



Thin film layers for the upcoming micro-LED displays –  
the race never stops!

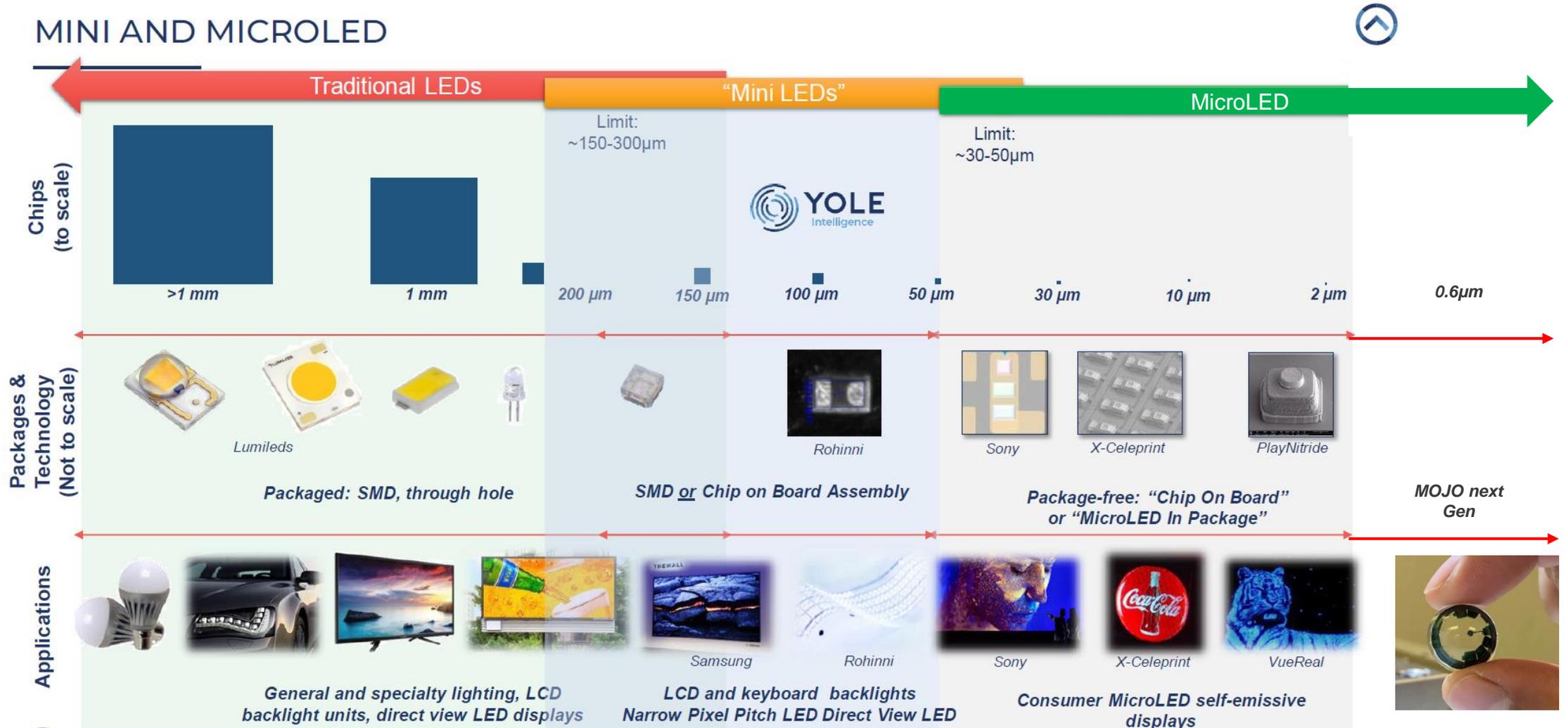
Franz Xaver Lenherr, Senior Product Manager, BU Optoelectronics,  
Evatec AG – Trübbach (CH)

THE THIN FILM POWERHOUSE

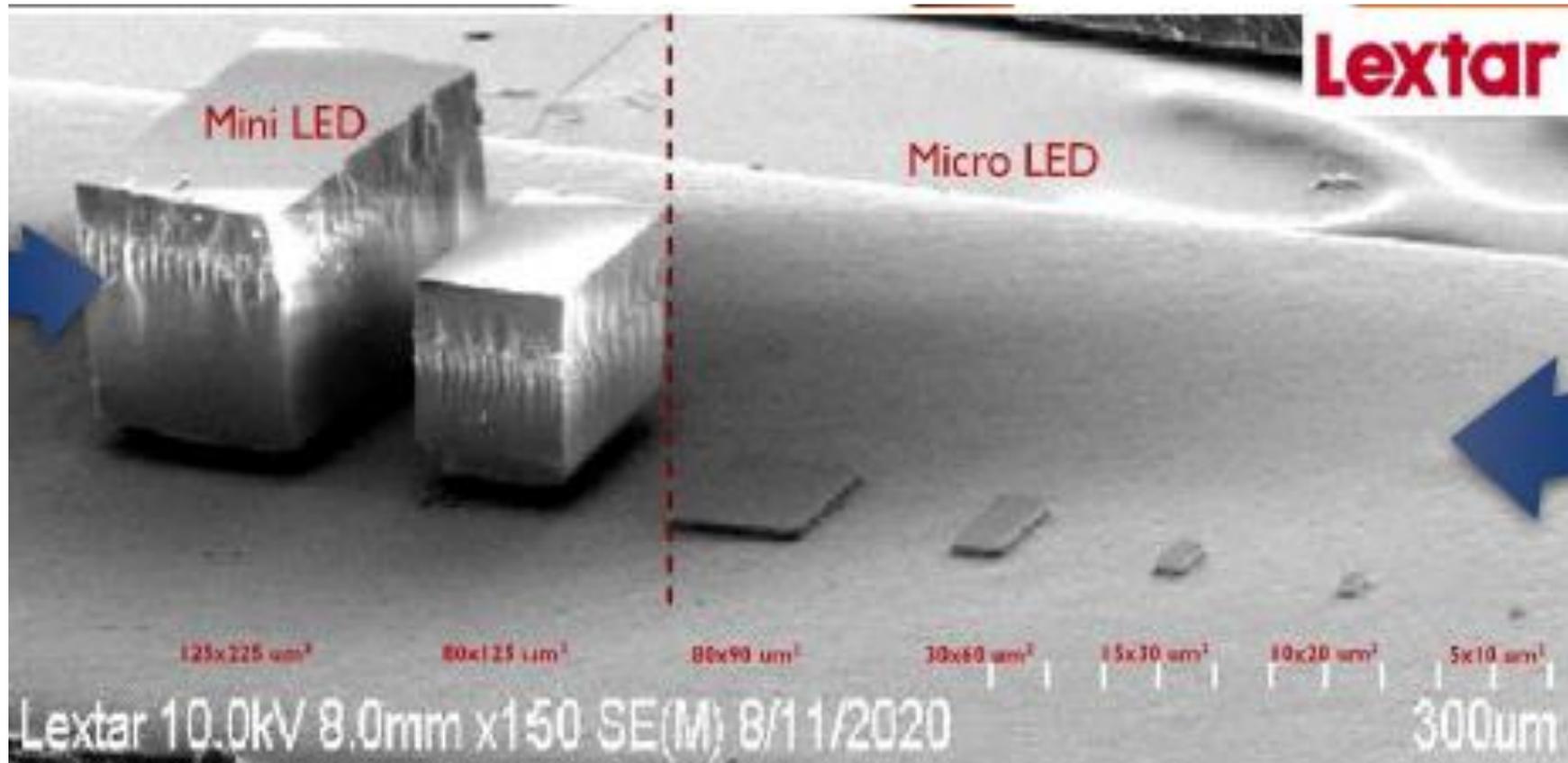
1	Market and technology	– where we are and where we heading for
2	Our contribution	– layers we deliver
3	Product portfolio	– a full range of production proven solutions
4	Evatec at a glance	– who we are
5	Questions	– visit us at our booth
6	Next generation evaporation	– meet the BAK 941

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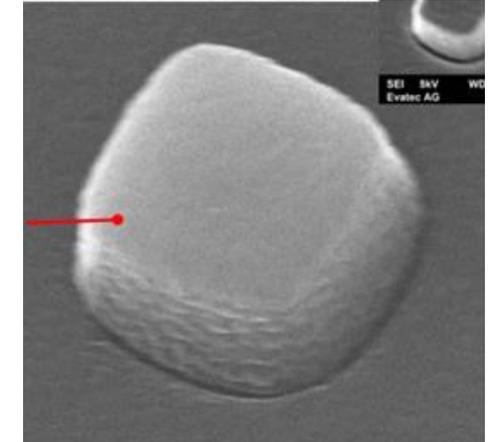
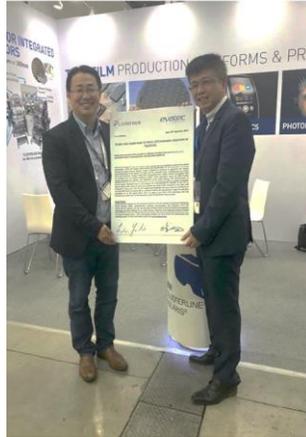
# MICRO-LED – SIZE COMPARISON FROM TRADITIONAL TO MICRO



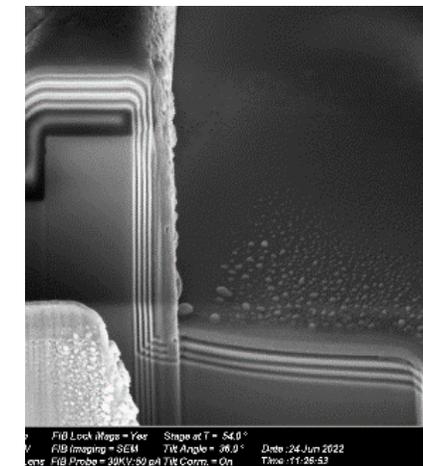
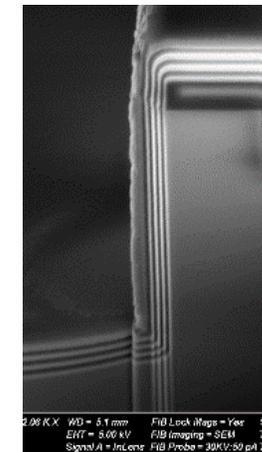
LED -> mini-LED -> micro-LED



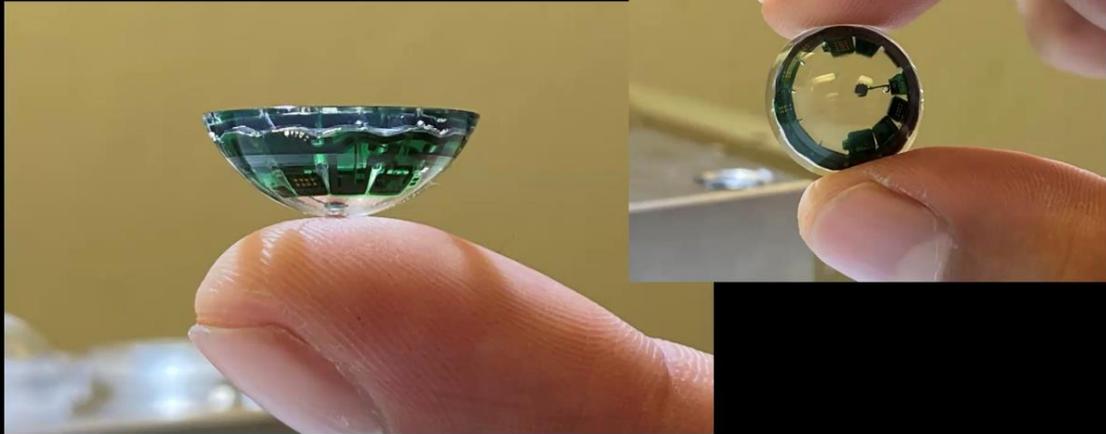
PLAYNITRIDE



Uniform side wall coverage by sputtering



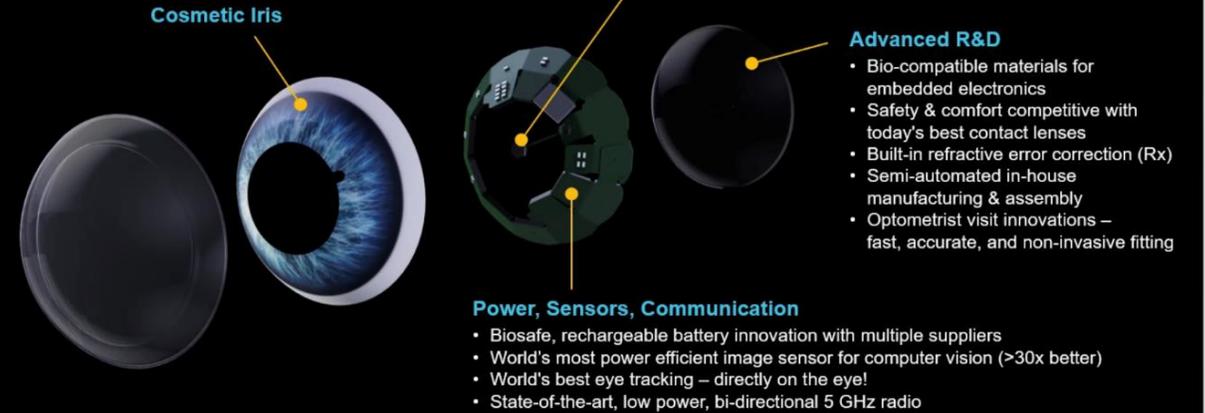
Feature Complete Mojo Lens



Mojo Lens – Architecture

**Smallest, Densest Dynamic Display Ever Made**

- 14K pixel-per-inch, monochrome
- 20K and 28K working on the bench
- Color display under development



# Mojo Vision Dynamic Display

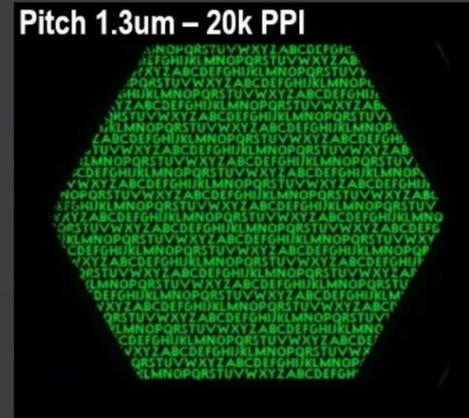
Pitch 6um – 4k PPI



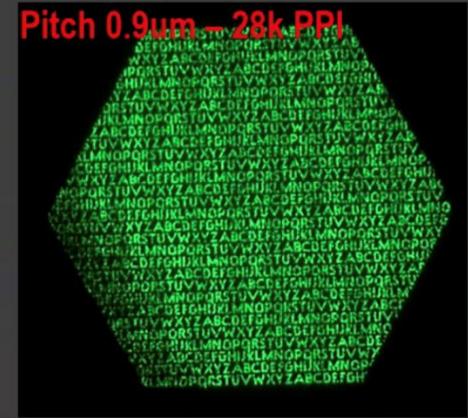
Pitch 1.8um – 14k PPI



Pitch 1.3um – 20k PPI



Pitch 0.9um – 28k PPI

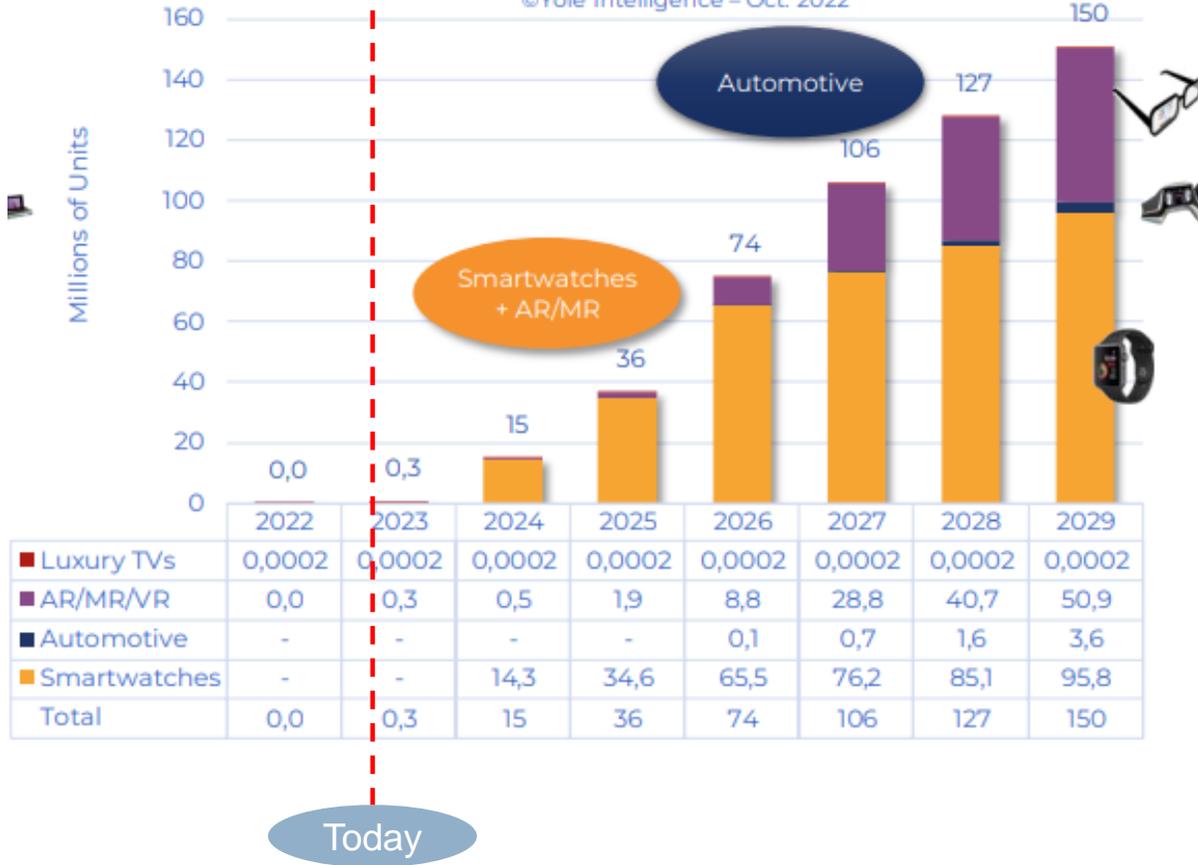


- World densest dynamic display
- High brightness for outdoor use
- Low power for all-day wearability
- **2<sup>nd</sup> generation in-house CMOS driver for display: unique in industry**

MicroLED Forecast – from conservative to aggressive – between 150 and 327 million panels in 2029

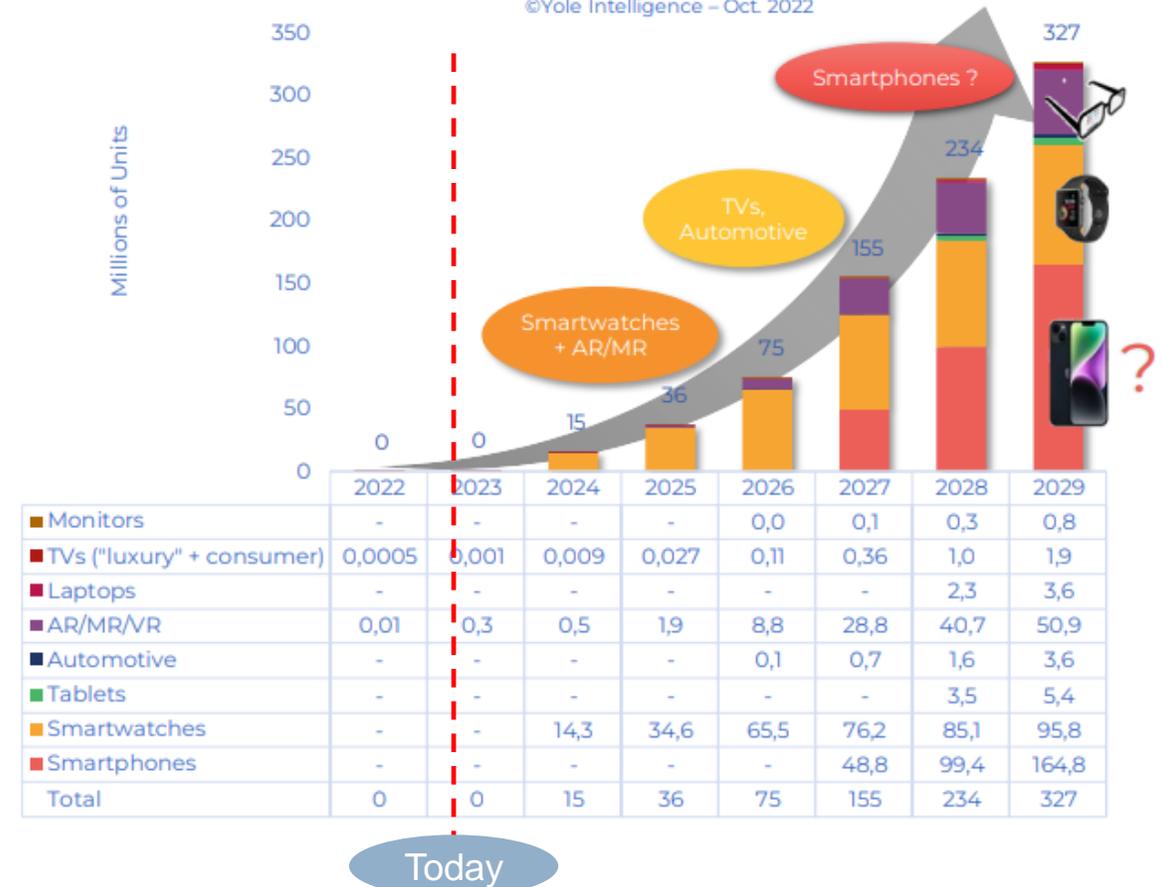
**MicroLED Panel Volume Forecasts - Conservative Scenario**

©Yole Intelligence – Oct. 2022

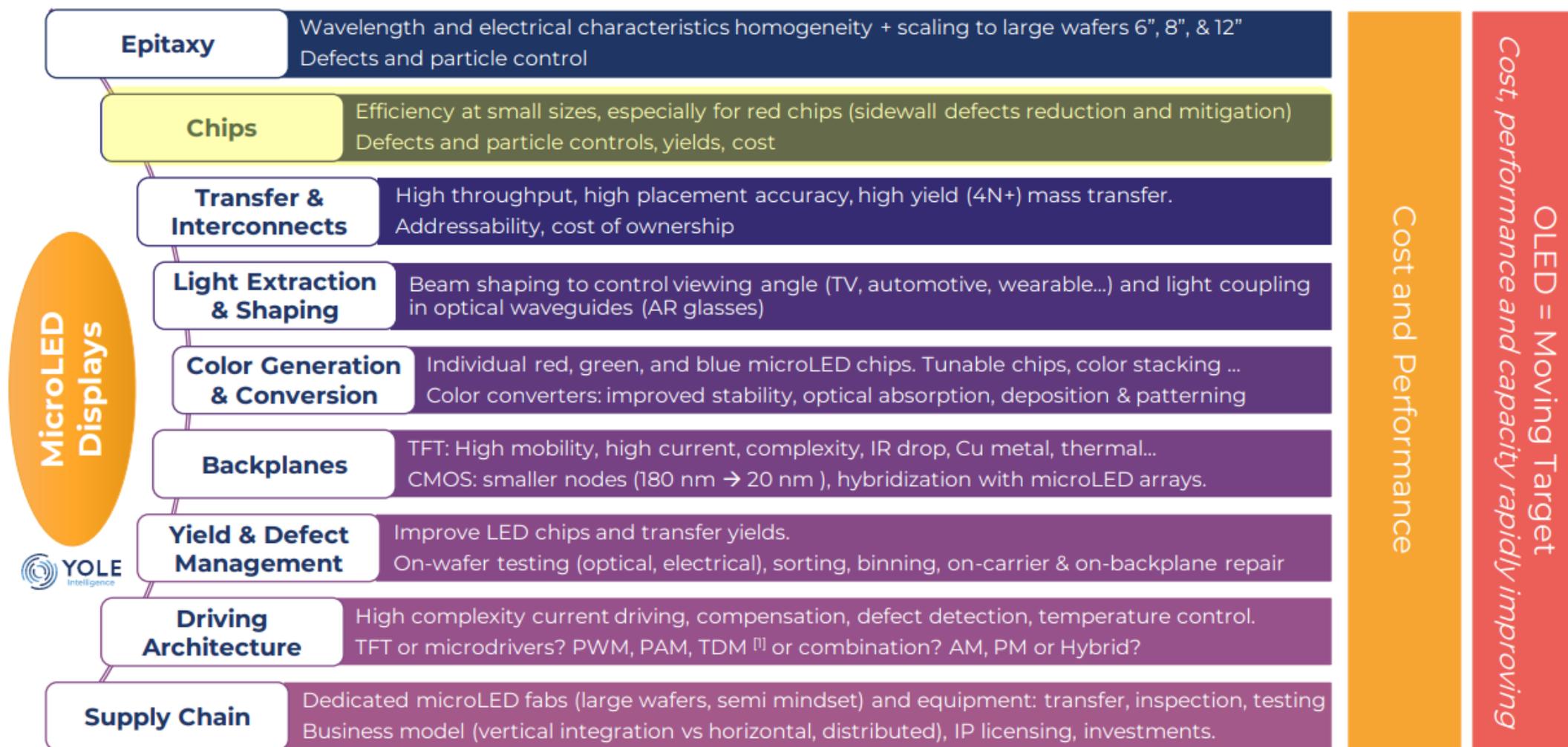


**MicroLED Panel Volume Forecast - Aggressive Scenario**

©Yole Intelligence – Oct. 2022



## TECHNOLOGY: OVERVIEW OF MAIN CHALLENGES

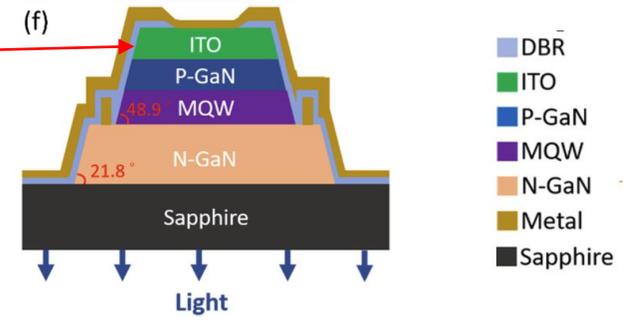
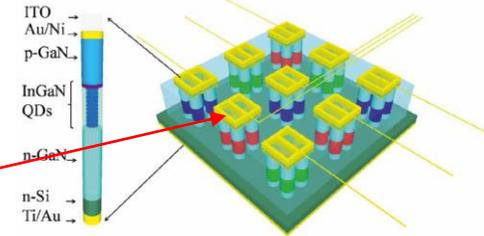


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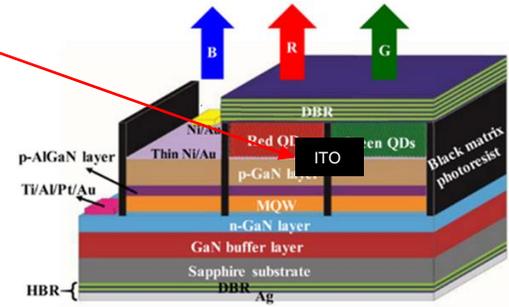
**ITO on top of p-GaN (low damage requirement)**

## Micro LED

**Monolithic nanowire technology**



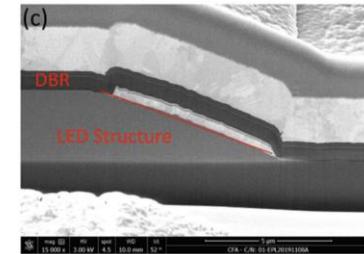
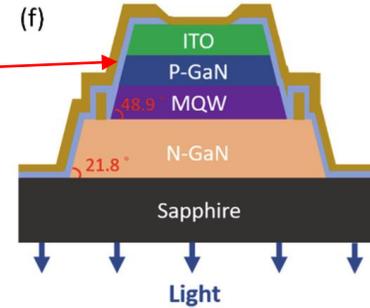
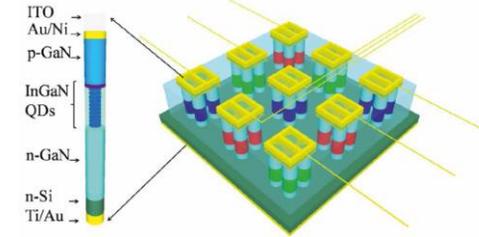
**Monolithic QD technology**



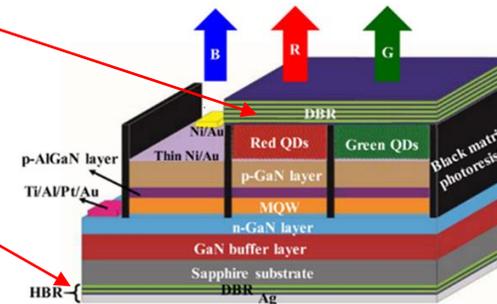
## DBR & Ag Mirrors

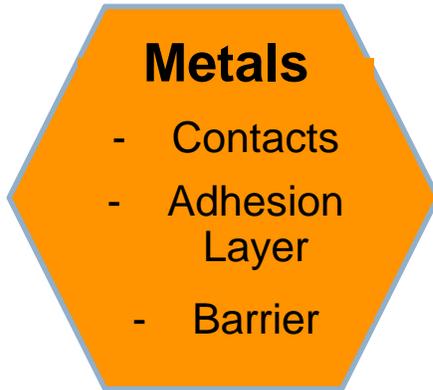
### Micro LED

**Monolithic nanowire technology**

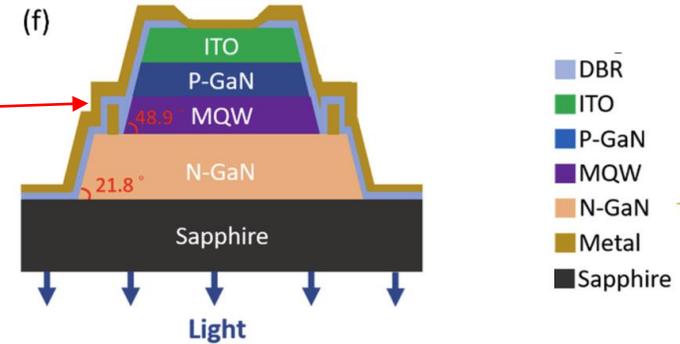
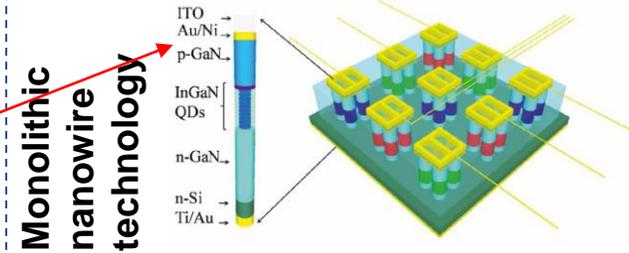


**Monolithic QD technology**

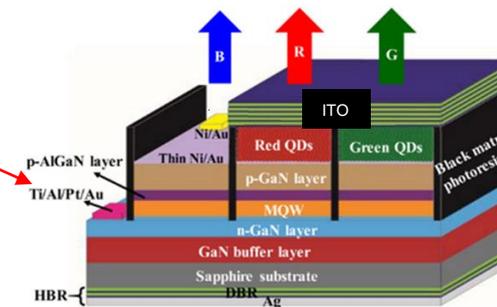




## Micro LED



**Monolithic QD technology**



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## BATCH



### BAK

Family of evaporators from 0.5 to 2 metres with wide range of process sources and with "Autoload" options



### LLS EVO II

Vertical sputter for metals, dielectrics, and magnetic films

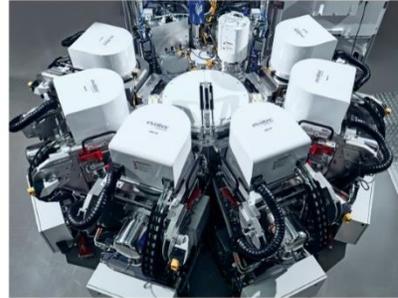


### MSP 1232

Batch sputter system for mass production of high precision optical stacks



## CLUSTER



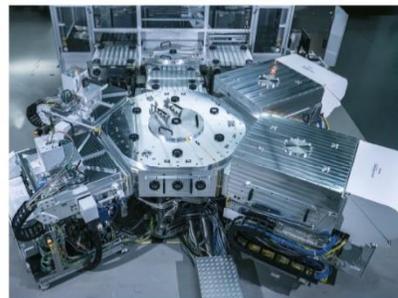
### CLUSTERLINE® 200

200mm cluster platform with configuration options for single substrate or batch processing



### CLUSTERLINE® 300

300mm cluster platform with configuration options for single wafer or dynamic processing in a batch module



### CLUSTERLINE® 600

FOPLP & IC substrate manufacturing on a cluster tool for panel handling up to 650x650mm

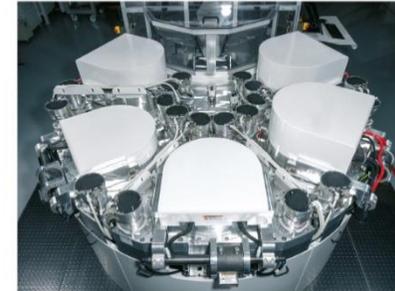


## INLINE



### HEXAGON

Your cost advantage in wafer level packaging processes



### SOLARIS®

Family of platforms for fully automated high speed inline sputtering in single substrate chambers

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**1000th**  
tool  
delivered  
under  
Evatec  
brand

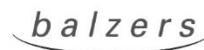
**1946**



**1960s**



**1980s**



**2000s**



**2004**



Founded

**2015**



**2022**



Headquarters in  
Trübbach, CH  
Global Headcount  
**≈ 640**

Assembly of  
**>40**  
systems  
simultaneously

**>3000m<sup>2</sup>**  
application laboratory down to  
ISO 4 with 30 tools, 30  
measurement techniques

**4 BUs**  
Advanced Packaging,  
Semiconductor,  
Optoelectronics & Photonics

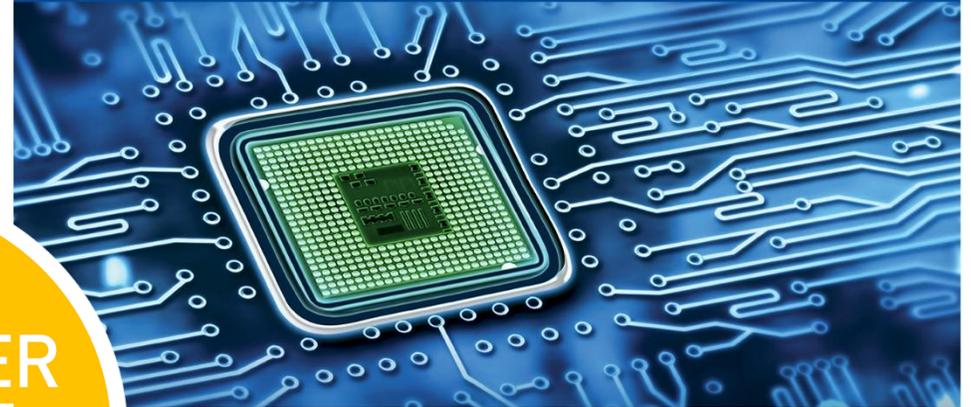
## ADVANCED PACKAGING

Wafer Level & Panel Level



## SEMICONDUCTOR

Power, MEMS, Wireless & FEI



**CUSTOMER SERVICE**  
Lifetime Partnership

## OPTOELECTRONICS

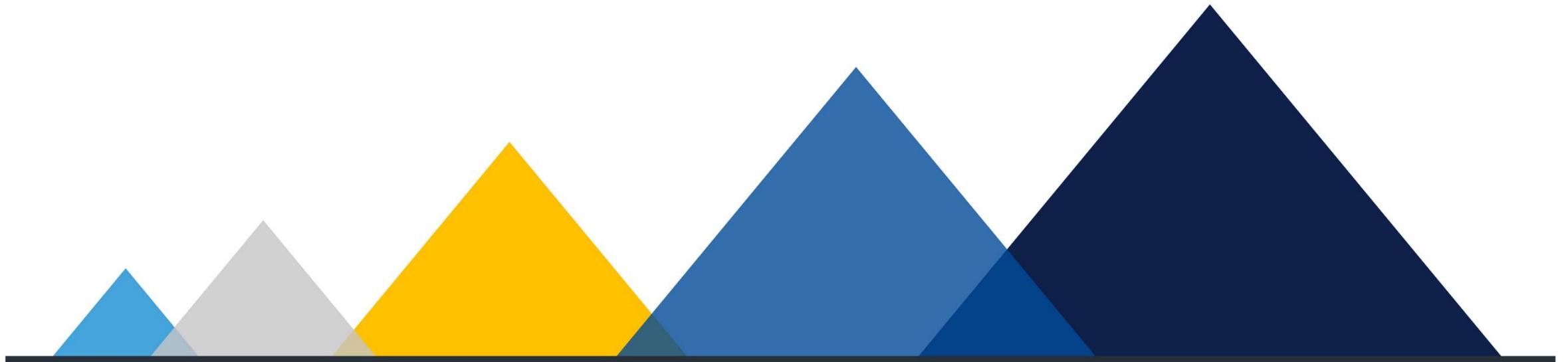
LED, Micro LED & LASER



## PHOTONICS

Filters, High Volume Optics





**2004**

Evatec Founded  
Sales: CHF 4m



**2005**

First full year  
Sales: CHF 12M



**2010**

Rapid growth Asia  
Sales: CHF 50M



**2015**

Oerlikon Systems  
acquisition  
Sales: CHF 127M

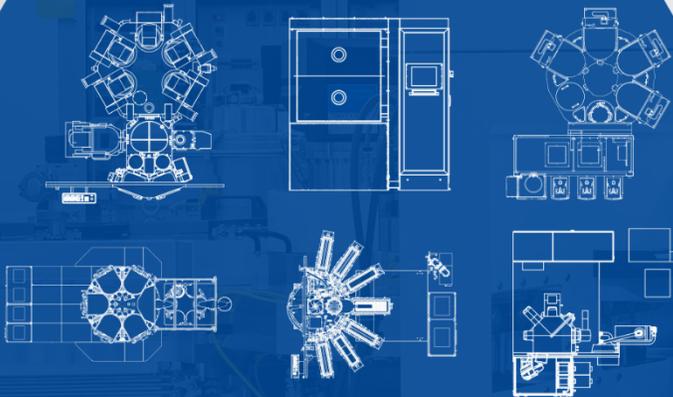


**2022**

Last financial year  
Sales: CHF 281M  
OI: CHF 417M



**Partnership achieves technology leadership**



**30 PROCESS TOOLS**

**15 CLUSTERLINE®**

**5 BAK**

**5 SOLARIS®**

.....

**PVD / PECVD / PEALD / ETCH**

**Substrate sizes up to 500mm**

**ECL** | EVATEC  
COMPETENCE  
LABORATORY

## OUR MISSION

Aiming to be number 1 in our chosen markets.

Working for the benefit of customers, employees and our partners whilst protecting the environment for the next generation.



## PEOPLE

Recruiting and developing our people



## IDEAS

Encouraging and supporting rapid innovation



## QUALITY

Getting it right first time every time

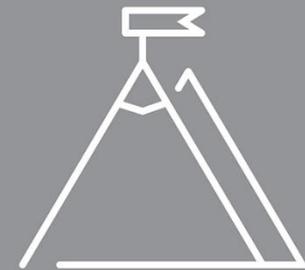


## CONTINUOUS IMPROVEMENT

Seeking and implementing new ways of working



Delivering the best customer value in the industry



## Our business is global...

Approx. 180 local technical staff  
(e.g FSEs & FAEs) supporting  
customers  
around the world out of  
15 sales & service  
organizations

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To get the movie about the Multi BAK –  
please feel free to contact me at:

[franzxaver.lenherr@evatecnet.com](mailto:franzxaver.lenherr@evatecnet.com)



LET'S SHAPE THE  
FUTURE TOGETHER