of response and deviation that might be expected from measurements made along a partition or when comparing results from similar partitions under different field conditions. Likewise, while there is discussion in the literature on STC, with some attempt to relate values to human perception and provide ratings for common partitions there is a generally limited discussion involving data collected under real conditions. The partitions in three different office rooms were tested and the results described. In particular, the effect of speaker type and location, source type, room geometry, microphone placement, the spatial variation and repeatability of measurements on a particular partition, and a comparison of results from similar partitions under different field conditions were analyzed and discussed in detail.

MONDAY AFTERNOON, 10 NOVEMBER 2003 PECOS ROOM, 1:30 TO 3:15 P.M.

Session 1pAO

Acoustical Oceanography: Developments in Multibeam Sonar for Water-Column Measurements II

Kenneth G. Foote, Chair

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Contributed Papers

1:30

1pAO1. Acoustic near field effects for the Simrad–Mesotech SM 2000 multibeam sonar. Norman A. Cochrane (Ocean Sci. Div., Dept. of Fisheries and Oceans, Bedford Inst. of Oceanogr., P.O. Box 1006, Dartmouth, NS B2Y 4A2, Canada) and Gary D. Melvin (St. Andrews Biological Station, St. Andrews, NB E5B 2L9, Canada)

Targets quantitatively observed with a multibeam sonar based on a truncated circular arc transducer geometry, focused at infinity, display anomalous apparent target strengths at short measurement ranges. Three near field mechanisms, affecting both the sonar transmit and receive responses, are identified: (1) Anomalous inter-elemental differential phase shifts, (2) inter-elemental differential spreading losses, (3) shifts in elemental viewing aspect. With reference to a commercial 200 kHz Simrad–Mesotech SM 2000 multibeam sonar, the relative importances of the three mechanisms are numerically examined at a 1-m target range. Combined effects in both transmit and in receive are further evaluated for target ranges between 0.5 and 20 m. For the instrument considered, near field effects are significant at ranges of 5 m and less and are characterized by systematically reduced target amplitudes after the application of ''normal'' sonar time variable gain. Systematic broadening of combined transmit–receive response patterns at short target ranges result in target defocusing in sonar imaging applications. Experimentally measured responses are presented for comparison with theory. [Work supported by the DFO National Hydroacoustic Program and generous access to the Defence Research & Development Canada—Atlantic acoustic calibration facilities.]

1:45

1pAO2. Development of a sea-well facility for calibrating multibeam sonar. Kenneth G. Foote, Terence R. Hammar, Stephen P. Liberatore, and Kenneth W. Doherty (Woods Hole Oceanogr. Inst., Woods Hole, MA 02543)

In order to calibrate multibeam sonars for use in quantifying water-column backscattering, a sea-well facility has been developed on Iselin Dock at the Woods Hole Oceanographic Institution. The suite of equipment and calibration instruments is described. This includes systems for mounting and rotating transducer arrays, a number of precision targets, systems for target suspension and positioning, and an external sonar-triggering unit. [Work supported by NSF Grant No. OCE-0002664.]

2:00

1pAO3. Development of a fresh-water tank facility for calibrating multibeam sonar. Kenneth C. Baldwin, Larry Mayer, Andrew McLeod (C-COM, Chase Ocean Eng. Lab, Univ. of New Hampshire, Durham, NH 03824), Kenneth G. Foote, Dezhang Chu (Woods Hole Oceanogr. Inst., Woods Hole, MA), Jonathan Beaudoin (Univ. of NB, Fredericton, NB E3B 5A3, Canada), and Tom Weber (Penn State Univ., University Park, PA 16802)

Multibeam sonars are being used increasingly to image fish. To realize their quantitative potential for measuring the numerical density of fish and other aquatic organisms, it is essential that they be calibrated. This can be done by the use of standard targets or reference hydrophones. The calibration of narrow beam acoustic arrays requires precision angular positioning of the transducer under test. This precision is defined as 0.1 deg of angular position control. This degree of control is achievable with the use of a precision rotary table typically used in CNC machining. This presentation describes: system specifications and the LABVIEW program used to control and coordinate position and acoustic data acquisition, the initial evaluation of the rotary table for repeatability and possible backlash, and representative acoustic measurements made with multibeam sonars using the new system. [Work supported by NSF Contract No. OCE 0002842.]

2:15

1pAO4. Protocols for calibrating multibeam sonar. Kenneth G. Foote, Dezhang Chu (Woods Hole Oceanogr. Inst., Woods Hole, MA 02543), Kenneth C. Baldwin, Larry A. Mayer, Andrew McLeod (Univ. of New Hampshire, Durham, NH 03824), Lawrence C. Hufnagle, Jr. (Northwest Fisheries Sci. Ctr., Seattle, WA 98112), J. Michael Jech, and William Michaels (Northeast Fisheries Sci. Ctr., Woods Hole, MA 02543)

The use of multibeam sonar for quantifying scatterers in the water column requires calibration. Principal elements of this include measurement of the directional characteristics of the transducer array or arrays, the determination of dynamic range, the definition of the system sensitivity, and the verification of linearity and time-varied-gain functions. Protocols developed or proposed in the course of a three-year project are reviewed. [Work supported by NSF Grant No. OCE-0002664.]