

Infineon

e-Manufacturing Workshop

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e-Manufacturing and e-Diagnostics at Infineon

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Automation Capabilities Management



Never stop thinking.

Status of 300mm Equipment Automation

- 300 mm standards are **productive**
 - **E37 HSMS** (Ethernet to all tools)
 - **E87 CMS** Carrier Management
 - **E40 PJM** Process Job Management
 - **E94 CJM** Control Job Management
 - **E90 ST** Substrate Tracking (increasing usage)Wrap up is necessary by **GEM300** Taskforce

- Basic Interoperability is defined
 - **300 mm Operational Scenarios v 9.0**

- Error Handling Scenarios will be defined
 - **MOES** guideline v 2.0 (Manufacturing Operation and Error Handling Scenarios)

- Areas of standardization are extended
 - **E116 EPT** Equipment Performance Tracking
 - **E127 IMM** Integrated Metrology
 - **E109 RM** Reticle Management

Current Equipment Automation Gaps

■ Remote connectivity for trouble shooting

■ Adequate usage of network

■ Data rate limited

■ Generic tool documentation vs. tool configuration

■ Unformatted binary recipes

stop thinking
Never

Remote Connectivity

- Several e-Diagnostics solutions by Equipment suppliers existing, using different IT technologies
- Impossible to install and maintain 50 different supplier solutions
- Strategically Infineon needs a centralized e-Diagnostics solution for all tools (by a third party supplier)
 - owned and administrated by Infineon
 - to protect our IP and keep IT efforts at acceptable level
- Evaluation and pilot project ongoing at Infineon Dresden

→ Standardized **e-Diagnostic** functionality and **Interface A** (Equipment to fab) and **Interface C** (supplier to fab) is necessary to achieve this

Adequate Usage of Network

- All 300 mm tools are connected via Ethernet TCP/IP
- Still using the point to point connection like the previous serial connection and the SECS data structure
- Takes no advantage of networking / internet capabilities rather than the higher data rate

- Common available **Internet technology** should be made available to the Semiconductor Industry
- Broad usage of **XML** is a precondition

Data Rate Limited

- Current data rate with SECS II is limited to 150 data points per s
- Insufficient for complex and fast (multi chamber) tools

→ DCM Data Collection Management

will provide a more flexible, intelligent and faster way for Data Collection with Data Collection Plans:
The Tool pushes the data to the certain application when needed

Generic Tool Documentation

- Data item lists currently provided are often plain lists, not describing the relation / belonging of data and status variables to a tool module / location (chamber)

→ CEM Common Equipment Model

provides a methodology for an object oriented Equipment model

- Equipment documentation is currently often generic for the tool type and not created for the certain configuration of the actual tool (if chamber A is installed on position 4, the data variable would have ID 123)

→ ESD Equipment Self Description

provides a mechanism to explore the current and actual tool configuration

Unformatted Binary Recipes

- Recipes are still most often unstructured binary and multi level
 - Recipe Management
 - Recipe Verification
 - Parameter adjustment for R2Ris difficult and expensive
- While Infineon prefers to do R2R parameter adjustment by Recipe Parameter Lists (acc. E40) instead of manipulating recipes a standardized and interpretable recipe format will be a definite requirement in the near future!

→ RaP Recipe and Parameter Adjustment

provides a structured, formatted and readable recipe format and mechanisms for recipe management and parameter adjustment

Infineons TOS* Roadmap (*Tool Operation Specification)

Never stop thinking

<p>E37 HSMS</p> <p>E5 SECS</p> <p>E30 GEM</p> <p>E39 OSS</p> <p>E87 CM</p> <p>E40 PJM</p> <p>E94 CJM</p> <p>E90 STS</p> <p>E84 PIO</p> <p>E54 SAB</p> <p>I300I Guidelines ISMT 300 mm Scenarios</p> <p>TOS II</p>	<p>E121 XML Style Guide</p> <p>E128 XML Message Structure</p> <p>#3570 XML Common Components</p> <p>#3851 Measurement Units in XML</p> <p>E132 Authentication</p> <p>#3509 Data Collection</p> <p>E125 Equipment Self Descr.</p> <p>E120 Common Equipment Model</p> <p>#3571 Equipment Data Collection Guide</p> <p>EDA Port (Interface A)</p> <p>e-Diagnostics (Interface C)</p> <p>E133 PCS (Interface B)</p> <p>#3442 Recipe and Parameter Adjustment</p> <p>EEC Guide</p> <p>TOS IV</p>
<p>E109 Reticle Mgmt.</p> <p>E127 Integrated Metrology</p> <p>#3682 Linked Litho</p> <p>E116 Equipment Performance</p> <p>E126 EQIP</p> <p>Data Utilization (FDC, R2R)</p> <p>#3652 Data Quality Guideline</p> <p>HVM Guideline (MOSE)</p> <p>e-Diagnostics Guideline</p> <p>TOS III</p>	