PANOPTES
Virtual Metrology

GAUSS LABS

Let AI predict your process outcomes.

Publications

Sawadwuthikul G., et al. "High-performing virtual metrology with group-wise feature transformation and advanced data aggregation techniques." SPIE Advanced Lithography & Patterning (2025)

Park W., et al. "A grid mapping-based U-net algorithm for photolithography overlay virtual metrology." SPIE Advanced Lithography & Patterning (2025)

Lee J., et al. "The Value of In-Line Metrology for Advanced Process Control." 35th Annual SEMI Advanced Semiconductor Manufacturing Conference (ASMC) (2024)

Shin M., et al. "Model aggregation for virtual metrology in high-volume manufacturing." SPIE Advanced Lithography & Patterning (2024)

Zabrocki S., et al. "Adaptive Online Time-Series Prediction for Virtual Metrology in Semiconductor Manufacturing." 34th Annual SEMI Advanced Semiconductor Manufacturing Conference (ASMC) (2023)

Download our white paper

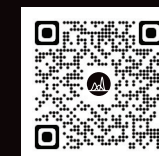### *Real-Time Insights Into Your Manufacturing Process*

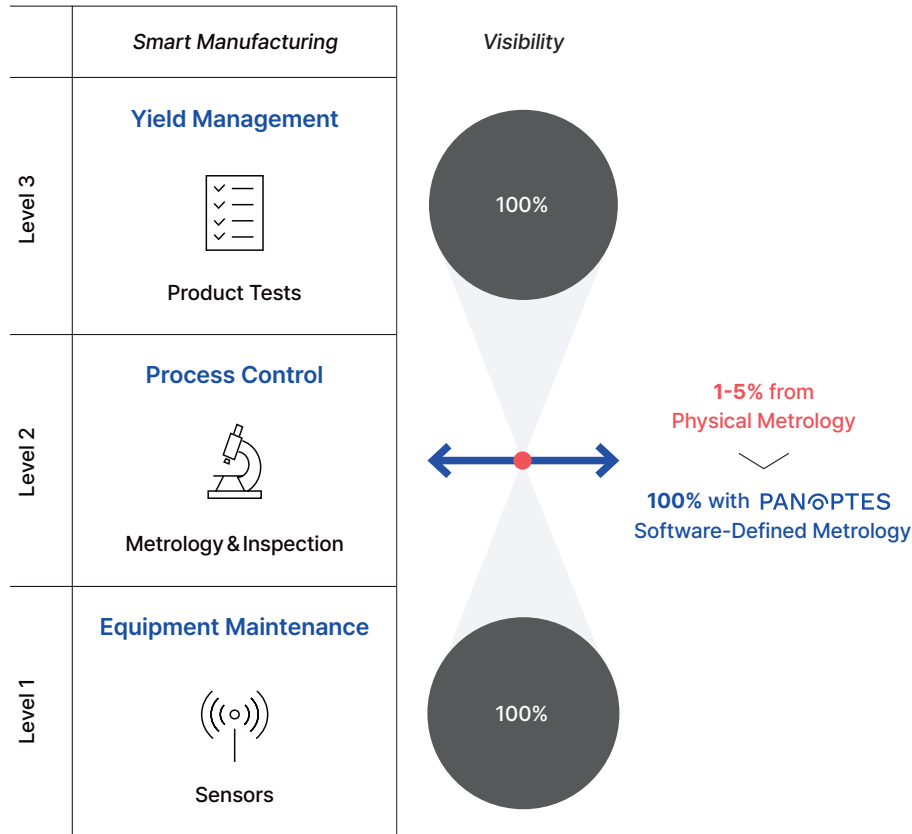Optimize the manufacturing process with full visibility enabled by AI-driven virtual metrology

Link 🔗

Real-Time Insights Into Your Manufacturing Process

Website

LinkedIn

Contact us at **solutions@gausslabs.ai**

Panoptes VM makes in-line processes visible with software-defined metrology.

	Smart Manufacturing	Visibility
Level 3	**Yield Management** Product Tests	100%
Level 2	**Process Control** Metrology & Inspection	
Level 1	**Equipment Maintenance** Sensors	100%

1-5% from Physical Metrology

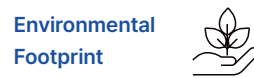100% with PANOPTES Software-Defined Metrology

Cost
Save CAPEX & OPEX for hardware equipment & sensors
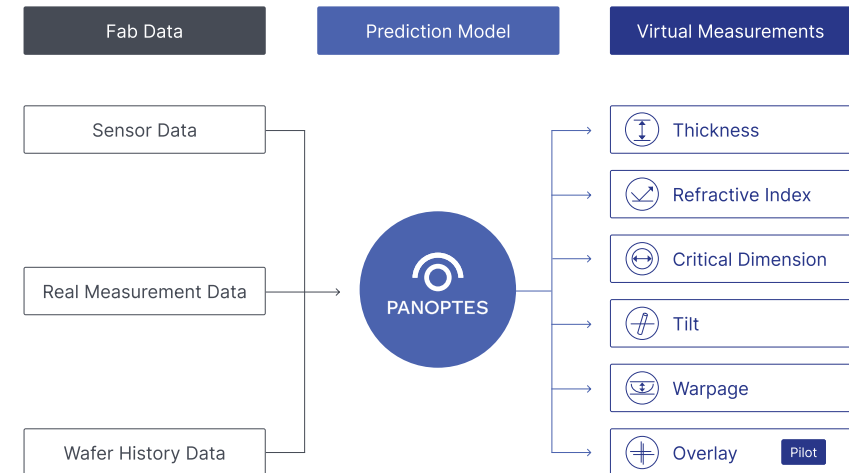
Space & Time
Reduce equipment footprint & delay in queues

Environmental Footprint
Conserve energy and carbon for metrology & inspection

Panoptes VM provides post-process measurements for all wafers.

Fab Data | Prediction Model | Virtual Measurements

Sensor Data

Real Measurement Data

Wafer History Data

PANOPTES

Thickness
Refractive Index
Critical Dimension
Tilt
Warpage
Overlay — Pilot

Panoptes VM covers various processes and measurands.

Deposition	Diffusion	Etching	Photolithography — Pilot
Thickness	Thickness	CD	CD
RI	Mass	Tilt	Overlay
Warpage	Rs	Subloss	

Customer Reference

SK hynix has adopted Gauss Labs's AI-based virtual metrology solution in their high-volume manufacturing fabs to predict process outcomes. Connected to real-time wafer-to-wafer recipe control systems, Panoptes VM reduced process variability by 29% on average and improved yield as well.

"Virtual metrology spares physical measurements and, instead, predicts the quality of products that have not been sampled by leveraging machine-generated data such as equipment sensor data."

D.H. Noh

"When Panoptes VM gets connected to process control such as APC, the process variability decreases and the yield increases."
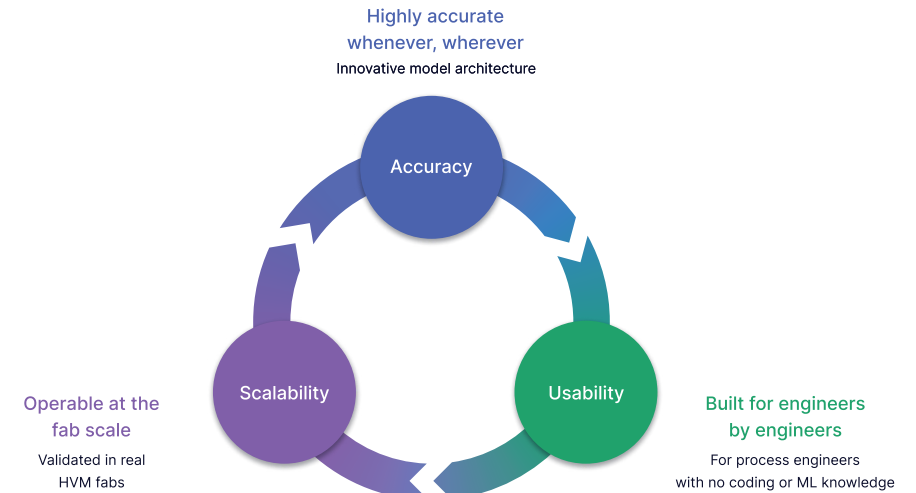
H.K. Jeong

* D.H. Noh is a technical leader in the AI/DA Solution Development Team at SK hynix
* H.K. Jeong is a technical leader in the Thin Film Technology Strategy Team at SK hynix

Source : SKhynix NEWSROOM

Strengths of Panoptes VM

Highly accurate whenever, wherever
Innovative model architecture

Accuracy

Scalability

Usability

Operable at the fab scale
Validated in real HVM fabs

Built for engineers by engineers
For process engineers with no coding or ML knowledge

Product Concept

Panoptes VM is built as a Pupose-Specific Automatic Learning Machine (PSALM).

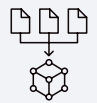|		
	Purpose-Specific	It is specifically developed for virtual metrology in manufacturing with our proprietary algorithms.
	Automatic	It enables easy model creation and management with automatic functions.
	Learning Machine	It operates hundreds of thousands of models in real time in high-volume manufacturing (HVM) environments.

Learn more about PSALM

Features of Panoptes VM

Model Setup

- Input data setup
- Product & operation grouped modeling
- Multi-step modeling
- Data wrangling
- Prediction time control

Model Management

- Automatic feature & model selection
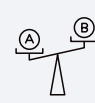- Automatic model update

Analysis

- Performance metrics
- Prediction explainability
- Model comparison

Publishing

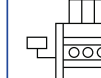- Publishing to multiple destinations
- Publishing safeguard

Use Case

Process Control	Process Monitoring
Metrology Optimization	Equipment Maintenance