOMM VOS Scheme

<http://www.bom.gov.au/jcomm/vos/>

United States VOS Program

<http://www.vos.noaa.gov/>

¹⁹ The WMO has regular meetings with the International Chamber of Shipping (ICS) to emphasize the importance of VOS.