 **IBIS Open Forum Minutes**

Meeting Date: **November 17, 2023**

Meeting Location: **Teleconference**

**VOTING MEMBERS AND 2023 PARTICIPANTS**

|  |  |
| --- | --- |
| Altair | (JuneSang Lee) |
| AMD (Xilinx) | (Bassam Mansour) |
| Ansys | Curtis Clark\*, Wei-hsing Huang, Minggang Hou, Xi Hu |
| Applied Simulation Technology | (Fred Balistreri) |
| Aurora System | Dian Yang, Raj Raghuram |
| Broadcom | (Yunong Gan) |
| Cadence Design Systems | Kyle Lake\*, Jared James, John Philips,  Kristoffer Skytte, Dingru Xiao, Jianping Kong, Shengli Wang, Shiying Fang, Zuli Qin |
| Celestica | (Sophia Feng), Echo Lv, Lurker Li |
| Cisco Systems | (Stephen Scearce), Hong Wu, Sally Yang |
| Dassault Systemes | Stefan Paret, Longfei Bai |
| GE Healthcare Technologies | (Balaji Sankarshanan) |
| Google | (Hanfeng Wang) |
| Huawei Technologies | Danilo Di Febo, Marco De Stefano, Hang (Paul) Yan |
| Infineon Technologies AG | (Christian Sporrer) |
| Instituto de Telecomunicações | (Abdelgader Abdalla), Joana Catarina Mendes |
| Intel Corporation | Chi-te Chen, Kinger Cai\*, Michael Mirmak\*, Hsinho Wu\*, Chuanyu Li, Alaeddin Aydiner\* |
| Keysight Technologies | Ming Yan, [Douglas Burns], Fangyi Rao,  Pegah Alavi, Hee-Soo Lee, Heidi Barnes, Chuanbao Li, Jiarui Wu |
| Marvell | Steven Parker |
| MathWorks | Graham Kus, Walter Katz, Kerry Schotz |
| Micron Technology | [Randy Wolff], Justin Butterfield,  Akshay Shivaji Chaudhari, Dragos Dimitriu, Cheng Zhang, Chunqiang Weng, Hongyan Li, Tree Li |
| MST EMC Lab | Chulsoon Hwang\*, Zhiping Yang\* |
| SerDesDesign.com | John Baprawski |
| Siemens EDA | Arpad Muranyi\*, Weston Beal\*, Matthew Leslie, Mikael Stahlberg, Todd Westerhoff, Scott Wedge, Randy Wolff\* |
| STMicroelectronics | Olivier Bayet, Rahul Kumar, Raushan Kumar, Manish-FTM Bansal, Sameer Vashishtha |
| Synopsys | Ted Mido\*, (Tushar Pandey), Wael Dghais, Jinghua Huang, Kevin Li, Xuefeng Chen |
| Teraspeed Labs | Bob Ross\* |
| Waymo | [Zhiping Yang], (Ji Zhang) |
| ZTE Corporation | (Shunlin Zhu), Changgang Yin, Jian Huang, Ming Zheng |
| Zuken | [Michael Schäder], Markus Bücker, Ralf Brüning, Hongmin Li, Zhi Yin |
| Zuken USA | Lance Wang\* |

**OTHER PARTICIPANTS IN 2023**

|  |  |
| --- | --- |
| Alibaba | Wenzhi Wang |
| Alphawave Semi | Adrien Auge, Todd Bermensolo |
| Ciena | Hugues Tournier |
| Empyrean | Chenghan Jia, Hanqing Tian, Jiajie Zhao, Tao Zhang, Yunpeng Pei |
| HiSilicon | Zhengrong Xu, Si Ruan, Gengxin Chen |
| Hitachi Ltd. | Yutaka Uematsu |
| Honeywell | Bavish Vazhayil |
| India Institute of Technology | Jai Narayan Tripathi, Vinod Verma |
| Lenovo | July Rao, Sophia Yang |
| Montage Tech Co. | Guobing (Robin) Han, Jianbin Wei, Xiangting Wang, Xiaoliang Xu, Hannah Bian, Amy Zhu |
| Nanjing University of Information Science & Technology | Hongchuan Jia, Xin Cheng |
| Ningbo DeTooLIC Technology | Zhifei Xu |
| Nokia | Ramiro Guzman |
| OMNIVISION | Sirius Tsang |
| Renesas | Billy Chen, Jie Pan, Mengting Liao, XiangYin Zeng, Zhong Fu Ji |
| SAE-ITC | Tammy Patton\* |
| Shanghai Fullhan Microelectronics Co. | Zhengyi Zhu |
| Signal Edge Solutions | Ben Dannan |
| SI Guys | Donald Telian |
| Socionext, Inc. | Raymond Yakura |
| University of Illinois Urbana-Champaign | Jose Schutt-Aine |
| University of Tunisia, Electronic Laboratory | Malek Souilem |
| Unaffiliated | Will Hobbs, Mike LaBonte, Jon Powell, Stephen Peters |
| Xiangdixian Computing Technology | Lili Dai |
| Xidian University | Xiuqin Chu, Yajun Lv |
| Xpeedic | Guangmeng Ji, Jessie Zhang |
| Zhejiang University | Ling Zhang |

In the list above, attendees present at the meeting are indicated by “\*.” Those submitting an email ballot for their member organization for a scheduled vote are indicated by “^.” Principal members or other active members who have not attended are in parentheses “( ).” Participants who no longer are in the organization are in square brackets “[ ].”

**UPCOMING MEETINGS**

The connection information for future IBIS teleconferences is as follows:

Microsoft Teams meeting

**Join on your computer or mobile app**

[Click here to join the meeting](https://nam10.safelinks.protection.outlook.com/ap/t-59584e83/?url=https%3A%2F%2Fteams.microsoft.com%2Fl%2Fmeetup-join%2F19%253ameeting_MmIwNzhhNmItNzA1NC00ZTg1LWE0MDMtNGFiYzg1NDQ3MmE5%2540thread.v2%2F0%3Fcontext%3D%257b%2522Tid%2522%253a%2522fcbfc6fa-e20b-4a1d-b629-1b8e17697dbc%2522%252c%2522Oid%2522%253a%25227735c7ad-2577-4290-9e27-bce52c296030%2522%257d&data=04%7C01%7Ccurtis.clark%40ansys.com%7C31ef953a4d93460c286f08d90345d1fb%7C34c6ce6715b84eff80e952da8be89706%7C0%7C0%7C637544421277314270%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000&sdata=zAeh7fCRElDR1NAQiiqHUfTwbTIg%2BkEQnkgGnEn65Kk%3D&reserved=0)

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All teleconference meetings are 8:00 a.m. to 9:55 a.m. US Pacific Time. Meeting agendas are typically distributed seven days before each Open Forum. Minutes are typically distributed within seven days of the corresponding meeting.

NOTE: "AR" = Action Required.

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**INTRODUCTIONS AND MEETING QUORUM**

Roll Call: 10 participants

New IBIS Participants: Alaeddin Aydiner introduced himself. He has worked on SI and PI at Intel for about 15 years. He has worked with Michael Mirmak on many items related to IBIS.

Meeting Quorum: Yes, 8 member companies

**CALL FOR PATENTS**

Lance Wang called for declaration of any patents or pending patents related to the IBIS, IBIS-ISS, ICM, or Touchstone 2.0 specifications.

**REVIEW OF MINUTES AND ARS**

* Minutes for October 27, 2023 IBIS Open Forum teleconference

Lance Wang called for comments on the minutes. Bob Ross moved to approve the minutes. Curtis Clark seconded the motion. There were no objections.

* Minutes for October 6, 2023 IBIS Open Forum teleconference

Lance Wang called for comments on the minutes. Bob Ross moved to approve the minutes. Curtis Clark seconded the motion. There were no objections.

ARs:

* Randy asks DesignCon for partnership agreement – done

Lance added that Randy contacted Suzanne Deffree of Informa Markets.

**ANNOUNCEMENTS**, **CALL FOR ADDITIONAL AGENDA ITEMS**

Lance Wang called for any new announcements.

**MEMBERSHIP STATUS AND TREASURER'S REPORT**

Bob reported that the following payments were made:

$347.88 payment to Steve Parker for the IBIS.ORG URL charge.

$1,500.00 Cadence Sponsorship payment for the Asian IBIS Summit (Shanghai)

$2043.33.00 payment balance to Lance Wang for Shanghai Summit expenses

Some early 2024 IBIS Membership payments may occur for dues set at $900.00. He started editing the spread sheet to record early 2024 payments.

Based on a quote, we expect to pay the parser developer $1,500.00 for IBISCHK721 in 2023, after it is finished.

Note that Honeywell has been listed by mistake as a VOTING MEMBER. We have no record of any membership transaction. We need to move the Honeywell entry back to the OTHER PARTICIPANTS list and delete Honeywell from the SAE STANDARDS BALLOT list at the end.

$16,354 Balance for 2023

$21,404 Adjusted Balance for 2023 (with 2020 $2000.00 ZTE sponsorship moved forward to 2023)

Bob noted the membership list is prepared for use by SAE ITC to send out membership dues payment requests for 2024.

A vote regarding the 2024 IBIS Membership fee decision was scheduled for this IBIS Open Forum teleconference:

         2024 IBIS Membership fee will remain at 900 USD

Ballot results:

- Ansys – Yes

- Cadence – Yes

- Infineon Technologies – Yes (by email)

- Intel Corporation - Yes

- MathWorks – Yes (via email ballot)

- MST EMC Lab – Yes

- Siemens EDA – Yes

- STMicroelectronics – Yes (via email ballot)

- Synopsys – Yes

- Teraspeed Labs – Yes

- Zuken – Yes

The vote passed with a tally of 11 – Yes, 0 – No, 0 – Abstain.

**WEBSITE ADMINISTRATION**

Lance Wang reported no update received from Steve Parker.

**MAILING LIST**

Curtis Clark reported one new user subscribed to the Interconnect and users lists. Everything is running smoothly.

**LIBRARY UPDATE**

Zhiping Yang reported he talked with people in China during the Summit, and there is interest in generating standards-compliant IBIS models.

**Press UPDATES**

None

**UNIVERSITY RELATIONS**

Professor Chulsoon Hwang reported no update.

**INTERNATIONAL/EXTERNAL ACTIVITIES**

Michael Mirmak reported that DASC is interested in hearing about our Summits. He expects there to be additional subscriptions from DASC members to the IBIS lists after forwarding IBIS Summit invites to the DASC lists.

**SUMMIT PLANNING AND REVIEW**

Asian IBIS Summit (Shanghai, China)

Location:

* Parkyard Hotel, Shanghai, November 10, 2023, 8:30am-5pm

Sponsors:

* IBIS Open Forum
* ANSYS China
* Cadence Design Systems
* Empyrean
* ZTE Corporation

Notes: Lance Wang reported that everything went smoothly. In Shanghai, it is still early to have meetings in person. We had about 70 registrations, but there were 59 attendees. There were good discussions about the presentations. Zhiping Yang noted this was his first time attending in Shanghai. He was not sure why the attendance from Huawei was low. Lance noted he expected more attendees from ZTE as well, so we need to investigate how to improve for next year.

Lance noted that in 2019 we setup a vendor session for the first time, and the attendance was low. He thought most people attended through the end of the vendor session this year.

Asian IBIS Summit (Tokyo, Japan)

Location:

* Tokyo, November 14, 2023 9:00-12:00 (JST)

Sponsors:

* IBIS Open Forum
* Japan Electronic and Information Technology Industries Association (JEITA)

Co-Sponsors:

* ANSYS, Inc.
* Apollo Giken Co.
* Keysight Technologies Japan K.K.
* Seiko Epson Corporation
* Toshiba Corporation
* Zuken Inc.

Notes: Lance Wang reported that most people attended on-line. About 20 people attended in the room including JEITA members and working group leaders. Bob Ross noted seeing about 125 people attending on-line. The meeting ran about 30 minutes over time. There was a Q&A session for Japan attendees. Lance had commented that the Summit is only once a year, but it would be good to host additional Q&A type sessions during the year. Ted Mido helped with translations, and Lance thanked him for that. Ted added that it was a productive meeting with a lot of discussions about EMD, AI/ML, and creating more dedicated discussions for training. Bob commented that several remote/on-site presentations were pre-recorded and had alternative language captions. Bob asked for Ted to help get the participant list with translated names including first names. Ted said we should request this from JEITA.

DesignCon IBIS Summit 2024 (Santa Clara, CA)

Location:

* February 2, 2024, Mission Towers I, First Floor Training Room, 3975 Freedom Circle, Santa Clara CA

Sponsors:

* IBIS Open Forum

Co-Sponsors:

* The MathWorks, Inc.
* Others to be determined.

Notes: Agreement signed with MathWorks for use of the meeting room. Lance Wang reported that the partnership agreement with DesignCon (Informa Markets) is signed. Randy Wolff added that the partnership with DesignCon gives us 5 all-access conference passes. These are available to IBIS members who are not able to obtain passes through other means. Bob noted that we are seeking additional sponsorships. Bob noted we should look into the audio in the room to improve the online experience.

**QUALITY TASK GROUP**

Bob Ross reported they have been working with the parser developer on IBISCHK7.2.1 development. There have been many discussions on the fix for BUG244. There has also been discussion on preparing for a parser for Touchstone 2.1. There have also been discussions about preparing a presentation for the 2024 DesignCon IBIS Summit on using the new Quality Checklist spreadsheet.

**Note:** The Quality Task Group checklist and other documentation can be found at:

[https://www.ibis.org/quality\_ver3.0/]( https://www.ibis.org/quality_ver3.0/)

**ADVANCED TECHNOLOGY MODELING TASK GROUP**

Arpad Muranyi reported the group recently discussed BIRD220 and BIRD226 relating to PSIJ. Kinger Cai gave a presentation on differences between the BIRDs. There was general agreement that BIRD226 was ready to be scheduled for a vote soon. Reviews on BIRD220 have resulted in some questions sent to the BIRD authors for feedback. Arpad encouraged EDA vendors to review BIRD220 technical details.

**Note:** Task group material can be found at:

[http://www.IBIS.org/macromodel\_wip/](http://www.ibis.org/macromodel_wip/)

**INTERCONNECT TASK GROUP**

Michael Mirmak reported Touchstone 2.1 has been released by the task group. The group has been discussing the pole/residue TSIRD for Touchstone 3.0, and this proposal is close to completion.

**Note:** Task group material can be found at:

[http://www.IBIS.org/interconnect\_wip/](http://www.ibis.org/interconnect_wip/)

**EDITORIAL TASK GROUP**

Michael Mirmak reported the group remains suspended.

**Note:** Task group material can be found at:

[http://www.IBIS.org/editorial\_wip/](http://www.ibis.org/editorial_wip/)

**NEW ADMINISTRATIVE ISSUES**

None.

**ROLL CALL**

Mid-meeting roll call: 15

**TECHNICAL DISCUSSION**

Touchstone 2.1 Draft Review

Michael Mirmak gave an overview of the changes in Touchstone 2.1, with the main one being support for per-port reference impedances in the option line in the Touchstone 1.0 format, considered Touchstone 1.1. Bob Ross noted that a draft 2 has been prepared that adds some additional references on the last page. Randy suggested we send out another email asking for review. Arpad suggested to include the list of TSIRDs supported in Touchstone 2.1 into the document. Michael will bring a new draft for review in the next Interconnect task group meeting. Any vote will be postponed until the new draft has been submitted for review. Bob suggested any list of supported TSIRDs be added in an appendix.

**NEW AND REVISED \*IRDs**

BIRD227 AMI Ignore Block Feature Aydiner et al

Link: <https://ibis.org/birds/bird227.docx>

Notes: Alaeddin Aydiner introduced the BIRD. It creates a new IBIS-AMI parameter, Adaptation\_Valid. This Boolean output indicates the EQ tracking status or locking status of an RX AMI, which becomes 1 when the simulation data of that block can be consumed for eye generation. Use of this parameter by EDA tools could result in shorter simulation times relative to waiting for the Ignore\_bits time to pass before starting to collect eye statistics.

Arpad Muranyi noted a question related to the BIRD, if it is useful to save the internal states of the model to re-use it without having to go through the Ignore\_bits timing in a new simulation. Alaeddin suggested this should be a different BIRD. Michael noted the need for discussion about how to store the internal states, such as in a binary format or readable format. Alaeddin suggested there may not be usefulness to this, and the states would likely need to be encrypted.

**IRDs Scheduled for Vote**

BIRD223.1 Add support for SPIM in IBIS Cai et al

Link: <https://ibis.org/birds/bird223.1.docx>

Kinger Cai reported that BIRD223.1 is a revision to BIRD223, which was approved in July.

BIRD223.1 made the below revisions from BIRD223:

1) Corrected the over-sighted editorial typo error of [Device Model] to [Device SPIM].

2) Updated [Device SPIM] to “Required in a .spim file, illegal in a .ibs file” in Table 2.

3) Simplified the description by eliminating the redundancy and updated for keyword: [Device SPIM], according to item#2.

4) Updated the description and example of the keyword [Device SPIM Group], according to item#2.

5) Updated “standard” to “streamlined” for the “S” in SPIM.

6) Simplified description for adding [Device SPIM Group] & [End Device SPIM Group] keyword pair, into the “tree” of .ibs file.

7) Corrected some minor editorial typo errors & wording format.

Michael Mirmak moved to approve the BIRD. Bob Ross seconded the motion. A vote was taken.

Ballot results:

- Ansys – Yes

- Cadence – Yes

- Intel Corporation - Yes

- MathWorks – Yes (via email ballot)

- MST EMC Lab – Yes (via email ballot)

- Siemens EDA – Yes

- Synopsys – Yes

- Teraspeed Labs – Yes

- Zuken – Yes

The vote passed with a tally of 9 – Yes, 0 – No, 0 – Abstain.

Lance Wang and Bob Ross will update the status of BIRD223.1 and correct the BIRD webpage for BIRD223 [AR].

**IRDS Eligible for Vote**

BIRD220: Pre-driver PSIJ Sensitivity Keyword Ding et al

Link: <https://ibis.org/birds/bird220.docx>

Arpad Muranyi reported that the BIRD is undergoing review and discussion in the ATM task group. Randy Wolff added that the BIRD has been reviewed by Siemens EDA developers, and this has led to some ongoing discussions with the BIRD authors about possible changes.

BIRD226 PSIJ Sensitivity Cai et al

Link: <https://ibis.org/birds/bird226.docx>

Arpad Muranyi moved to schedule a vote on the BIRD for the next Open Forum meeting. Michael Mirmak seconded the motion. There were no objections.

Lance Wang to send out a vote solicitation email for BIRD226 [AR].

**Tabled IRDs: (No Discussion Without Motion to "untable")**

Notes:

**IBISCHK AND TSCHK PARSER AND BUG STATUS**

Bob Ross reported the Quality task group is preparing a parser specification for a TSCHK2.1 parser.

Randy Wolff asked if the IBISCHK7.2.1 parser is expected before the end of the year. Bob noted that it is, but the release date is unknown. The parser developer is working on BUG244 currently.

**NEW TECHNICAL ISSUES**

None

**NEXT MEETING AGENDA AND SCHEDULING**

The next IBIS Open Forum teleconference meeting would be held as a teleconference meeting December 8, 2023, and the following date of January 5, 2024.

Motion to Adjourn: Arpad Muranyi moved to adjourn. Michael Mirmak seconded the motion. The meeting adjourned.

========================================================================

**NOTES**

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This meeting was conducted in accordance with SAE ITC guidelines.

All inquiries may be sent to [info@ibis.org](mailto:info@ibis.org). Examples of inquiries are:

* To obtain general information about IBIS.
* To ask specific questions for individual response.
* To subscribe to or unsubscribe from the official [IBIS@freelists.org](mailto:ibis@freelists.org) and/or [IBIS-users@freelists.org](mailto:ibis-users@freelists.org) email lists (formerly [IBIS@eda.org](mailto:ibis@eda.org) and [IBIS-users@eda.org](mailto:ibis-users@eda.org)):
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  + [https://www.freelists.org/list/IBIS-macro](https://www.freelists.org/list/ibis-macro)
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  + [https://www.freelists.org/list/IBIS-editorial](https://www.freelists.org/list/ibis-editorial)
  + [https://www.freelists.org/list/IBIS-quality](https://www.freelists.org/list/ibis-quality)
* To inquire about joining the IBIS Open Forum as a voting Member.
* To purchase a license for the IBIS parser source code.
* To report bugs or request enhancements to the free software tools: IBISchk7, tschk2, icmchk1, s2IBIS, s2IBIS2 and s2iplt.

The BUG Report Form for IBISchk resides along with reported BUGs at:

[http://www.IBIS.org/bugs/IBISchk/](http://www.ibis.org/bugs/ibischk/)   
[http://www.IBIS.org/ bugs/IBISchk/bugform.txt](http://www.ibis.org/%20bugs/ibischk/bugform.txt)

The BUG Report Form for tschk2 resides along with reported BUGs at:

[http://www.IBIS.org/bugs/tschk/](http://www.ibis.org/bugs/tschk/)   
[http://www.IBIS.org/bugs/tschk/bugform.txt](http://www.ibis.org/bugs/tschk/bugform.txt)

The BUG Report Form for icmchk resides along with reported BUGs at:

[http://www.IBIS.org/bugs/icmchk/](http://www.ibis.org/bugs/icmchk/)   
[http://www.IBIS.org/bugs/icmchk/icm\_bugform.txt](http://www.ibis.org/bugs/icmchk/icm_bugform.txt)

To report s2IBIS, s2IBIS2 and s2iplt bugs, use the Bug Report Forms which reside at:

[http://www.IBIS.org/bugs/s2IBIS/bugs2i.txt](http://www.ibis.org/bugs/s2ibis/bugs2i.txt)   
[http://www.IBIS.org/bugs/s2IBIS2/bugs2i2.txt](http://www.ibis.org/bugs/s2ibis2/bugs2i2.txt)   
[http://www.IBIS.org/bugs/s2iplt/bugsplt.txt](http://www.ibis.org/bugs/s2iplt/bugsplt.txt)

Information on IBIS technical contents, IBIS participants and actual IBIS models are available on the IBIS Home page:

[http://www.IBIS.org/](http://www.ibis.org/)

Check the IBIS file directory on IBIS.org for more information on previous discussions and results:

[http://www.IBIS.org/directory.html](http://www.ibis.org/directory.html)

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**SAE STANDARDS BALLOT VOTING STATUS (attendee X; absent -)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Organization** | **Interest Category** | **Standards Ballot Voting Status** | **Sept 15, 2023** | **Oct 6, 2023** | **Oct 27, 2023** | **Nov 17, 2023** |
| Altair | User | Inactive | - | - | - | - |
| AMD (Xilinx) | Producer | Inactive | - | - | - | - |
| Ansys | User | Active | X | X | X | X |
| Applied Simulation Technology | User | Inactive | - | - | - | - |
| Aurora System | User | Inactive | - | - | - | - |
| Broadcom Ltd. | Producer | Inactive | - | - | - | - |
| Cadence Design Systems | User | Active | X | X | - | X |
| Celestica | User | Inactive | - | - | - | - |
| Cisco Systems | User | Inactive | - | - | - | - |
| Dassault Systemes | User | Inactive | - | - | - | - |
| GE Healthcare Technologies | User | Inactive | - | - | - | - |
| Google | User | Inactive | - | - | - | - |
| Huawei Technologies | Producer | Inactive | - | - | - | - |
| Infineon Technologies AG | Producer | Inactive | - | - | - | X |
| Instituto de Telecomunicações | User | Inactive | - | - | - | - |
| Intel Corp. | Producer | Active | X | X | X | X |
| Keysight Technologies | User | Inactive | - | - | - | - |
| Marvell | Producer | Inactive | X | - | - | - |
| MathWorks | User | Active | X | X | X | X |
| Micron Technology | Producer | Inactive | X | - | - | - |
| MST EMC Lab | User | Active | X | X | - | X |
| SerDesDesign.com | User | Inactive | - | - | - | - |
| Siemens EDA | User | Active | X | X | X | X |
| STMicroelectronics | Producer | Inactive | - | - | - | X |
| Synopsys | User | Active | X | X | X | X |
| Teraspeed Labs | General Interest | Active | X | X | X | X |
| Waymo | User | Inactive | - | - | - | - |
| ZTE Corp. | User | Inactive | - | - | - | - |
| Zuken | User | Active | X | X | - | X |

= Temporarily not a voting member

Criteria for SAE member in good standing:

* Must attend two consecutive meetings to establish voting membership.
* Membership dues current
* Must not miss two consecutive meetings (voting by email counts as attendance)

Interest categories associated with SAE standards ballot voting are:

* Users - members that utilize electronic equipment to provide services to an end user.
* Producers - members that supply electronic equipment.

General Interest - members are neither producers nor users. This category includes, but is not limited to, government, regulatory agencies (state and federal), researchers, other organizations, and associations, and/or consumers.