11:00

1115

SIGNAL ENHANCEMENT FOR AUTOMATIC IDENTIFICATION OF ARTERIAL WALL ECHOES FROM AN INTRAVESSEL SCANNER

**R. W. Martin; G. H. Pollack;
J. B. Phillips; D. W. Watkins
Department of Anesthesiology and
Division of Bioengineering, RN-10
University of Washington,
Seattle, WA 98195**

An ultrasonic instrument is being developed to allow the continuous measurement of stroke volume from a catheter positioned in the pulmonary artery. Flow is determined from measurement of vessel cross sectional area and blood velocity. This paper discusses techniques under development for automatic processing of echo information for determining vessel area. Reliable identification of the wall echo is complicated by considerable variation in the amplitude of echoes received and frequent appearance of multiple echoes. Four strategies have been investigated: (1) ensemble in integration; (2) adaptive setting of the number of ensemble integrations performed for each transducer scanned; (3) echo video integration; and (4) adaptive threshold crossing detection. Each of these methods has proven useful in overcoming particular problems associated with reliable wall echo identification. Each method, along with results of *in vitro* and *in vivo* tests, will be discussed.

11:15

1117

A TECHNIQUE FOR IMAGING THREE-DIMENSIONAL STRUCTURES AND COMPUTING THEIR VOLUMES USING NON-PARALLEL ULTRASONIC SECTOR SCANS.

**J. F. Brinkley, W. E. Moritz*,
and D. W. Baker
Ctr. for Bioengineering/Dept. of
Electrical Engineer.*
University of Washington, Seattle, WA 98195**

A computer-based system has been developed for the reconstruction of an object from a series of non-parallel sector scans from which volume can be obtained. Sector scans from different portions of the object are collected and outlined using a real-time sector scanner and light pen, while the three-dimensional orientation of each scan plane is determined by a spark gap position locating system. Using this information, the computer then creates an image which can be viewed in perspective or used to find volume. Thirty reconstructions were obtained on 7 water-filled balloons whose volumes ranged between 50 and 317 cc; the range of errors was -9.3 to +7.8%, correlation coefficient was .99 and standard error of the estimate was 9.7