FSIS ™ Ferrybox Sensor Interface Standard

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SEAKEEPER 1000 OPERATION

The SeaKeeper 1000™ Self cleaning, automated, meteorological and oceanographic data acquisition and telemetry system has proven it's worth over the past six years. Of the 46 systems deployed, many report meteorological data over the Global Telecommunication System (GTS) using FM13 and oceanographic parameters via FM62 every 3 hours. SeaKeepers is currently poised to participate in an experiment by starting parallel BUFR formatted transmissions.

All of the deployed systems have empty sensor bays ready to accept new sensors as they become available and applications warrant. The Ferrybox Sensor Interface Standard (FSIS) describes the mechanical, electrical, plumbing and data exchange criteria that need to be met in order to occupy one of these sensor bays.

In addition to collecting data from it's oceanographic sensor suite each system tags all collected data with UTC time, Latitude, Longitude, Speed over ground, Course over ground and Meteorological data. All data are stored at one minute intervals and every 3 hours a 10 minute average of all variables is transmitted via satellite. NOAA has developed a low power controller NDBC Oceanographic Sensor Interface Controller (NOSIC) which operates in conjunction with the NDBC buoy or C-MAN payload.

The transmitted and delayed high frequency data are manually quality controlled and stored on a secure server where they may be accessed via our website www.SeaKeepers.org. The automation of the Q/A - Q/C process is presently under review.

Demonstration systems are deployed on a car ferry transiting between Marseilles, France and North Africa, and on the pier at Scripps Institution of Oceanography, La Jolla, California.

THE SEAKEEPER 1000™ LINEAGE

From founders' yachts

To automated VOS ships

To unmanned buoys and coastal stations

To SAMOS?

SEAKEEPER GOAL

The purpose of the SEAKEEPER 1000 and the FSIS is to facilitate the integration of high quality sensors from specialized manufacturers into observing systems, freeing the manufacturers of the requirement to acquire navigational data and the obligation to log or telemeter data. The interoperability will increase the volume of both sensors and systems sold which will in turn reduce the manufacturers costs and make equipment available locally to IOOS and internationally to GOOS participants at a lower cost than would otherwise be possible. Furthermore the incorporated biocide generator and flow through technology will assist in reducing system maintenance costs by reducing the biological fouling of the systems.

METEOROLOGICAL SENSORS

Anemometer (wind speed and direction).

Barometric Pressure port, Air Temperature and Relative Humidity sensors (mounted within the louvered radiation shield).

INMARSAT-C antenna.

Digital Barometer and Serial interface with internal fluxgate magnetic compass.

AVAILABLE SENSORS

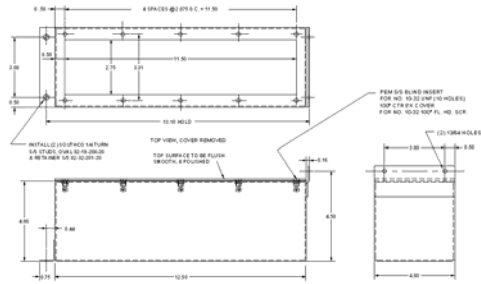
SENSORS UNDER DEVELOPMENT Q1 2006

Falmouth Scientific, Inc.	Thermosalinograph based upon inductive conductivity cell.
Mote Marine Laboratory	"Brev buster" Optical sensor designed to detect levels of *Karenia-Brevis* microscopic algae responsible for Red Tide phenomenon in the Gulf of Mexico.
Pro-Oceanus Systems Inc	pCO2 sensor utilizing gas tension technique.
WET Labs Inc.	Manufacturers of optical hyperspectral flow-through sensors.
Turner designs Inc.	Cyclops 7 fluorometer.

DETAILED SPECIFICATIONS

Mechanical

The mechanical shape and size are shown in the drawing below, the sensor enclosure drawn is typically used to mount electronics and a flow cell will be mounted on the top cover as illustrated in the photograph below.



All drawing dimensions are in inches

The sensor module can be mounted horizontally as illustrated in the drawing above, with the ¼ turn screws to the left or vertically with the ¼ turn screws at the top.
Plumbing connections are Teflon ¼ inch tubing and compression fittings or quick disconnects, plumbing connections come from the left of the package convenient for connection to the distribution manifold. Electrical connections are mounted on the right side of each modules cover plate. Connectors are round series Amphenol C16 bulkhead connectors and mating connectors utilize a right angled cover to maintain a low profile

2. Electrical

Supply Voltage 12Volt
Available current Application dependent
For **shipboard** applications power source will be a 300 Watt computer power supply
For **buoy** applications sensors will be powered down between measurements.
Power and communication connector
Bulkhead connector for power and communication:
Amphenol C-16 7 pole receptacle p.n. T3105-001
Mating connector
Amphenol C-16 7 pole pins p.n. T3105-081

Pin 1	+12 Volts
2	RS232 TX
3	RS232 RX
4	RS232 Common
7	12 Volt return

Photograph illustrates a sensor module plumbed into the distribution manifold in the SeaKeeper 1000

3. Data Communication

Communication will be RS232C, ASCII ideally sampling will be prompted and data will be available at rates up to 1 Hz.
Communication protocol will be 9600 baud, 8 data bits, 1 stop bit, no parity. For larger volume data producers (e.g. spectral instruments) higher standard data rates are supported.

4. Plumbing

Available space is consistent with a 250 ml flow through cell, the water supply can vary between 12 liters per minute and 2.5 liters per minute depending upon the number of sensors mounted in the system. Flow rates will be approximately halved for situations where a SunPumps SDS-T-128 submerged pump is used. For example on piers where a significant lift is required.