



**Anteryon**

at the

**ViaOptic Technology Day 2007**

**Richard van Densen  
Business Developer**

**Anteryon**  
LEADERS IN OPTICAL INTERFACE TECHNOLOGY

CLEAR CONNECTIONS . BRIGHT SOLUTIONS

## Overview

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History

Facts

Technology

Camera Modules

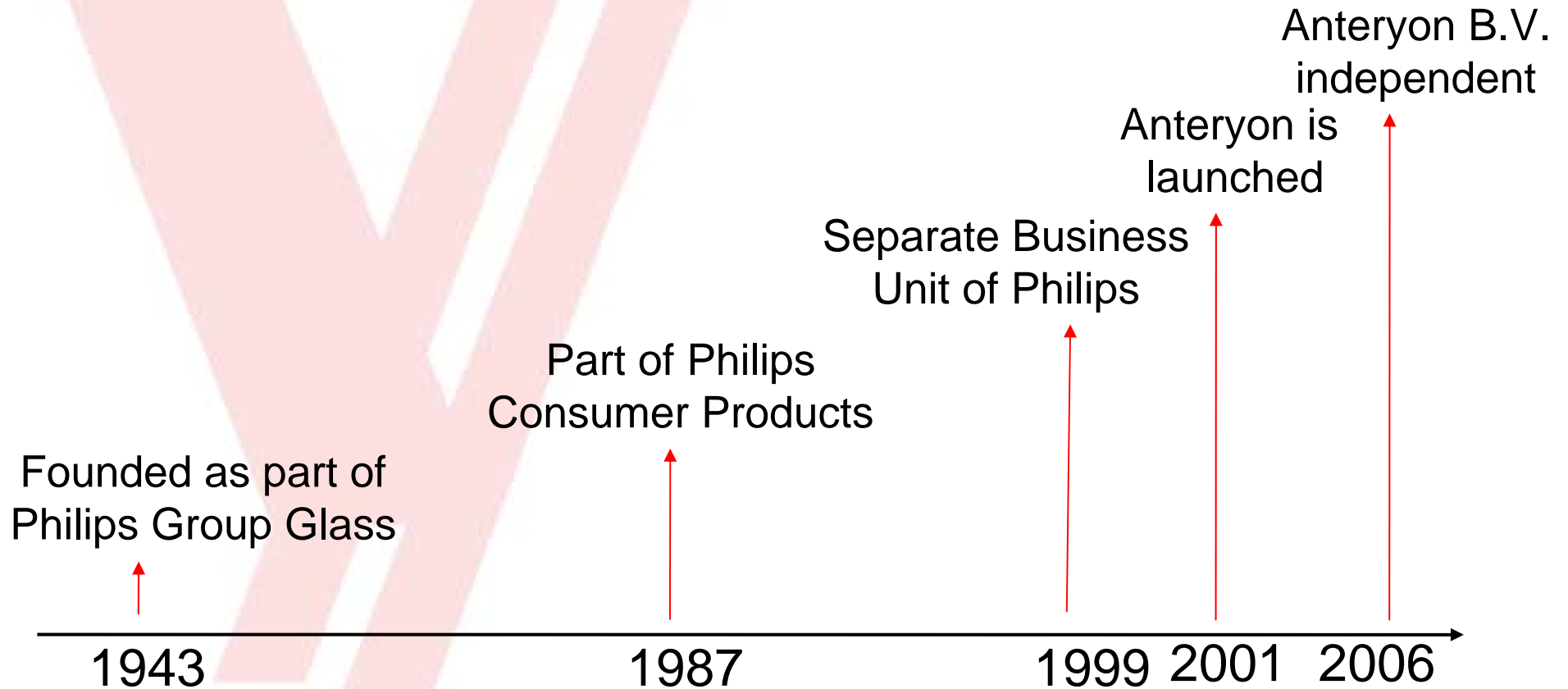
3D Displays

Summary



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## History



## Facts

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Privately owned

\$ 20 million revenue

135 headcount

60 R&D and process engineering, 3 Quality Assurance

5000 m<sup>2</sup> floor space

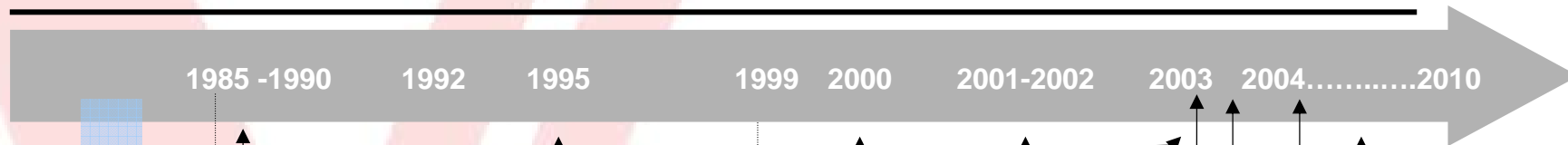
3300m<sup>2</sup> production (1300m<sup>2</sup> cleanroom), 1000m<sup>2</sup> office, 700 storage

Operations based in Eindhoven, the Netherlands

Global customer base



# Facts



Milestones

Start of the unique replication technology: Anteryon created high volume economical processes for aspheric objective and collimator lenses for CD and DVD

Anteryon is able to produce 500.000 lenses per week making the company capable of fulfilling a market leaders role

Anteryon delivered world's first turnkey 2D barcode scan engine for Symbol, the #1 company

Production of single fiber optic collimator assembly for MEMS based full optical switches

Integrated fiber optic collimator array assemblies

Optical wafers

2D/3D Display systems

Bio sensors  
Micro fluidics

Integrated lens stack for mobile imaging



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## Facts

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### Quality

Certification of ISO 9000 & ISO 14001

ESD Certification

Telcordia compliant

Production control by statistical in process monitoring  
(six sigma)



Technology

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# Replication Process

- Individual lenses
- Lens arrays



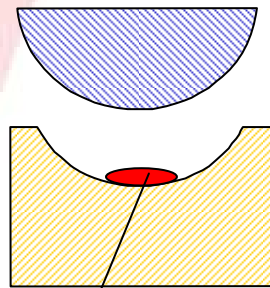
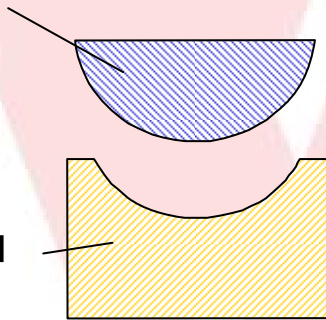
# Technology

## Replication of individual lenses

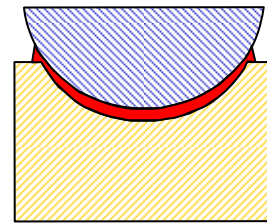
of an Asphere or Acylinder on a spherical or cylindrical surface

Spherical Glass Body

Mould

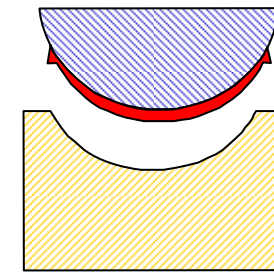


Liquid polymer



UV Curing

Aspherical Lens



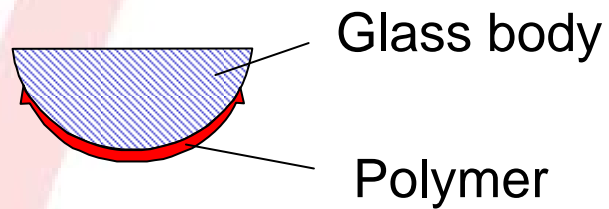
*Cold process !!*

## Technology

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### Replicated lens

Lens



## Technology

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### Examples of replicated Aspheres and Acylinders



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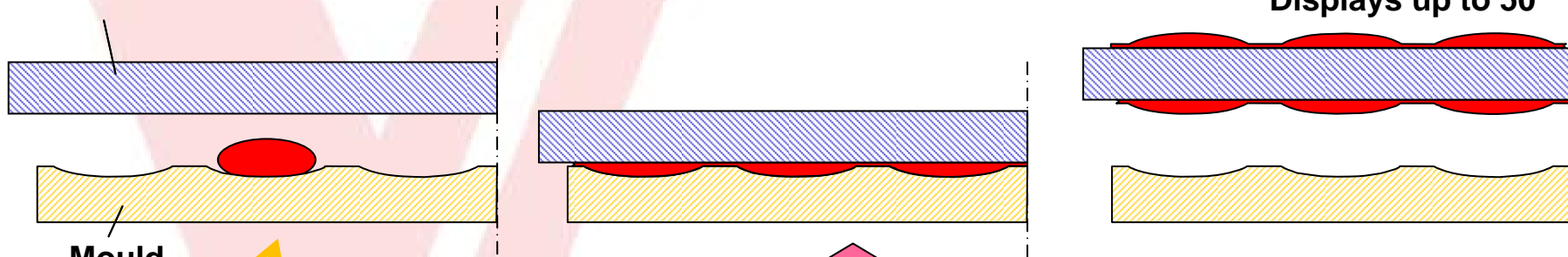
# Technology

## Replication process of lens arrays on flat substrates

Substrate < 8" up to 50"

Wafers up to 8" or

Displays up to 50"

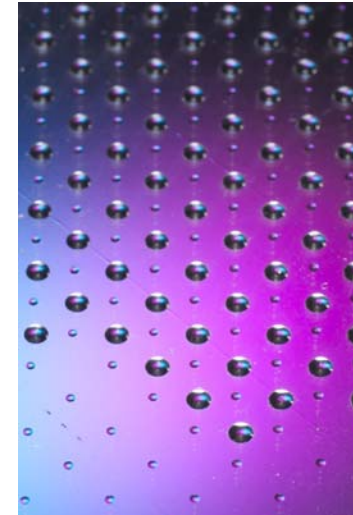


Mould

UV Curing

Mould quality essential !!

Layer thickness range <5 to >500  $\mu\text{m}$ ,  
High Sag height

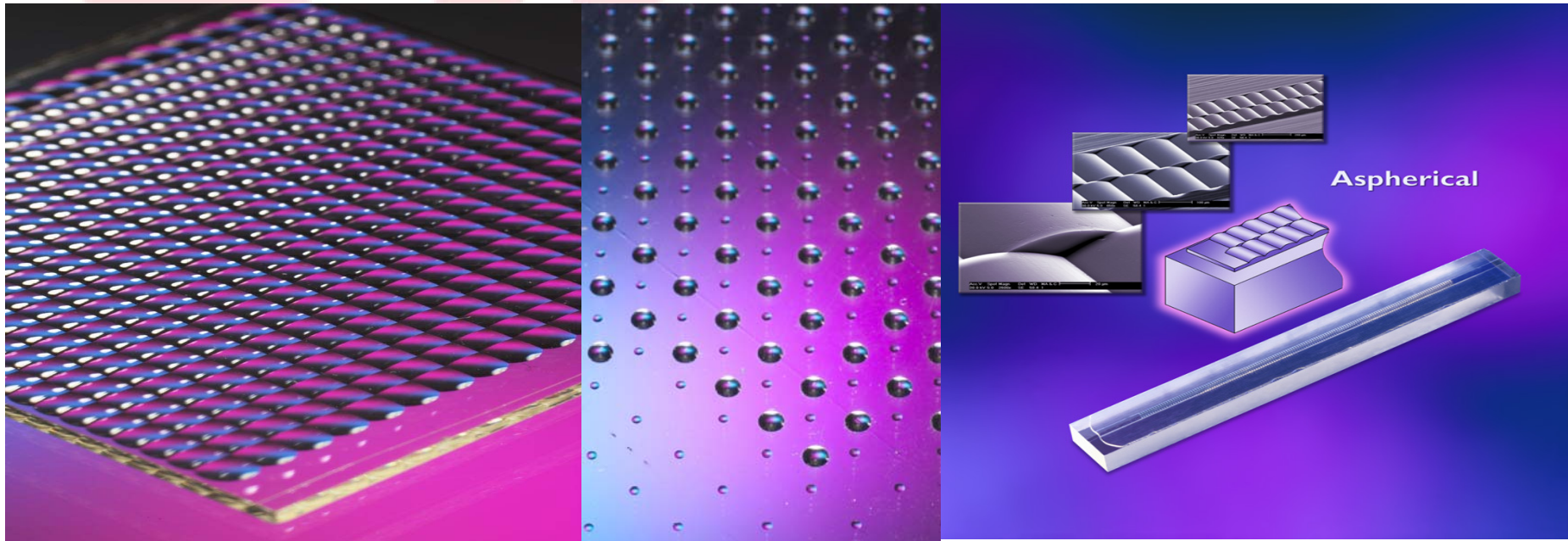


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# Technology

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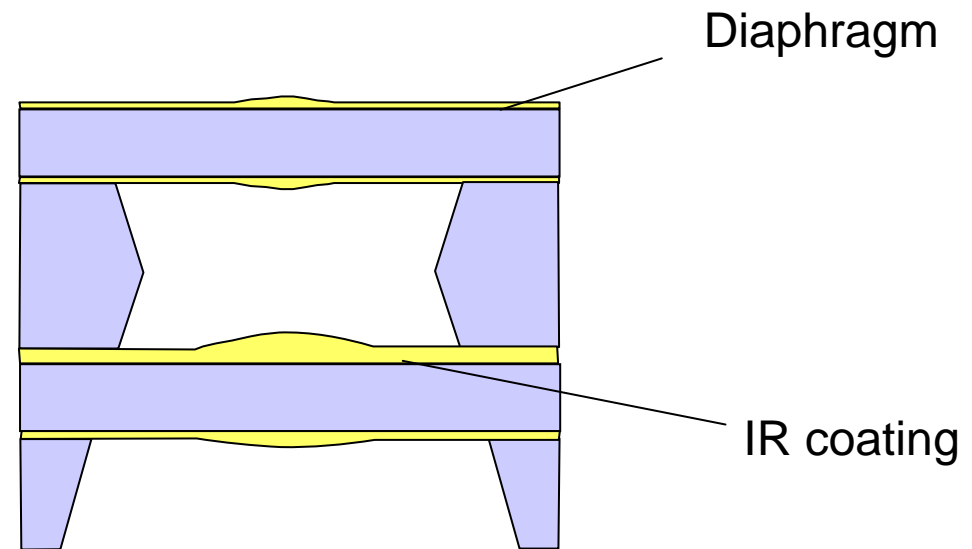
## Examples substrates or lens arrays



## Camera Modules

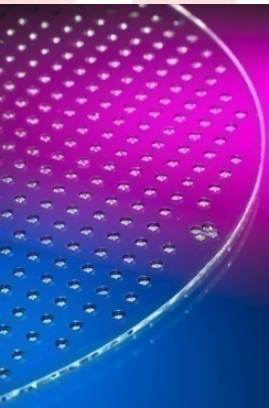
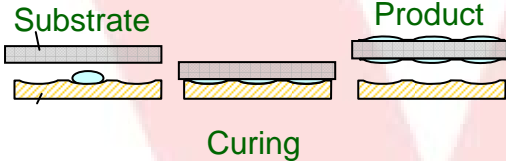
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### VGA Lens Stack with Integrated coatings and diaphragms

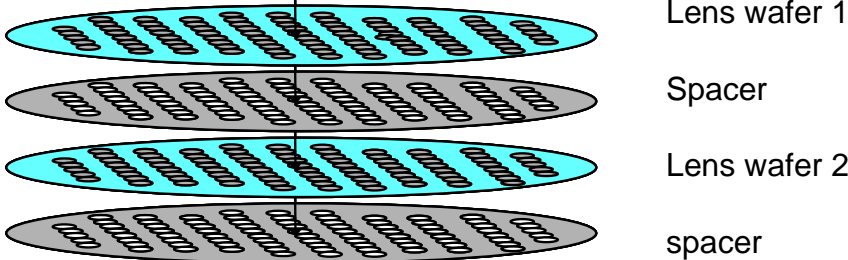


# Camera Modules

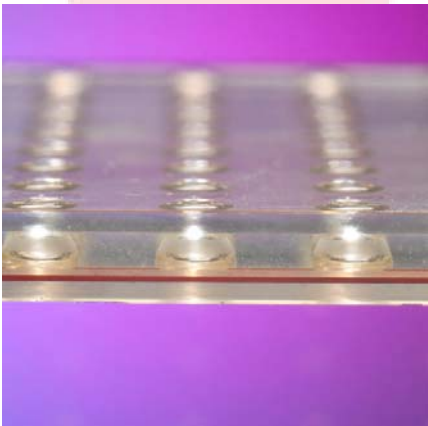
Step 1: Optical wafers



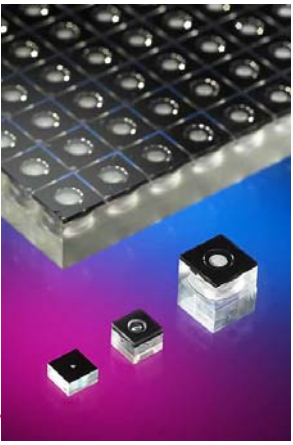
Step 2: Bonding



Step 3: Inspection

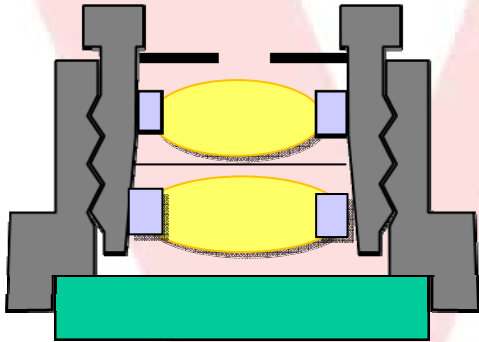


Step 4: Dicing or Wafer to Wafer bond directly on CMOS wafer



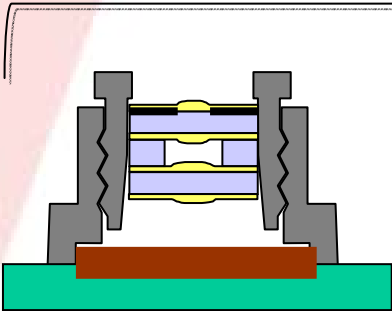
# Camera Modules

## WaferOptics™ Implementation Options



Traditional VGA Camera Module

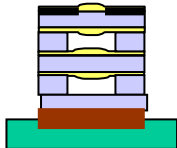
Focusing required



WaferOptics VGA Camera Module

a) Conservative implementation

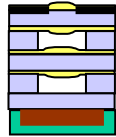
Focusing required



WaferOptics VGA Camera Module

b) Pick & Place

Focus free



WaferOptics VGA Camera Module

c) Wafer to Wafer bonded

Focus free



## Camera Modules

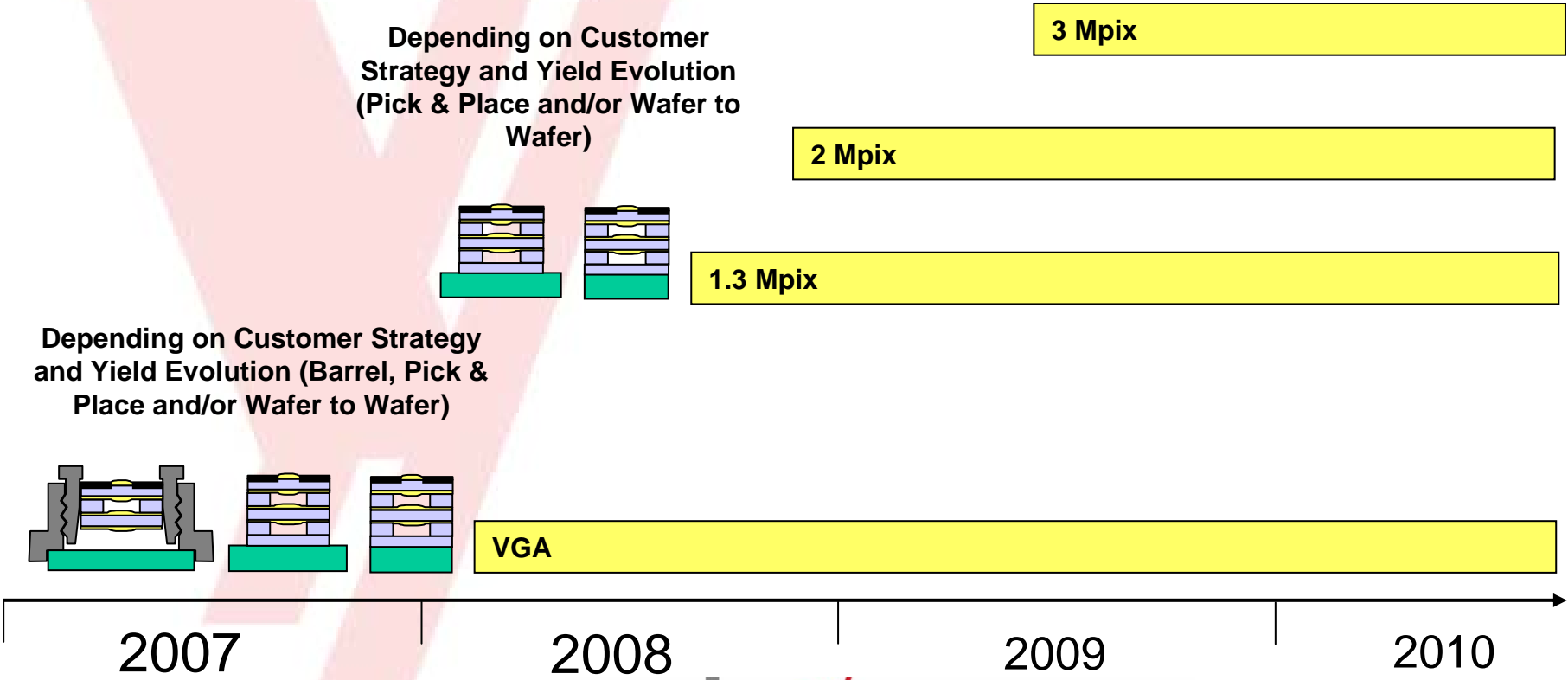
### Comparison WaferOptics/Plastic/Glass

Feature	WaferOptics	Plastic Lenses in Barrel	Glass Lenses in Barrel
IR coating	integrated in cube	individual parts	individual parts
Diaphragm	integrated in cube	individual parts	individual parts
Apertures	integrated in cube	individual parts	individual parts
Focusing	not needed	required	required
Co-centricity	<< 5 microns possible	<5 microns->low yield	< 5 microns-> low yield
Reflow soldering lead free	OK	NOK	OK
Pixel roadmap - small cameras	OK	NOK (handling/yield issues)	NOK (handling/yield issues)
Prototypes availability	< 4 weeks	8..10 weeks	> 10 weeks
Volume Ramp-up	fast	fair	fair
EDOF (requires alignment of optics)	OK	NOK (rotation at focusing)	NOK (rotation at focusing)



# Camera Modules

## Anteryon Roadmap



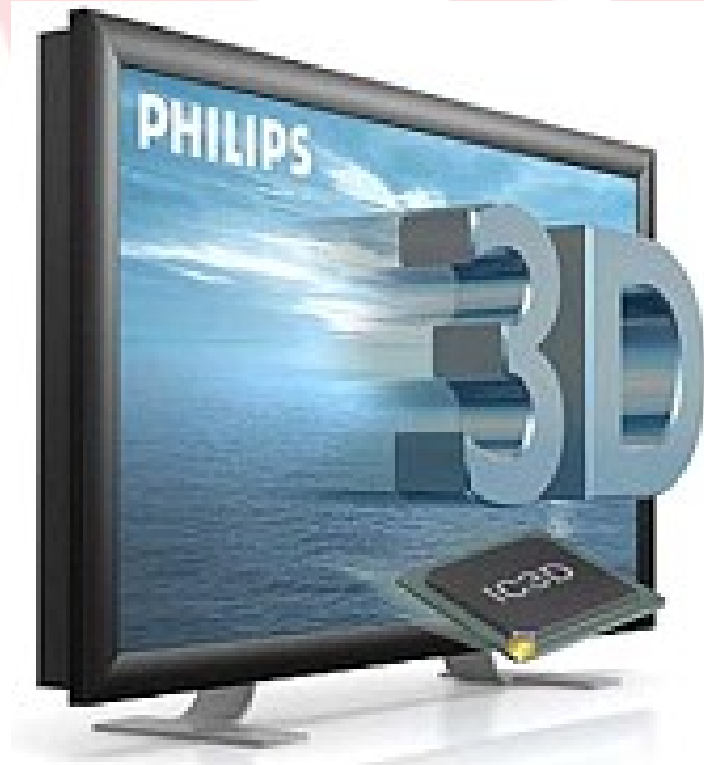
## Camera Modules

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CE TECHNOLOGY

## 3D Displays



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## 3D Displays

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Cooperation program with Philips 3D Solutions includes:

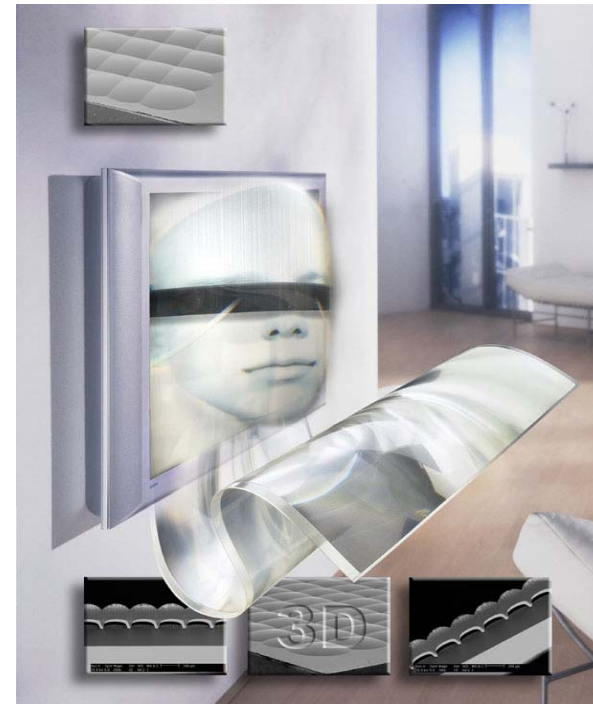
**Co-design optical light path  
and interfacing**

**Prototyping**

**Pilot series production in Eindhoven**

**Gearing for Volume production**

**Transfer to low cost mass volume**



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## 3D Displays

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### Why Philips 3D?

- Exciting out of screen effects
- No need for special glasses
- Multiple users can experience 3D at the same time
- A large 3D viewing zone
- Full brightness, full contrast and true color representation
- A high quality in both 2D and 3D modes
- Philips provides tools for creating content for 3D displays

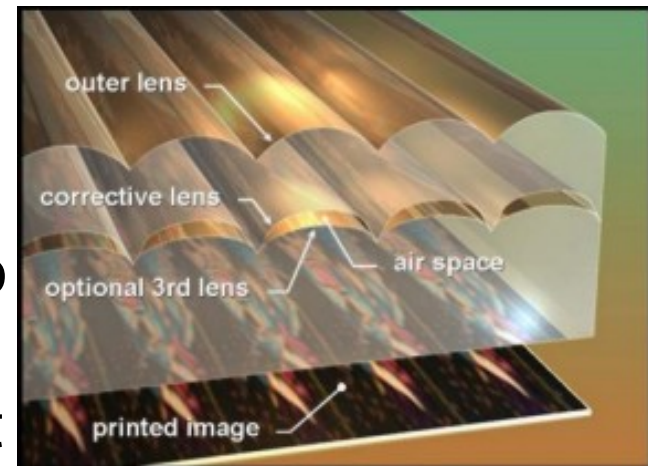


## 3D Displays

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### How does it work?

A sheet of transparent lenses, is fixed on an LCD screen. This sheet sends different images to each eye, and so a person sees two images. These two images are combined by our brain, to create a 3D effect. Because the sheet is transparent, it results in full brightness, full contrast and true color representation



## 3D Displays

### How does it work?



## 3D Displays

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### Who are the customers?

Currently development for and volume supply to high end and innovative display companies for professional markets like:

- Control rooms
- Gaming
- Medical and
- Geological applications



## Summary

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- Determined to be the world leading supplier of WaferOptics™ and Integrated Lens Stacks
- Strong Growth potential
- More than 15 years experience in all key enabling technologies for WaferOptics™
- Anteryon is no Start-Up.
- Relevant worldwide Patent Applications



## ViaOptic Technology Day

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Questions?





**End**

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Thank you for your attention

Anteryon BV

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