Bistatic VLF Bottom and Target Scattering Measurements

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A series of controlled measurements are planned to investigate bistatic target acoustics and bistatic bottom scattering in the Very Low Frequency (VLF, 1-10kHz) range. The measurements will be performed in the Coastal Systems Station Facility 383, which is a 13.7-m deep, 110-m long by 80-m wide test pool that has 1.5 m of sand on the bottom. The measurements are now practical because of a recently developed parametric sonar, designated as F84Y, that was specifically designed as a research tool in the 1 kHz to 20 kHz frequency band. The F84Y will be attached to a sonar tower complete with horizontal pan and vertical tilt motors. The sonar tower rides along a 5.5-m rail on the bottom. Targets will include several cylindrical (mine-like) and spherical shapes. Ripples will be formed on the water-sediment interface using a sand scraper to rake ripples into the sand. The scraper consists of a frame and a rake that glides along the frame. An insert placed on the rake determines the ripple profile. Several free-field hydrophones will be used to collect bistatic data at discrete scattering angles (both azimuth and elevation). The bistatic bottom scattering data will be collected from flat and rippled bottoms, and the bistatic target scattering data will be obtained for targets placed on a flat bottom as well as on a rippled bottom.