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U.S. DEPARTMENT OF INTERIOR
Geological Survey Open-File Report 87-147

Single-channel seismic-reflection profiles collected aboard R/V POWELL, cruises P-2-85, P-3-85, P-4-85 in the nearshore waters around Puerto Rico and the Virgin Islands

by N. Terence Edgar[1] and Kathryn M. Scanlon[2]

Approximately 4,600 nmi (8,519 km) of single-channel seismic-reflection data were collected in the nearshore waters around Puerto Rico and the Virgin Islands simultaneously, but on a noninterference basis, with a gravity program funded by the Defense Mapping Agency. The survey was conducted on cruises P-2-85, P-3-85, and P-4-85 of the R/V POWELL between February 28 and April 8, 1985.

Seismic instrumentation included two 40 in^3 (755 cm^3) airguns and a 200-ft (60-m) single-channel hydrophone streamer. In addition, a Uniboom sled and 8-ft (2.4-m) single-channel hydrophone streamer were used in water depths less than 660 ft (200 m).

Navigation control was provided by a Magnavox Integrated Navigation System which integrates data from Global Positioning System (GPS) satellites, transit satellites, bottom-track sonar, Loran-C, Mini-Ranger stations, gyrocompass and speed log. GPS provided the most accurate navigational control, but was functional for only about 12 hours each day. The transit satellite system operated throughout the cruise and provided relatively accurate positions when GPS was not operational. The Mini-Ranger stations proved to be unreliable because of problems at the shore stations and Loran-C operated only on the north side of the islands, at times in only the range-range mode.

Because the gravity program required accurate data and strict navigation control, some lines had to be run more than once or run with a following sea in a westerly direction only. Consequently, there is tight line spacing in some areas. The Uniboom high-resolution reflection data are good to poor in the shelf areas around Puerto Rico but are generally poor over the predominantly carbonate sediments around the Virgin Islands. The airgun data are fair to good, particularly considering the ship cruised at about 7 kn (13.0 km/hr) and at times reached 8 kn (14.8 km/hr) which is about the upper limit at which the system will function.

Original seismic profile records can be seen at the U.S. Geological Survey offices, Woods Hole, MA 02543. Microfilm copies of the seismic profile records and trackchart can be purchased only from the National Geophysical Data Center, Code E64, 325 Broadway, Boulder, CO 80303 (303/497-6345).

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1. USGS, Reston, VA 22092

2. Woods Hole, MA 02543

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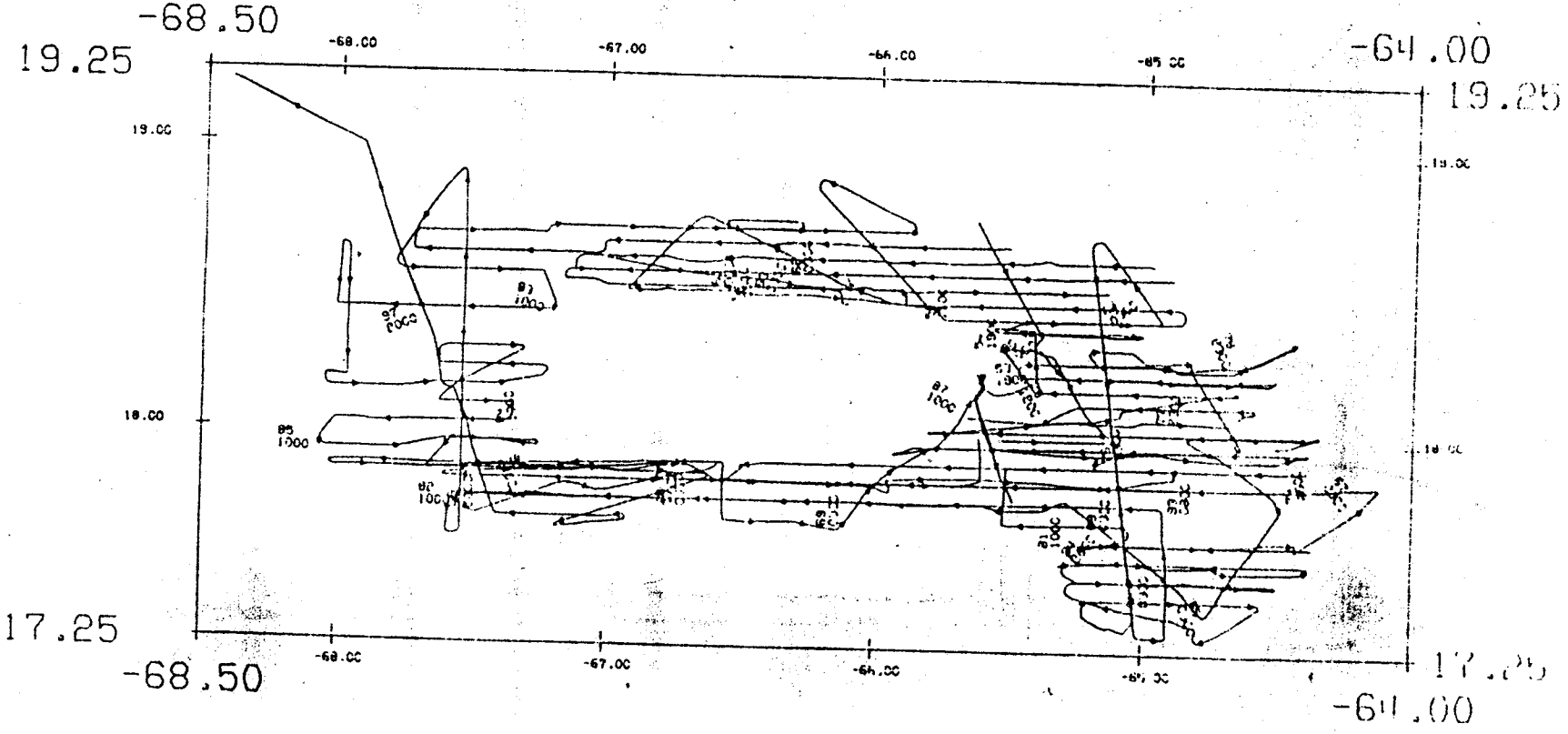

Figure 1. Ship's track

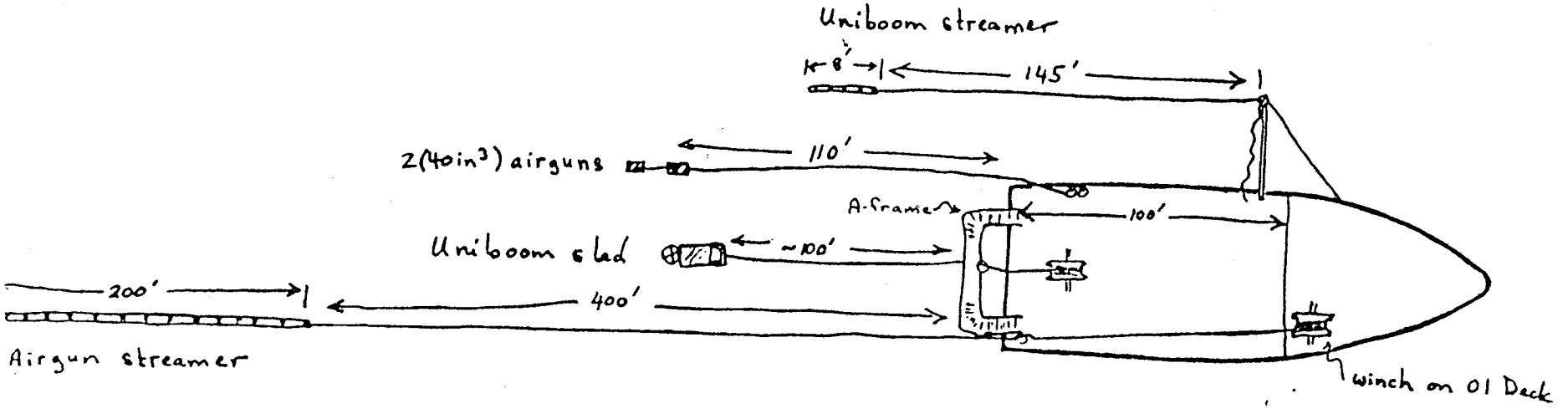

Figure 2. Configuration of towed equipment.