

SEMICON[®]
TAIWAN

HighTech NL
Taiwan experience
2022

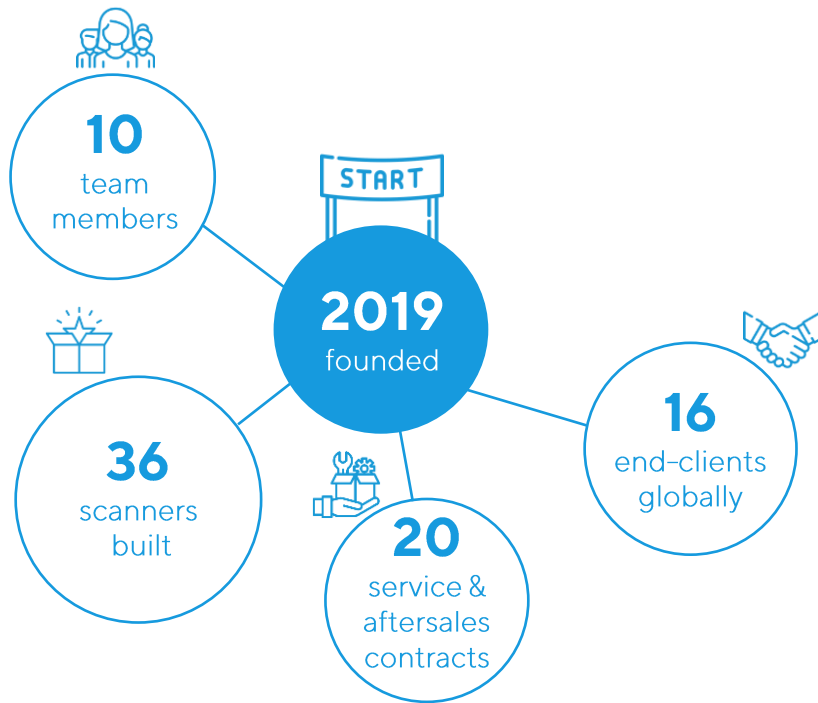
fastmicro
cleanliness control

**Introducing the new standard in surface
particle contamination measurements**

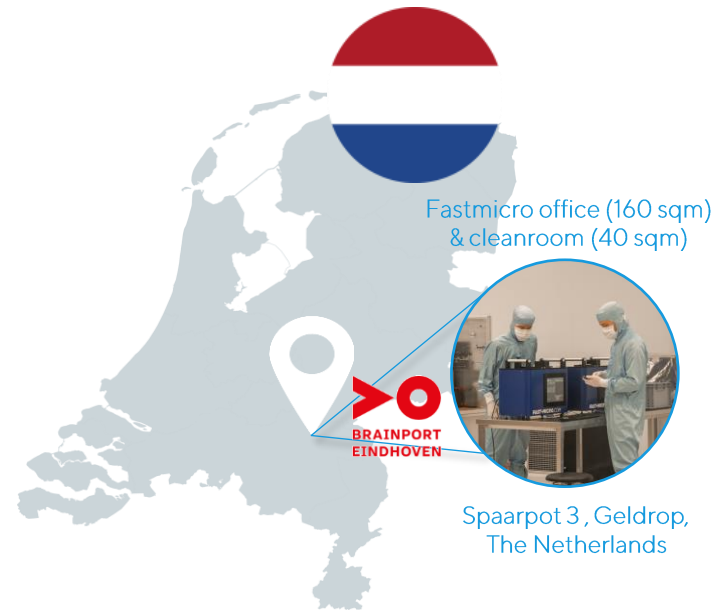
Erik Vermeulen, CEO Fastmicro
7th June 2023

Introducing Fastmicro

Facts



Presence



Core product portfolio

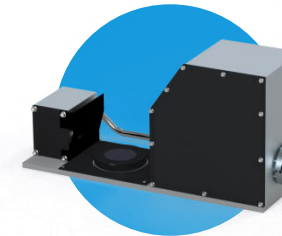


Sample Scanner

Product Scanner



Fallout Scanner



Clients

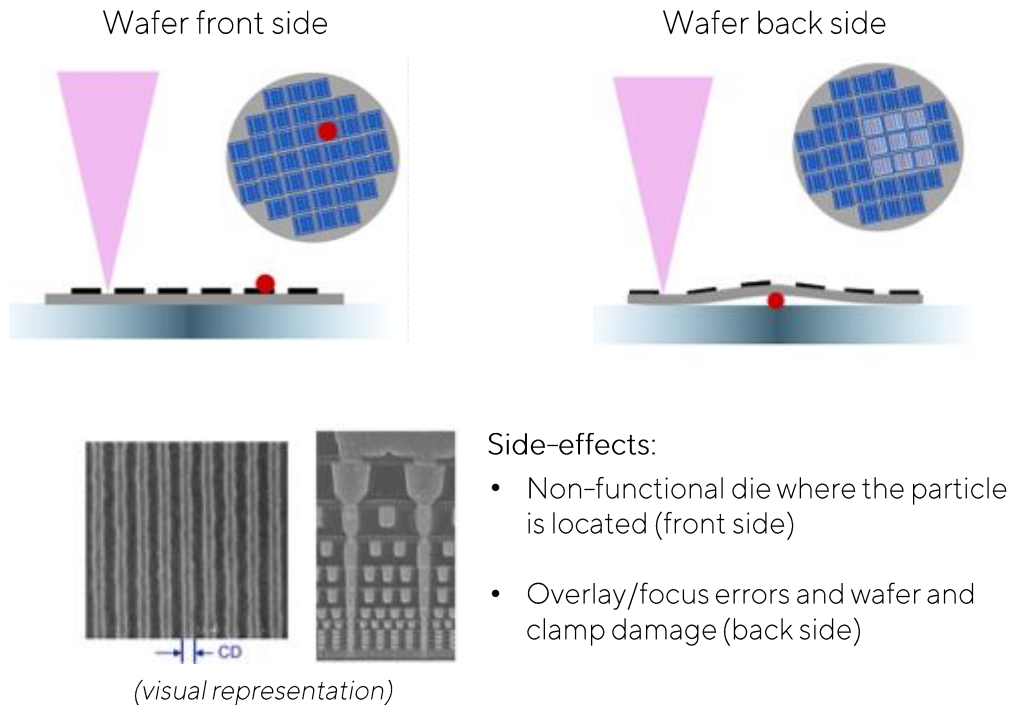


Seeing beyond



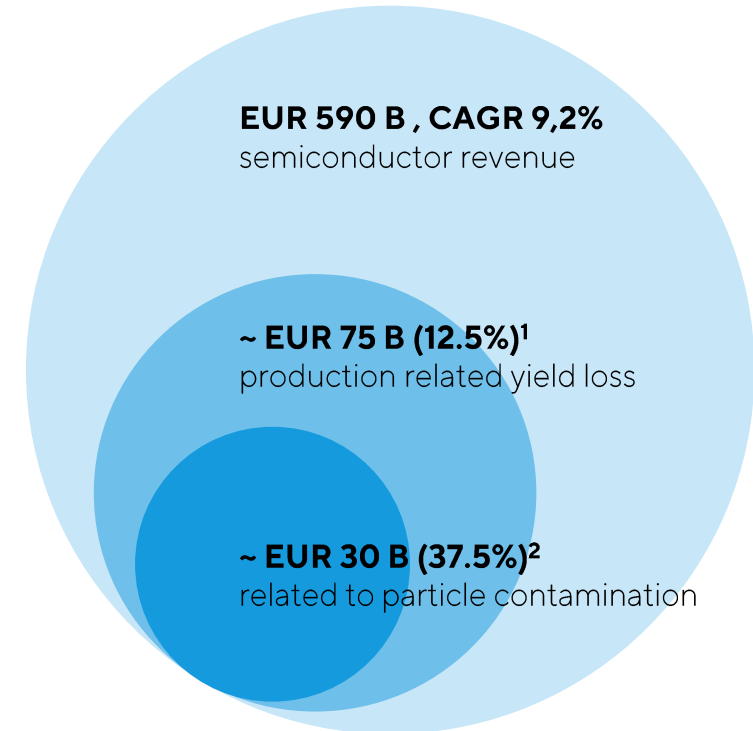
At least a **EUR 30 billion yield loss** annually in semiconductors due to particle contamination, driving the need for ultra cleanliness

Effects of contamination on semiconductor **wafers**



Cost of yield

(Output loss; Uptime Loss; Rework; Recalls)



1. Mid point between the estimated range of 5% to 20%. Sources: [link1](#), [link2](#), company estimates

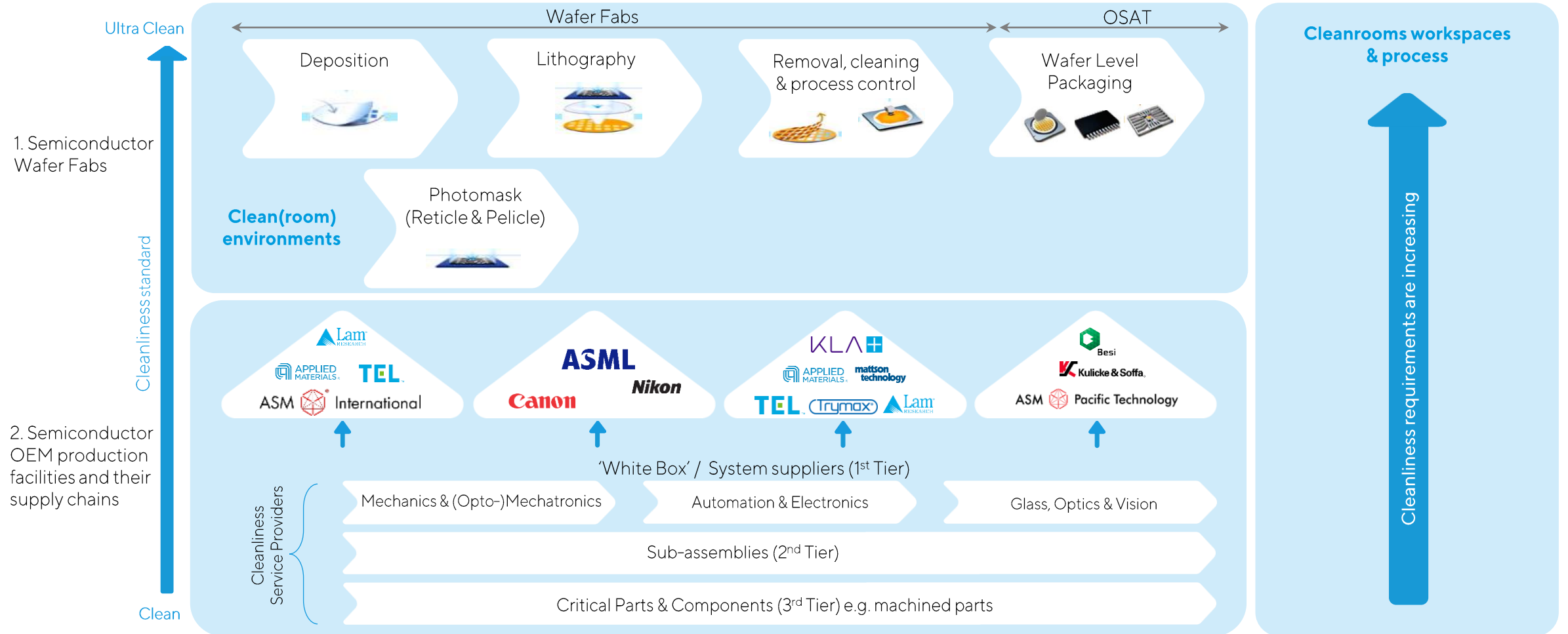
2. Mid point between the estimated range of 25% to 50%. Sources: [link3](#), [link4](#).

Why now: cleanliness is now required **everywhere** in the semiconductor value & supply chain

Application areas

Semiconductor Value and supply chain

(Simplified overview)

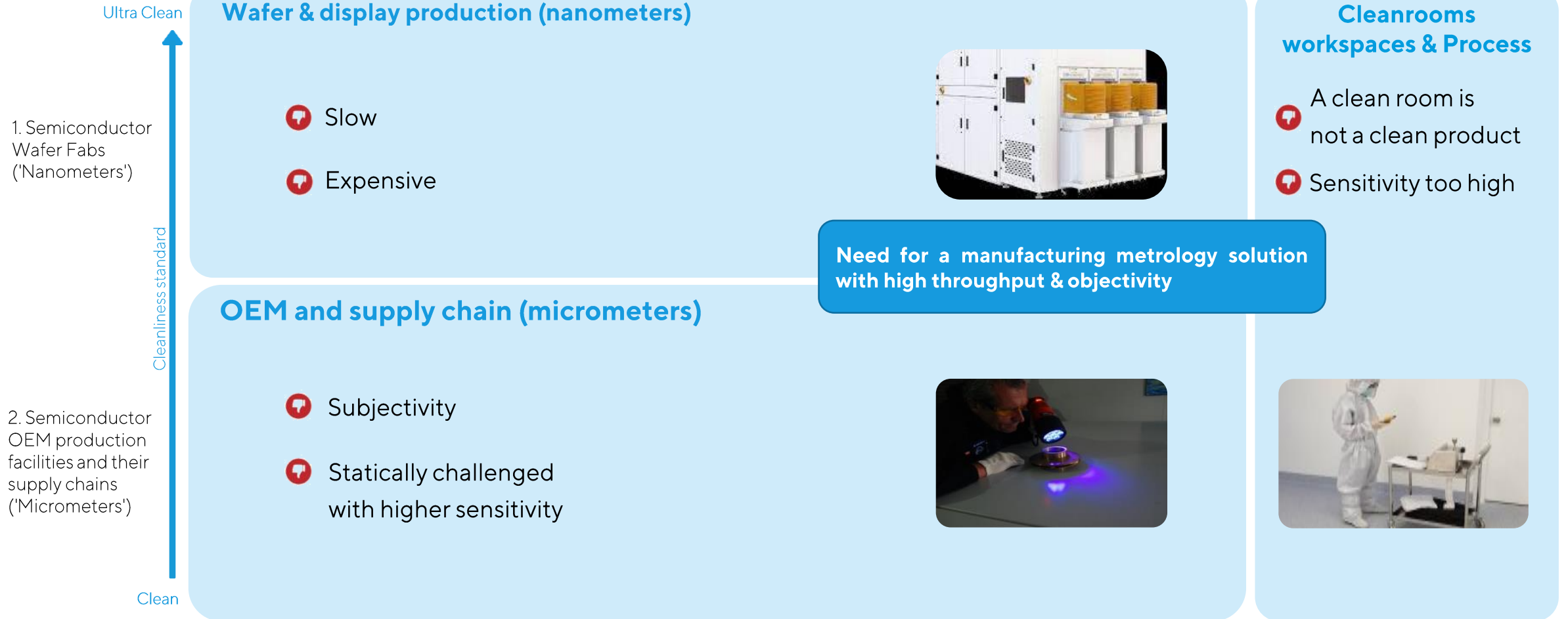


Current particle counting metrology slow & not effective enough

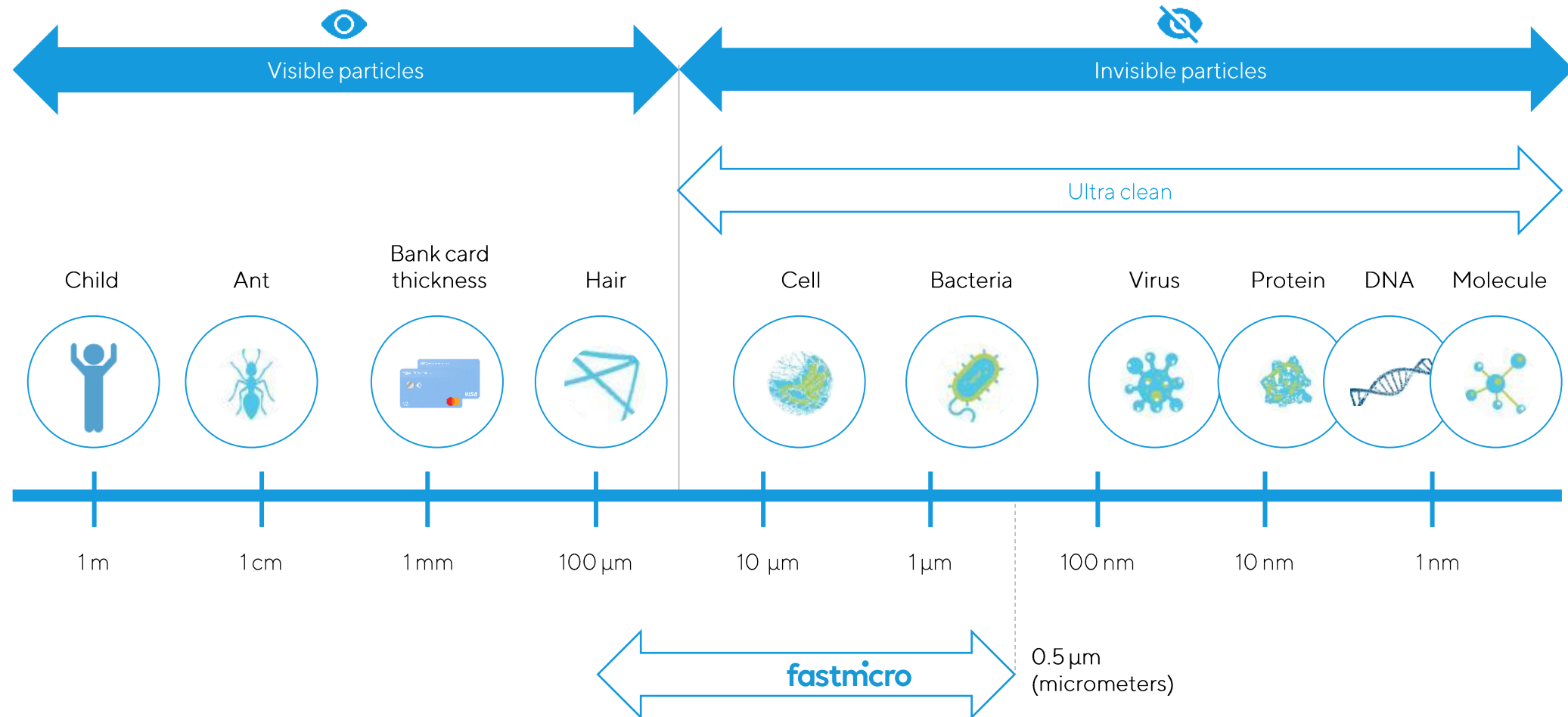
Application areas

Semiconductor Value and supply chain

(Simplified overview)



High Volume Manufacturing environments have to control particles **invisible to the human eye**



Source: Long-term measurement of ultrafine particles in the Urban and Rural Environment;
Dirk Felton, P.E. Research Scientist III

Fastmicro: The IoT sensor for surface particle contamination in the digital factory of the future

Current practices

Desired industry standard

Particle
measurement
method



**Airborne
Particles
Counters**



**Liquid
Particles
Counters**



**Lab
Scientist**

Key Persona

**Integrated metrology solution:
hardware + software + services**



**Surface
Particles
Counters**



**Factory
Operator**

Cleanliness process engineers' journey from interviews in the supply chain



**Airborne
Particles
Counters**

**Cleanroom
ISO14644-1**

From ISO 7-> 5

With airborne particle counters.

Cleanliness process engineers' journey from interviews in the supply chain



**Airborne
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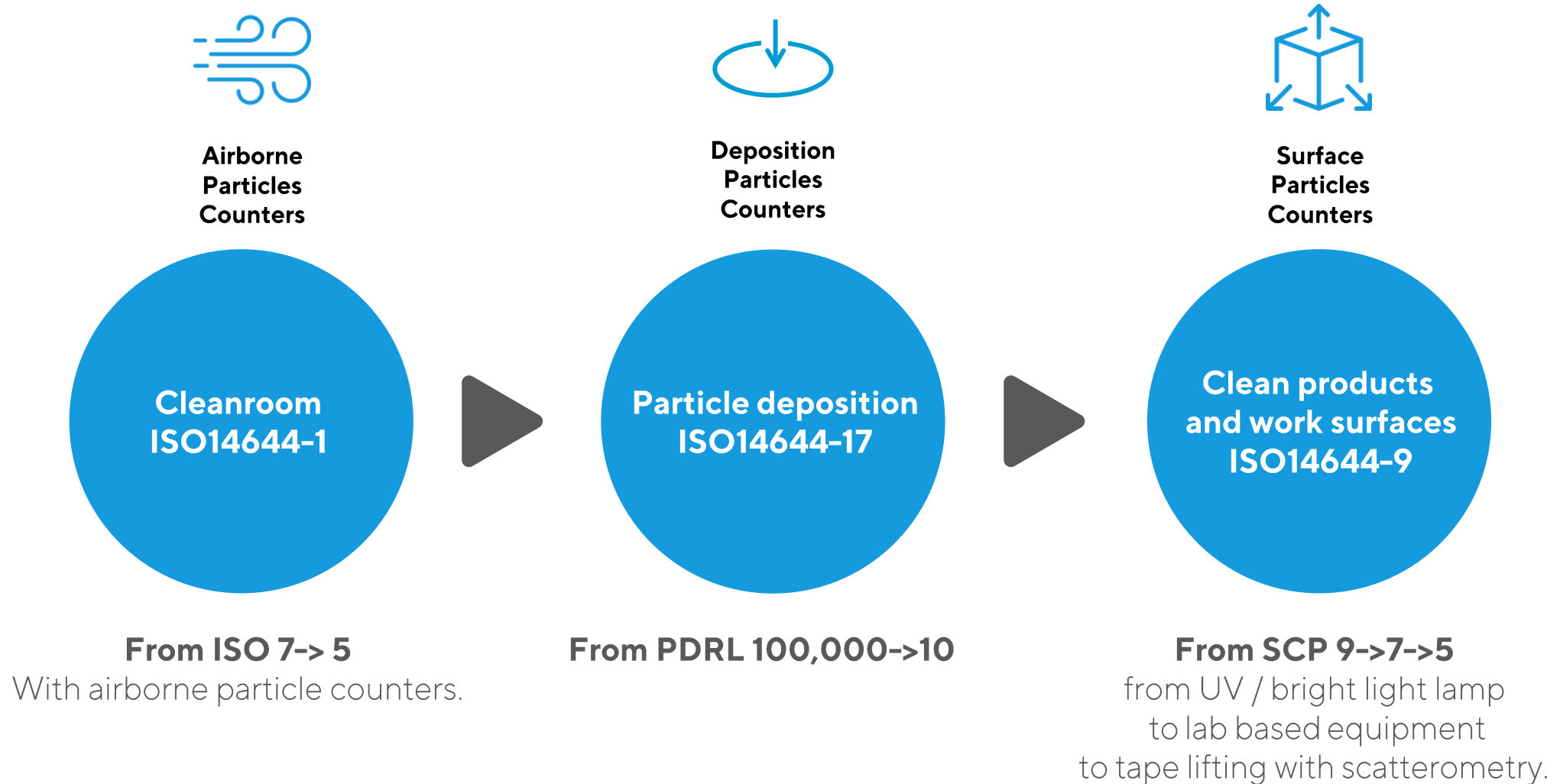
**Surface
Particles
Counters**

**Clean products
and work surfaces
ISO14644-9**

From SCP 9->7->5

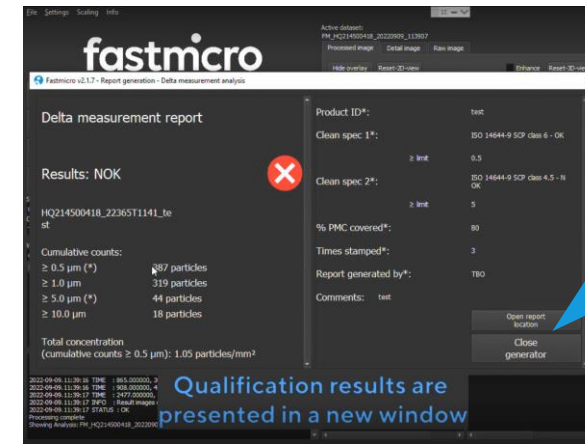
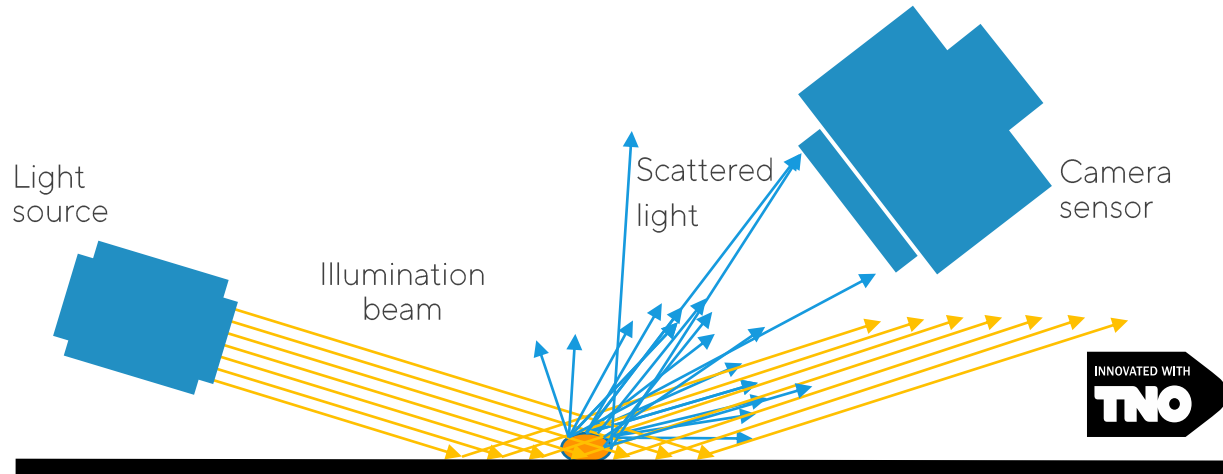
from UV / bright light lamp
to lab based equipment
to tape lifting with scatterometry.

Cleanliness process engineers' journey from interviews in the supply chain



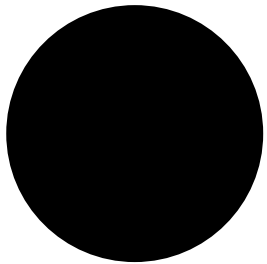
fastmicro

Unique and patent-protected technology set-up using scattered light to detect surface particles at microscale

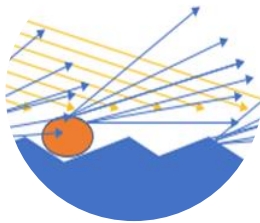


Operator independent processing and reporting of cleanliness results according to regulatory standards

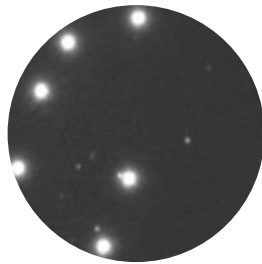
Design principles:



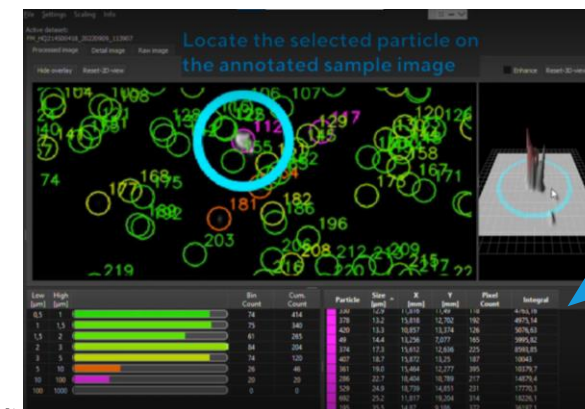
Dark environment



Smooth surfaces



Size calibration on PSL shape & optical properties, according to the NIST standard



Smart inspection of particles of interest to improve cleanliness strategy

Service offer building blocks

1

Preventive maintenance & calibration
To secure (synchronised) performance

2

On-site repair SLA
Fast response time (5 days)

3

Swop and repair SLA
Very fast response time (3 days)

Benefits Fastmicro measurements at microscale



Fast

Imaging in
seconds



Quantitative

Measurement
and qualification
reports



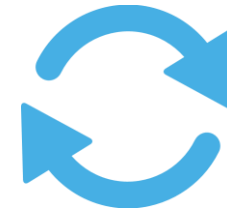
Easy to operate

Operator
independent



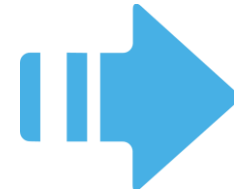
Accurate

High-resolution
measurement
(quantity,
position, size)



Consistent

Objective
measurements,
time after time



High throughput

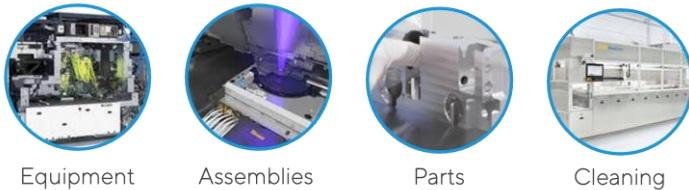
Processing in
less than a
minute

Product offering covering the entire semiconductor value & supply chain

Sample Scanner



Applications:



Semiconductor & value chain focus area:

Wafer & display production

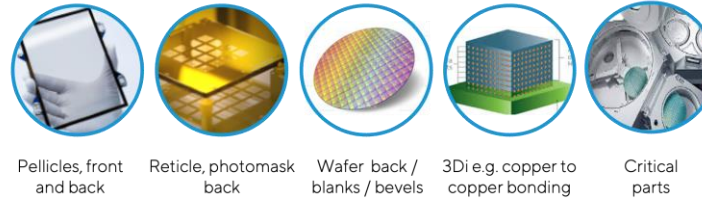
OEM and supply chain

Cleanrooms
workspaces &
process

Product Scanner



Applications:



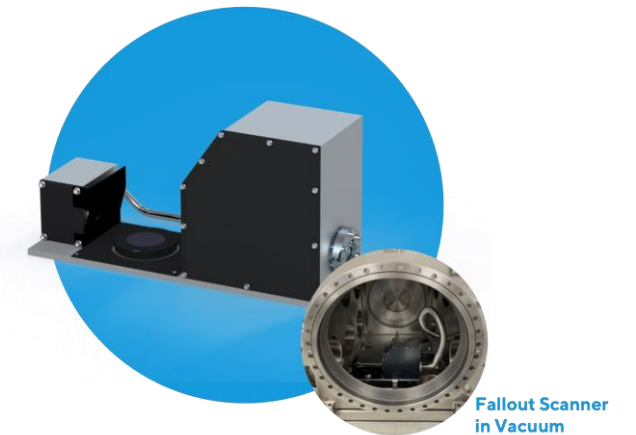
Semiconductor & value chain focus area:

Wafer & display production

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Cleanrooms
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Fallout Scanner



Applications:



Semiconductor & value chain focus area:

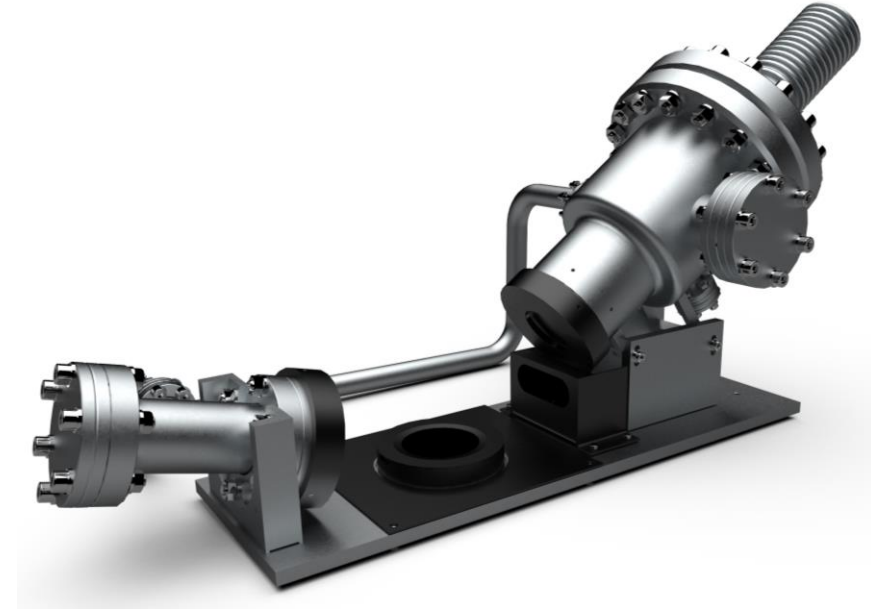
Wafer & display production

OEM and supply chain

Cleanrooms
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process

Particle Fallout Scanner for continuous monitoring of particle deposition in **ambient** or **vacuum**

fastmicro



Easy to operate

Operator independent



Accurate

High-resolution measurement
(quantity, position, size)



Consistent

Objective measurements,
time after time

Industry leader semicon litho supports our core technology



Fastmicro has transformed our inspection capability business significantly. Before migration to this new inspection tool, **we saw a 50% variation** in the particle count measurements. This is **now reduced to less than 10%** in combination with a particle detection limit that went down significantly by more than one order of magnitude to **0.5 micrometer**. We have confidence in the Fastmicro scanner to help us with finding an excellent quantification of the surface cleanliness of critical parts.

As valued customer, I know that the integration of Fastmicro, has allowed us to **reach our required machine defectivity performance**.

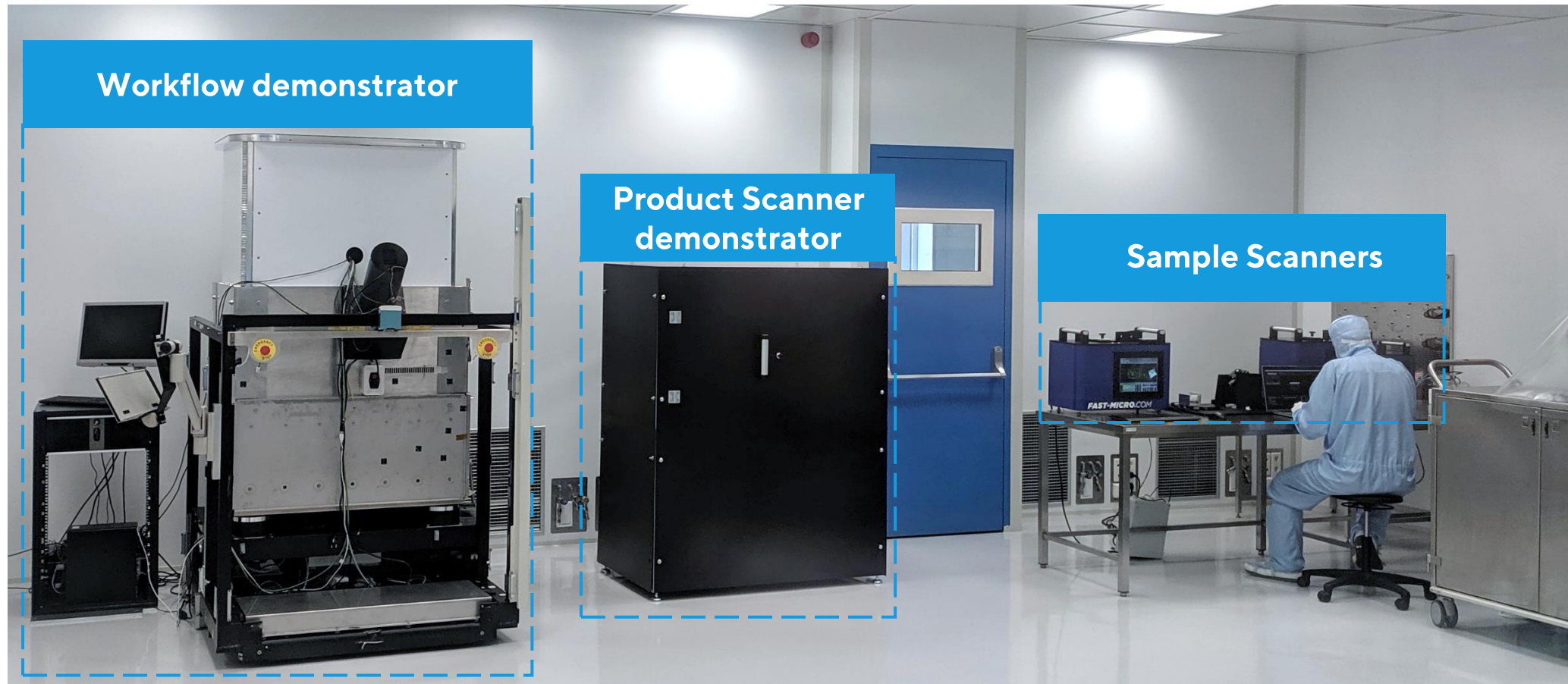
Besides **accurate measurements**, the tool offers **ease of use** and **high throughput** features. We appreciate the **professional service and collaboration** with Fastmicro to extend the capabilities of the tool further in the future.

Dr. Ir. L.H.A. Leunissen
ASML, cleanliness project manager



Demo lab for product development and customers testing

Fastmicro cleanroom in Geldrop, the Netherlands



fastmicro



LeadinWay

緯利股份有限公司



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Dutch-Taiwan collaboration

- Leadinway partnership for regional expertise and service
- Innovations of Fastmicro to benefit sustainability through yield improvement in Taiwan (and China)
- In micro technology, with focus on semicon and display

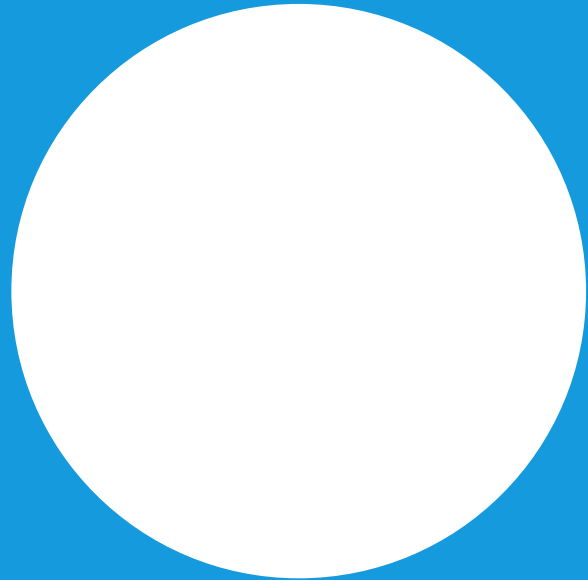


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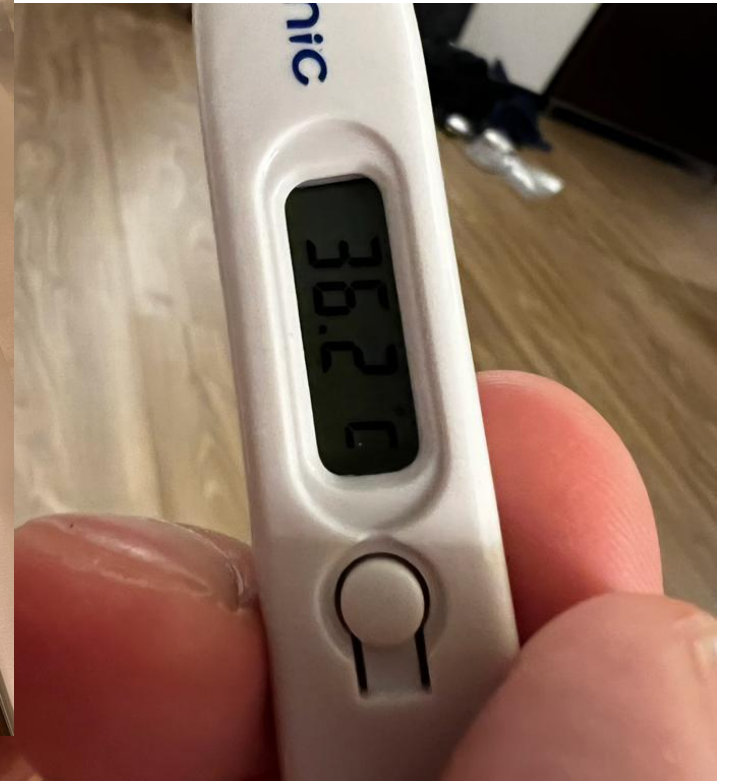
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cleanliness control

Taiwan summary

September 2022

2022: 3 days quarantine, masks and checks

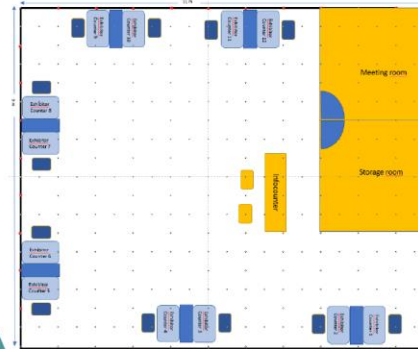


fastmicro Tradeshow



SILICON EUROPE JOINT BOOTH

BOOTH VISUALISATION:



Fab visit



Our business partner

