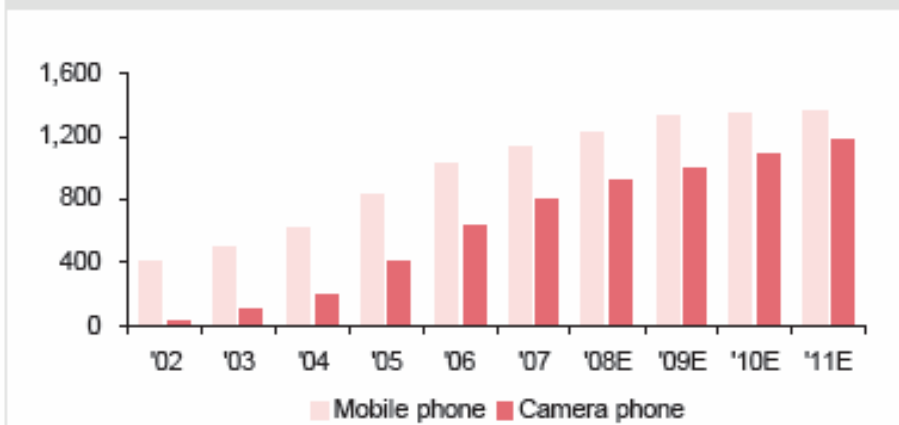


Demonstrator 8: Anteryon Minicamera

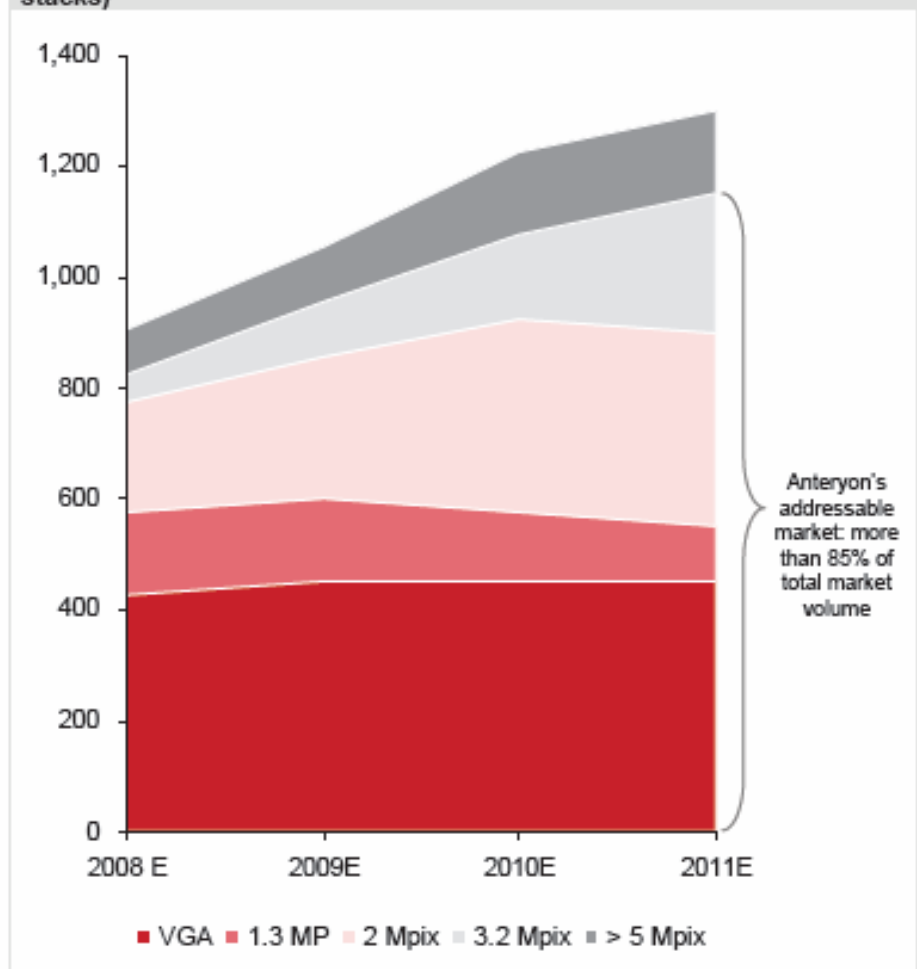


Mobile Phones market leading

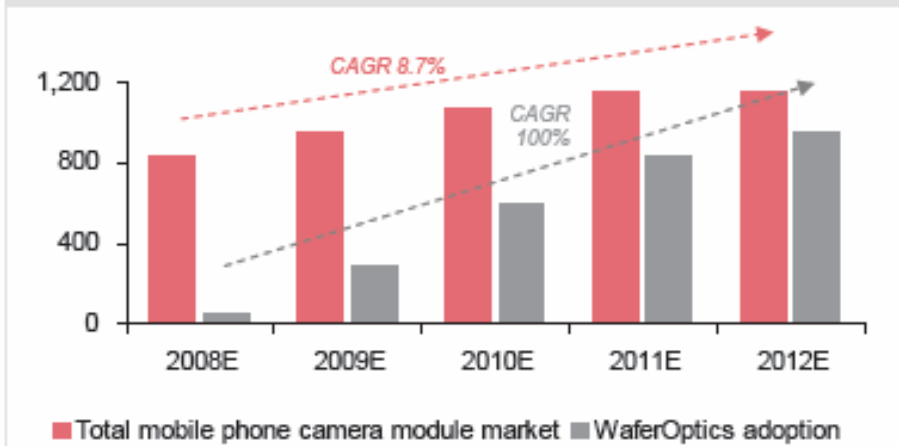
Projected mobile phone market (million units)



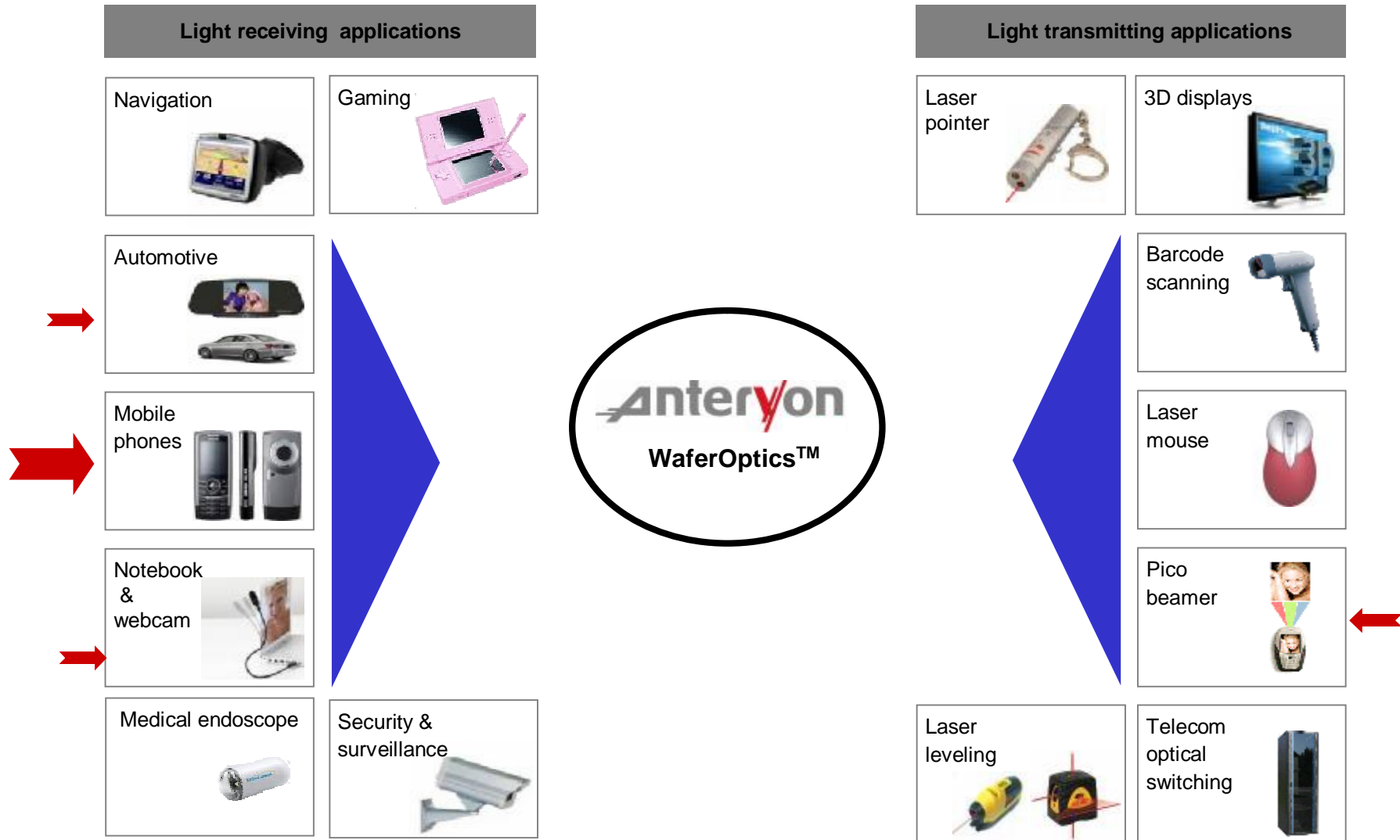
Projected mobile phone camera module market size (million lens stacks)



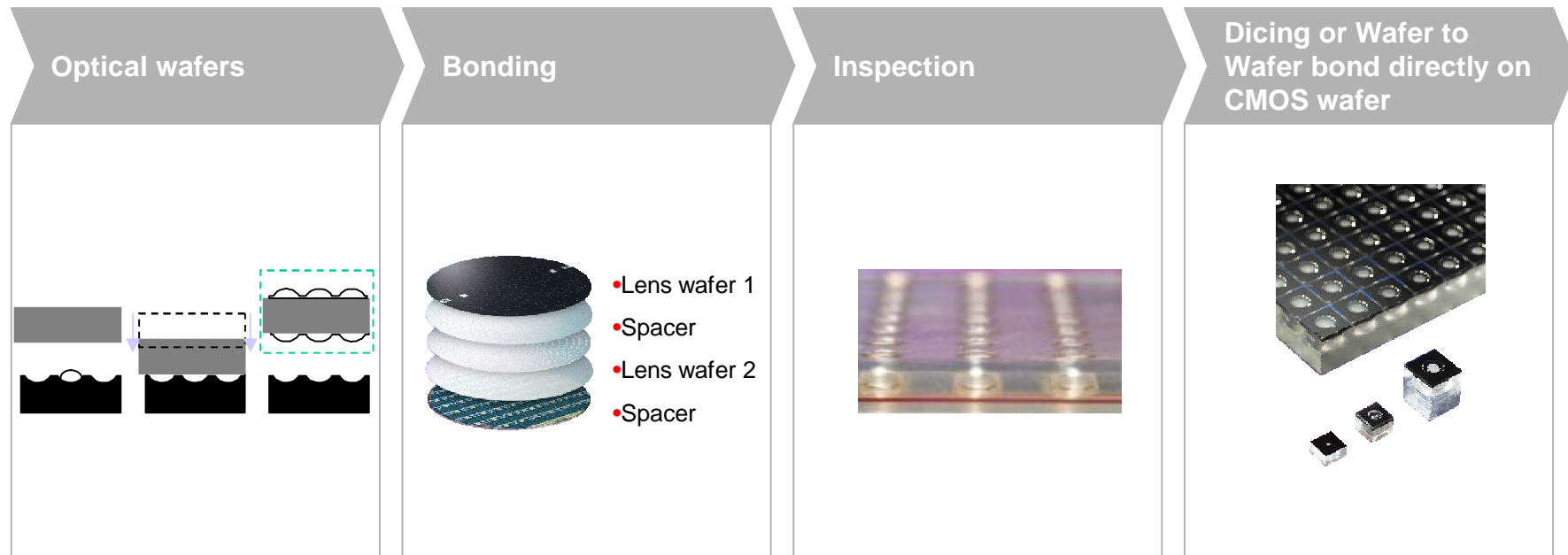
Projected adoption WaferOptics technology in mobile phone camera module market¹⁾ (million units)



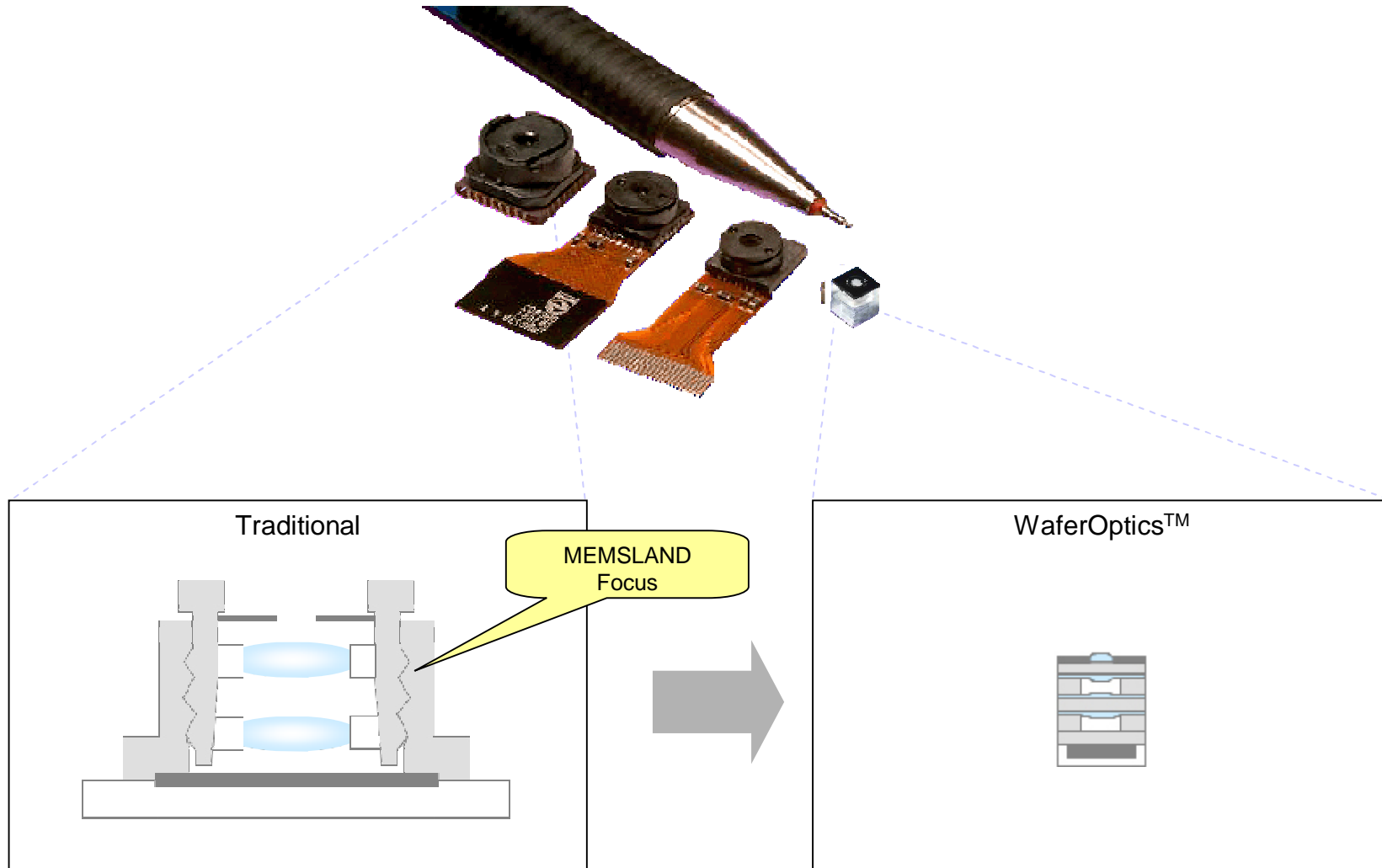
High volume markets new and existing applications



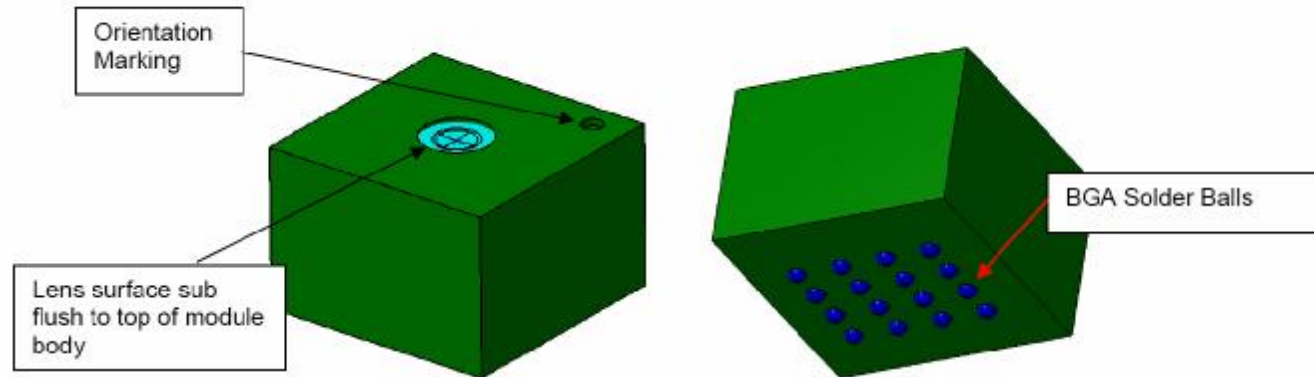
The concept of WaferOptics® production, the answer to the trends mentioned before



WaferOptics[®] camera module



First SMIA standard for Wafer Level Camera Packaging



5.3 Size Options

The key dimensions of SMIA++ module outlines are shown in the table below.

Name	Length	Width	Height Option 1	Height Option 2
SMIA35++	3.5 mm	3.5 mm	2.5 mm	NA
SMIA45++	4.5 mm	4.5 mm	3.6 mm	NA
SMIA55++	5.5 mm	5.5 mm	4.6 mm	NA

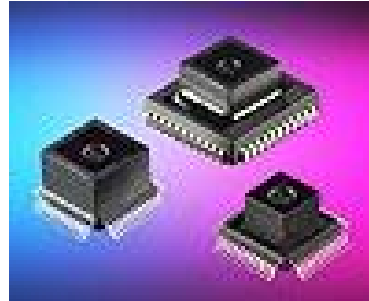
SMIA++ WLM Reflow Mechanical Specification

Version 1.00 (22-Dec-08)

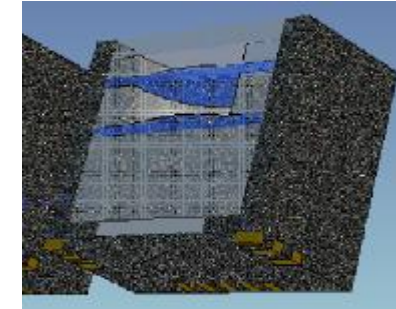
Packaging is the next Challenge: ILS Encapsulation



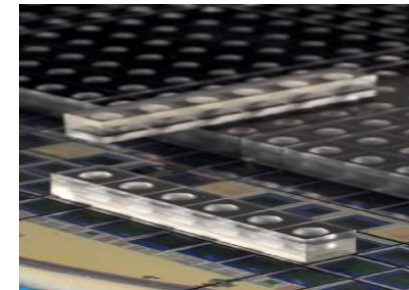
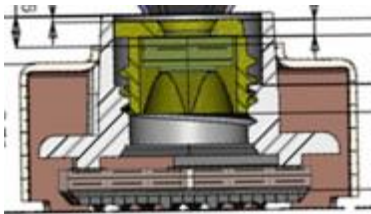
**Classical Camera Lens
and Module assembly**



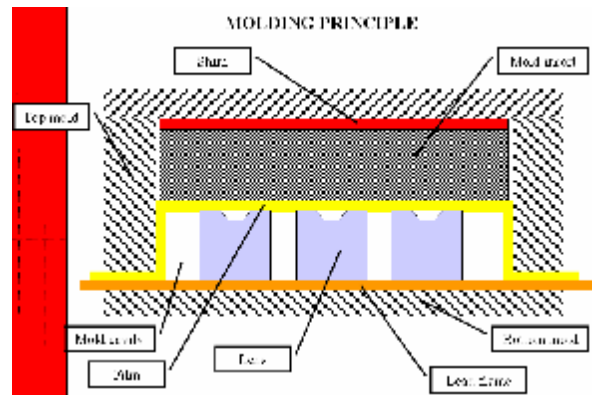
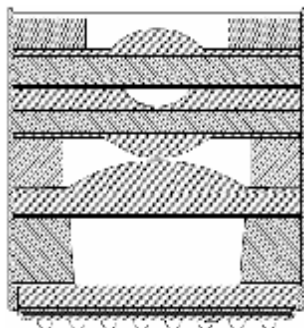
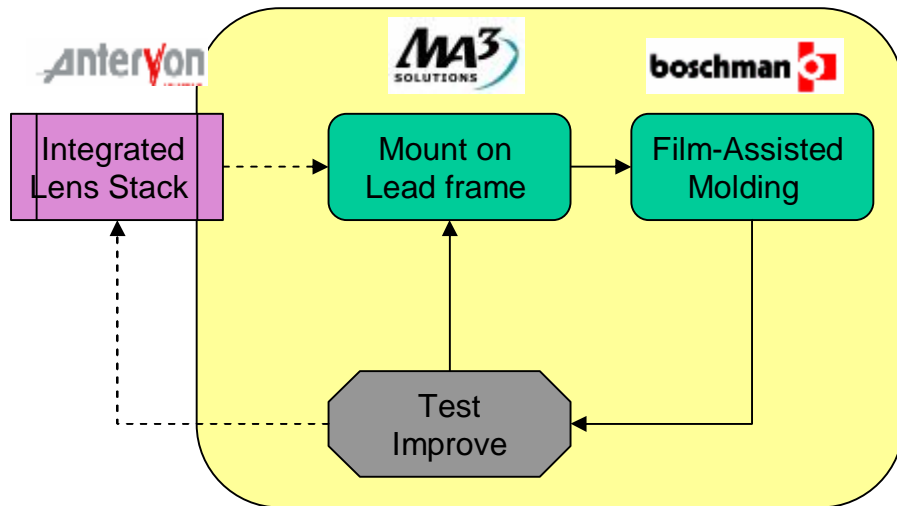
**Overmolded Integrated
lens stack on lead frame**



**Wafer based
overmolding**



Process flow



Developed technologies

Micron level Position Accuracy
Precision Assembly
Preserve specs/after encapsulation!

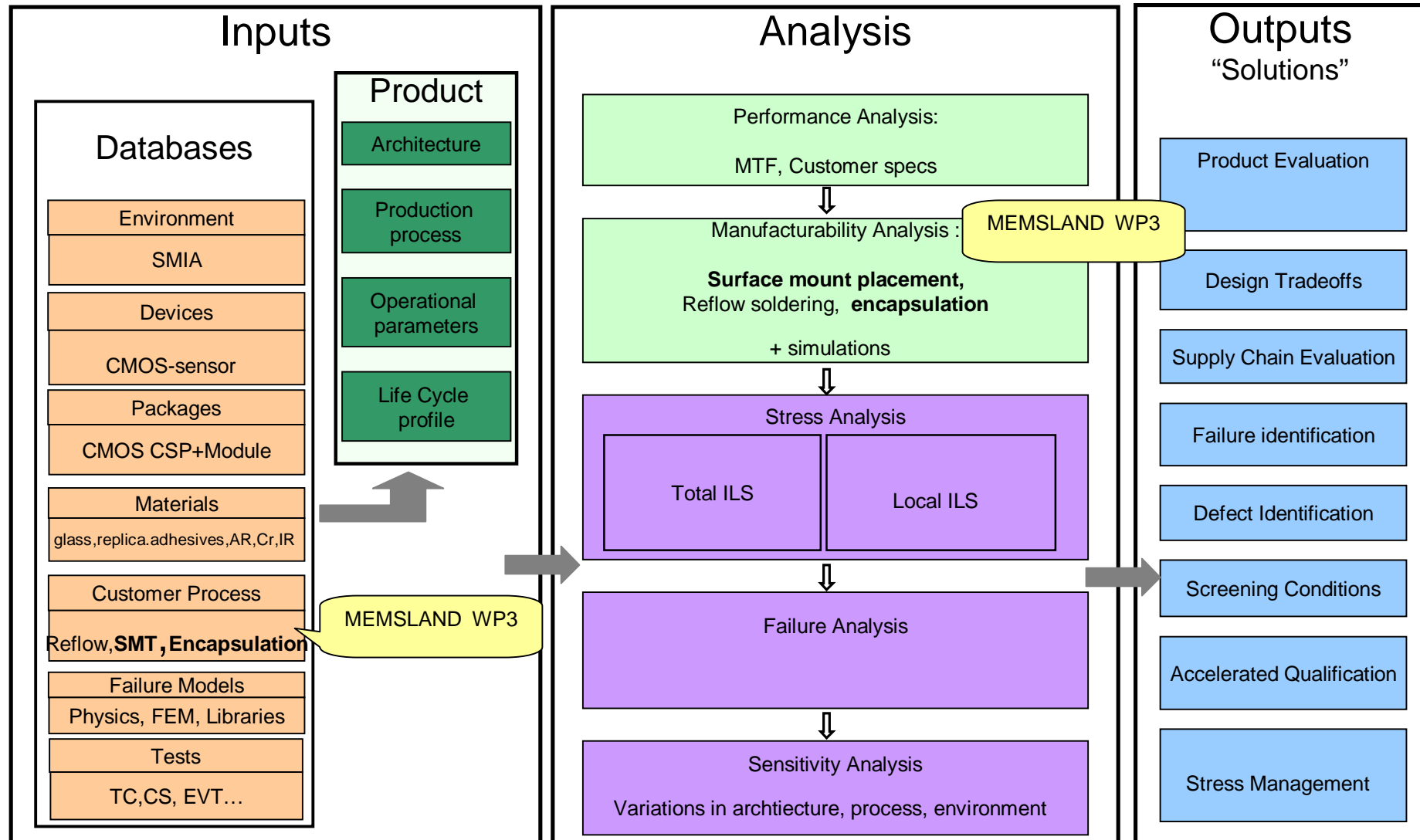
Film Assisted Molding technology
Molding Compound materials
Clamping mechanisms/tools

Optical integrity test through:
Focus length (EFL, BFL)
MTF function
Visual Quality top lens surface and within ILS

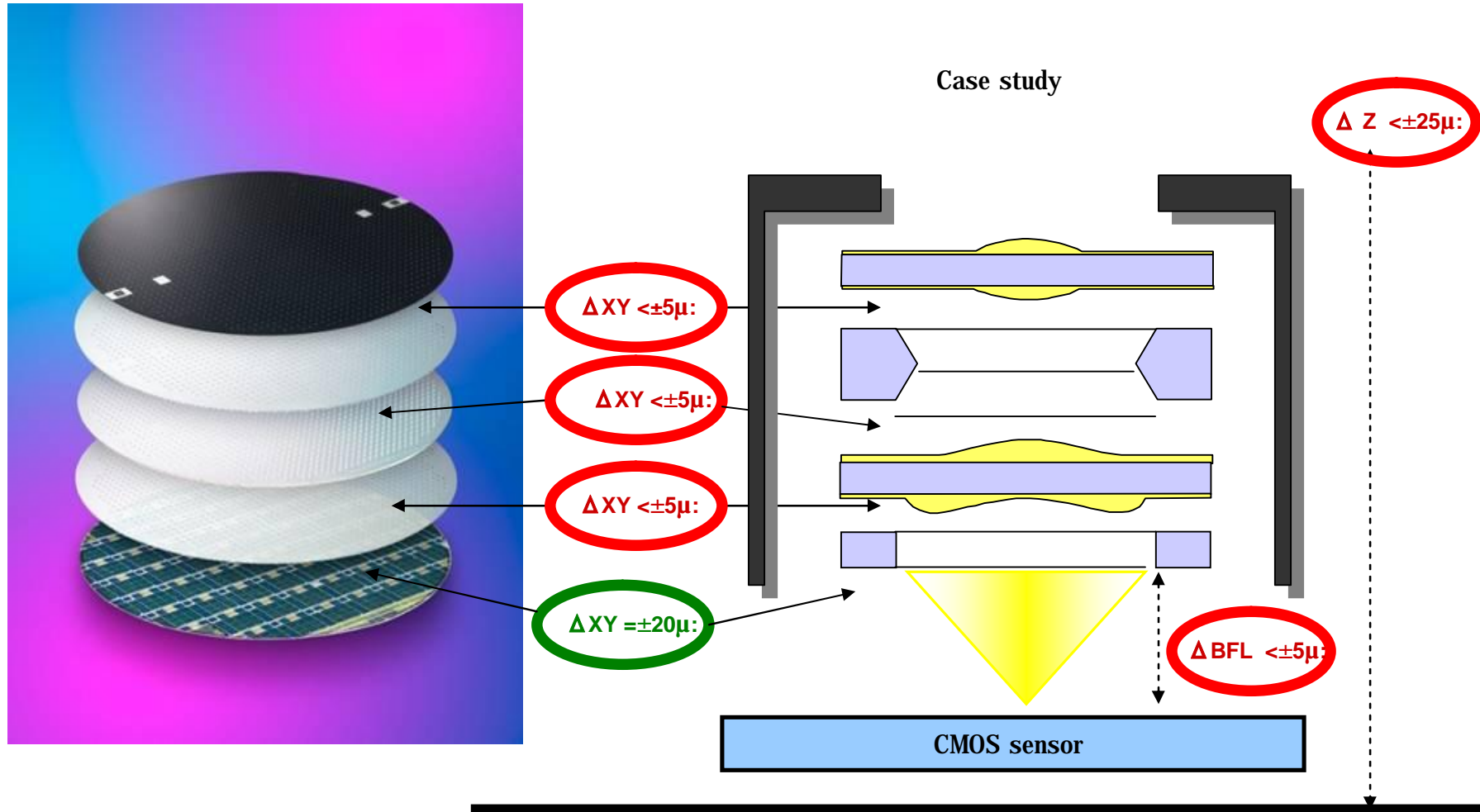
Packaging integrity:
Delamination/cracks

Adhesive materials

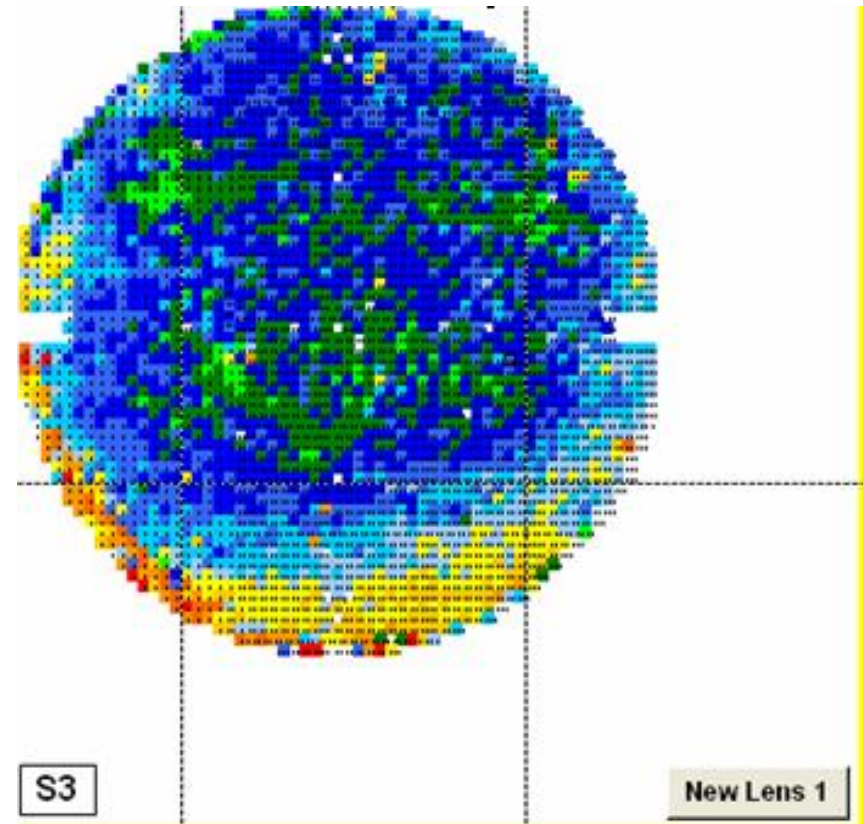
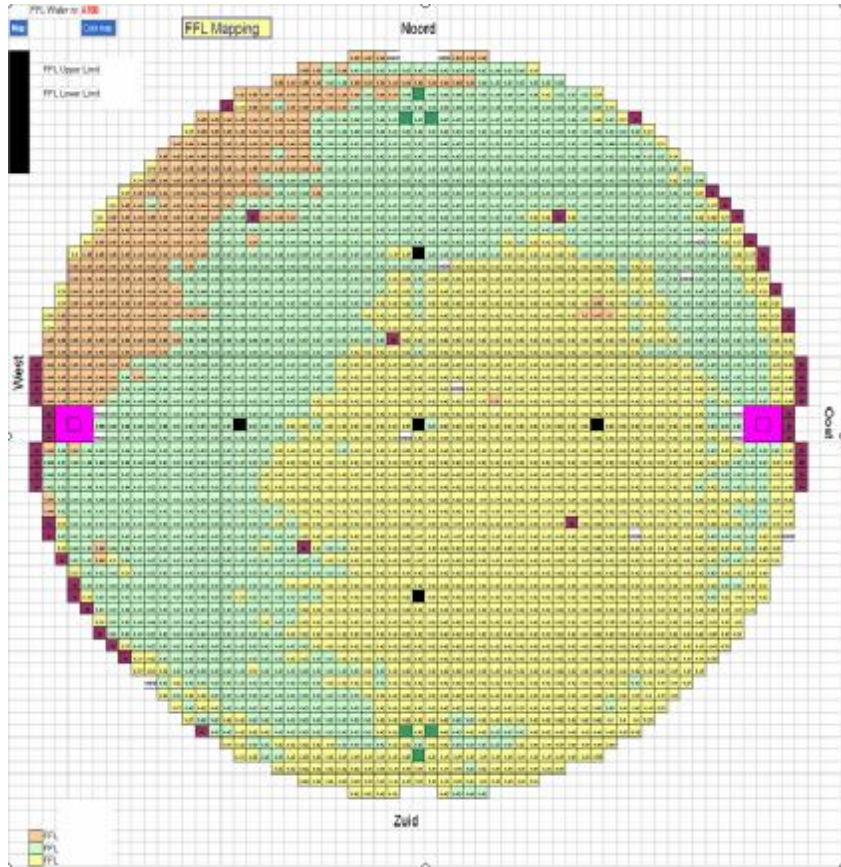
Thermomechanical Development Process:



Wafer Optics ®= Tight tolerance control in *all* layers

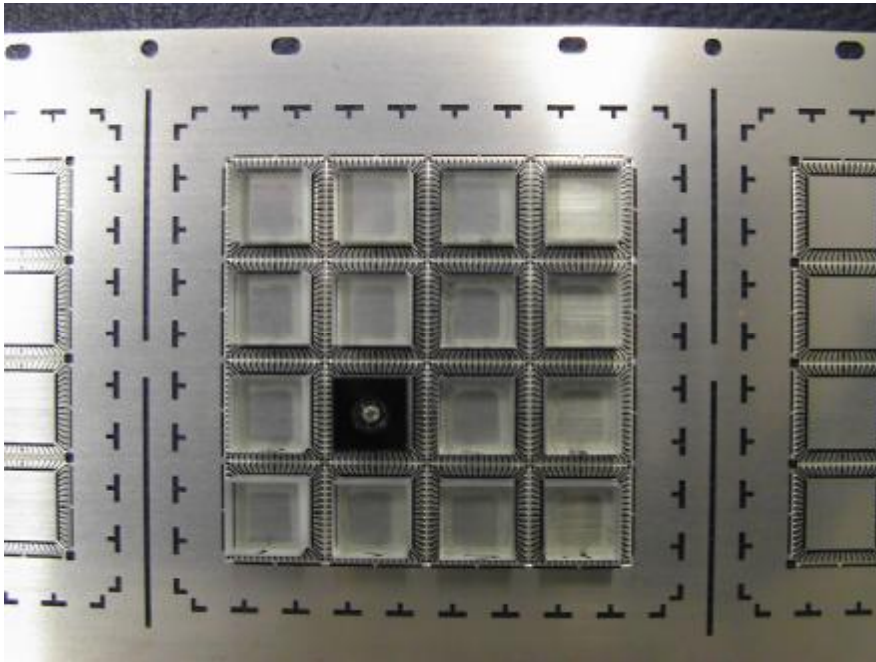


Accurate wafer level mapping of XY and Z variations

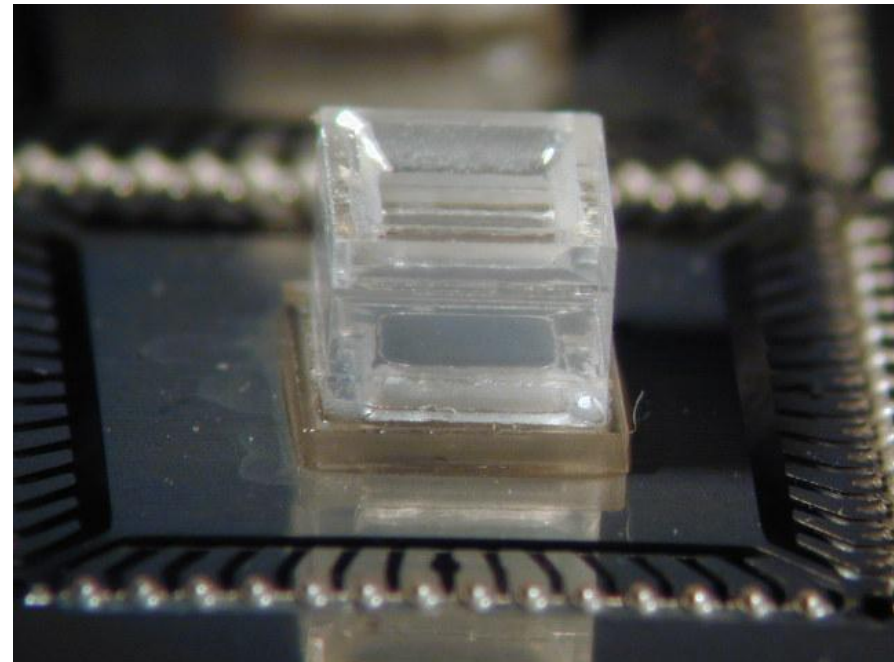


Thickness variations & concentricity variations of all internal layers can be assessed

Interconnection and Assembly

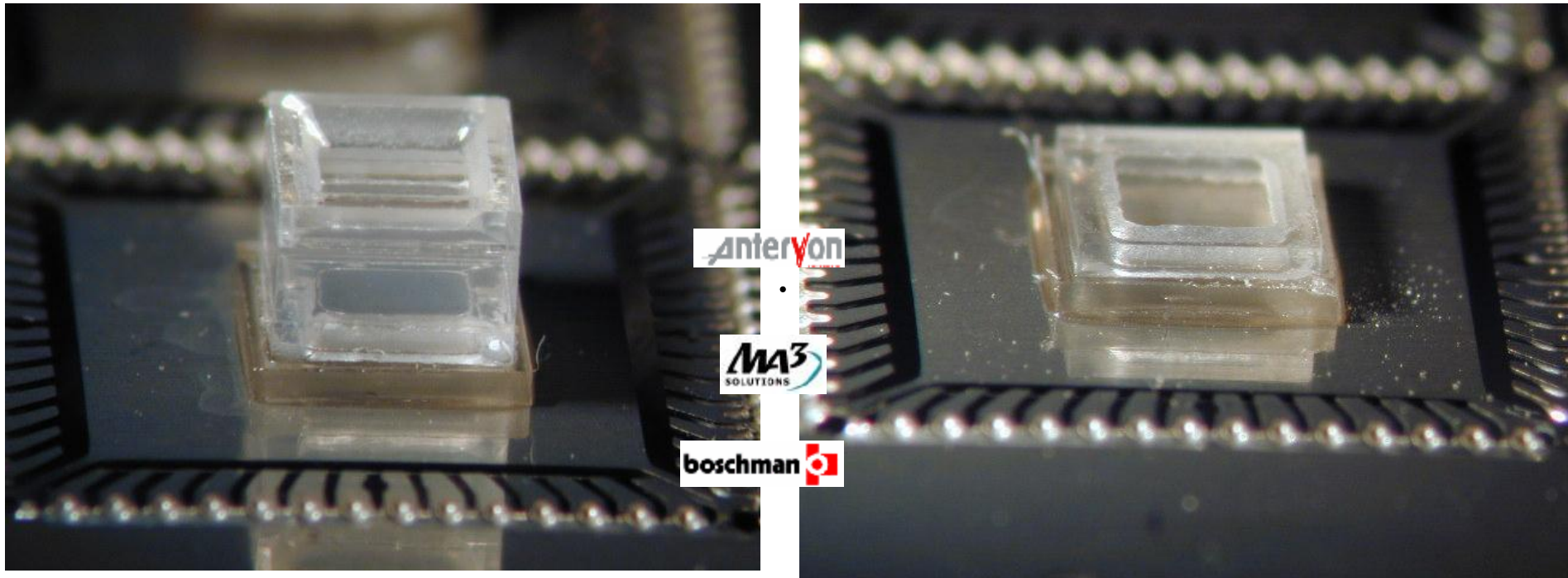


First design (2006) on LF



Current size on LF

Adhesive interface study



Small local micron level XY displacements to be monitored as well!

Adhesive layer strength study

