

e-Diagnostics & EEC Workshop

Update on Equipment Data Acquisition Standards

Presentation Objective:

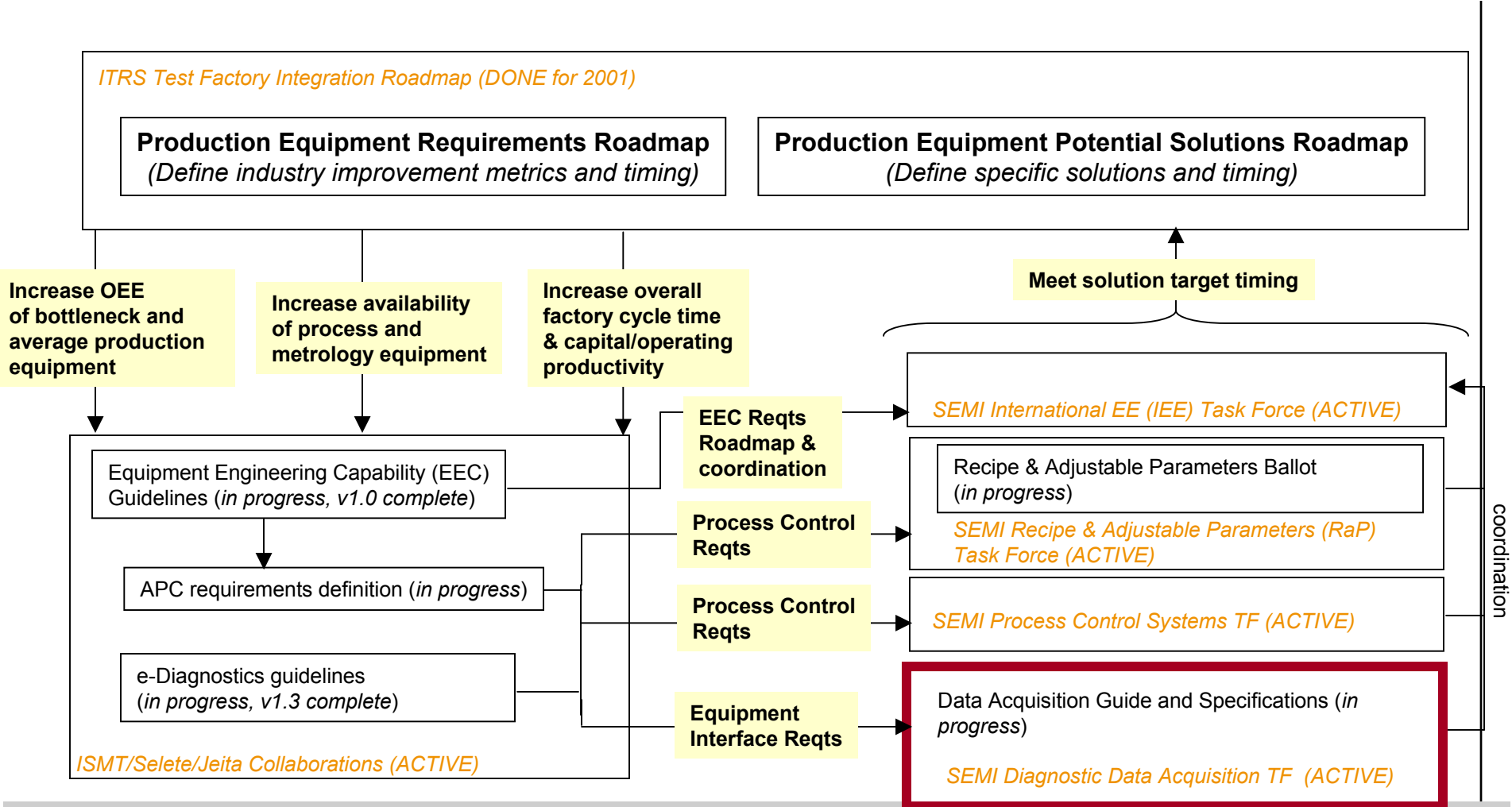
Inform on current Data Acquisition activities, status, and plans

James Martin, Intel Corp, SEMI DDA TF Co-Chair

james.w.martin@intel.com

26 July 2002

Industry Standards Activity Relationships



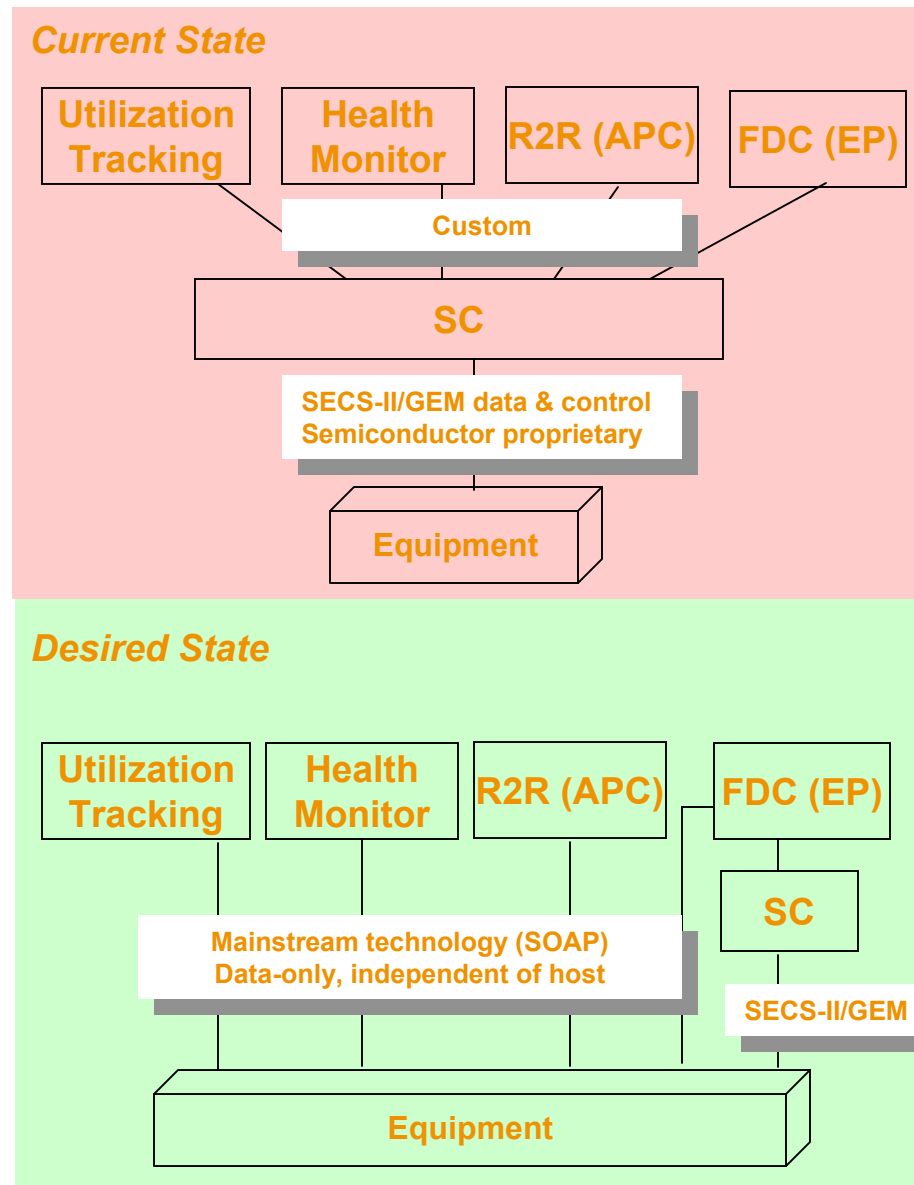
Key Focus Areas for 2002:

- 1) Specification of data acquisition capabilities (Driven through SEMI DDA TF)
- 2) Position SEMI for adoption of mainstream computing technologies (Driven through DDA, RaP, IEE)

Data Acquisition Requirements Status

- ✓ e-Diagnostics Guidelines published by ISMT (10/00)
- ✓ SEMI DDA TF kicked off (3/01)
- ✓ SECS/GEM and Standards gap lists in place (7/01)
- ✓ EEC Guidelines published by ISMT/Selete Collaboration (10/01)
- ✓ SEMI DDA-Japan Formed (12/01)
- ✓ New standards identified and prioritized, document requests submitted to SEMI (1/02)
- ✓ Blue ballots drafted and submitted to SEMI (2/02)
- ✓ Guide Yellow Ballot submitted to SEMI (4/02)
- Remaining Yellow Ballots submitted to SEMI (9/02)
- Technology adjuncts submitted to SEMI (4/03)

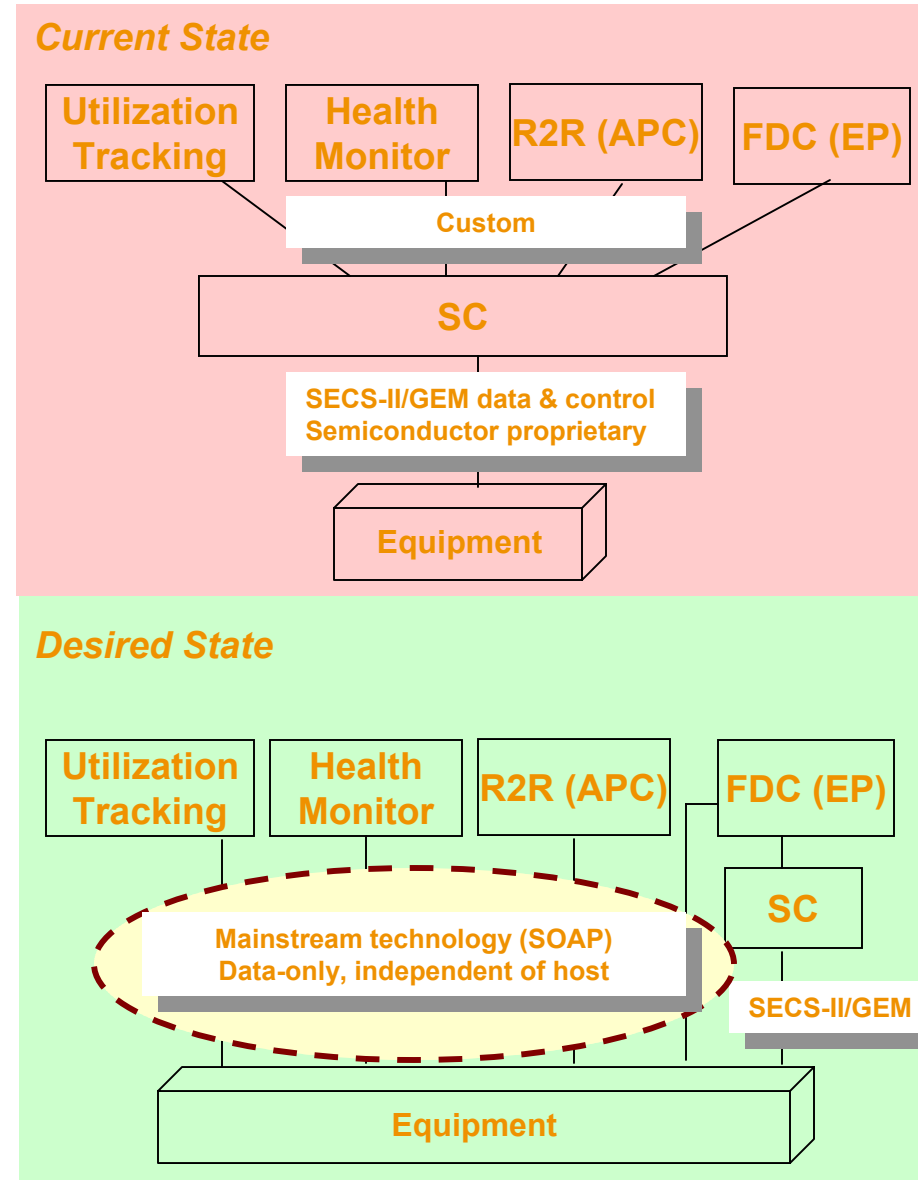
Note: 2 sub-teams + 1 coordination team are meeting weekly to drive ballot development (~20 members from ~16 companies in NA and JP).



Data Acquisition Requirements Status

- **System Requirements:**

- **Host-independent data collection:** clients setup and collect data near-real-time independent of host on/off-line status
- **Security:** only factory-authorized applications permitted to collect data, single point of control is enforced at factory level
- **Self-describing interface:** equipment structure, implemented state models, available data items & types, events, exceptions, and alarms can be learned at runtime from the tool
- **Baseline process control data:** all data currently accessible to SECS-II host, with improvements in the ability to collect sampled data for up to 50 parameters per process chamber at a frequency 1% of shortest recipe step (worst case assumption is 1000 scalar parameters at 10Hz)
- **Equipment operational data:** visibility into module- subsystem- and potentially actuator-level activity for facilitating equipment health monitoring and troubleshooting



Data Acquisition Scope

- **SEMI Ballots:**
 - **New - Data Acquisition Guide**
 - Overview of problem statement, relevant clients, related standards, technologies, etc.
 - **3507 - Equipment Client Authentication Spec**
 - Definition of authentication handshake required for subsequent communication with the equipment
 - **3510 - Equipment Services Description Spec**
 - Definition of technique for modeling equipment structure, available data items, implemented state models, their associated events and reportable parameters, and exceptions/alarms. Clients will be able to discover this information at runtime.
 - **3509 - Data Collection Management Spec**
 - Definition and management of data collection plans, allowing clients to specify desired trace, exception, and event data as well as triggering and buffering policies

Data Acquisition Interim Solution

- **Ballot**

- **3508 – Interim EDA Guide**

- Definition of an 'interim' interface to sync industry on concepts and technology
 - Facilitate near-term e-Diagnostic systems while specs are developed

- **Phased approach:**

- **Long lead time for suppliers**

- Improvements in equipment design to support dedicated data collection system without impacting equipment performance are expected to require significant design and development time for suppliers

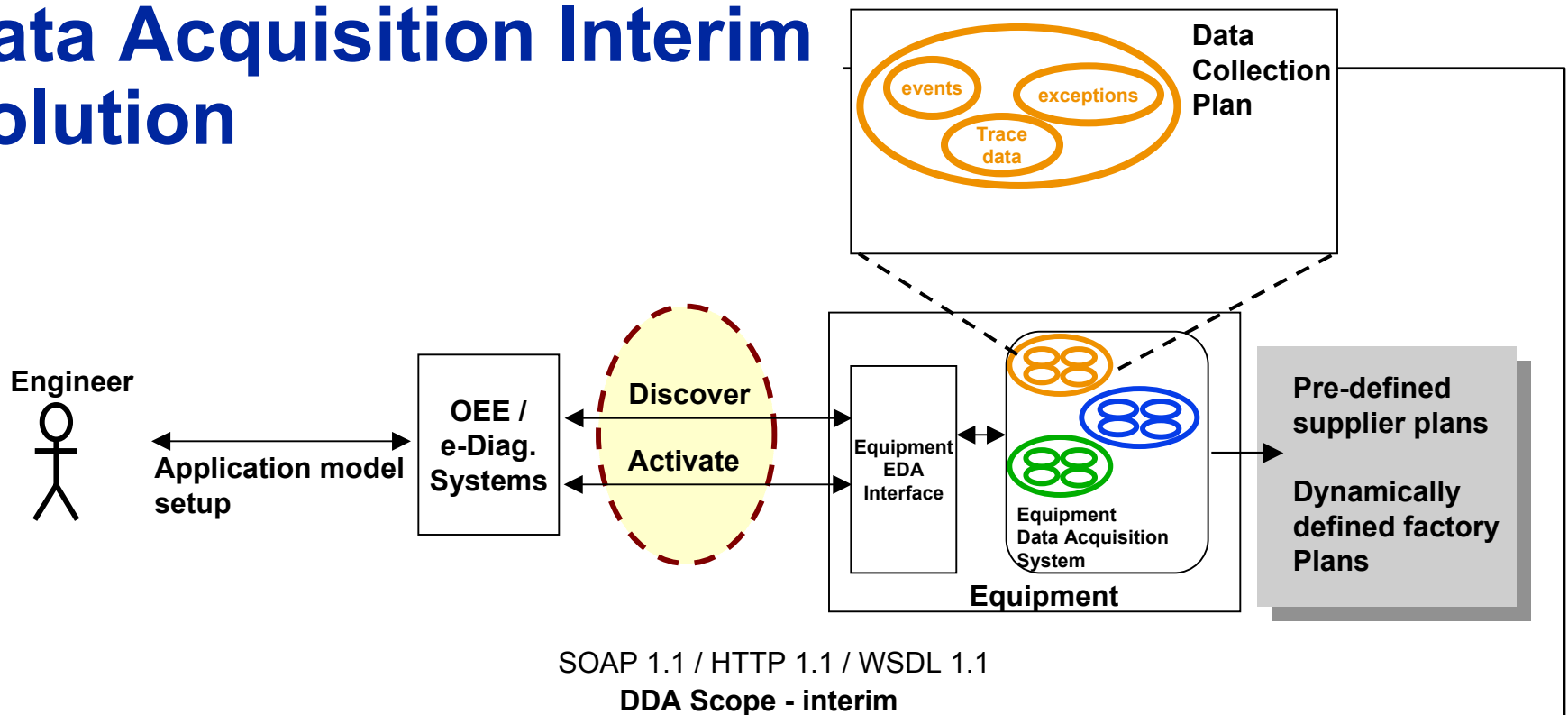
- **New Technologies**

- Adoption of new technologies in the industry will also involve significant learning and adjustment period for suppliers, ICM's, and application providers

- **Interim solutions**

- Simpler, single-client, minimally configurable push of equipment data. Provide access to new data on new technologies while complete specifications are being developed and designed-to
 - Not a SEMI specification (essentially a precursor to the final standards).
Targets current generation of 300mm equipment

Data Acquisition Interim Solution



- **Typical Use Case:**

- **Discover**

- Equipment connects to configured data consumer, communicates available DC plans. DC plan definitions may be contained in separate XML file via URL on tool or intermediate server.
- Supports dynamic creation of data collection plans

- **Activate**

- Data consumer enables desired plans, equipment sends corresponding data to consumer

Next Steps for Data Acquisition Standards

- **Revised interim guide submitted to SEMI** (8/02)
 - Finalize interim interface definition by Southwest 2002
- **Close on key issues** (8/02)
 - Equipment communication security
 - Data Collection Plans and associations with jobs/recipes
- **Spec Yellow Ballots submitted to SEMI** (9/02)
- **Establish XML/SOAP Technology Foundations (XML TF)** (1/03)
- **Technology mapping adjunct ballots for DDA specs submitted to SEMI** (9/03)

DDA Ballot Schedule

| SEMI Document/Standard | 2002 Cycle 1 | 2002 Cycle 2 | 2002 Cycle 3 | 2002 Cycle 4 | 2003 Cycle 1 | 2003 Cycle 2 | 2003 Cycle 3 | 2003 Cycle 4 |
|---|-------------------------------------|---------------------------------|----------------------|-----------------|-------------------------------------|---------------------------------|----------------------|-----------------|
| | Winter Mtg US/Jpn SEMICON Europa | SEMICON West Japan June Mtgs | SEMICON Southwest | SEMICON Japan | Winter Mtg US/Jpn SEMICON Europa | SEMICON West Japan June Mtgs | SEMICON Southwest | SEMICON Japan |
| Diagnostics Data Acquisition (DDA) | | | | | | | | |
| #??? - e-Diagnostics Guide (Overview) | | SNARF | Blue Ballot | | 2nd Blue | Yellow Ballot | 2nd Yellow | |
| #3508 - EDA Interim Interface | Blue Ballot | Yellow Ballot | 2nd Yellow | | | | | |
| #3509 - Data Collection Std. | Blue Ballot | | | Yellow Ballot | | 2nd Yellow | | |
| #3510 - Meta Data/Equipment Descr. | Blue Ballot | Interim Itf Complete | | Yellow Ballot | | 2nd Yellow | | |
| #3507 - Authentication/Security | Blue Ballot | | | Yellow Ballot | | 2nd Yellow | | |
| #TBD - 3510.1 Tech. Spec (XML/SOAP) | | | | | SNARF | Blue Ballot | Yellow Ballot | |
| #TBD - 3507.1 Tech. Spec (XML/SOAP) | | | | | SNARF | Blue Ballot | Yellow Ballot | |
| #TBD - 3509.1 Tech. Spec (XML/SOAP) | | | | | SNARF | Blue Ballot | Yellow Ballot | |
| | 2004 Cycle 1 | 2004 Cycle 2 | 2004 Cycle 3 | 2004 Cycle 4 | | | | |
| | Winter Mtg US/Jpn SEMICON Europa | SEMICON West Japan June Mtgs | SEMICON Southwest | SEMICON Japan | | | | |
| #??? - e-Diagnostics Guide (Overview) | | | | | | | | |
| #3508 - EDA Interim Interface | | | | | | | | |
| #3509 - Data Collection Std. | | | | | | | | |
| #3510 - Meta Data/Equipment Descr. | | Interface A Standardized | | | | | | |
| #3507 - Authentication/Security | | | | | | | | |
| #TBD - 3510.1 Tech. Spec (XML/SOAP) | 2nd Yellow | | | | | | | |
| #TBD - 3507.1 Tech. Spec (XML/SOAP) | 2nd Yellow | | | | | | | |
| #TBD - 3509.1 Tech. Spec (XML/SOAP) | 2nd Yellow | | | | | | | |