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United States Patent [19][11] **Patent Number:** **5,951,479****Holm et al.**[45] **Date of Patent:** **Sep. 14, 1999**[54] **METHOD AND APPARATUS FOR SYNTHETIC TRANSMIT APERTURE IMAGING**[75] Inventors: **Sverre Holm**, Asker; **Hongxia Yao**, Oslo, both of Norway[73] Assignee: **General Electric Company**, Schenectady, N.Y.[21] Appl. No.: **09/162,848**[22] Filed: **Sep. 29, 1998**[51] **Int. Cl.**⁶ **A61B 8/00**[52] **U.S. Cl.** **600/447; 600/443**[58] **Field of Search** 600/441, 443, 600/447, 449, 444; 128/916[56] **References Cited****U.S. PATENT DOCUMENTS**

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[57] **ABSTRACT**

An ultrasound imaging system uses a synthetic transmit aperture method with prefocused subapertures. The transmit aperture is divided into several subapertures. Transmission is done sequentially on each subaperture while receiving on the full aperture. The received data sets are then combined using the appropriate delays. In this way the focusing performance of a composite focusing system using a number of focal zones equal to the square of the number of subapertures is achieved. The gain is an increase in the frame rate which is also equal to the number of subapertures used.

21 Claims, 2 Drawing Sheets