SPARSE ARRAY TECHNOLOGY FOR 3D SONAR IMAGING SYSTEMS

- Broadband Ultra-sparse Acoustic Arrays
- Final planar array 225 elements over $256 \lambda \times 256 \lambda$ area
- Bandwidth: 30% of center frequency, $F_0$

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# Sparse Array Technology for 3D Sonar Imaging Systems

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Naval Undersea Warfare Center

**Supplementary Notes:**
DARPA, Air-Coupled Acoustic Microsensors Workshop held on August 24 and 25, 1999 in Crystal City, VA,. The original document contains color images.

**Supplementary Notes continued:**

**Abstract:**

**Subject Terms:**

**Security Classification of:**
- Report: unclassified
- Abstract: unclassified
- This Page: unclassified

**Limitation of Abstract:**
UU

**Number of Pages:**
6
BROADBAND BEAMPATTERN

\[
B(\Theta_x, \Theta_y) = \left( \sum_{i=0}^{M-1} w_i \cos(2\pi f_o \tau_i) \frac{\sin(\pi \tau_i W)}{\pi \tau_i W} \right)^2
\]

\[
\tau_i = \frac{u x_i}{c}
\]

Source direction

Array plane

\[M = 5\]
PROTOTYPE 1D ARRAY
THEORETICAL BEAMPATTERN

Final Beampattern on an expanded scale with revised weights R2
Weights plotted against sensor positions with revised weights R2
PROTOTYPE SPARSE LINEAR ARRAY
ACOUSTIC TEST FACILITY