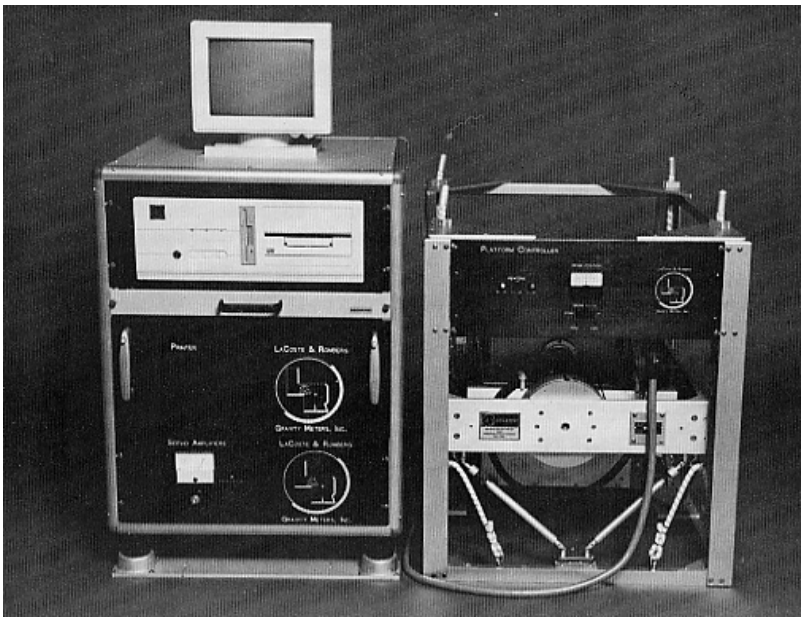
SEASYS

Digital Control System for Air/Sea Gravity Meters

The SEASYS marine system is a fully automated system for controlling the LaCoste and Romberg Shipborne Gravity Meter and its inertial platform. Operating the system may be as simple as turning on the power switch or it may be as complex as the operator desires. The system can operate largely unattended, and will set an alarm if certain catastrophic hardware malfunctions are detected.



The SeaSys II Gravity System

The system is compatible with all shipborne gravity meters produced by LaCoste and Romberg. The system is designed to function with meters that are equipped the capacitance position indicator (CPI) circuit used for detecting the beam position.

The computer has three additional expansion boards. These serve as an analog-to-digital converter, a digital-to-analog converter, and a stepping motor controller. Also available on the expansion boards are a number of parallel I/O ports which are used for various purposes. The electrical signals from the platform and meter are sampled 200 times a second by the A/D converter. These signals are two gyro outputs, two accelerometer outputs, and the gravity meter beam signal.

The following functions are performed by the system:

- Sample and process the gyro signals 200 times a second to derive a voltage to be sent to the servo amplifiers, via the D/A converter, to torque the platform to its level position.
- Sample and process the accelerometer signals 200 times a second to derive a voltage to be sent to the gyros to obtain a platform period and damping of approximately 4 minutes and 0.707 times critical, respectively.
- Sample the beam signal 200 times a second and process the data to derive the speed at which the spring tension motor must turn. Update the motor speed at 10 second intervals.
- Filter the data appropriately for the marine environment.
- Compute nine cross coupling monitors, as well as the cross-coupling correction (when one is required).
- Scale the data according to the gravity meter scale factor or table, whichever is appropriate.
- Transfer data to any or all of the following storage media: hard disk, printer (in either digital or graphical form), and serial port. Provision is made for backing up data from hard disk to floppy disk.
- Provide a means for the operator to communicate with the system without interrupting it. Communication is through menu selection.

SEASYS TECHNICAL SPECIFICATIONS

SENSOR SPECIFICATIONS

RANGE:	12,000 milligal
DRIFT	3.0 milligal per month or less
TEMPERATURE SETPOINT:	46^0 to 53^0C

STABILIZED PLATFORM SPECIFICATIONS

PLATFORM PITCH:	± 25 degrees
PLATFORM ROLL:	± 25 degrees
PLATFORM PERIOD:	4 to 4.5 Minutes
PLATFORM DAMPING:	0.707 of Critical

CONTROL SYSTEM SPECIFICATIONS

RECORDING RATE:	1 Hz (SEASYS Version 2.0)
SERIAL OUTPUT:	RS-232 (RS-422 Optional)
ADDITIONAL I/O:	6 Analog Inputs (±10V full scale) 16 bits parallel input (Magnetometer)

SYSTEM SPECIFICATIONS

ACCURACY AT SEA:	
(Based upon crossing point analysis)	1.0 milligal or better
ACCURACY IN LABORATORY:	
50,000 mgal Horizontal Acceleration	0.25 milligal
100,000 mgal Horizontal Acceleration	0.50 milligal
100,000 mgal Vertical Acceleration	0.25 milligal
OPERATING TEMPERATURE:	0^0C to 40^0C
STORAGE TEMPERATURE:	-30^0C to 50^0C
POWER REQUIREMENTS:	300 watts at 115/230 VAC

DIMENSIONS AND WEIGHTS	**LENGTH**	**WIDTH**	**HEIGHT**	**WEIGHT**
STABILIZED PLATFORM AND SENSOR	27 in 70cm	22 in 55cm	25 in 64cm	175 Lbs 79Kg
STANDARD CONSOLE	21 in 53cm	21 in 53cm	42 in 106cm	145 Lbs 67Kg
MINI-CONSOLE	27 in 67cm	22 in 55cm	12 in 30cm	68 Lbs 31 Kg

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