

**MEMORANDUM**

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DATE	: March 5, 1998	Bldg 318
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FROM	: Michael Reynolds	(tel) 516-344-7836
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SUBJECT	: <i>GasEx98 Cruise Plans for Brookhaven National Laboratory</i>	

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The Brookhaven National Laboratory (BNL) is developing a meteorological instrument package which will make detailed radiation measurements along with mean meteorological measurements such that the entire air-sea energy and water flux budget can be estimated using bulk formulae. We call the entire system the "Portable Radiation Package" (PRP) because the emphasis on the design is for an unattended, stand-alone package which can be deployed on volunteer ships and ships of opportunity. The GasEx experiment is a splendid opportunity for us to inter-compare our system with the much more complex and proven turbulence flux instrumentation from NOAA-ETL and WHOI.

**PRP Configuration on the Ship**

The PRP is a distributed group of intelligent sensor clusters under the control of local microcontrollers that report to a central base station. The arrangement we envision for GasEx98 is shown in Figure 1. The components for the PRP are as follows:

**A. Short-Wave Package.** (Figure 2A)

- Weight: 20 lbs approx.
- Size: 24 in. dia plate.
- Power: 11-18 VDC @ 500 mA max. (Solar power is optional)
- Location on Ship: The SW package will be mounted to the ship's radome base. The radome will not be mounted during this cruise. We will use hose clamps or U-bolts and attach the vertical mast to available railings. A fiber optic cable will drop through an available stuffing tube into the radio room where it will be connected to available FO connections internal to the ship. Patches can be made so we can pick up the FO connection in the main laboratory. (Note: Mr. Loewen is aware of this plan.)

Current plans call for the short-wave package to be powered by a solar panel. We are now testing that option and making power tests of the complete system with sensor constant-temperature heaters. If the power consumption be greater than what can be provided by our panel, we will run a 12 VDC cable from a power supply in the radio room.)

**B. Wind-Nav Package.** (Figure 2B)

- Weight: 20 lbs approx
- Size: 6 ft tall
- Power: 11-18 VDC @ 200 mA
- Location on the ship: After some discussion it was decided to place this stand-alone package on the radom base near the Short-wave Package. The Wind-Nav Package will operate from solar power, as discussed above, and will transmit data using a 2 W, 410.8 MHz UHF radio modem. Data will be transmitted in packets each minute. Telemetry duty cycle will be approximately 2%. As a back up in case radio interference occurs, EIA422 serial cable can be routed directly to the main lab.

**C. Skin SST Package** (Two boxes, Figure 2C)

- Weight: Sensor box = 100 lbs. Data logger box = 50 lbs.
- Size (lwh): Sensor box = 24 × 24 × 30 inches. Data logger box = 24 × 24 × 16 inches.
- Power: 120 VAC at approx 1 A
- Location on the Ship: The SSST package will mount on the top platform of the bow tower in the forward starboard corner. We believe it can sit directly on the floor of the upper deck and will have a good view of undisturbed water. The data logger module will sit alongside. An EIA422 serial data cable will run from the data logger box down the cable to the O2 deck and join the cables from the M-AERI to run along the outside of the starboard side back into the main laboratory.

#### D. Meteorological Package (Figure 2D)

- Weight: Zeno can = 50 lbs. mast = 30 lbs approx.
- Size: Zeno can = 19 in. diameter by 24 in tall. Mast = 60 in tall approx
- Power: 12 VDC @ 750 mA
- Location on the Ship: The Met Package will also mount on the top of the bow tower at the front edge in the center. The mast will mount to a railing by hose clamps or U-bolts. A fiberoptic data cable will run from the Met Package, along the wire rope to the O2 level and will join the other PRP cables and the M-AERI cables to run along the ship to the main laboratory.

#### D. Base computer in Main Laboratory.

- Weight: PC computer = 40 lbs. Half rack = 75 lbs.
- Size: Standard PC with 17 in. monitor and a one-half size standard rack.
- Power: 120 VAC at approximately 3 A
- Location on the Ship: The PRP base station will occupy a space in the main laboratory, starboard side rear against the wall. It will be adjacent to the M-AERI equipment. The PC will occupy a space on the lab table and the half-rack will sit on the floor adjacent to the table. The PRP cables (and the M-AERI cables) will enter the ship through the cable entry near the back starboard door of the lab.

### SCS Requirements

I will need the best possible one-minute averages of the following:

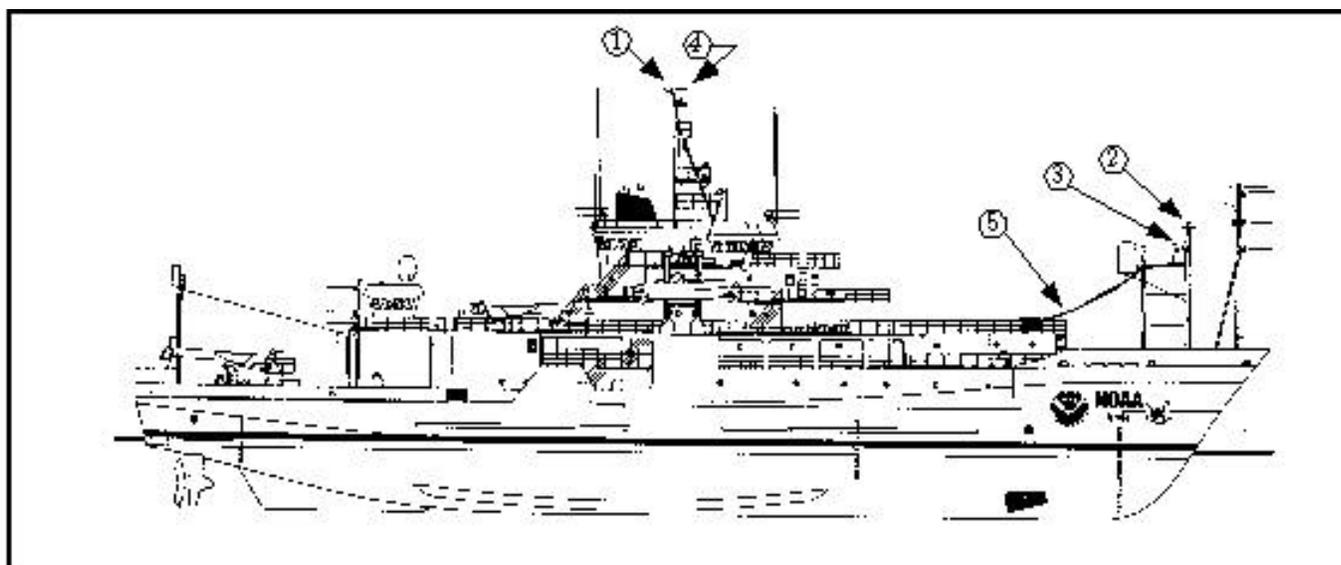
- ship position
- heading (azimuth)
- course
- speed
- water temperature (intake)
- air temperature and RH (bridge and elsewhere if available)
- barometric pressure

### Personnel

Leg One: Dr. R. Michael Reynolds will be on board and will completely involved with the PRP instrumentation.

Leg Two: We will not have a scientist on board during this busy leg. We will train Dr. Minnett's technician in the maintenance of the equipment.

Leg Three: Either Dr. Reynolds or Mr. Scott Smith will accompany the equipment on the return voyage. There will be time available to participate in standing watches during this leg.



GasEx 1

1. Short-wave package (fiber optic cables)
2. Meteorology package (fiber optic cables)
3. Skin SST package (EIA422 serial cable)
4. Wind/Nav package (Radio packet link 410.8 MHz)
5. Cables from the bow tower run down the wire-rope cable to the O2 deck then follow the M AERI cables along the outside and into the Main Lab area.

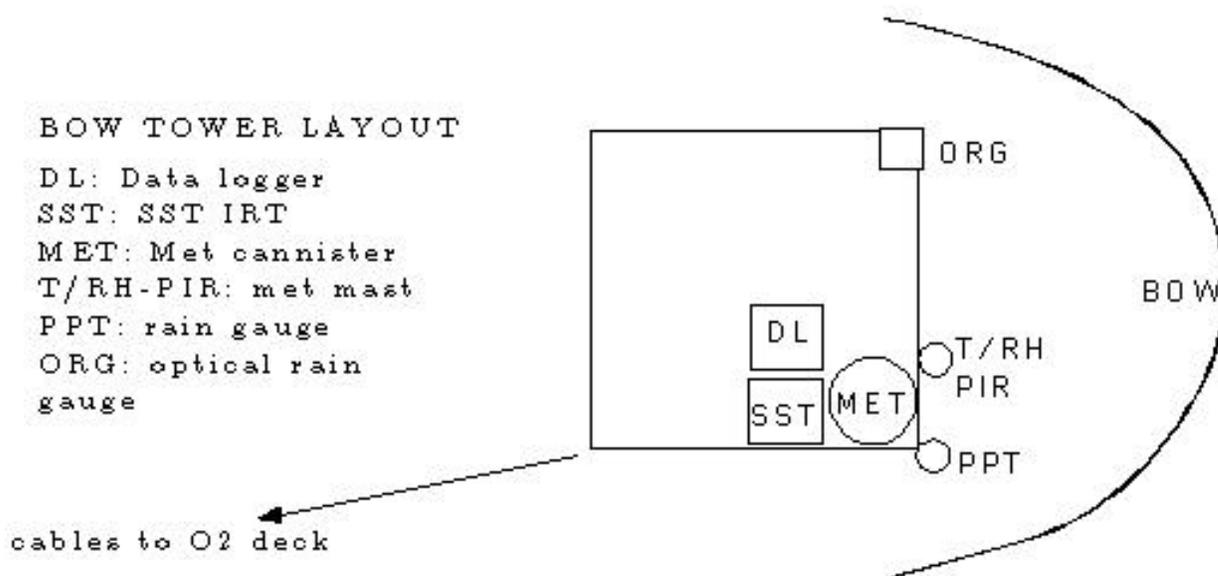
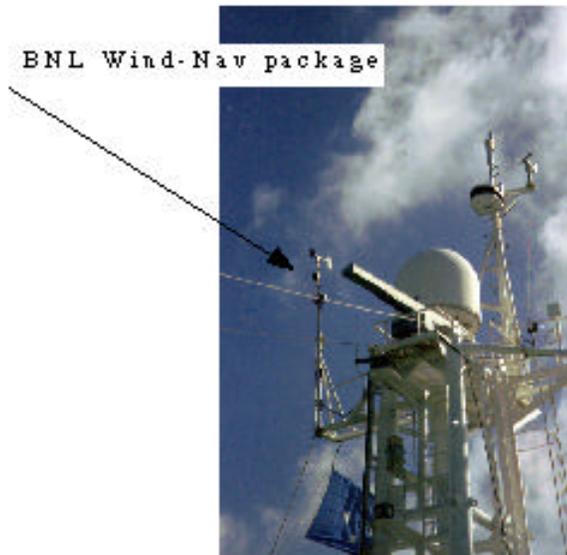


Figure 1. Locations of instruments on the R/V Brown during the GasEx98 Experiment.



A. short-wave package



B. Wind/Nav Package



C. Skin SST package  
(From left: Sensor box,  
data logger, M-AERI)



D. Met Package  
(SW package on top)

Figure 2. The different packages used in the Portable Radiation Package. A: Short-wave package. B: Wind/Nav Package C: Skin SST Package and D: Met Package