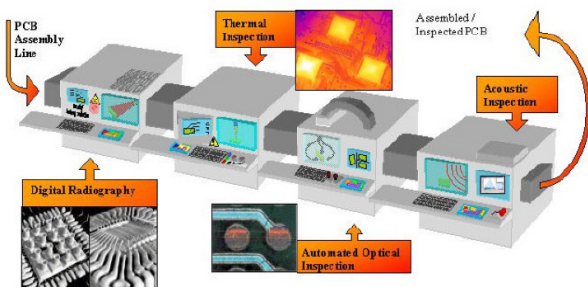


# Development of Comprehensive in-line Quality Control System for Printed Circuit Board Assemblies / MICROSCAN

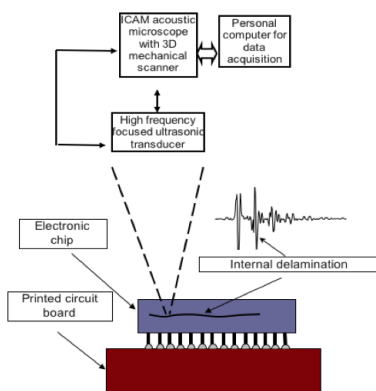
## the objective of the project

Development of the total quality control of printed circuit board (PCB) assemblies based on various non-destructive techniques: X-ray, infrared and acoustic techniques.



## ultrasound institute

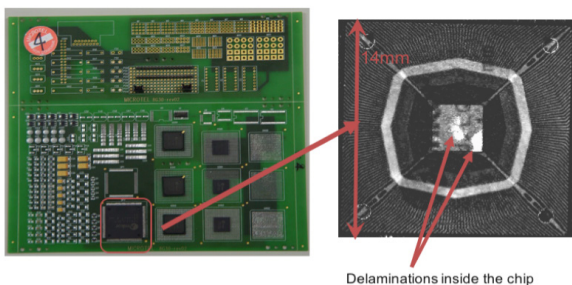
Has developed an improved ultrasonic imaging technique for examination of defects in PCB assemblies and electronic chips.



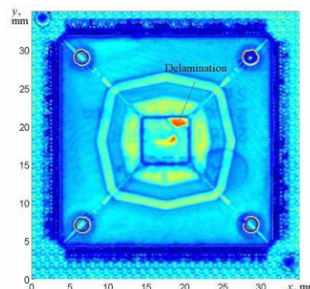
Acoustic microscopes operate in "pulse echo" mode.

Short pulses are transmitted into the test object and returning echoes are monitored;

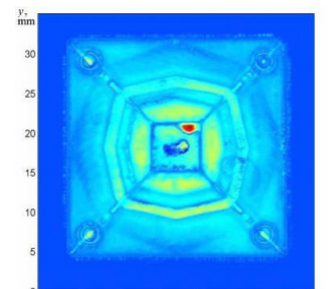
By scanning the transducer an acoustic image of the internal structure is formed.



Delaminations inside the chip



a)

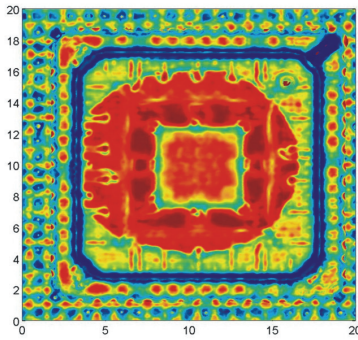


b)

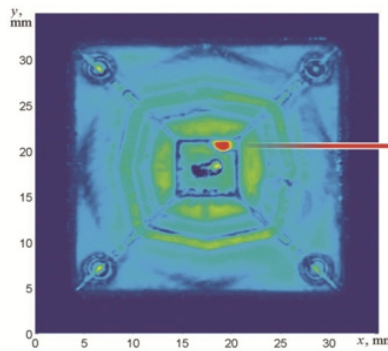
Acoustic image of the PCB chip with defects (25 MHz)

Signal processing of the acoustic image of the defective chip of the PCB using filtering in time-frequency domain:

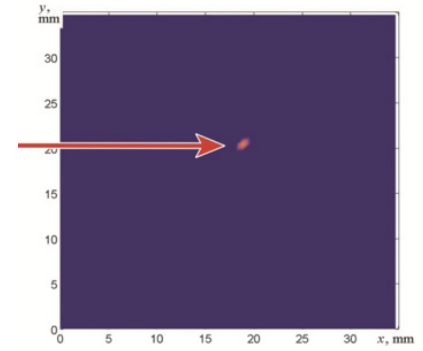
a – before, b – after.



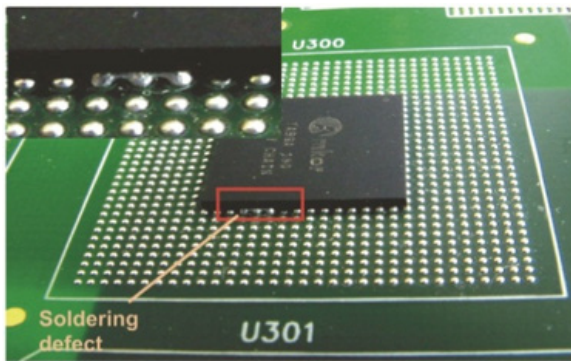
Detected large delamination in an electronic chip. Scanning step 0.035mm,  $f = 50$  MHz



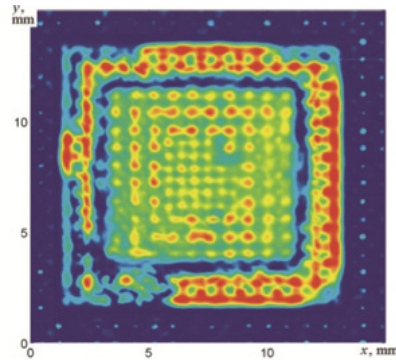
The ultrasonic image of the small delamination in the chip obtained using the 0.035mm scanning step ( $f = 50$  MHz) and created using the developed signal processing



The binary ultrasonic image of the small delamination in the chip using 1mm scanning step. The image was created using the developed signal processing algorithm



The photo of the soldering defect under a chip



The ultrasonic image of the chip with a soldering defect obtained using conventional amplitude imaging

## project partners

X-Tek Systems Ltd (UK), Lot Oriel GmbH & CoKG (Germany), Machine Vision Products Inc. (UK), Gentech Electronics Ltd (Ireland), Beta Electronics Ltd (Ireland), Ultrasonics Sciences Ltd (UK), Inboard Leiterplattentechnologie GmbH (Germany), Goodrich Control Systems Ltd (UK), Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung E.V. (Germany), TWI (UK), Kaunas University of Technology (Lithuania).

## related publications

1. O. Tumšys, L. Mažeika, R. Kažys, R. Raišutis. Application of the signal processing in the case of ultrasonic inspection of PCB components. *Ultragarsas*. 2007. Vol. 62. No. 3. P. 16-19.
2. R. Raišutis, O. Tumšys, R. Kažys and L. Mažeika. Application of ultrasonic iterative deconvolution technique to the case of internal defect detection in multi-layered PCB components. *Insight*. 2010. Vol. 52. No. 1. p. 27-33.