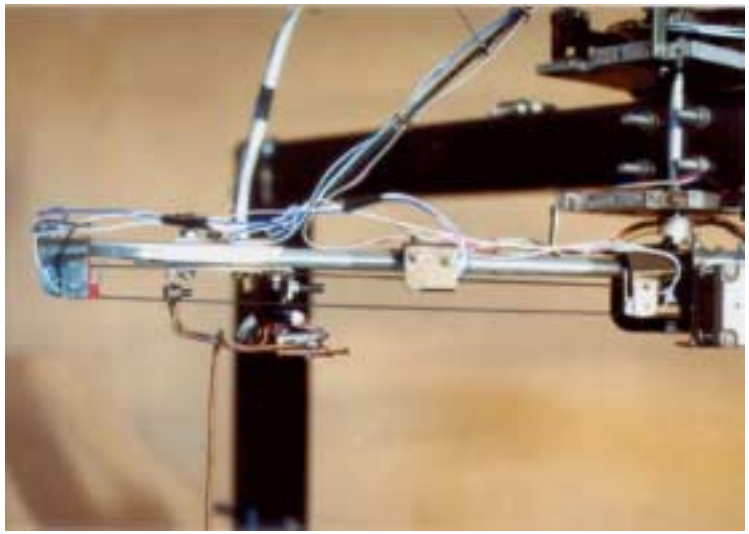
Experimental Setup



In order to check and optimize the above mentioned method for 3-D problems and use it in practice the experimental setup was built that performs illumination of some objects by ultrasonic wave and records the values of the amplitudes and phases of the total (incident plus scattering) field in some nearby area. Piezoelectric source and a dielectric focusing system are used to form the incident ultrasonic wave. The frequency of the incident field is in the range from 30 kHz to 60 kHz. The positioning system enables to move the ultrasonic sensor around the illuminated object in spherical coordinates and is controlled by the computer program. The range of angles in azimuthal direction is within and in meridional direction within . The sensor can be moved in radial direction within the distances from 0 mm to 500 mm from the object (coordinate origins). The sensor is an ultrasonic microphone that is connected to the scalable amplifier.

The investigated object is located in the water tank. The measured signal (amplitude and phase) is converted into digital form and is redirected to PC. The specially developed software processes the automatically recorded data. The processing algorithm is based on the above mentioned wave field visualization method and reconstructs the image of the object.