

AI in Semiconductor

Dr. Thomas Altenmüller, SEMICON Europa, November 11, 2026

Public

AI in semiconductors is much more than GenAI



Plan
Sense & Shape Demand

- Demand Sensing
- Demand forecasting
- Capacity & Allocation

Source
Secure Supply

- Supplier Intelligence
- Risk sensing
- Material/equipment availablity

Make
Run & Learn

- Defect Classification
- Process Control & Vitual Metrology
- Predictive maintance
- Knowledge assistants for maintance
- Scheduling & Dispatching

Deliver
Commit & Serve

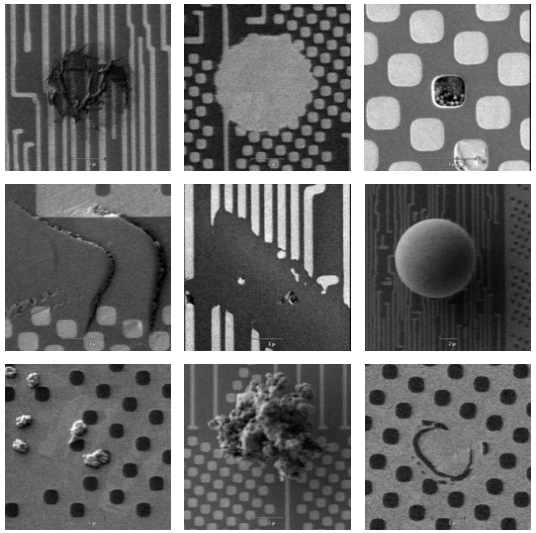
- Inventory / ATP
- ETA / logistics
- Customer Service

AI is becoming a horizontal capability across the semiconductor operating model.

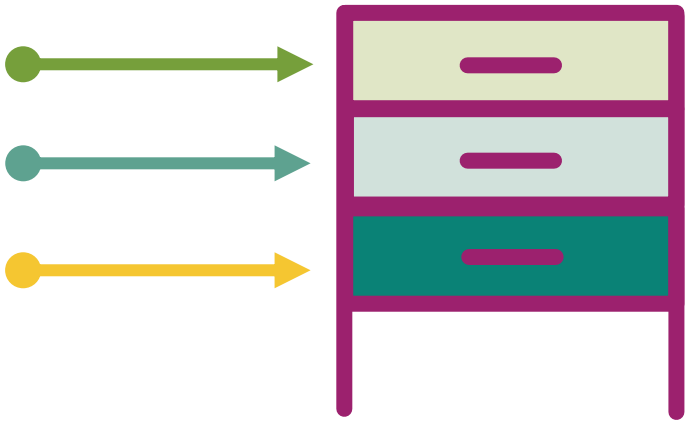
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AI in manufacturing today: AI-Powered Wafer Defect Classification

Advanced Analytics



Wafer defect images



Classification by defect type



AI identifies the defect

Reduced manual effort | Faster analysis | Higher yield

Status: Fully established

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AI in Manufacturing today: Chatbots at shop floor level

Equipment maintenance TALK uses **generative AI, to support knowledge retrieval and documentation** in equipment maintenance

Knowledge retrieval
Quickly find answers from manuals, technical notes and historical data

Documentation
Generate and summarize maintenance reports and technical documents

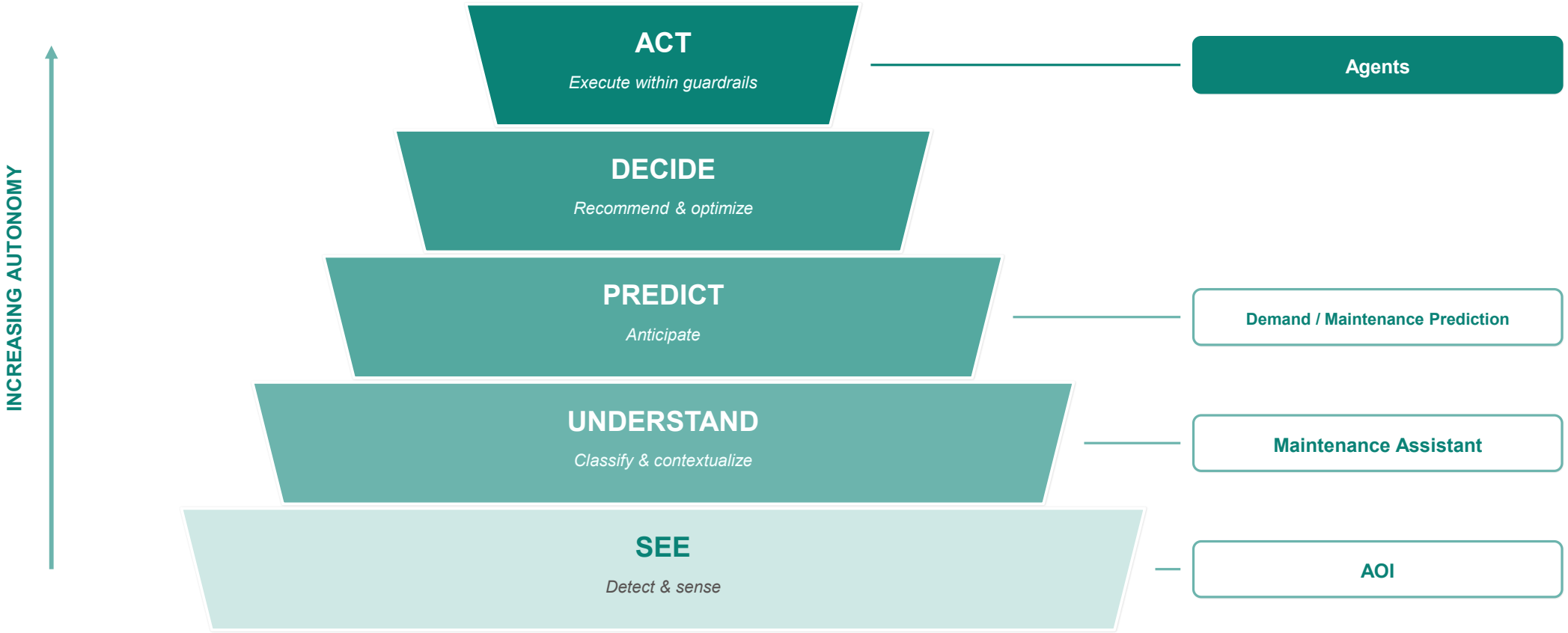
Report generation
Create consistent, high-quality reports with AI support

Status: **Roll out** underway



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And AI is moving up the decision stack



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The target operating model:
Human-directed autonomy integrates AI reasoning with controlled execution

Autono-mous Manufac-turing

1 **People define direction**
Set goals, standards, context and guardrails

2 **AI reasons and coordinates**
Combines data, knowledge and simulations

3 **Systems act safely**
Execute standardized workflows, verify and escalate when needed



Built on standardized processes, trusted data, interoperable interfaces and clear accountability

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The management test for granting agency

From “Can AI detect it?” to “How much agency do we give AI?”



Human decides → AI acts within guardrails

INCREASING AGENCY

The operating question is not only capability. It is controlled participation in decisions.

TRUST	CONTEXT	INTEGRATION	GOVERNANCE	ECONOMICS
Is the result reliable enough?	Does AI understand the constraints?	Can it interact with operational systems?	Who is accountable for the outcome?	Is it better than today’s process?

Where should AI advise — and where may it act?

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