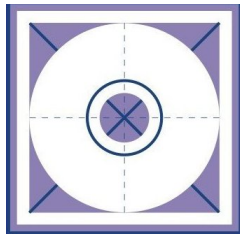


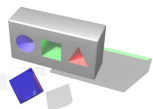


**otb** ENGINEERING



**otb** ENGINEERING

*Organic Light Emitting Diodes*



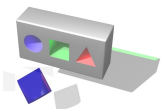


<b>OTB Group</b>	
<b>OTB-E</b>	<b>ODME Replication</b>
<b>Solar</b> <b>Display</b> <b>New Businesses</b>	<b>Replication</b> <b>- Pre recorded</b> <b>- Recordable</b>

Locations: Eindhoven, Irvine (USA), Hong Kong, Singapore

Employees: 150

Patents: 79 different reported inventions

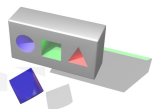




OTB Engineering is a leading company in the design, engineering, development and manufacturing of *inline* production equipment.

OTB realizes major cost reductions with:

- inline concepts
- tailor made solutions
- breakthrough technologies



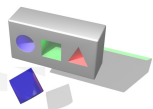


- Minimizing process steps
- Integration in one machine
- Smart controller with integrated feed back
- Modular concept
- Ease of maintenance
- Eliminate clean room environment

### Results

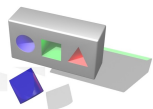
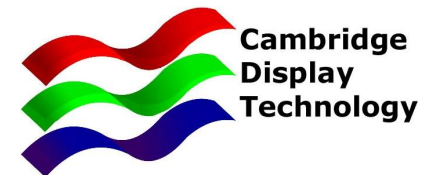
- Reduced cycle times
- Increased yields
- Improved product quality
- Reduced investments
- Less operators

} **reduced Total Cost of Ownership**



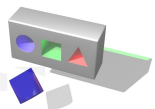


- Inline equipment supply
  - Inline PLED system
  - Inline Vacuum system Cathode & Thin Film Encapsulation
  - Inline Printing system
- Development tools
  - Thin film encapsulation tool
  - Full PLED research tool
- Product and process support in co-operation with CDT
  - Product design, product samples and testing
  - LEP Materials





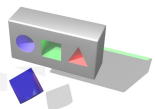
- First fully inline PLED manufacturing system
- Integration of newest processes
  - Inline printing process
  - Fast Cathode deposition
  - Thin Film Encapsulation
- Unique product carrier system in vacuum
- Unique masking and load lock systems
- Modular expandable design
- Compact and no clean room





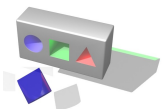
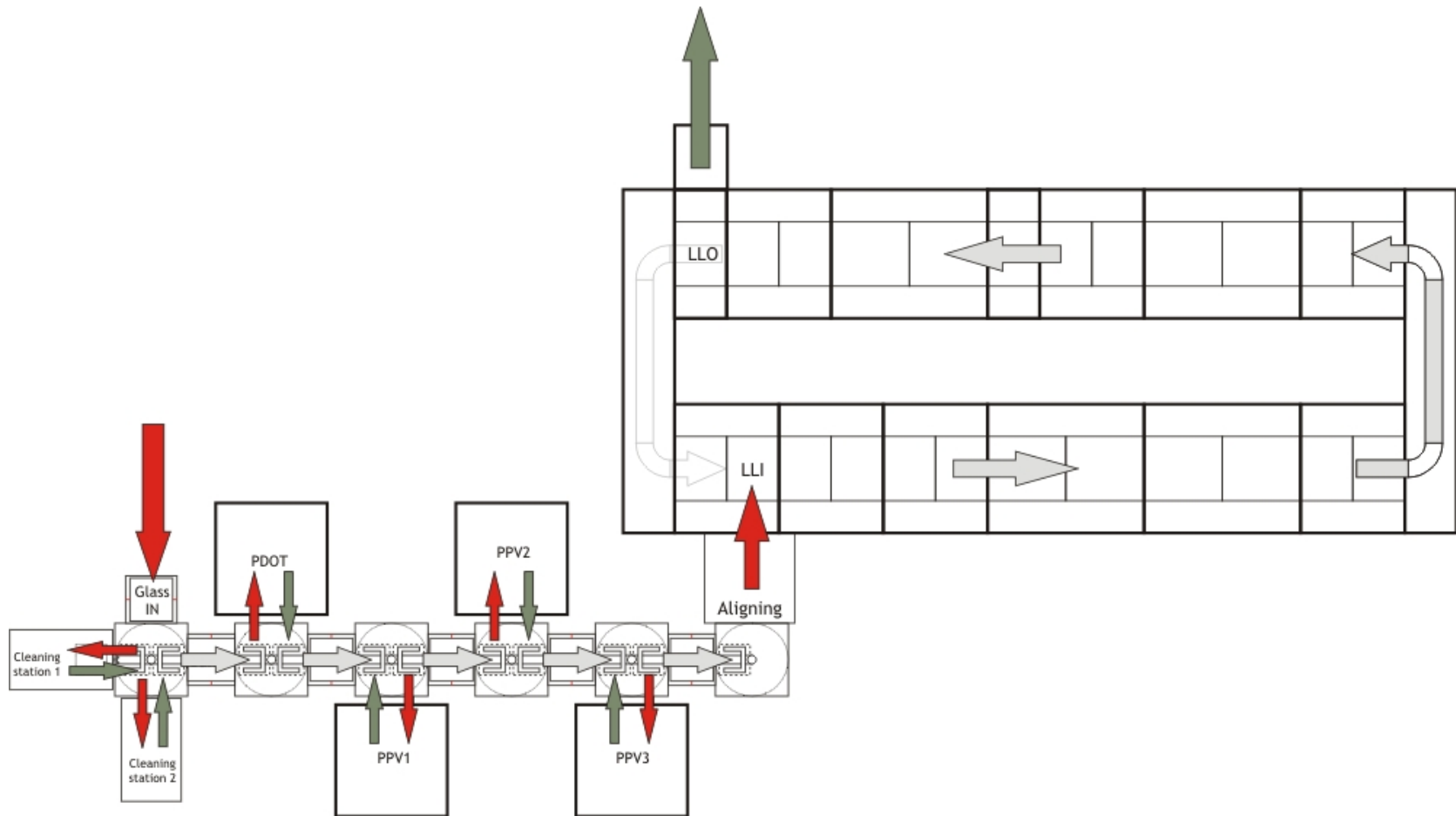
## OTB's inline PLED system

---





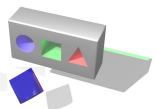
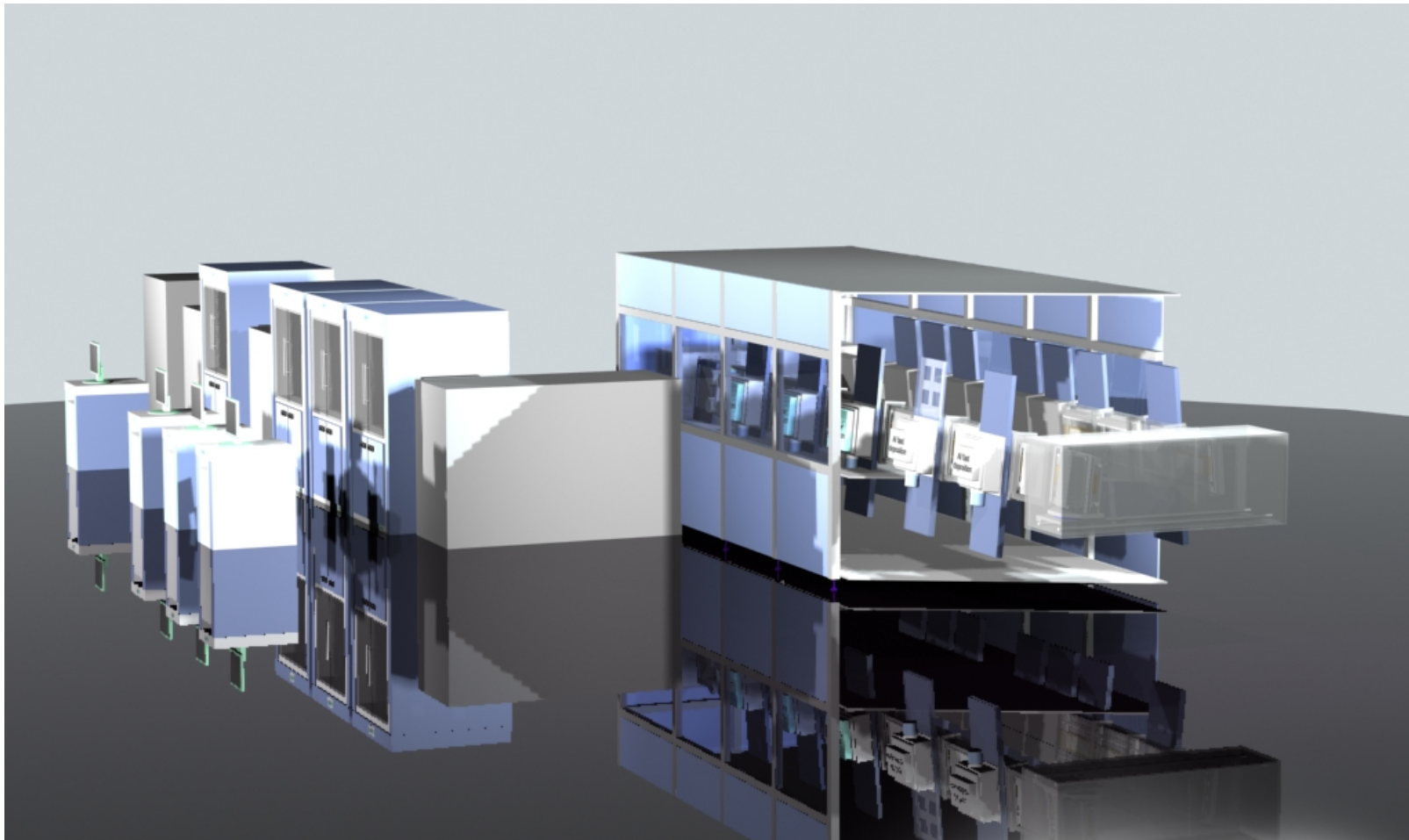
# OTB's inline PLED system







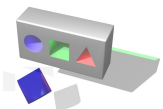
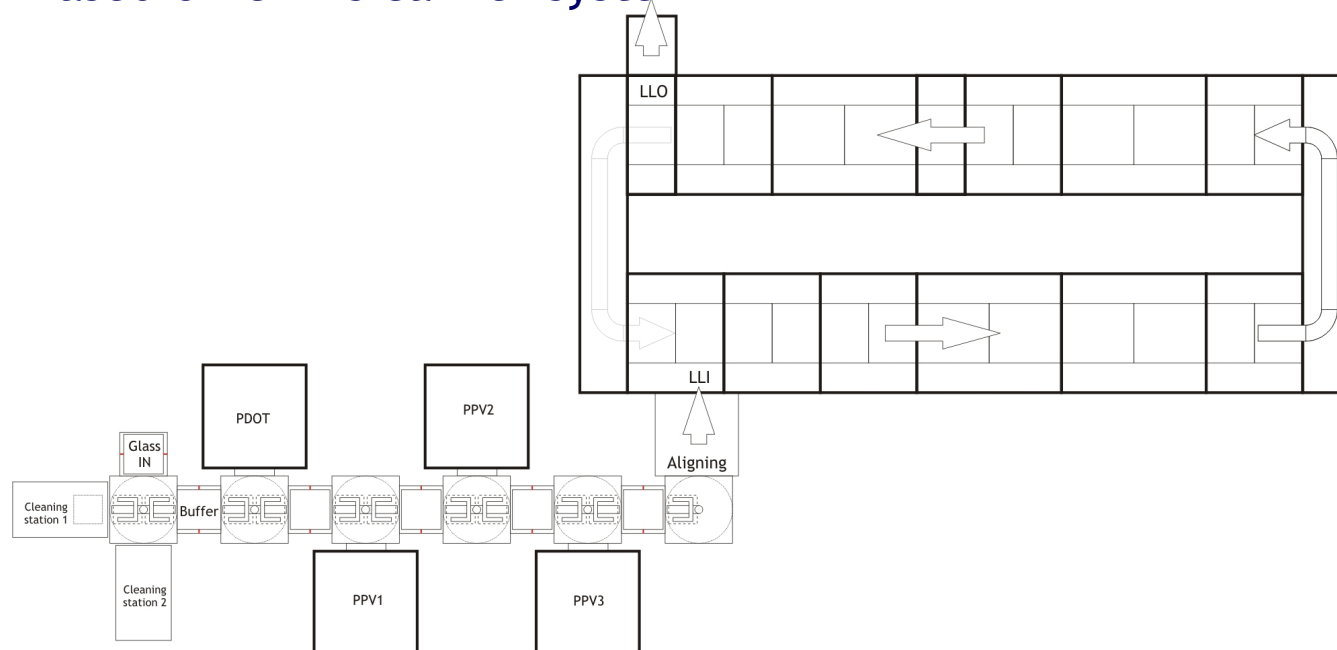
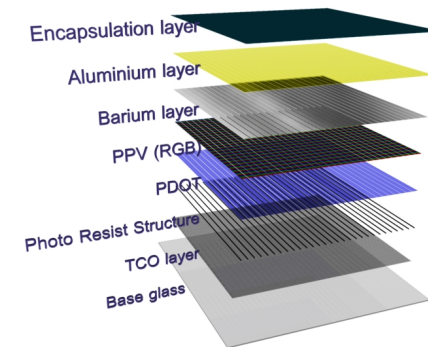
## OTB's inline PLED system





## Inline equipment for PLED

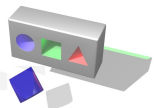
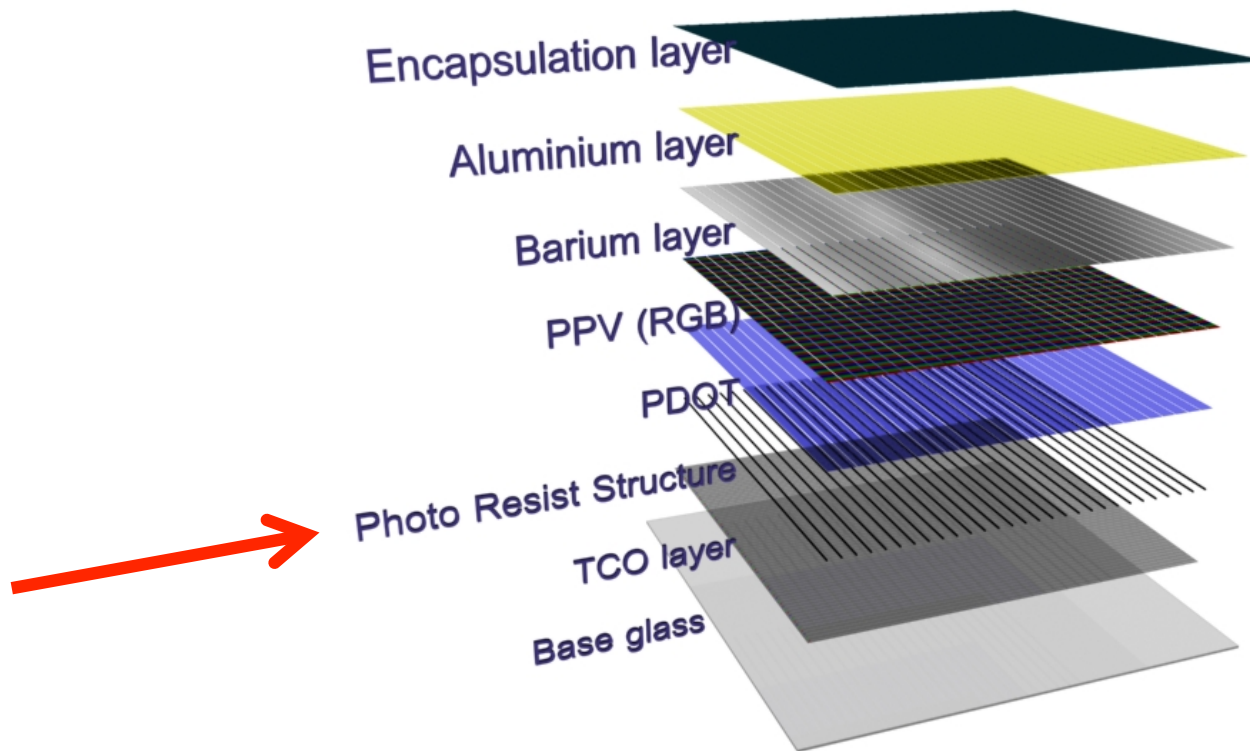
- Inkjet printing
- Cathode deposition
- Thin Film encapsulation layer
- Based on OTB's carrier system

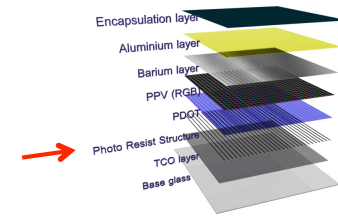




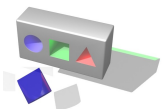
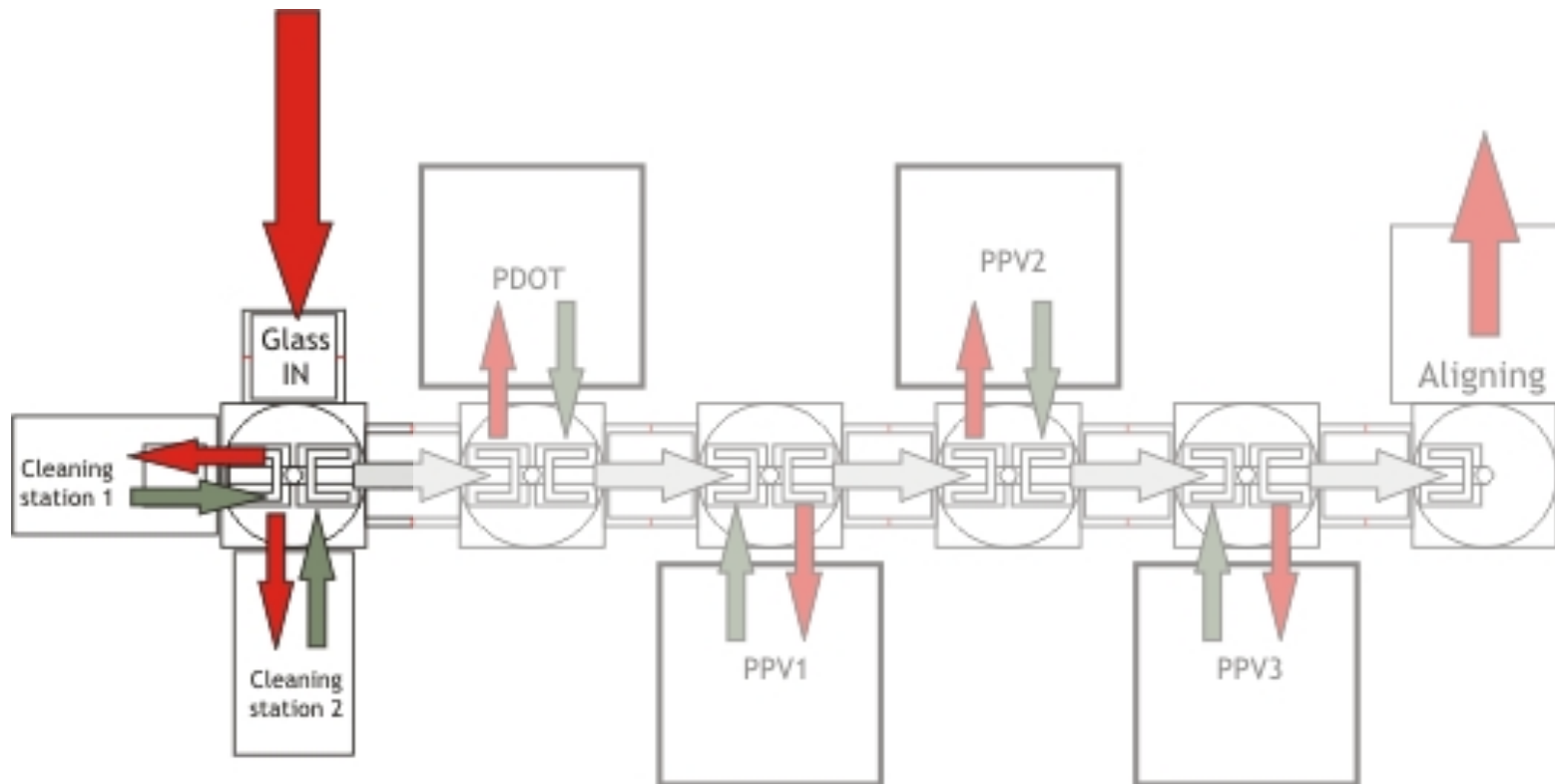
## A tour through the PLED production line

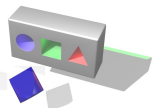
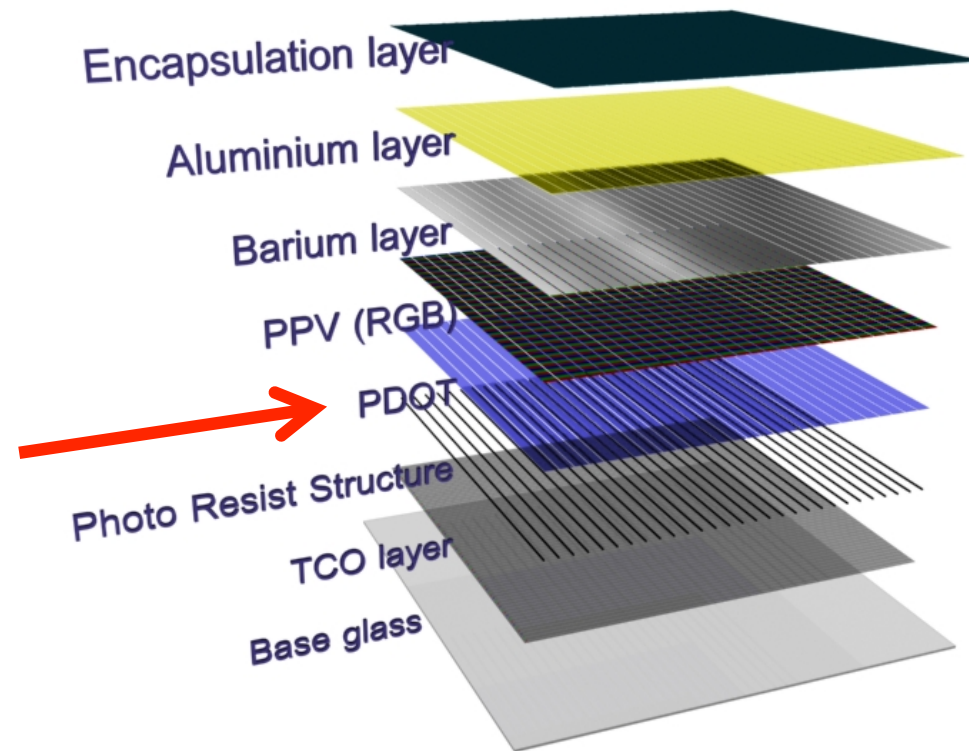
Step 1 - Incoming glass substrates with TCO and Photo Resist Structure





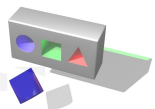
## Step 2 - Cleaning incoming glass substrates





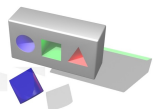
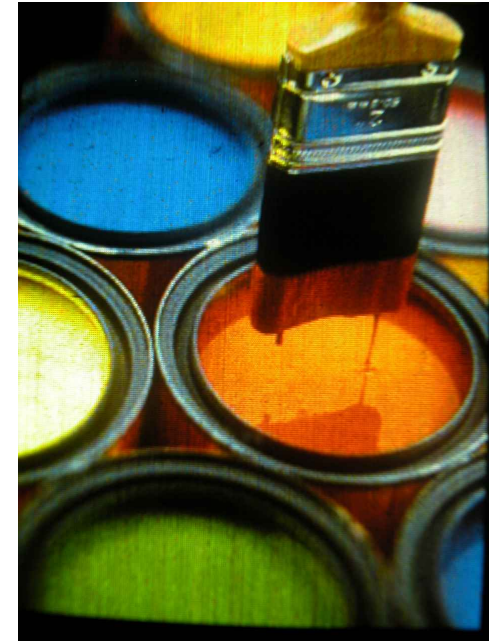
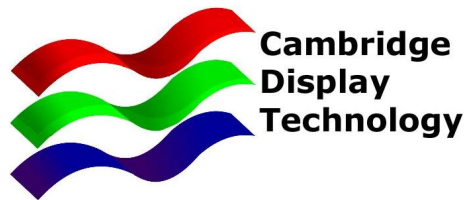


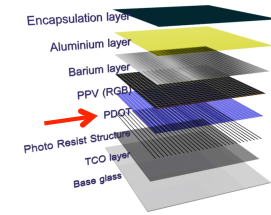
- Inline printer
  - Substrate pre-treatment
  - CDT/Litrex printing modules and software
  - Dry and bake steps between the printers for highest performance



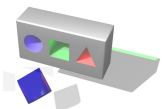
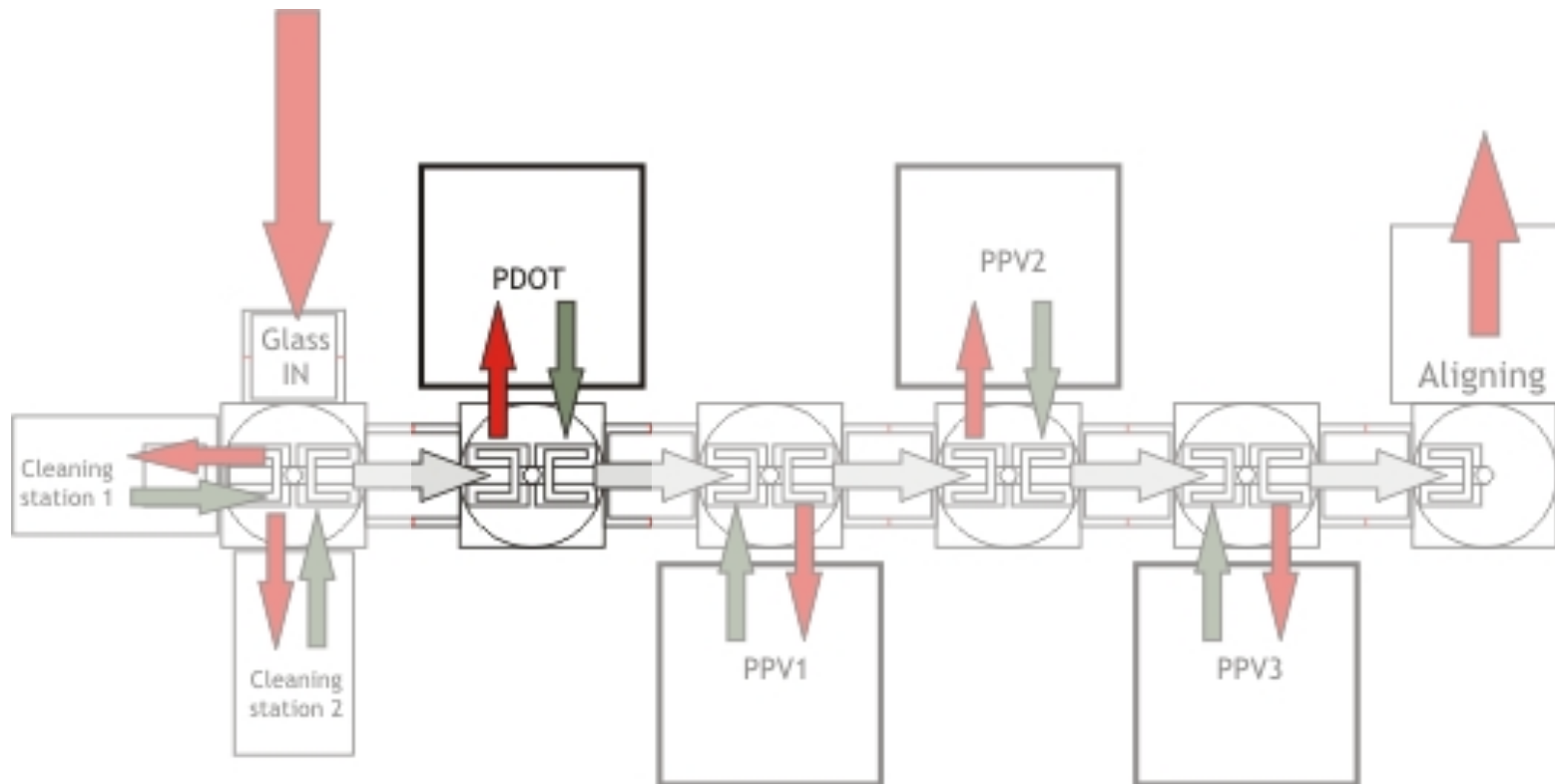


- Litrex 140 series inkjet modules
  - PDOT
  - LEP materials
- CDT proven inkjet process and materials

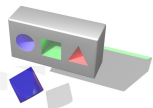
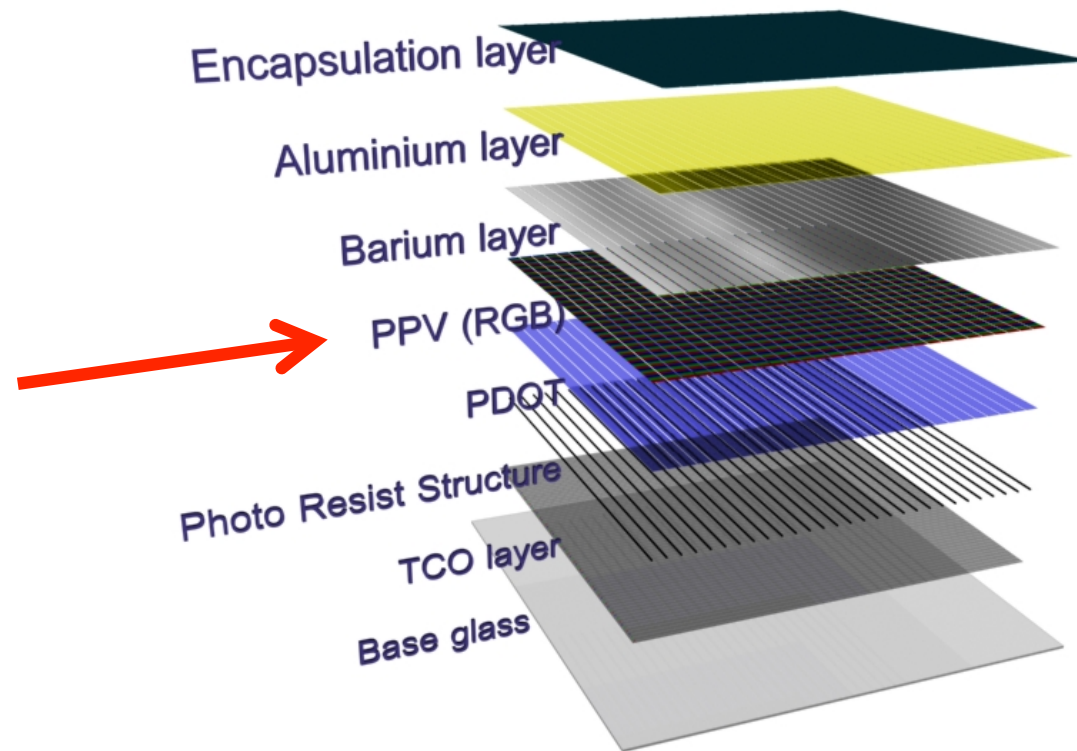


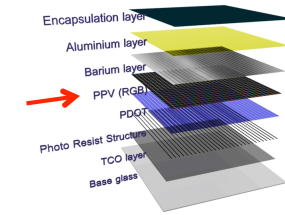


Step 3 - High speed printing of PDOT layer with inkjet technologies

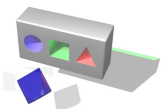
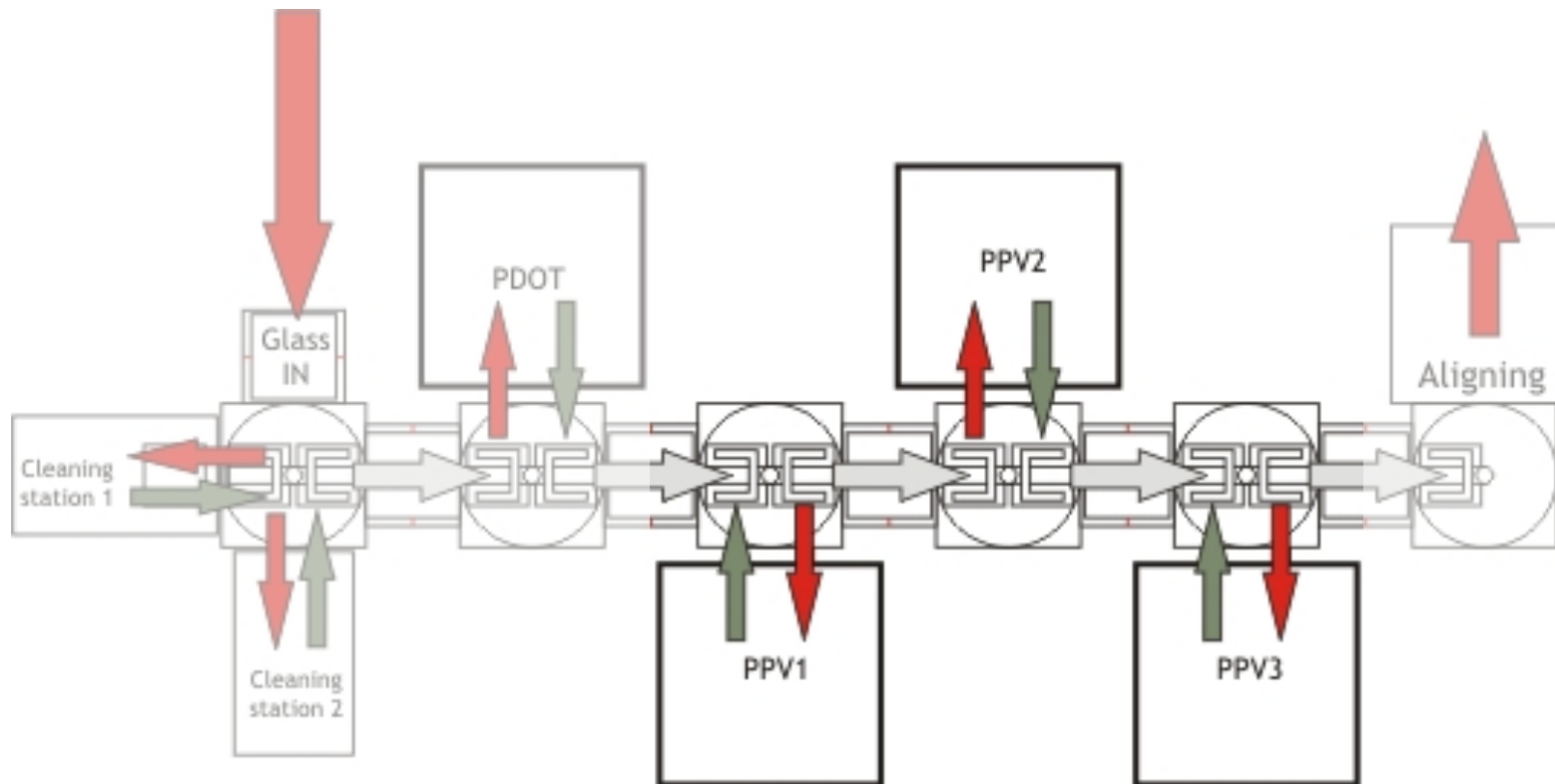


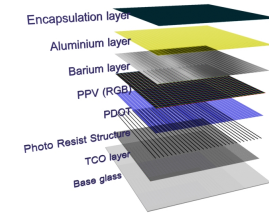




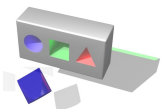
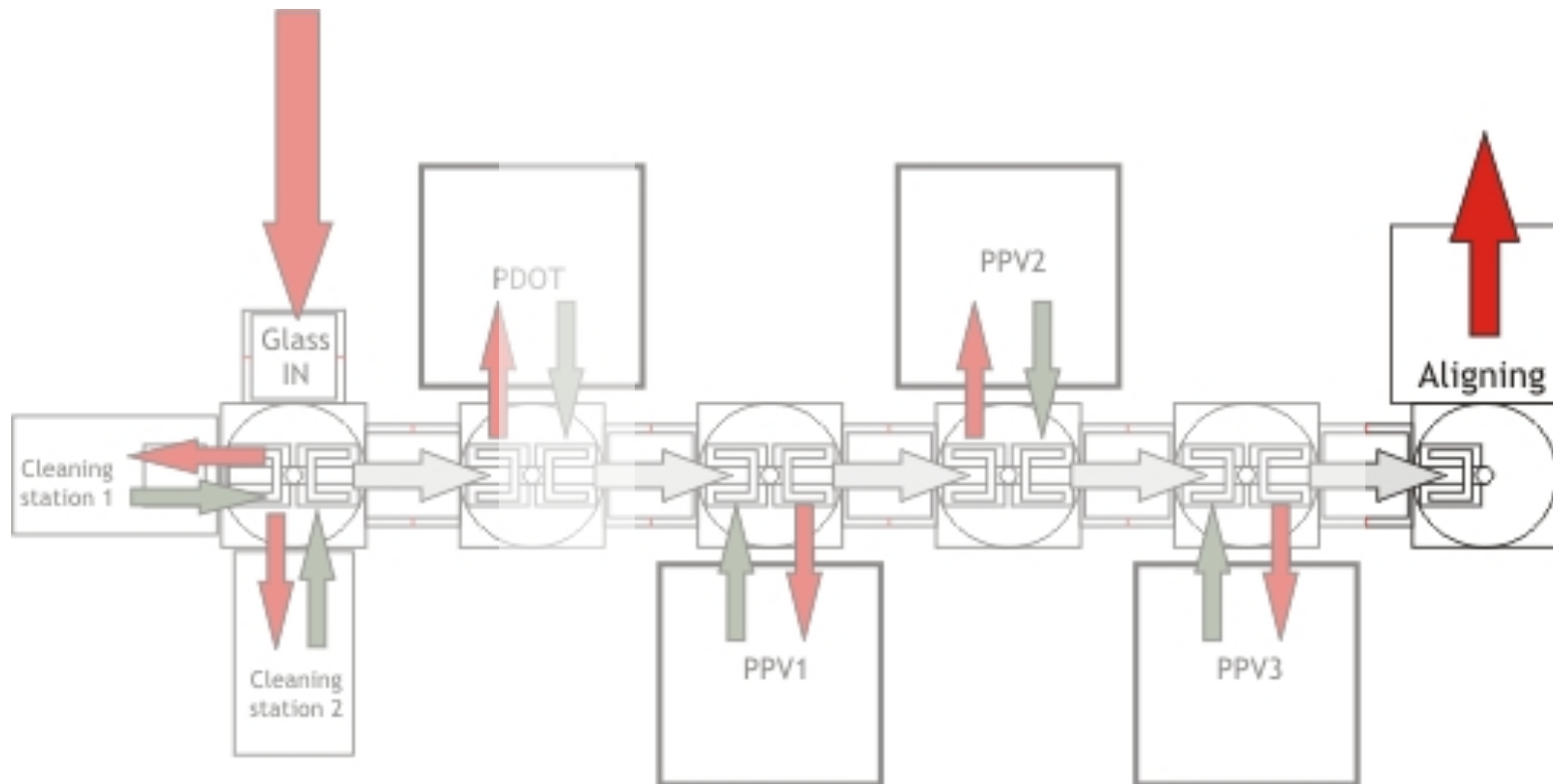


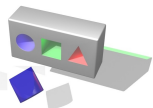
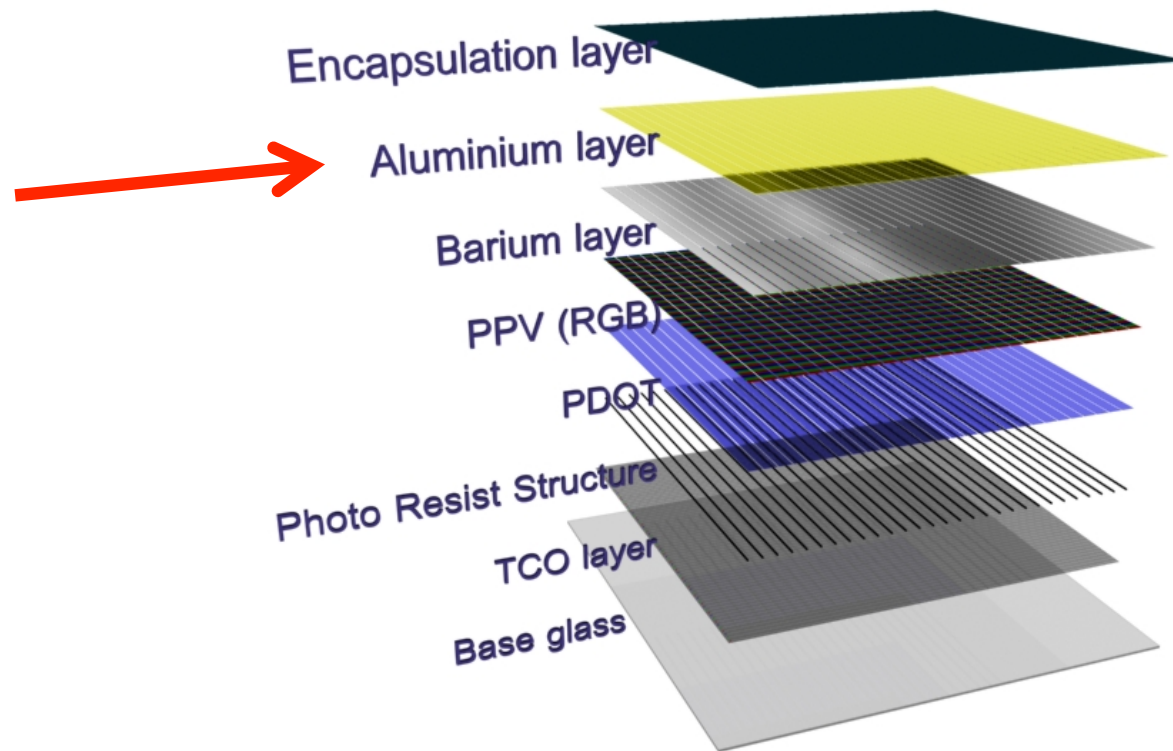
Step 4 - High speed printing of PPV layers with inkjet technologies





## Step 5 - Aligning of the substrates on a carrier plate

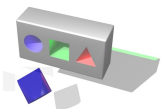
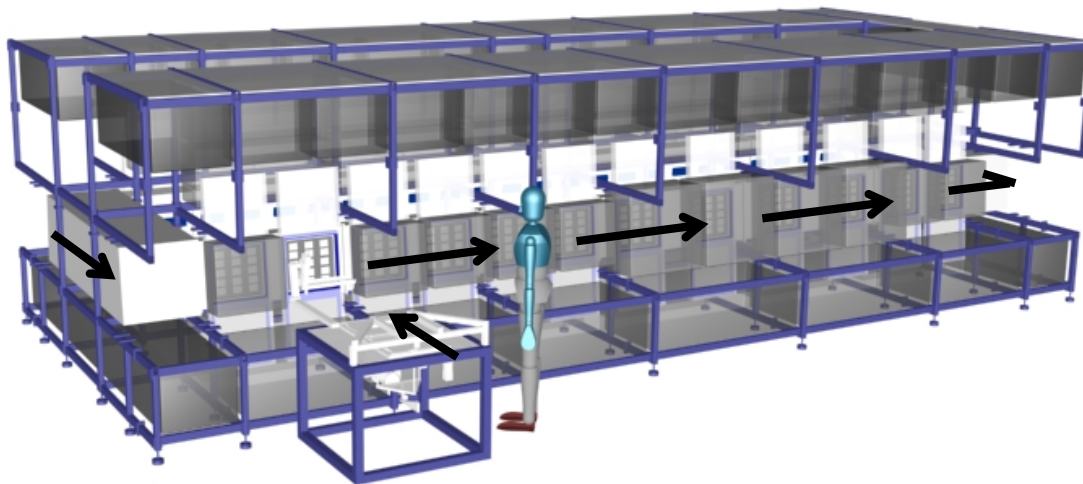
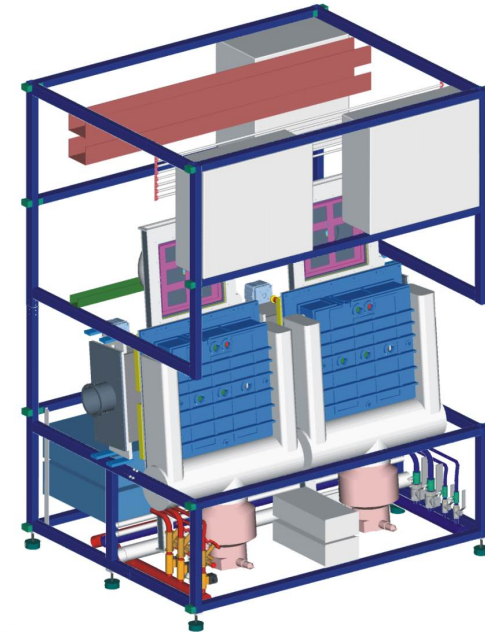


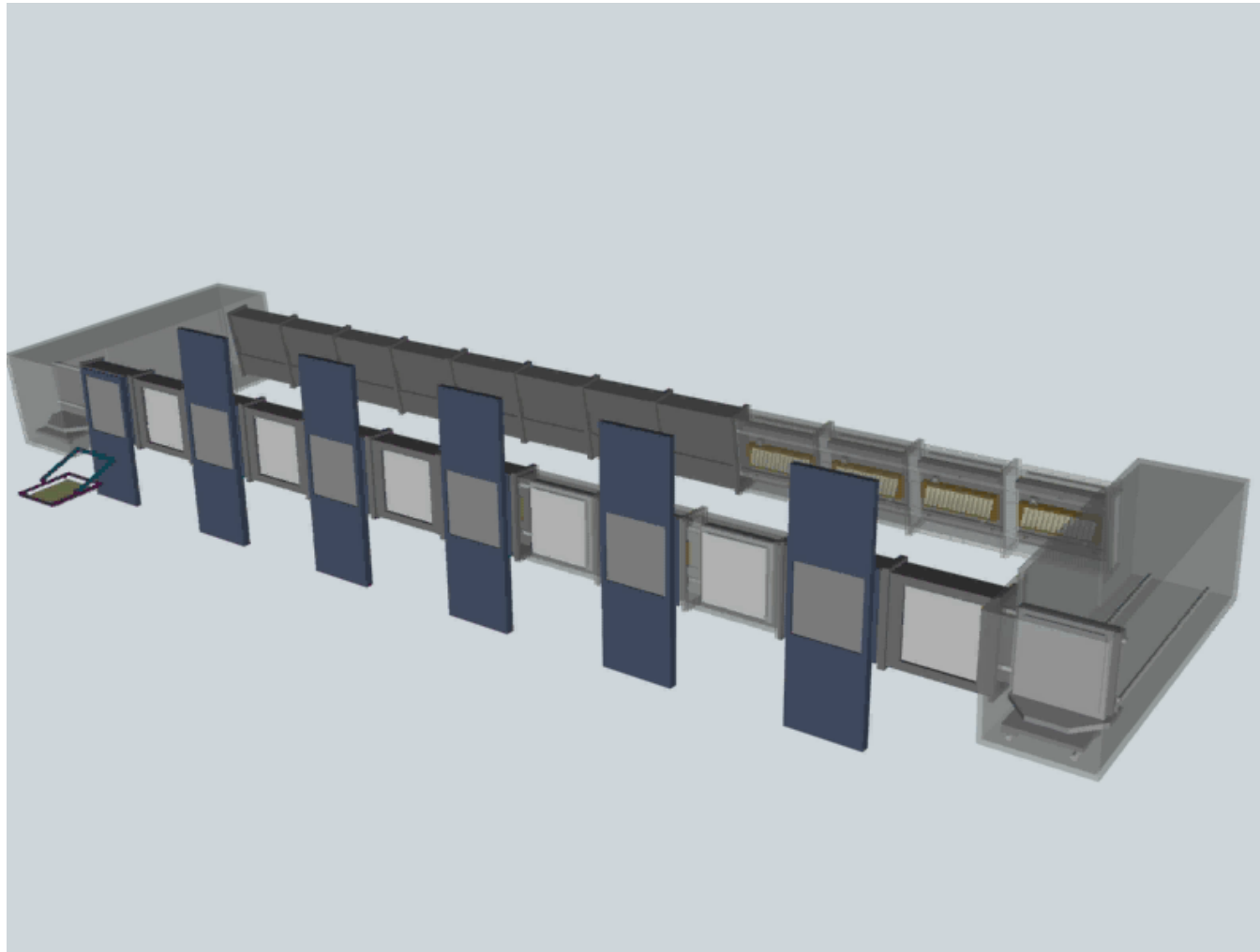




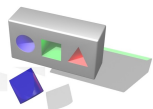
## Vacuum system

- Vacuum system
  - Linear Motor System (LMS)
  - Load locking and masking
  - Process chambers
  - Complete modular build up
- Glass Encapsulation (optional)



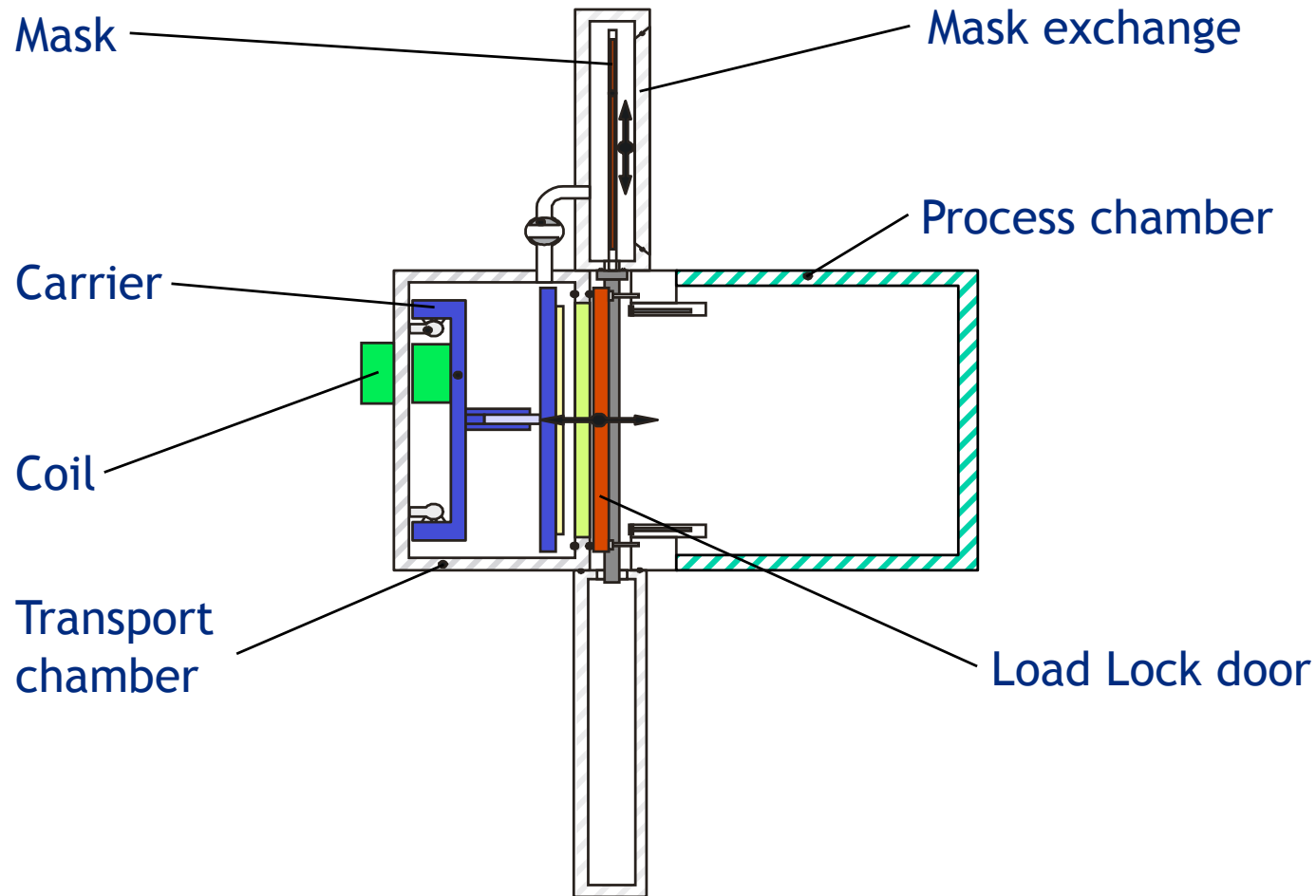


concept of the vacuum system

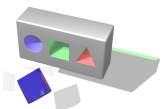




## Load locking & masking

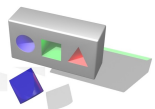
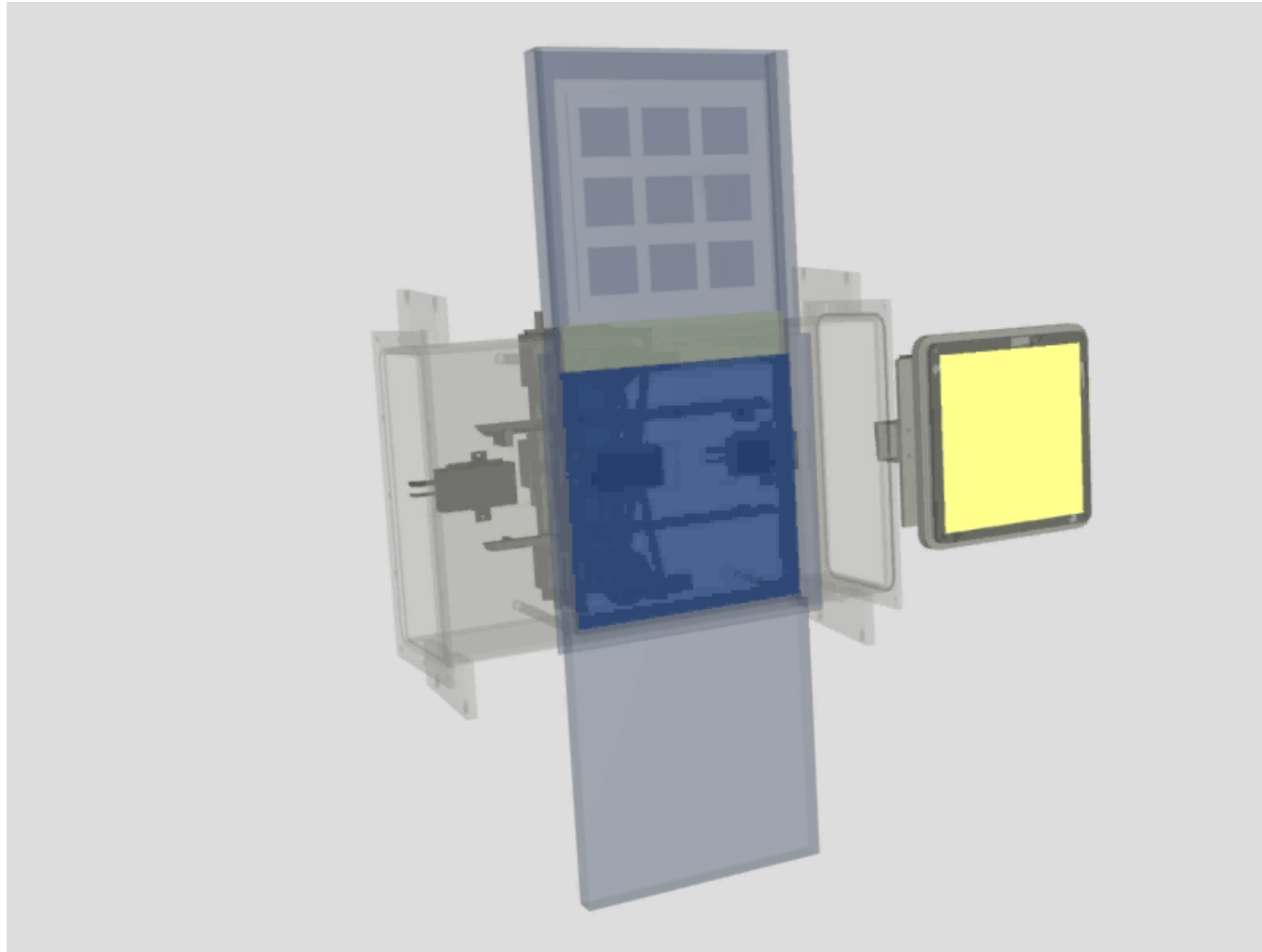


patent pending

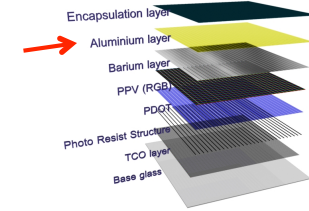




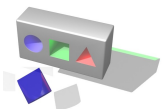
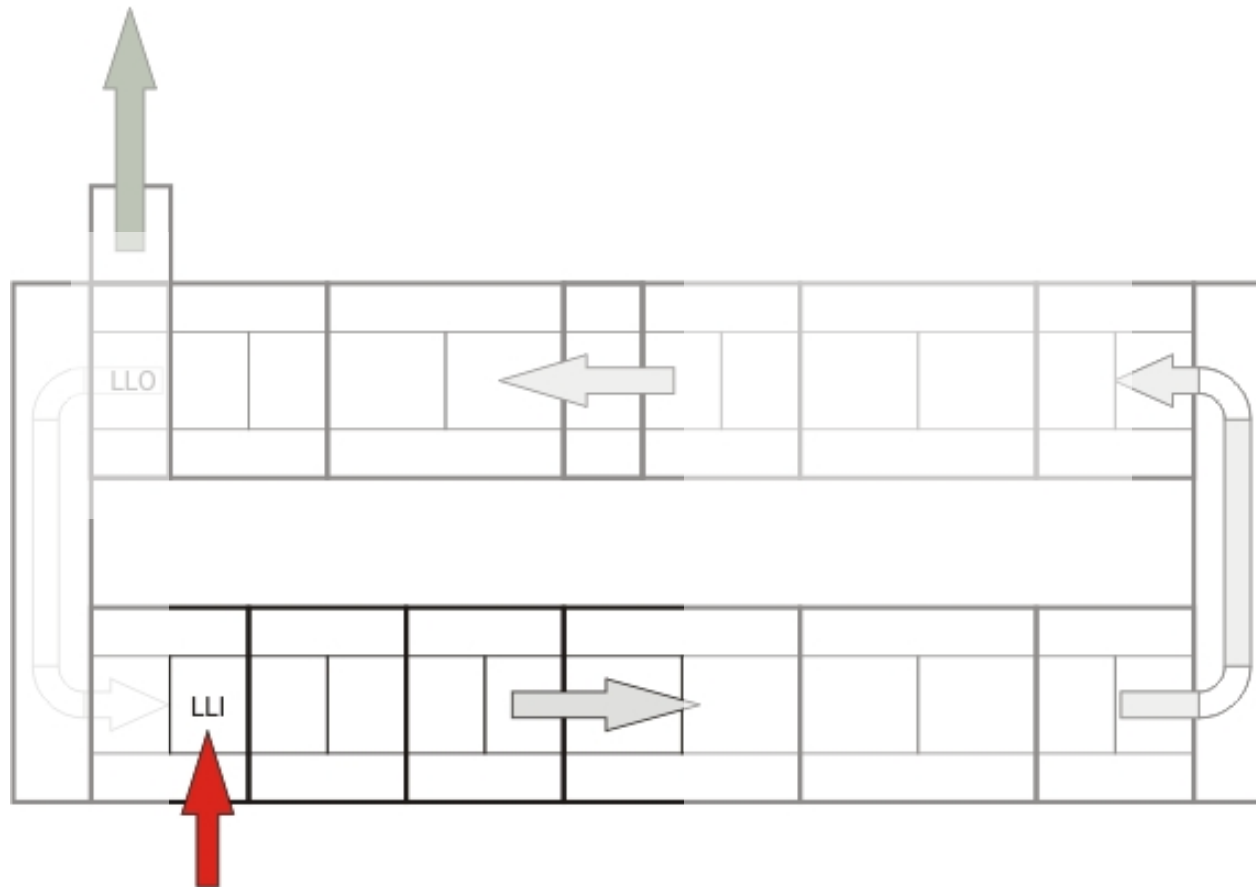
## Load locking & masking

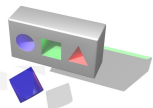
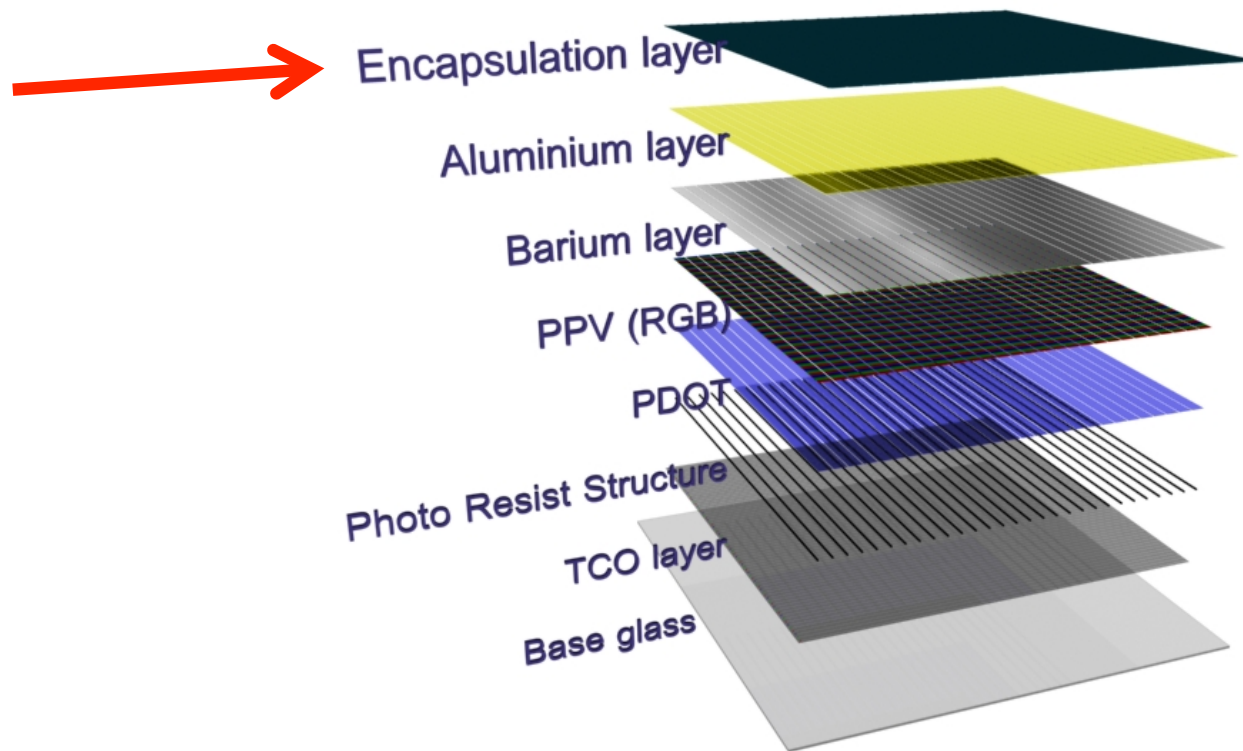


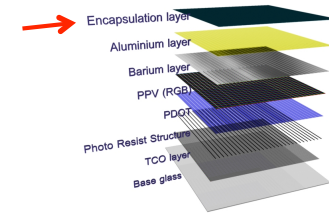




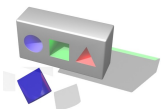
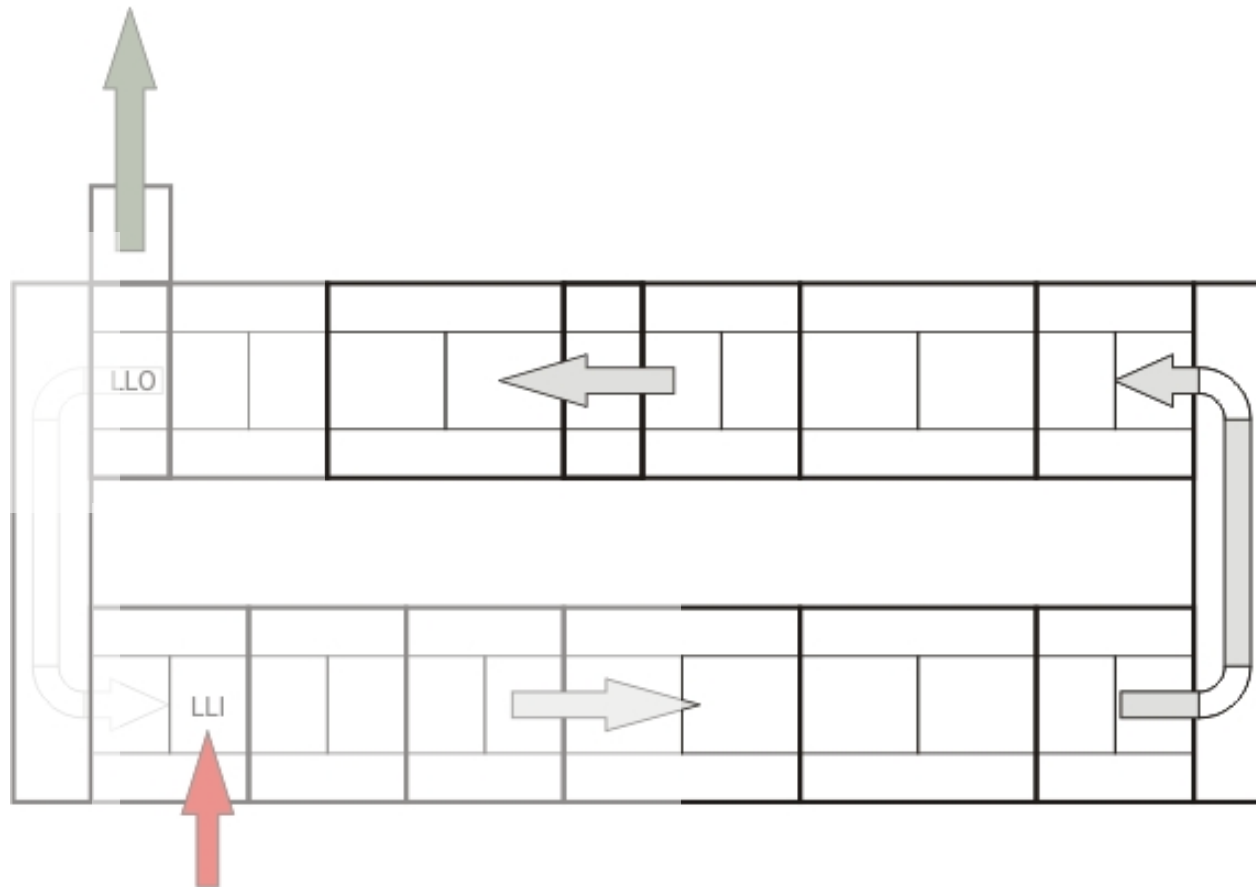
Step 6 - Deposition of a Barium & Aluminium layer → Cathode deposition

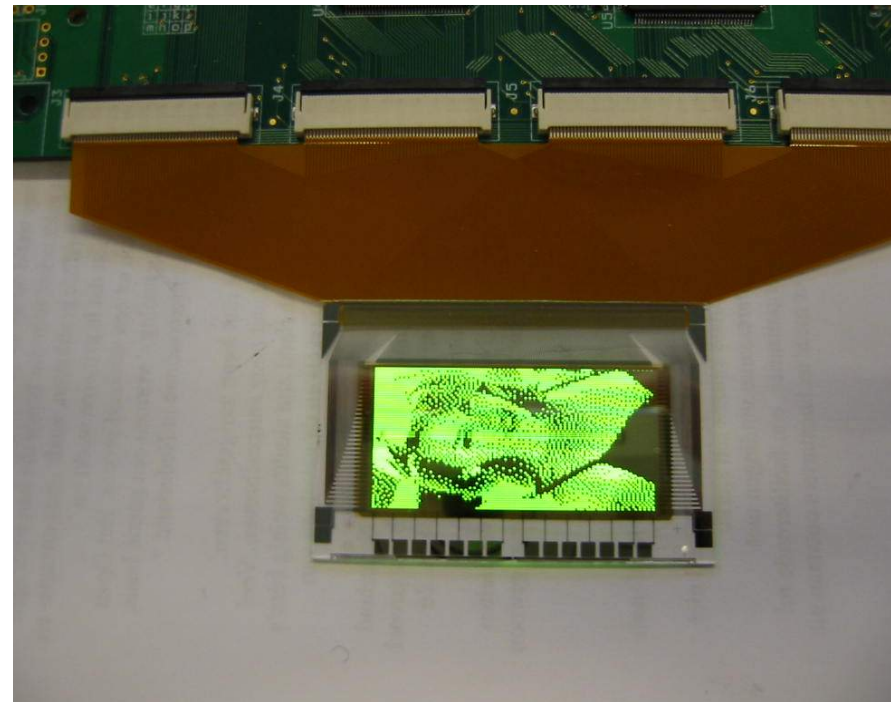
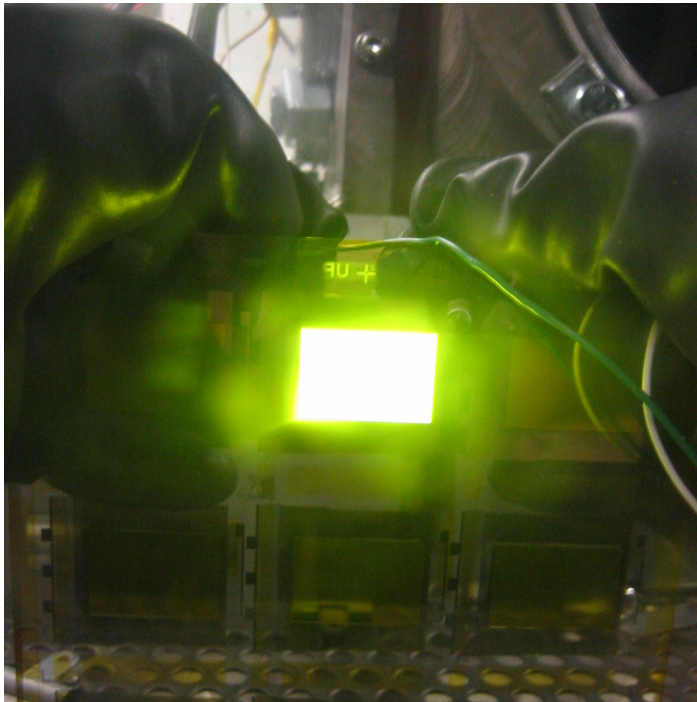
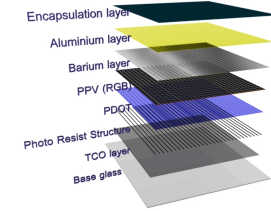






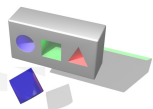
Step 7 - Deposition of a stack of layers → Thin film encapsulation

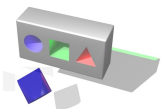
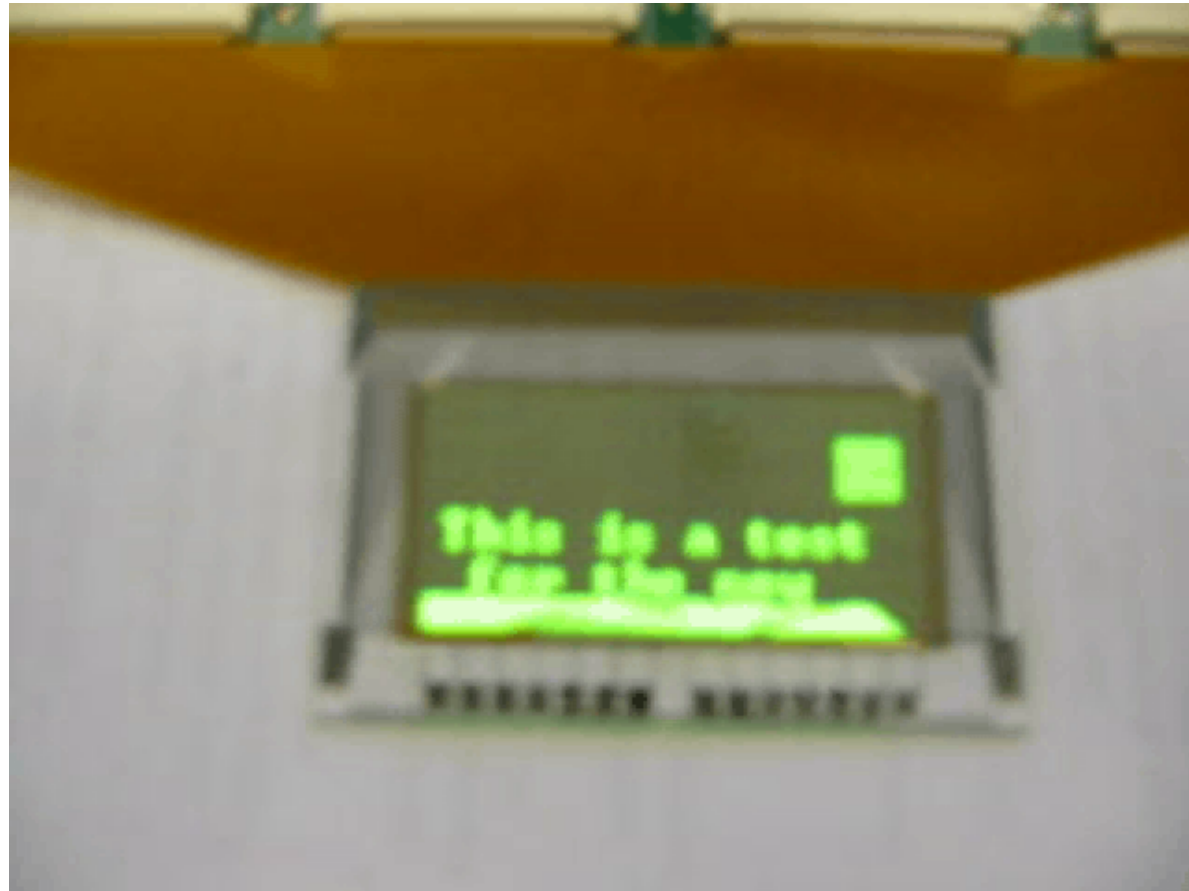
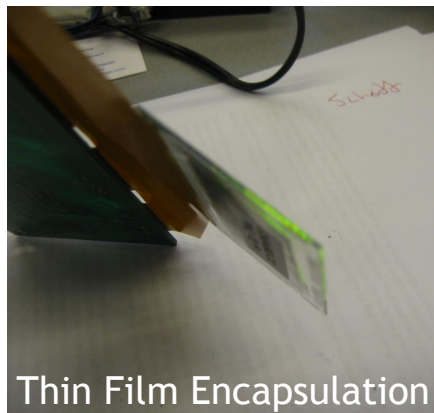
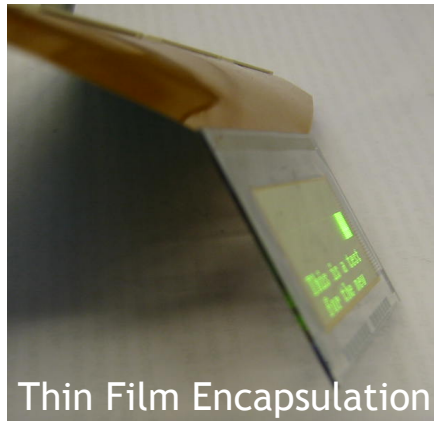
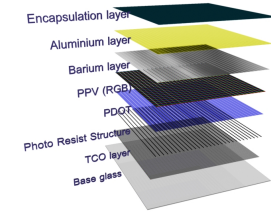




Specifications:

- 128 x 64 pixels
- 300  $\mu\text{m}$  square pixel size
- Thin Film Encapsulation







---

# THANK YOU

OTB Engineering B.V.

Luchthavenweg 10, 5657 EB Eindhoven

P.O. Box 7005, 5605 JA Eindhoven, The Netherlands

phone +31 (0) 40 2581700 fax +31 (0) 40 2509871

website [www.otb.nl](http://www.otb.nl)

e-mail [sales@otb.nl](mailto:sales@otb.nl)

