

Confocal Microwave Imaging for Breast Cancer Detection: Localization of Tumors in Three Dimensions

Nicole Baugh

University of Rhode Island

Department of Electrical, Biomedical and Computer Engineering

Kingston, Rhode Island

February 24th, 2003

Breast cancer is the most common form of cancer among women in the US. In the North America alone in 2000 there were 202,044 cases of breast cancer and 51,184 deaths. The number of deaths because of breast cancer in women over 50 has increased since 1995.

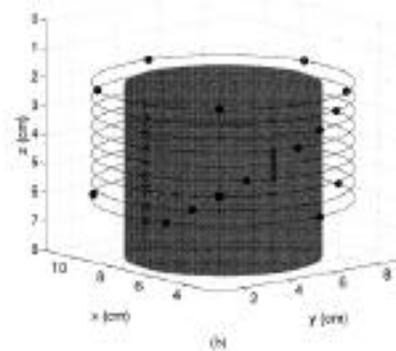
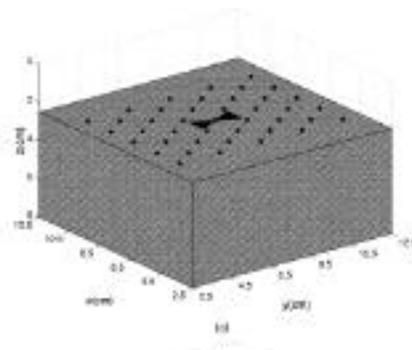
Early detection and effective treatment is the only way of decreasing the mortality rate because of breast cancer. Traditional ways of detecting breast cancer has been through Mammograms.

This process involves pressing the breast in order to apply a smaller dose of ionizing radiation. The result is an x-ray of the breast tissue. Many women find this process uncomfortable, this being one of the main reasons women opt not to have a mammogram done.

The 2-D x-ray also has a high incidence of false positive results and false negative. Researchers have then tried to find new more effective ways of detecting breast cancer.

The basis for using microwave imaging in breast cancer detection is the contrast in dielectric properties

between normal and malignant breast tissue.



Antenna array arrangement for a) planar b) cylindrical systems.

Confocal microwave imaging involves illuminating the breast with an ultra-wideband pulse from several antenna locations, and then systematically focusing reflections from the breast. The result is a 3-D numerical model of the breast tissue.