

ACOUSTICS2008/2505 Airborne Phased Array for Airborne Applications based on Cellular Polymer

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Object recognition, advanced distance measurements and other inspection scenarios have an increasing demand in versatile airborne ultrasonic phased arrays for acoustic scanning without moving parts. Based on cellular polymer film with high piezoelectric effect we have realized an array structure with a pitch of 0.5 mm and element length of 10 mm. The working frequency of the material was measured to 250 kHz.

From pointspread simulation with the small ratio of pitch/wavelength of 0.35 we could expect good beam steering and focusing characteristics. A first test array was realized and characterized. There was good agreement between measurement results and simulations. Additionally a low frequency electronic beamformer system was developed for generating the first B-image of an airborne phased array.

Measurements showed that cellular polymer is a well suitable material for airborne applications. It can easily be structured to the desired shape. It allows especially the realization of Phased Arrays for applications like surface or profile measurement, access control, attendance check, robot guidance etc..

New airborne array types like linear, phased, curved or circular arrays are now possible. Also single element transducers with varying apertures (rectangular, oval), shaped apertures (focusing (line- or point-focusing), defocusing) or combinations of both are possible.