North America Physical Interfaces & Carriers Committee
Meeting Summary and Minutes

North America Standards Spring 2015 Meetings
01 April 2015, 0800 – 1630 Pacific Time
Intel Headquarters (Robert Noyce Building) in Santa Clara, California

Committee Announcements
Next Committee Meeting
NA Standards Meetings at SEMICON West 2015
Wednesday, July 15, 2015; 0900 – 1200 Pacific Time
San Francisco Marriott Marquis Hotel in San Francisco, California

Table 1 Meeting Attendees
Italics indicate virtual participants
Co-Chairs: Matt Fuller (Entegris), Stefan Radloff (Intel)
SEMI Staff: Michael Tran

<table>
<thead>
<tr>
<th>Company</th>
<th>Last</th>
<th>First</th>
<th>Company</th>
<th>Last</th>
<th>First</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acteon</td>
<td>Komatsu</td>
<td>Shoji</td>
<td>Muratec</td>
<td>Yamamoto</td>
<td>Makoto</td>
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<tr>
<td>Brooks Automation</td>
<td>Babbs</td>
<td>Daniel</td>
<td>Muratec</td>
<td>Fukushima</td>
<td>Masazumi</td>
</tr>
<tr>
<td>Consultant</td>
<td>Crockett</td>
<td>Alan</td>
<td>Muratec</td>
<td>Tokumoto</td>
<td>Mitsuya</td>
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<tr>
<td>Entegris</td>
<td>Fuller</td>
<td>Matt</td>
<td>SUMCO</td>
<td>Nakai</td>
<td>Tetsuya</td>
</tr>
<tr>
<td>Intel</td>
<td>Jung</td>
<td>Melvin</td>
<td>Tokyo Electron</td>
<td>Mashirosupika</td>
<td></td>
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<tr>
<td>Intel</td>
<td>Quinn</td>
<td>Thomas</td>
<td>J.A. Associates</td>
<td>Hartsough</td>
<td>Larry</td>
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<td>Intel</td>
<td>Radloff</td>
<td>Stefan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KLA-Tencor</td>
<td>Johanson</td>
<td>Eric</td>
<td>SEMI</td>
<td>Amano</td>
<td>James</td>
</tr>
<tr>
<td>Miraial</td>
<td>Nagashima</td>
<td>Tsuyoshi</td>
<td>SEMI</td>
<td>Tran</td>
<td>Michael</td>
</tr>
</tbody>
</table>

Table 2 Leadership Changes

<table>
<thead>
<tr>
<th>Group</th>
<th>Previous Leader</th>
<th>New Leader</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3 Ballot Results
Passed ballots and line items will be submitted to the ISC Audit & Review Subcommittee for procedural review.
Failed ballots and line items were returned to the originating task forces for re-work and re-balloting.

<table>
<thead>
<tr>
<th>Document #</th>
<th>Document Title</th>
<th>Committee Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
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</tbody>
</table>
### Table 4 Authorized Activities

<table>
<thead>
<tr>
<th>#</th>
<th>Type</th>
<th>SC/TF/WG</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>5867</td>
<td>SNARF</td>
<td>Global PIC Maintenance TF</td>
<td>Line item revision to SEMI E21-94 (Reapproved 0309), Cluster Tool Module Interface: Mechanical Interface and Wafer Transport Standard with title change to: Specification for Cluster Tool Module Interface: Mechanical Interface and Wafer Transport</td>
</tr>
<tr>
<td>5868</td>
<td>SNARF</td>
<td>Global PIC Maintenance TF</td>
<td>Line item revision to SEMI E22-0697 (Reapproved 0309), Cluster Tool Module Interface: Transport Module End Effector Exclusion Volume Standard with title change to: Specification for Cluster Tool Module Interface: Transport Module End Effector Exclusion Volume</td>
</tr>
<tr>
<td>5869</td>
<td>SNARF</td>
<td>Global PIC Maintenance TF</td>
<td>Line Item Revision to SEMI E84-1109, Specification for Enhanced Carrier Handoff Parallel I/O Interface</td>
</tr>
<tr>
<td>5877</td>
<td>SNARF</td>
<td>International Shipping Box 450 mm TF</td>
<td>Revision to SEMI M80-0514, Mechanical Specification For Front-Opening Shipping Box Used to Transport and Ship 450 mm Wafers with title change to: Specification for Front-Opening Shipping Box Used to Transport and Ship 450 mm Wafers (Pending PIC GCS approval)</td>
</tr>
</tbody>
</table>

Note: SNARFs and TFOFs are available for review on the SEMI Web site at: [http://downloads.semi.org/web/wstdsbial.nsf/TFOFSNARF](http://downloads.semi.org/web/wstdsbial.nsf/TFOFSNARF)

### Table 5 Authorized Ballots

<table>
<thead>
<tr>
<th>#</th>
<th>When</th>
<th>SC/TF/WG</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>5869</td>
<td>Cycle 5, 2015</td>
<td>Global PIC Maintenance TF</td>
<td>Line Item Revision to SEMI E84-1109, Specification for Enhanced Carrier Handoff Parallel I/O Interface</td>
</tr>
<tr>
<td>5877</td>
<td>Cycle 5, 2015</td>
<td>International Shipping Box 450 mm TF</td>
<td>Revision to SEMI M80-0514, Mechanical Specification For Front-Opening Shipping Box Used to Transport and Ship 450 mm Wafers with title change to: Specification for Front-Opening Shipping Box Used to Transport and Ship 450 mm Wafers (Pending PIC GCS approval)</td>
</tr>
</tbody>
</table>
Table 6 New Action Items

<table>
<thead>
<tr>
<th>Item #</th>
<th>Assigned to</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015Apr #01</td>
<td>Michael Tran</td>
<td>Send Larry Hartsough the latest list of PIC Standards due for 5-Year Review.</td>
</tr>
<tr>
<td>2015Apr #02</td>
<td>Michael Tran</td>
<td>Send PIC committee members the latest list of PIC Standards due for 5-Year Review and ask whether these Documents are still being used. Ask committee members to send responses to Larry Hartsough and Shoji Komatsu.</td>
</tr>
<tr>
<td>2015Apr #03</td>
<td>Michael Tran</td>
<td>Compile list of NA PIC Standards that have nonconforming titles per Appendix 4 of the Procedure Manual.</td>
</tr>
<tr>
<td>2015Apr #04</td>
<td>James Amano</td>
<td>Follow up with Lin Tso and Ray Morgan on Supika Mashiro’s participation in the SEMI SCIS Special Interest Group.</td>
</tr>
</tbody>
</table>

Table 7 Previous Meeting Actions Items

<table>
<thead>
<tr>
<th>Item #</th>
<th>Assigned to</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014Nov #01</td>
<td>Michael Tran</td>
<td>Send Larry Hartsough (U.A. Associates) SEMI E21 and SEMI E22 for his five year reviews.</td>
</tr>
<tr>
<td>2014Jul #05</td>
<td>Jan Rothe</td>
<td>Draft a SNARF to revise SEMI E84 for error handling and follow up with the Japan PI&amp;C TC chapter meeting.</td>
</tr>
</tbody>
</table>

1 Welcome, Reminders, and Introductions

Matt Fuller, committee co-chair, called the meeting to order at 9:05 AM. After welcoming all attendees, a round of introductions followed. The SEMI meeting reminders on membership requirements, antitrust, patentable technology, and meeting guidelines were then presented and explained.

Attachment: 01, SEMI Standards Required Meeting Elements

2 Review of Previous Meeting Minutes

The committee reviewed the minutes of the previous meeting held November 5 in conjunction with the NA Standards Fall 2014 meetings.

Motion: Accept the minutes of the previous meeting as written.
By / 2nd: Alan Crockett (consultant) / Makoto Yamamoto (Muratec)
Discussion: None
Vote: 6-0 in favor. Motion passed.

Attachment: 02, NA PIC Fall 2014 meeting (November 5) minutes

3 Liaison Reports

3.1 Japan Physical Interfaces & Carriers Committee

Tsuyoshi Nagashima presented the Japan PIC liaison report. The key items were as follows:

- Leadership and Structure Change
  - International Reticle SMIF Pod and Lord Port Interoperability TF
    - Koji Oyama stepped down as TF co-leader.
• Leadership
  o Committee Co-chairs
    ▪ Tsuyoshi Nagashima (Miraial)
    ▪ Tsutomu Okabe (TDK)
    ▪ Kenji Yamagata (DAIFUKU)
  o Technical Architect
    ▪ Shoji Komatsu (Acteon)
• Next Meeting: April 15 in conjunction with the Japan Spring 2015 Meetings (SEMI Japan Office, Tokyo)
• Document Review Summary (Japan Winter 2014 Meetings)

<table>
<thead>
<tr>
<th>Document #</th>
<th>Document Title</th>
<th>Committee Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>5524</td>
<td>Revisions to SEMI E156-0710, “Mechanical Specification for 450 mm AMHS Stocker to Transport Interface”, with title change to “Mechanical Interface Specification for 450 mm AMHS Stocker to Transport Equipment”</td>
<td>Failed and returned to the task force</td>
</tr>
<tr>
<td>5777</td>
<td>Reapproval of SEMI E92-0302E, “Specification for 300 mm Light Weight and Compact Box Opener/Loader to Tool-Interoperability Standard (Bolts/Light)”</td>
<td>Passed as balloted Superclean</td>
</tr>
</tbody>
</table>

• Approved SNARFs (Japan Winter 2014 Meetings) – None
• Authorized Ballots (Japan Winter 2014 Meetings)

<table>
<thead>
<tr>
<th>#</th>
<th>When</th>
<th>SC/TF/WG</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>5524A</td>
<td>Cycle 4 or 5, 2015</td>
<td>450 mm AMHS Task Force</td>
<td>Revisions to SEMI E156-0710, “Mechanical Specification for 450 mm AMHS Stocker to Transport Interface”, with title change to “Specification for Mechanical Interfaces between 450 mm AMHS Stocker and Transport Equipment”</td>
</tr>
</tbody>
</table>

• Ballots to be reviewed at the Japan Standards Spring 2015 Meetings – None
• 450 mm AMHS Task Force
  o #5524, Revision to SEMI E156-0710, “Mechanical Specification for 450 mm AMHS Stocker to Transport Interface, with title change to Mechanical Interface Specification for 450 mm AMHS Stocker to Transport Equipment”
    ▪ Failed and returned for rework to the task force.
    ▪ The title was wrong.
  o #5524A, Revisions to SEMI E156-0710, “Mechanical Specification for 450 mm AMHS Stocker to Transport Interface”, with title change to “Specification for Mechanical Interfaces between 450 mm AMHS Stocker and Transport Equipment”
    ▪ To be submitted for Cycle 4 or 5, 2015

• Fiducial Mark Interoperability TF
  o Ballot document #5752 (submitted Cycle 7, 2014 )
    ▪ TF is assigned to prepare TF recommendation for adjudication by Traceability GCS
    ▪ Passed with editorial changes at Japan TC Chapter meeting of Traceability Global TC on Dec. 5 in conjunction with SEMICON Japan 2014 and also passed at A&R in Feb., 2015.
  o TF is assigned to following ballot of #5752
    ▪ Revisit T7 purpose and scope
    ▪ Modify Figure 3 to align with M1
    ▪ M20 coordinate system
NA PIC Committee 5 April 1, 2015
Meeting Minutes Intel HQ in Santa Clara, California

- To be discussed following items related to Information & Control
  - Fiducial Mark Reading Condition Report
- Global PIC Standards Maintenance Task Force (JA Side)
  - Ballot #5777, Reapproval of SEMI E92-0302E, “Specification for 300 mm Light Weight and Compact Box Opener/Loader to Tool-Interoperability Standard (Bolts/Light)”
    - Passed as balloted at the Japan TC Chapter meeting on Dec. 4, 2014 in conjunction with SEMICON Japan 2014, and also passed at A&R in Feb., 2015.
  - SEMI E110-1102 “Guideline for Indicator Placement Zone and Switch Placement Volume of Load Port Operation Interface for 300 mm Load Ports”
    - TC Chapter decided to make E110 inactive at the Japan TC Chapter meeting on Dec. 4, 2014 in conjunction with SEMICON Japan 2014.
  - Discussion of Revision to SEMI E84-1109 “Specification for Enhanced Carrier Handoff Parallel I/O Interface”
- International 450 mm Physical Interfaces & Carriers Task Force (JA Side)
  - None
- International Process Module Physical Interface (IPPI) TF (JA Side)
  - None
- International Reticle SMIF Pod and LP Interoperability TF (JA Side)
  - Koji Oyama stepped down as TF co-leader
- Staff Contact: Chie Yanagisawa (cyanagisawa@semi.org)

Attachment: 03, Japan PIC Liaison Report

3.2 Europe Equipment Automation Committee (Information & Control, Metrics, Physical Interfaces & Carriers)
James Amano presented the Europe PIC liaison report. The key items were as follows:

- Next meeting:
  - SEMICON Europa 2015 (Dresden, Germany)
- E48 Revision TF has been disbanded.
- Document to go inactive
  - SEMI E48-1101 (Reapproved 1107) - Specification for SMIF Indexer Volume Requirement
- In early June, 2014 the PV Automation TC and the ERSC validated a motion to make the following transformation. This has been validated by the ISC:
  - PV Automation TC → Automation Technology TC
- Automation Technology
  - New Chairman: Christian Hoffmann (PEER Group)
- Staff Contact: Andrea Busch (abusch@semi.org)

Attachment: 04, Europe Equipment Automation Liaison Report

3.3 SEMI Staff Report
Michael Tran (SEMI) gave the SEMI Staff Report. The key items were as follows:

- 2015 Global Calendar of Events
  - SEMICON Southeast Asia (April 22-24, Penang, Malaysia)
  - Advanced Semiconductor Manufacturing Conference [ASMC] (May 3-6, Saratoga Springs, New York)
o Intersolar Europe (June 10-12, Munich Germany)
o SEMICON Russia (June 17-18, Moscow)
o SEMICON West (July 14-16, San Francisco, California)
o SEMICON Taiwan (September 2-4, Taipei)
o European MEMS Summit (September 17-18, Milan, Italy)
o Strategic Materials Conference [SMC] (September 22-23, Mountain View, California)
o SEMICON Europa (October 6-8, Dresden, Germany)
o SEMICON Japan (December 16-18, Tokyo)

• NA Standards Spring 2015 Meetings (March 29 to April 2)
  o Committees meeting at SEMI Headquarters (San Jose)
    ▪ 3DS-IC | EHS | Facilities & Gases | HB-LED | Information & Control | Liquid Chemicals | MEMS/NEMS | Metrics | PV Materials
  o SEMI thanks Intel (Santa Clara) for hosting the Physical Interfaces & Carriers (PIC) committee and task force meetings.
  o SEMI thanks KLA-Tencor (Milpitas) for hosting the Silicon Wafer committee and task force meetings.

• Upcoming North America Meetings (2015)
  o 2015:
    ▪ NA Compound Semiconductor Materials TC Chapter Meeting (May 20 in conjunction with CS MANTECH, Scottsdale, Arizona)
    ▪ NA Standards Meetings at SEMICON West 2015 (July 13-16, San Francisco, California)
    ▪ NA Standards Fall 2015 Meetings (November 2-5, San Jose, California)
  o 2016:
    ▪ NA Standards Spring 2016 Meetings (April 4-7, San Jose, California)

• Technical Ballot Critical Dates for NA Standards meetings at SEMICON West 2015
  o Cycle 4: due April 10 / Voting Period: April 21 – May 21
  o Cycle 5: due May 8 / Voting Period: May 22 – June 22

• Standards Publications Report

<table>
<thead>
<tr>
<th>Cycle</th>
<th>New</th>
<th>Revised</th>
<th>Reapproved</th>
<th>Withdrawn</th>
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<td>November 2014</td>
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<td>4</td>
<td>1</td>
<td>0</td>
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<tr>
<td>December 2014</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>0</td>
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<tr>
<td>January 2015</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>1</td>
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<tr>
<td>February 2015</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>0</td>
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</tbody>
</table>

  o Total in portfolio – 928 (includes 110 Inactive Standards)

• New Requirements/Process Reminders for TC Chapter Meetings
  o Standards Document Development Project Period
    ▪ Project period shall not exceed 3 years (Regs 8.3.2)
      ▪ SNARF approval to TC Chapter approval
• If document development activity is found to be continuing, but cannot be completed with the project period, TC Chapter may grant one-year extension at a time, as many times as necessary.

  o SNARF Review Period
    • A submitted SNARF for a new, or for a major revision to an existing, Standard or Safety Guideline is made available to all members of a TC Chapter’s parent global technical committee for two weeks for their review and comment. (Regs 8.2.1)
      • If the SNARF is submitted at a TC Chapter meeting, the committee can review and approve, but the SNARF will need to be distributed for two weeks and then approved via GCS.

  o New SNARF & TFOF forms [embedded in Staff Report, see Attachment 03 of these minutes]

  o Procedures for Correcting Nonconforming Titles of Published Standards Document (PM Appendix 4)
    • Some Standards qualify for a special procedure where a line item change can be used to correct the titles. Otherwise, the corrective action will likely require a major revision.

  o Table of Content (TOC)
    • No section of a Standard or Safety Guideline may contain a list of section numbers and titles (e.g., similar to a Table of Contents).
    • Table of content can be approved editorially during Reapproval

  o Assignment of Draft Document Numbers
    • Upon successful publication of a Document, or termination of work on it by the TF, Standards staff retires the Document number and its associated SNARF, and they are not to be used for further Document development activity.
    • For a Document with Line Item(s) that passed while others failed, the same SNARF may be used to reballot only those failed Line Item(s).
    • A new SNARF is required to introduce new Line Item(s).

  o SNARF
    • SNARFs may be submitted and approved for new, revised, reapproved, or reinstated Documents that have been approved by the TC Chapter, but not yet published (i.e., no new Publication Date Code exists yet). (PM NOTE 8)

  o Minority Report (MR)
    • The motion passes if a simple majority of the total GCS voting membership (i.e., not just those who return votes) approve the motion (Regs 9.9)

• Latest Approvals/Next Revisions
  o Follow-up revisions of Regulations and Procedure Manual were published on 27 March, 2015 for use in NA Spring Standard meetings.

• Regulations/PM Ballot Revisions
<table>
<thead>
<tr>
<th>Group #</th>
<th>Title</th>
<th>Regs</th>
<th>PM</th>
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<tbody>
<tr>
<td>1</td>
<td>Clarification on Standards Document Development Project Period</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>2</td>
<td>GCS Voting Period for Minority Reports</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>3</td>
<td>Improvement on Minority Report Handling for Shorter Time to Publication</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>4</td>
<td>TC Membership Requirement</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>5</td>
<td>Ballot Adjudication Process Improvement</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>6</td>
<td>Revision to Procedural Review</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>7</td>
<td>Clarification of TC Chapter Review and Adjudication Term</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>8</td>
<td>Clarification of Procedure Guide to Procedure Manual</td>
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<td>Y</td>
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<td>9</td>
<td>Miscellaneous Changes of Regulations</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>10</td>
<td>Add New Requirements Related to Notices</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>11</td>
<td>Add New Guidance Related to Note</td>
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<tr>
<td>12</td>
<td>Clarification on SNARF and TFOF submitter</td>
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<tr>
<td>13</td>
<td>Clarification on SNARF approval procedures for New Standards/Safety Guidelines and major revision of existing Standards/Safety Guidelines</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>14</td>
<td>Update Appendix 4 Related to Correction of Nonconforming Titles</td>
<td>N</td>
<td>Y</td>
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<tr>
<td>15</td>
<td>Clarifications of Procedures Related to Table of Contents</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>16</td>
<td>Clarifications on Use of Shall, Must, and Should</td>
<td>N</td>
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</tr>
<tr>
<td>17</td>
<td>Miscellaneous Changes to Procedure Manual</td>
<td>N</td>
<td>Y</td>
</tr>
</tbody>
</table>

Indicates follow-up from Oct-Nov 2014 Regs ballot

- Ballot Adjudication Process Improvement (Group 5)
  - Problem
    - Publications of Documents can be delayed by the need to go through another cycle of Letter Ballot issuance and adjudication at a TC Chapter meeting to make any technical change.
  - Proposed Solution
    - Allow TC Chapter to make technical changes on balloted Standard Document during its adjudication under certain conditions. Conduct a Ratification Ballot in order to ensure global consensus on supporting the technical changes made by the TC Chapter.
  - NOTE: This Group was originally proposed as Group 10 in the previous Regulations Ballot to ISC and failed.
    - Taking suggestion of ISC at its SEMICON Japan 2014 meeting in December, the scope of the Ratification Ballot is now limited to technical changes made by TC Chapter during adjudication of a Letter Ballot.
• GCS Voting Period for Minority Report (Group 2)
  o Problem
    ▪ Voting period for Minority Report is too short to solicit sufficient votes from GCS voting members.
  o Proposed Solution
    ▪ To let GCS member have 2 weeks voting period, which is same length as the Minority Report submission window.
  o NOTE: This problem was raised by the NARSC at its Fall 2014 meeting at which the ISC Ballot on Regulations change was discussed. Following-up on this problem by additional changes in the Regulations was suggested by the Regulations SC Chair at the time.

• Improvement on Minority Report Handling for Shorter Time to Publication (Group 3)
  o Problem
    ▪ Despite the rare occurrence of MR submission, every Document approved by the TC Chapter has to wait at least a month before it qualifies for A&R procedural review, which in turn results in a longer time to publish.
  o Proposed Solution
    ▪ Expedite the process by allowing A&R procedural review to be commenced as soon as record of ballot review made available.
    ▪ If an MR is submitted on a Document, Publication will be on hold until responsible parties reach conclusion on the MR. If the Document is returned to the TF for rework based on consideration of the MR, A&R approval is nullified.
  o NOTE: This problem was raised by JARSC at its SEMICON Japan 2014 meeting. ISC members expressed their support on improvement toward faster publication.

Attachment: 05, SEMI Standards Staff Report
4 Task Force Reports

4.1 Joint International 450 mm Physical Interfaces & Carriers Task Force (450 mm IPIC TF) / International Process Module Physical Interface Task Force (IPPI TF)

The key items were as follows:

- Interoperability Test Group (ITG) Input
  - Issues related to a door closing have been raised from G450C.
  - ITG started the tests.
- Move KC chapter to E154 (LP)
  - Input from the Mashiro-san (TEL) to M80 ballot 5771.
    - Consideration for KCP section, move to LP STD from Carrier STD → Discussion in NA Spring meeting.
  - Notes from TF meeting 3/31:
    - In the future, the 450 IPIC will consider moving the KC Pin section and related dimensions from the 450 Carrier standards to E154.
    - Planned execution is at the time of major revisions to the carriers.
  - Discussion: The task force agrees with the principle of the proposed change but this activity may not be accepted by the global PIC committee due to the need to change multiple documents simultaneously. The ROI is small related to the effort involved and the standards are working as published.

Motion: NA PIC TC Chapter supports the 450 IPIC TF recommendation of keeping the KC pin info in the 450 carrier standards.

By / 2nd: Larry Hartsough (U.A. Associates) / Supika Mashiro (Tokyo Electron)
Discussion: None.
Vote: 7-0 in favor. Motion passed.

- 450 mm AMHS TF Input
  - Doc.5524A: Revisions to SEMI E156-0710, Mechanical Specification for 450 mm AMHS Stocker to Transport Interface, with title change to: Mechanical Interface Specification for 450 mm AMHS Stocker to Transport Equipment
    - Cycle 5, 2015
      • Ballot Submission Date: May 8, 2015
      • Voting Period Starts: May 22, 2015
      • Voting Period Ends: June 22, 2015

Attachment: 06, 450 mm IPIC Task Force Report

4.2 Global PIC Maintenance Task Force

Larry Harstough presented to the committee two new SNARFs revising SEMI E21 and E22:

- Line item revision to SEMI E21-94 (Reapproved 0309), Cluster Tool Module Interface: Mechanical Interface and Wafer Transport Standard with title change to: Specification for Cluster Tool Module Interface: Mechanical Interface and Wafer Transport
  - Rationale: Correct nonconforming title per Procedure Manual (March 2015), Appendix 4
  - Scope: Correct title & affected text to conform to current Regulations. New title to be: Specification for Cluster Tool Module Interface: Mechanical Interface and Wafer Transport
• Line item revision to SEMI E22-0697 (Reapproved 0309), Cluster Tool Module Interface: Transport Module End Effector Exclusion Volume Standard with title change to: Specification for Cluster Tool Module Interface: Transport Module End Effector Exclusion Volume
  - **Rationale:** Correct nonconforming title per Procedure Manual (March 2015), Appendix 4.
  - **Scope:** Correct title & affected text to conform to current Regulations. New title to be: Specification for Cluster Tool Module Interface: Transport Module End Effector Exclusion Volume

Larry reported that these will be balloted for the Cycle 5, 2015 voting period.

**Motion:** NA PIC TC Chapter approve SNARFs for E21 and E22 revisions as well as submission for the Cycle 5, 2015 voting period.

**By / 2nd:** Larry Hartsough (U.A. Associates) / Alan Crockett (consultant)

**Discussion:** None.

**Vote:** 6-0 in favor. Motion passed.

4.3 *International / NA 450 mm Shipping Box Task Force*

• M80 Document 5771A Review
  - Suggested to also include x12, x14, and y8 dimensions in 6.13.1 for completeness of defining the exclusion area. TF agrees.
  - Add “as” defined by r6, .... in 6.13.1
  - All negative/comments from prior balloting have been addressed.
  - Reviewed SNARF update:
    - Reworded Scope Line 7 to “Correction of some sentences for “proper” understanding.
    - Add Line 8: Replace “must” with “shall” in many requirements items.
  - Submit Doc. 5771A for Cycle 5. Ballot results will be reviewed at SEMICON West and reviewed/adjudicated at Japan Si Wafer Committee in September.

• Wafer Shipping System Discussion
  - Section A1-1.1 re-word with “should”. Style guide says do not use “will” unless it’s a fact.
  - TF recommendation is to continue to wait to re-ballot the Shipping System document (#5069B) until after M80 ballot is passed.

**Attachment:** 07, 450 ISB Task Force Report

4.4 *International Reticle SMIF Pods and Load Ports Interoperability Task Force*

No report received.

4.5 *EUV Reticle Handling Task Force*

No report received.

4.6 *450 mm Automated Test Die Prep Task Force*

Stefan Radloff reported that the NA 450 ATDP TF is inactive. Most of the activities are being driven from Japan, under the Packaging Committee. The Japan TF is discussing 450 mm notchless wafers and their impact on test standards.
5 Old Business

5.1 Status update on action items generated from the previous meetings:

<table>
<thead>
<tr>
<th>Item #</th>
<th>Assigned to</th>
<th>Details</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014Nov #01</td>
<td>Michael Tran</td>
<td>Send Larry Hartsough copies of SEMI E21 and SEMI E22 for his five year reviews</td>
<td>Open</td>
</tr>
<tr>
<td>2014July #05</td>
<td>Jan Rothe</td>
<td>Draft a SNARF to revise SEMI E84 for error handling and follow up with the Japan PI&amp;C TC chapter meeting</td>
<td>Open</td>
</tr>
</tbody>
</table>

5.2 Documents due for 5-Year Review

Michael Tran reported that the following PIC Standards are due for 5-Year Review:

- SEMI E156-0710, Mechanical Specification for 450 mm AMHS Stocker to Transport Interface (Active SNARF)
- SEMI E117-1104 (Reapproved 0710), Specification for Reticle Load Port
- SEMI E101-1104 (Reapproved 0710), Guide for EFEM Functional Structure Model
- SEMI E100-1104 (Reapproved 0710), Specification for a Reticle SMIF Pod (RSP) Used to Transport and Store 6 Inch or 230 mm Reticles
- SEMI E23-1104 (Reapproved 0710), Specification for Cassette Transfer Parallel I/O Interface
- SEMI E15-0698E2 (Reapproved 0310), Specification for Tool Load Port
- SEMI E131-0304 (Reapproved 0310), Specification for the Physical Interface of an Integrated Measurement Module (IMM) into 300 mm Tools Using BOLTS-M

Additional Committee Discussion:
The committee discussed whether these Documents are still being used in industry. James Amano suggested allowing these Documents to go Inactive if they are not being used. Stefan Radloff reported that there are tools that still use E131. Alan Crockett pointed out that KLA does not use E131 since KLA does not use BOLTS interface. Alan suggested contacting MKS Instruments to see whether they are still using this standard. Melvin Jung stated that he would like to keep E100 active.

An action item was created for Michael to ask PIC members whether they are still using these Standards [listed above]. In the meantime, the committee will plan to move forward with issuing Reapproval ballots to keep these Documents active.

Action Item: 2015Apr #01, Michael Tran to send Larry Hartsough latest list of PIC Standards due for 5-Year Review.

Action Item: 2015Apr #02, Send PIC committee members the latest list of PIC Standards due for 5-Year Review and ask whether these Documents are still being used. Ask committee members to send responses to Larry Hartsough and Shoji Komatsu.

5.3 SNARFs Past Three Year Document Development Period

Per Regulations section 8.3.2, the Standard Document Development Project Period shall not exceed three years. The SNARF becomes invalid and the Document development activity defined by the SNARF must be discontinued after this period. The EXCEPTION for Regulations section 8.3.2 enables the TC Chapter to grant a one-year extension at a time if Document development activity is found to be continuing. Michael Tran reported that SNARF #4649 (Next Generation Carrier Hand-off) is long past the three-year document development period. The committee took no further action (i.e., SNARF #4639 will be discontinued).
5.4 Published Standards with Nonconforming Titles

Many of the published SEMI Standards have titles that do not conform to the requirements specified in the SEMI Standards Regulations and Procedure Manual. Appendix 4 of the SEMI Standards Procedure Manual establishes a procedure for correcting nonconforming titles of published Standards Documents. A number of PIC Standards have been identified as having nonconforming titles that must be corrected.

**Action Item:** 2015Apr #03, Michael Tran to compile list of NA PIC Standards that have nonconforming titles per Appendix 4 of the Procedure Manual.

6 New Business

6.1 SEMI Semiconductor Components, Instruments, and Subsystems (SCIS) Special Interest Group (SIG)

Daniel Babbs provided an overview of the SEMI SCIS Special Interest Group. The key items were as follows:

- The SEMI SCIS SIG represents companies that produce, package and/or distribute any of the following used in the semiconductor or related industries:
  - Components such as seals, filters, mass flow controllers, valves, sensors, ion beam sources, etc.
  - Instruments for in-line and off-line data measurement, collection, and monitoring
  - Sub-systems that support process tools e.g. vacuum, robotics, power conversion, abatement, chillers, etc.

The overall objective of this special interest group is to facilitate the collective efforts on issues related to the components, instruments and sub-systems that the members feel are more effectively or efficiently undertaken as an association than as individual companies.

- SCIS Subcommittees
  - **SCIS Defectivity**
    - **Goal:** To create a standard system of comparable metrics which will be used to rate, compare, and classify process-critical OEM components in order to reduce defects generated in semiconductor manufacturing.
  - **SCIS BKM/Roadmaps/Standards**
    - **Goal:** Collaborate with IDM’s and OEM’s to define and create a standardized industry supply chain roadmap. Identify and scope new opportunities for SEMI Standards and identify relevant targets that affect or could be met by SCIS suppliers.
  - **Events/Communication**
    - **Goal:** To provide a communication and event platform for SCIS related activities by leveraging SEMI channels including Trade Shows, Newsletters, workshops, Standards activities, etc.

- SCIS Core Members

- SCIS Customer Advisory Panel (CAP)
  - Intel, GLOBALFOUNDRIES, Western Digital, IBM, KLA Tencor, Lam Research, Applied Materials, Sematech, Mattson Technology
Subteams:
- Valves & Seals ST | Pumps ST | Liquid Delivery ST | Automation ST | RF Products ST | Gas Delivery ST | Other Components ST

SCIS Automation Sub-Team
- Scope
  - Develop inputs from industry and assess for standards, guidelines or BKM
  - Bi-monthly meetings and FTF at SEMICON West
  - Output recommendations to SCIS Steering Committee then ultimately standards committee if applicable
- Anyone interested in participating, please contact Daniel Babbs (daniel.babbs@brooks.com)

Additional Committee Discussion:
- Supika Mashiro reported that Les Marshall (GLOBALFOUNDRIES) reached out to her asking for Tokyo Electron’s participation in the SCIS SIG. Supika pointed out that while she responded indicating that she has agreed to join, she has not heard back for several months. James Amano will follow up with Lin Tso and Ray Morgan at SEMI.
- James Amano pointed out that participation in the SCIS SIG is open to all SEMI members.

**Action Item:** 2015Apr #04, James Amano to follow up with Lin Tso and Ray Morgan on Supika Mashiro’s participation in the SEMI SCIS Special Interest Group.

**Attachment:** 08, SEMI SCIS SIG Overview

6.2 _New SNARFs & TFOFs_

6.2.1 _M80 Revision_

Since the 450 ISB TF updates to the existing M80 revision SNARF (#5771) are considered significant changes, it was determined that a new SNARF for M80 revision would be needed (per section 2.2.6 of the Procedure Manual) and the existing SNARF #5771 would be retired.
SNARF for: Revision to SEMI M80-0514, Mechanical Specification For Front-Opening Shipping Box Used to Transport and Ship 450 mm Wafers with title change to: Specification for Front-Opening Shipping Box Used to Transport and Ship 450 mm Wafers

Rationale: The proposed change is to add non-mechanical specification to 450 mm FOSB (Front-Opening Shipping Box) in addition to M80-0514 which specified only mechanical design criteria since it is deemed necessary to add non-mechanical specifications for 450mm FOSB so that it can maintain wafer quality, facilitate easy detection of trouble such as wafer breakage when received.

The proposed change also include information for reuse to promote environmental consideration

A Referenced Standard for wafers SEMI M74 will be replaced by SEMI M1 with this revision since 450mm Product (Prime) wafers specification has been defined in M1.

Scope (updated):
1. Change the title; delete the “MECHANICAL”
2. Update the Section 4: Referenced Standards and Documents
3. The re-numbering of the Requirement chapter
4. Add the new Section “Materials consideration” in requirement chapter.
5. Add the new appendix: WAFER SHIPPING BOX REUSE.
6. A correction of “R” omission in figures; Figure 4, 23, 24 and 34.
7. The correction of some sentences for proper understanding
8. Replace “must” with “shall” in many requirements items.

Motion: NA PIC approves SNARF for M80 revisions.
By / 2nd: Tsuyoshi Nagashima (Miraial) / Makoto Yamamoto (Muratec)
Discussion: A copy will be distributed to the global PIC technical committee for review and feedback. Per SEMI Standards Regulations section 8.2.1 and Procedure Manual section 2.2.5, prior to submitting for approval, SNARF(s) for new or major revision shall be made available to all TC Members of global technical committee for feedback.
Vote: 6-0 in favor.

Motion: NA PIC approves to request GCS approval on SNARF for M80 revision as well as submission for Cycle 5, 2015 voting period.
By / 2nd: Alan Crockett (consultant) / Tsuyoshi Nagashima (Miraial)
Discussion: None.
Vote: 7-0 in favor.

6.2.2 E84 Revision

SNARF for: Line Item Revision to SEMI E84-1109, Specification for Enhanced Carrier Handoff Parallel I/O Interface

Rationale: Add an improved error handling description for TP3/4 timeout errors that ensures that internal buffer (equipment buffer) handoff by the AMHS does not lead to a situation in which the equipment tries to access a carrier that is still physically held by the OHT device.

Scope: Add the description into section R1-2.2

Motion: NA PIC approves SNARF for E84 line item revisions.
By / 2nd: Alan Crockett (consultant) / Makoto Yamamoto (Muratec)
Discussion: None.
Vote: 4-0 in favor.
Motion: NA PIC approves Cycle 5, 2015 ballot submission for E84 line item revisions.
By / 2nd: Alan Crockett (consultant) / Makoto Yamamoto (Muratec)
Discussion: None
Vote: 4-0 in favor.

6.3 Authorizations for Ballot Submission

<table>
<thead>
<tr>
<th>#</th>
<th>When</th>
<th>SC/TF/WG</th>
<th>Details</th>
</tr>
</thead>
</table>
| 5867 | Cycle 5, 2015 | Global PIC Maintenance TF | Line item revision to SEMI E21-94 (Reapproved 0309), Cluster Tool Module Interface: Mechanical Interface and Wafer Transport Standard  
with title change to:  
Specification for Cluster Tool Module Interface: Mechanical Interface and Wafer Transport |
| 5868 | Cycle 5, 2015 | Global PIC Maintenance TF | Line item revision to SEMI E22-0697 (Reapproved 0309), Cluster Tool Module Interface: Transport Module End Effector Exclusion Volume Standard  
with title change to:  
Specification for Cluster Tool Module Interface: Transport Module End Effector Exclusion Volume |
| 5869 | Cycle 5, 2015 | Global PIC Maintenance TF | Line Item Revision to SEMI E84-1109, Specification for Enhanced Carrier Handoff Parallel I/O Interface |
| 5877 | Cycle 5, 2015 | International Shipping Box 450 mm TF | Revision to SEMI M80-0514, Mechanical Specification For Front-Opening Shipping Box Used to Transport and Ship 450 mm Wafers  
with title change to:  
Specification for Front-Opening Shipping Box Used to Transport and Ship 450 mm Wafers  
(Pending PIC GCS approval) |

Motion: Approve ballot submission of the above documents for Cycle 5, 2015 voting period.
By / 2nd: Larry Hartsough (U.A. Associates) / Tom Quinn (Intel)
Discussion: None
Vote: 7-0 in favor. Motion passed.

7 Action Item Review

7.1 Open Action Items

Michael Tran (SEMI) reviewed the open action items. These can be found in the Open Action Items table at the beginning of these minutes.

7.2 New Action Items

Michael Tran (SEMI) reviewed the new action items. These can be found in the New Action Items table at the beginning of these minutes.
8 Next Meeting and Adjournment

The next NA PIC TC Chapter meeting is scheduled for July 15 in conjunction with SEMICON West 2015 in San Francisco, California. The tentative schedule is provided below:

**SEMICON West 2015 Meetings**

July 13-16, 2015  
San Francisco Marriott Marquis Hotel  
780 Mission Street  
San Francisco, California 94103  
U.S.A.

Tuesday, July 14  
• PIC Global Maintenance TF (10:00 AM – 12:00 PM)  
• Joint Int’l 450 mm PIC TF / Int’l Process Module Physical Interface TF (1:00 PM – 3:00 PM)  
• Int’l 450 mm Shipping Box TF (3:00 PM – 5:00 PM)

Wednesday, July 15  
• NA Physical Interfaces & Carriers TC Chapter (9:00 AM – 12:00 Noon)

Having no further business, a motion was made to adjourn the NA PIC Committee meeting on April 1 in conjunction with the NA Standards Spring 2015 Meetings. Adjournment was at 12:00 Noon.

Respectfully submitted by:
Michael Tran  
Senior Standards Engineer  
SEMI North America  
Phone: +1.408.943.7019  
Email: mtran@semi.org

Minutes approved by:  
Matt Fuller (Entegris) June 12, 2015  
Stefan Radloff (Intel) June 12, 2015

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<td>NA PIC Fall 2014 (November 5) meeting minutes</td>
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<td>3</td>
<td>Japan PIC Liaison Report</td>
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<td>Europe Equipment Automation Liaison Report</td>
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<td>SEMI Standards Staff Report</td>
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<td>450 mm IPIC Task Force Report</td>
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<td>450 ISB Task Force Report</td>
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<tr>
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<td>SEMI SCIS SIG Overview</td>
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#1 Due to file size and delivery issues, attachments must be downloaded separately. A .zip file containing all attachments for these minutes is available at www.semi.org. For additional information or to obtain individual attachments, please contact Michael Tran at the contact information above.