

# AMVERSEAS Applications System

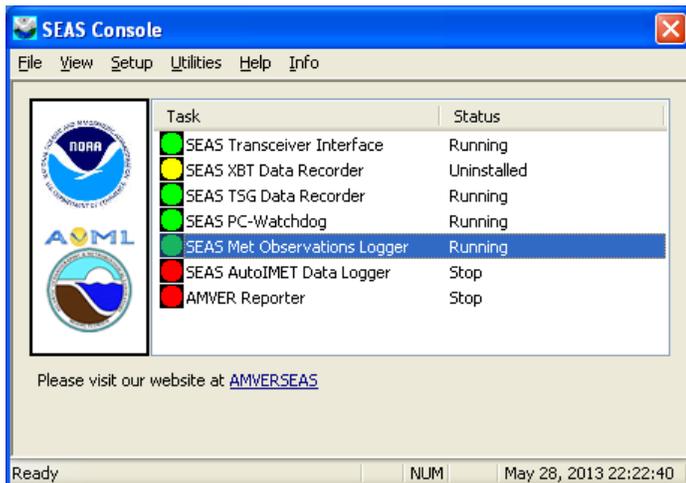
[http://www.aoml.noaa.gov/phod/qoos/seas/amverseas\\_software.php](http://www.aoml.noaa.gov/phod/qoos/seas/amverseas_software.php)

AMVERSEAS is a comprehensive computer application system used in research and commercial vessels worldwide to acquire and distribute oceanographic and meteorological observations in real-time. The system has been created to assist the Ship Of Opportunity Program<sup>1</sup> (SOOP) and the Voluntary Observing Ship<sup>2</sup> (VOS) program in their effort to provide data to scientists working in climate research, weather forecast and modeling. The system also generates reports for the U.S. Coast Guard's Automated Mutual-assistance Vessel Rescue system<sup>3</sup> (AMVER) to aid in rescue missions at sea.

Data acquired and transmitted by AMVERSEAS includes meteorological reports, ocean temperature profiles, sea surface temperature and salinity observations as well as AMVER reports. The program is designed to be intuitive for users at all levels of computer experience.

## AMVERSEAS components

**SEAS Console:** The SEAS Console is the interface to manage the AMVERSEAS programs activities. This is the utility where all the AMVERSEAS applications management functions are found. In the SEAS Console the setup of all other components can be performed and the status of these components monitored.



**SEAS Transceiver Interface:** The Global Positioning System (GPS) is a satellite-based navigation system that comprises an assemble of 24 satellites placed into orbit by the U.S. Department of Defense and available for civilian use. GPS works in any weather conditions, anywhere in

the world, 24 hours a day. The GPS can be used to determine time and position with high accuracy.

SEAS Transceiver Interface is a real-time application that combines reception of GPS data and transmission of collected observations over several devices. It reads time, position, velocity, and course heading from the GPS and provides this information to all other applications. It also constitutes a reliable transmission tool for all collected observations via satellite. The operation is transparent to the user.

The SEAS Transceiver Interface operates in vessels equipped with transceiver units such Furuno, Thrane & Thrane and Iridium.



**SEAS XBT Data Recorder:** The Expendable Bathythermograph (XBT) has been used by oceanographers for many years to obtain information on the temperature structure of the ocean to depths of up to 2000 meters. The use of XBTs has significantly increased over the past decade. The National Oceanic and Atmospheric Administration (NOAA) is actively participating in an international effort to increase the number of subsurface temperature observations in support of global oceanographic and climate studies. A standard XBT system consists of an expendable probe (the XBT), a data recorder system and a launcher.

The SEAS XBT Data Recorder is a real-time data acquisition application that operates on SOOP and research vessels. The XBT data collected is typically transmitted in real-time and distributed globally.



*XBT probe*



*Sippican hand launcher*



*AOML Auto launcher*

<sup>1</sup> <http://www.aoml.noaa.gov/phod/soop/index.php>

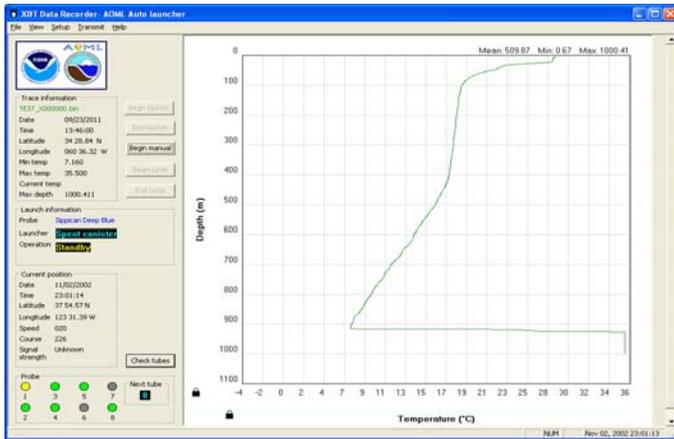
<sup>2</sup> <http://www.vos.noaa.gov/>

<sup>3</sup> <http://www.amver.com/>

On many applications it is necessary to deploy XBTs on a 24 hours schedule. Depending on the desired special resolution the software allows the deployment of probes using a hand launcher or the Atlantic Oceanographic and Meteorological Laboratory<sup>4</sup> (AOML) developed automated XBT launcher, allowing a single operator to conduct an extended cruise with deployment rates of up to 15 minutes. A maximum of eight probes can be loaded and then deployed at predetermined times or positions.

SEAS TSG Data Recorder receives continuously the measured water temperature and conductivity, archiving these data in a computer file. The user can set the collection and transmission sampling interval. Other tasks performed by this application include:

- Automatic detection of the calibration coefficients from the MicroTSG unit, as well as the remote temperature sensor.
- Automatic test and monitoring of communication between instruments.
- Automatic detection and setup of the instrument baud rate for compatibility and easy communication.
- Automatic instruments default setup.



**SEAS Met Observations Logger:** The Met(eorological) Observations Logger application is one of the three world wide used electronic logbooks to produce high quality marine weather observations. This application operates on vessels of the VOS program to collect and transmit local weather conditions, and to locate and determine the strength of weather systems such as fronts, air masses, high and low pressure systems, tropical storms, and hurricanes. Meteorological observations are made at least four times per day at 00Z, 06Z, 12Z, and 18Z. Ships are encouraged to also submit reports at 03Z, 09Z, 15Z and 21Z. This application provides accurate meteorological and oceanographic data in real-time from ships at sea through the use of satellite data transmission techniques.

Fully automatic, the application is able to determine if tubes in the launcher are empty as well as diagnose several issues with the probe before and during the deployment. Bad deployments can be repeated automatically and tubes skipped in case of missing probes.

All Sippican XBT probes types<sup>5</sup> are supported.

**SEAS TSG Data Recorder:** The SEAS TSG Data Recorder is a real-time data acquisition application for SOOP and research vessels equipped with a thermosalinograph unit<sup>6</sup> to collect underway sea surface temperature and salinity observations.



Synoptic Code Symbols with Range of Values		
BBXX	Ship Weather Report Indicator	BBXX
D...D	Radio call sign	Call Sign
YY	Day of the month	01-31
GG	Time of observation	00-23
w	Wind indicator	3, 4
L <sub>1</sub> L <sub>2</sub> L <sub>3</sub>	Latitude	000-900
Q <sub>0</sub>	Quadrant	1, 3, 5, 7
L <sub>0</sub> L <sub>1</sub> L <sub>2</sub> L <sub>3</sub>	Longitude	0000-1800
i <sub>r</sub>	Precipitation data indicator	4
i <sub>x</sub>	Weather data indicator	1, 3
h	Cloud base height	0-9, /
VV	Visibility	90-99
N	Cloud cover	0-9, /
dd	Wind direction	00-36, 99
ff	Wind speed	00-99
fff	High Speed Wind	Knots (099- )
s <sub>a</sub>	Sign of temperature	0, 1
TTT	Dry bulb temperature	Celsius Degrees
T <sub>d</sub> T <sub>d</sub> T <sub>d</sub>	Dew point temperature	Celsius Degrees
PPPP	Sea level pressure	Actual Hp or Mb (omit 1 in thousandths)
a	3-hour pressure tendency	0-8
ppp	3-hour pressure change	Hp or Mb
ww	Present weather	00-99
W <sub>1</sub>	Past weather (primary)	0-9
W <sub>2</sub>	Past weather (secondary)	0-9
N <sub>h</sub>	Lowest cloud cover	0-9, /
C <sub>L</sub>	Low cloud type	0-9, /
C <sub>M</sub>	Middle cloud type	0-9, /
C <sub>H</sub>	High cloud type	0-9, /
D <sub>s</sub>	Ship's course	0-9
V <sub>s</sub>	Ship's average speed	0-9
S <sub>s</sub>	Sign/type sea surface temp.	0-7
T <sub>w</sub> T <sub>w</sub> T <sub>w</sub>	Sea surface temp.	Celsius Degrees
P <sub>w</sub> P <sub>w</sub>	Sea period	Seconds
H <sub>w</sub> H <sub>w</sub>	Sea height	Half Meters
d <sub>w1</sub> d <sub>w1</sub>	Primary swell direction	01-36, 99
d <sub>w2</sub> d <sub>w2</sub>	Secondary swell direction	01-36, 99, //
P <sub>w1</sub> P <sub>w1</sub>	Primary swell period	Seconds
H <sub>w1</sub> H <sub>w1</sub>	Primary swell height	Half Meters
P <sub>w2</sub> P <sub>w2</sub>	Secondary swell period	Seconds
H <sub>w2</sub> H <sub>w2</sub>	Secondary swell height	Half Meters
I <sub>s</sub>	Ice accretion cause on ship	1-5
E <sub>s</sub> E <sub>s</sub>	Ice accretion thickness on ship	Centimeters
R <sub>s</sub>	Ice accretion rate on ship	0-4
S <sub>w</sub>	Sign/type wet bulb temp.	0-7
T <sub>b</sub> T <sub>b</sub> T <sub>b</sub>	Wet bulb temp.	Celsius Degrees
c <sub>i</sub>	Sea ice concentration	0-9, /
S <sub>i</sub>	Sea ice development	0-9, /
b <sub>i</sub>	Ice of land origin	0-9, /
D <sub>i</sub>	Ice edge bearing	0-9, /
Z <sub>i</sub>	Ice trend	0-9, /

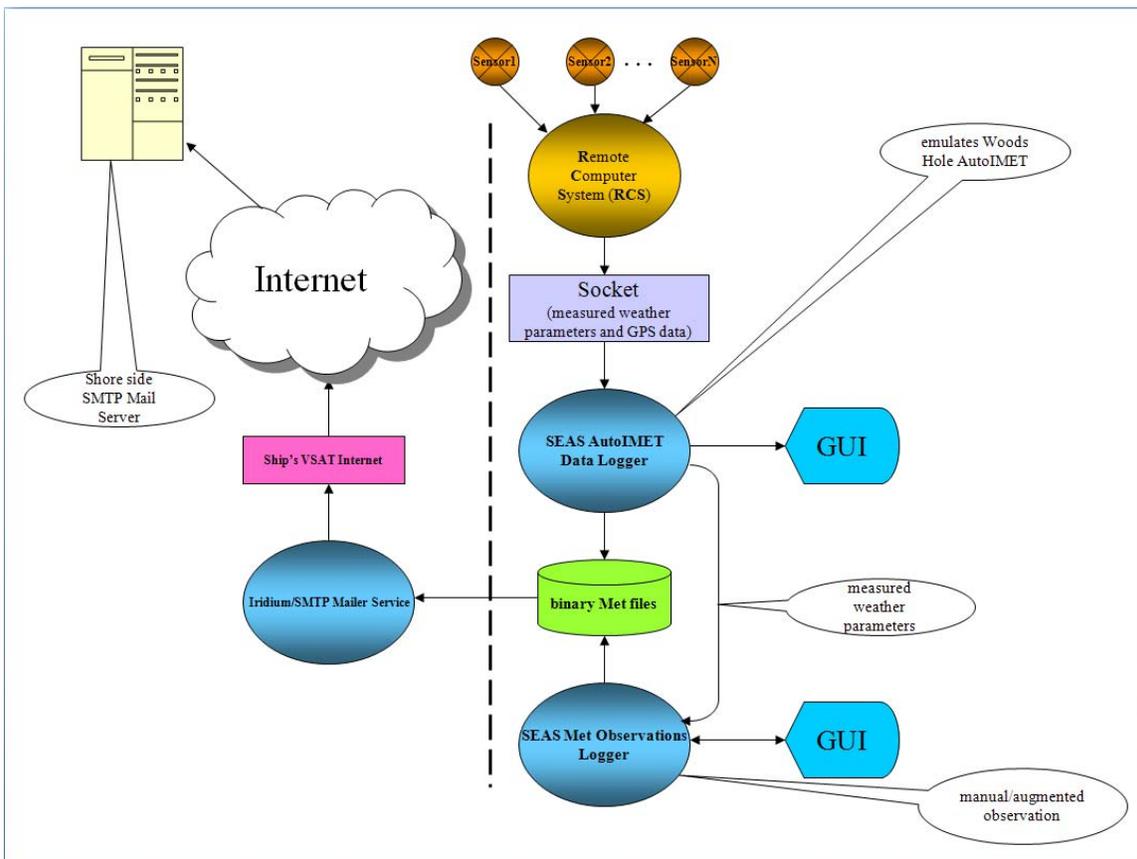
<sup>4</sup> <http://www.aoml.noaa.gov/>

<sup>5</sup> <http://www.sippican.com/contentmgr/showdetails.php/id/312>

<sup>6</sup> <http://www.seabird.com/products/ThermoS.htm>

**SEAS AutoIMET Data Logger:** The SEAS AutoIMET (Automatic [Air-Sea] Interaction Meteorology system) Data Logger is a fully automatic real-time data acquisition and transition application that operates on VOS and research vessels. It connects to the Remote Computer System (RCS) using sockets to retrieve a data stream containing measured weather parameters. The software

formats the data and feeds the user interface for additional augmentation, allowing the quality control of the marine weather observations at the point of origination. The data are transmitted on a user-determined schedule; typically hourly, using the meteorological observation BBXX format.



**SEAS PC-Watchdog:** The SEAS PC-Watchdog is an application dedicated to monitoring the operation of AMVERSEAS components. It is designed to keep the applications running continuously. Adding the PC-Watchdog to AMVERSEAS allows a reduction of downtime, prevents data loss as a result of application programs crashes, and saves costs of dispatching a technician to remote locations to reset/reboot programs or frozen computers. The most significant features include:

- Simple and intuitive graphic user interface, easy to operate for everyone.
- Monitoring of those applications selected by the user.
- Setup of automatic PC reboots.
- Visual and audible alarms during reboot countdown time.
- User selection between software or hardware automatic reset.

The hardware reset will be executed using an external serial device, similar to a PC reset button.



**AMVER Reporter:** AMVER is a worldwide voluntary ship reporting system operated by the United States Coast Guard to promote safety of life and property at sea. AMVER's mission is to quickly provide search

and rescue authorities accurate on demand information on the positions and characteristics of vessels near a reported distress. The AMVER Reporter component submits four types of reports:

- Sailing plan.
- Deviation report.
- Position report.
- Arrival report.

These reports are used by the U.S. Coast Guard to update their data base allowing the identification of vessels in the vicinity of a ship in distress.