



## IBIS Open Forum Minutes

Meeting Date: **April 2, 2021**

Meeting Location: **Teleconference**

### VOTING MEMBERS AND 2021 PARTICIPANTS

ANSYS	Curtis Clark*
Applied Simulation Technology	(Fred Balistreri)
Broadcom	(Yunong Gan)
Cadence Design Systems	Zhen Mu
Cisco Systems	(Stephen Searce)
Dassault Systemes (CST)	(Stefan Paret)
Ericsson	(Guohau Wang)
Google	Zhiping Yang*
Huawei Technologies	(Hang (Paul) Yan)
IBM	(Juan Martinez)
Infineon Technologies AG	(Christian Sporrer)
Instituto de Telecomunicações	(Abdelgader Abdalla)
Intel Corporation	Hsinho Wu*, Michael Mirmak*
Keysight Technologies	Radek Biernacki*, Fangyi Rao*
Marvell	Steve Parker
Maxim Integrated	Tushar Pandey*
Micron Technology	Randy Wolff*, Justin Butterfield
MST EMC Lab	(Chulsoon Hwang)
NXP	(John Burnett)
SerDesDesign.com	(John Baprawski)
Siemens EDA (Mentor)	Arpad Muranyi*, Weston Beal
SiSoft (MathWorks)	Mike LaBonte*, Walter Katz*
Synopsys	Ted Mido*
Teraspeed Labs	Bob Ross*
Xilinx	(Romi Mayder)
ZTE Corporation	(Shunlin Zhu)
Zuken	(Michael Schäder)
Zuken USA	Lance Wang*

### OTHER PARTICIPANTS IN 2021

Achronix Semiconductor	Hansel Dsilva*
------------------------	----------------

In the list above, attendees at the meeting 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:

<https://tinyurl.com/IBISOFridayTeams>

### Join Microsoft Teams Meeting

Conference ID: 803 509 041#

[Local numbers](#) | [Learn more about Teams](#) | [Meeting options](#)

Join with a video conferencing device

[106010980@teams.bjn.vc](mailto:106010980@teams.bjn.vc) VTC Conference ID: 1143484747

[Alternate VTC dialing instructions](#)

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.

---

## INTRODUCTIONS AND MEETING QUORUM

Curtis Clark declared that a quorum was reached.

## CALL FOR PATENTS

Randy Wolff called for declaration of any patents or pending patents related to the IBIS, IBIS-ISS, ICM, or Touchstone 2.0 specifications. No patents were declared.

## REVIEW OF MINUTES AND ARS

Randy Wolff called for comments on the minutes of the March 12, 2021 IBIS Open Forum teleconference. Bob Ross moved to approve the minutes. Lance Wang seconded the motion. There were no objections.

Randy reviewed ARs from the previous meeting.

1. Zhiping Yang to check with IEEE EMC+SIPI event organizers for details on special registration codes and schedule for Standards Week [AR].  
Randy reported this had been done. The discussion is in the Summit Planning and Status section.
2. Randy Wolff to update Date Accepted field on BIRD202.3 [AR].  
Randy reported that this had been done.
3. Randy Wolff to update Date Accepted field on BIRD209 [AR].  
Randy reported that this had been done.

4. Steve Parker to update BIRD202.3 on website [AR].  
Randy reported that this had been done.
5. Steve Parker to update BIRD209 on website [AR].  
Randy reported that this had been done.
6. Bob Ross to update status of BUG215 on website [AR].  
Bob reported that this had been done.

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

None.

## **MEMBERSHIP STATUS AND TREASURER'S REPORT**

Bob Ross reported that we have 27 members. The quorum for meetings is 7. Cash flow for 2021 is \$14,625 and total adjusted balance for 2021 is \$17,975. These figures are up \$4,500 from the previous meeting and reflect 5 additional membership payments.

Bob said we expect two new membership payments in 2021, a new Touchstone parser source code license payment in 2021, and a new ibischk7 parser license payment as well. All current member organizations should now have received an invoice for 2021 membership. Current 2020 memberships will expire in May of 2021 if payment is not received by then. Bob reported that 20 members have paid for 2021, and he is following up on the 7 remaining membership renewals.

## **WEBSITE ADMINISTRATION**

Randy Wolff reported for Steve Parker. Randy noted that BIRD202.3 and BIRD209 had been updated per the [AR]s. Randy asked for further comment on the website. Bob Ross noted that Randy had sent the SPI 2021 logo to Steve, but it still had not been uploaded to our website. Bob asked that this be handled as soon as possible, since we have an agreement with SPI 2021. Steve Parker to upload the SPI 2021 logo to the Events page [AR].

## **MAILING LIST ADMINISTRATION**

Mike LaBonte reported that mailing lists were operating smoothly.

## **LIBRARY UPDATE**

Zhiping Yang reported no new updates to the model library.

## **INTERNATIONAL/EXTERNAL ACTIVITIES**

- Conferences

SPI2021 – the 25<sup>th</sup> IEEE Workshop on Signal and Power Integrity (virtual May 10-12, 2021) :

<https://spi2021.uni-siegen.de>

IEEE EMC + SIPI Symposium 2021 (virtual from July 27-August 13, 2021):

<https://www.emc2021.emcss.org>

DesignCon 2021 (August 16-18, 2021, San Jose, CA):

<https://www.designcon.com/>

- Press Update  
None.

- Related standards  
None.

### **SUMMIT PLANNING AND STATUS**

- SPI 2021 (May 10-12, 2021 entirely virtual)

Bob Ross noted that Randy Wolff had sent out the second announcement for this summit. The IBIS summit will be held on Wednesday, May 12<sup>th</sup>, from 4 p.m. to 8 p.m. local time. Bob reported that attendees were starting to register. He said Alistair Duffy, IEEE EMC Society Chair, was planning to talk about the latest IEEE transactions on Signal and Power Integrity, and we have 5 additional presentations planned. We are still open to new submissions.

Bob said we had considered asking people to sign up for the summit through the SPI 2021 site, but they had already started registrations for SPI, so we did not combine them. They are mentioning the IBIS summit at the SPI registration page, and a link directs people to us. Please register through Lance Wang to get the access code. Bob noted that we are using Zoom for this conference because SPI uses Zoom. Randy said he can host the Zoom meeting via Micron.

- IEEE EMC+SIPI (July 27-August 13, 2021 virtual)

Zhiping Yang reported that the conference schedule is taking shape. The first week is scheduled for the university program, the second week is for workshops and tutorials, and the third week is for papers. Zhiping noted that their TCSC committee meeting will occur during weeks one and three. Zhiping said he thought it would be best to hold the IBIS summit during week three, and he said the TCSC meeting could be used to advertise it and boost attendance.

Zhiping reminded everyone that the conference is a collaboration with EMC Europe. For this reason, it has 4 and a half hours scheduled each day in the morning US time. This makes it more convenient for participants from Europe but is inconvenient for those from APAC. Zhiping suggested Thursday or Friday in week 3 for the summit. Randy suggested a time frame such as we're using for SPI, morning in the US, 4 p.m. to 8 p.m. in Europe. Bob suggested Thursday, since that typically is free of other IBIS meetings. Randy agreed and suggested Thursday, August 12<sup>th</sup>.

Bob asked if we could get permission to add the EMC+SIPI banner or splash page on the IBIS website. Zhiping to check on what image(s) we may use [AR]. Zhiping noted that the fee

structure for the conference has been finalized. Zhiping to get final information on discount codes and how we may share them [AR]. Randy said the first announcement for this would go out in early June.

- DesignCon 2021 (August 16-18, 2021 planned for in-person)

Randy said we had received no new updates from DesignCon. Randy to contact Informa Markets to see if they have an update on DesignCon summit accommodations [AR].

### **QUALITY TASK GROUP**

Mike LaBonte reported that the group meets on Tuesdays at 8:00 a.m. PT. The group continues to plan for the next ibischk release. Mike noted that the group was first formed to develop the IBIS Quality Specification, which had not been discussed for some time. However, they had recently received an inquiry from an organization interested in using the IBIS Quality spreadsheet.

The Quality task group checklist and other documentation can be found at:

[http://www.ibis.org/quality\\_wip/](http://www.ibis.org/quality_wip/)

### **ADVANCED TECHNOLOGY MODELING TASK GROUP**

Arpad Muranyi reported that the group meets on Tuesdays at 12:00 p.m. PT. The group continues to discuss improvements to the AMI flow for redrivers. He said that BIRD210 and the newly submitted BIRD211 provide two good proposals, and we need to decide on one.

Task group material can be found at:

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

### **INTERCONNECT TASK GROUP**

Randy Wolff reported that the Interconnect task group remains suspended. Its former timeslot is being used by the Editorial task group.

Task group material can be found at:

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

### **EDITORIAL TASK GROUP**

Randy Wolff reported that the group now meets at 8:00 a.m. PT on Wednesdays using the suspended Interconnect task group's time slot. They are making good progress on an IBIS 7.1 draft. They have finished addressing the IBIS 7.0 known issues list, and they are on draft 4 of an IBIS 7.1 document, which currently contains about half of the newly approved BIRDs. Even though a final vote on which BIRDs will be included has not been held, they are proceeding under the assumption that they know certain BIRDs will be included. All newly accepted BIRDs

related to AMI parameters have been folded in. Randy noted that the BIRD202.3 editorial changes discussed at the previous Open Forum meeting will be folded in along with BIRD202.3.

Task group material can be found at:

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

## **NEW ADMINISTRATIVE ISSUES**

- Randy Wolff said that at the next meeting we will start discussing the election of IBIS officers, which comes up in the May timeframe.

## **BIRD211: NEW REDRIVER FLOW**

Walter Katz introduced and reviewed his new BIRD211. He said that everyone agrees the IBIS 7.0 Redriver flow is broken. He said we had bent over backwards to make the input to Tx2 (Redriver Tx) be the downstream channel to keep it symmetric with Tx1 (initial Tx). However, the flow in IBIS 7.0 deprives the Rx2 (terminal Rx) of the upstream information because the output of Rx2 is convolved with the output of Rx1. Therefore, the Rx2 does not have the information it needs to optimize correctly. Walter said there are several ways to fix it. They all involve making sure the upstream information is included in the input to Rx2, and they are all equivalent as long as the Tx2 Init does not optimize itself and is all LTI.

Walter reviewed the BIRD211 flow, the fundamentals of which were first introduced in BIRD166, and noted that BIRD166 was requested by and co-authored by Redriver device vendors. Walter said Redriver vendors had immediately noticed the IBIS 7.0 flow was fundamentally flawed. Walter said BIRD166 had not been approved because Fangyi Rao had pointed out two limitations. One was related to supporting crosstalk, and the other was related to a Tx2 model that wanted to optimize itself based on downstream information. Walter said the Tx2 issue is important for some new models for optical devices, where the ability to optimize based on downstream response is important. However, for legacy Tx2 models for electrical channels, optimizing based on the downstream channel had proven to be a bad idea. Walter said the only Tx model he was aware of that had tried to optimize based on the downstream channel had over-equalized the channel and caused problems for the Rx's equalization.

Walter said his issue with the BIRD210 proposal was that it required all models in the channel to support its new parameter and the 2 newly added columns in the impulse matrix. He said this would mean legacy models for the Tx1 and Rx2, which don't need any of the new information, would have to be rewritten, and EDA tools would have to make non-trivial changes. Walter said BIRD211 contains a modified version of BIRD166 that addressed the issues he has with BIRD210. Michael Mirmak said that EDA vendors and model makers should make sure they compare BIRD210 and BIRD211.

Walter reviewed a presentation "BIRDs\_210\_211", which he had prepared. He said it summarized some of the debate points from the ATM discussions, though he noted the authors of BIRD210 had not yet seen these slides.

Slide 2 – Current IBIS Redriver Flow

This slide shows both the statistical and time-domain Redriver flows in IBIS 7.0. Walter noted that the statistical flow is fundamentally broken because the input to Rx2 Init does not include the upstream channel information.

#### Slide 3 – BIRD166 (April 2014)

BIRD166 addressed the IBIS 7.0 Redriver problem by including the output of Rx1 in the input to Rx2. Walter observed that there are several ways this can be done, and they're all equivalent if the Tx2 Init doesn't optimize based on its input. Fangyi had noted that BIRD166 had problems supporting complicated crosstalk flows and supporting Tx2 models that optimize themselves based on their downstream channel. Supporting crosstalk propagation requires the EDA tool to know the equalization of the model filter. Walter said another benefit of having the filter impulse response is that the EDA tool doesn't need deconvolution to implement a proxy GetWave for an Init Only model.

#### Slide 4 – BIRD211

Walter said he had created BIRD211, which is a modified version of BIRD166, to provide all the capabilities of BIRD210 without requiring changes to legacy models that didn't need them, particularly the Tx1 and Rx2.

#### Slide 5 – BIRD211 revised flow

BIRD211 Redriver statistical flow diagram, which shows the output of Rx1 as the input to Tx2. The output of Tx2 is then convolved with the downstream channel and passed to Rx2. This flow is different from BIRD166 in the order in which the upstream information is folded in to the input to Rx2, but the two are identical if the Tx2 does not optimize itself. Walter noted that any EDA tool producing correct Redriver answers is already using some version of this flow for the through channel.

#### Slide 6 – BIRD211 New Reserved Parameter Tx\_Requires\_Downstream\_Channel

Walter noted that a modification to the flow in slide 5 is only required when the Redriver Tx2 optimizes its equalization based on the downstream channel. This has applications in optical links. Walter said his proposal only adds this new parameter and new impulse matrix column for the Tx2, and only if it needs it.

#### Slide 7 – Differences Between BIRD210 and BIRD211

Walter noted that both required that all AMI models in the channel return a modified impulse response (Init\_Returns\_Impulse=True). Walter said BIRD210 requires that every model in the channel support the new AMI Reserved Parameter Use\_v7p1\_AMI\_Flow and the two new columns in the impulse matrix. He said this is required to get the new flow with BIRD210 and avoid the IBIS7.0 flow issues, but the primary Tx (Tx1) and terminal Rx (Rx2) don't know or care if there's a Redriver in the middle and don't need the new information anyway. Walter said BIRD211 supports legacy Tx1 and Rx2 models.

#### Slide 8 – BIRD210 requirements

Walter said BIRD210 maintains the legacy columns and flow of information and adds two new columns. The first new column is identical to what is proposed in BIRD211 (slide 3). The second new column is for use by the model to return its filter's response. This is useful for crosstalk flows and for the tool to provide a proxy GetWave for Init Only models without having to rely on deconvolution.

#### Slide 9 – Option when the Filter Equalization is required

Walter noted that EDA tools have always had the option of simply adding a unit impulse response, i.e., Dirac delta – zero at every point except 1/sample\_interval at 1 point, to the impulse matrix passed in to Init. Since the model is obligated to apply its equalization to every crosstalk column, that column will return the filter's response.

For the terminal Rx, these crosstalk aggressor columns are modified by the model to add its filter response to them so the EDA tool can incorporate crosstalk impulse responses in its results. Some newer models are also planning to utilize the crosstalk column information themselves for implementing crosstalk cancellation or modifying their CTLE, FFE, DFE tradeoff decisions based on aggressor crosstalk content. These models would have to know to ignore a unit impulse response crosstalk column when making their optimization decisions. Walter said this was largely an academic concern, since he thought any model sophisticated enough to handle crosstalk cancellation or optimization based on crosstalk would surely include a GetWave function anyway. So, there would be no need for the tool to create a proxy GetWave.

#### Slide 10 – Summary

BIRD211 is essentially the same basic flow as BIRD166, which was introduced in 2014 and recommended by Redriver vendors. All EDA tools generating the correct Redriver results are already using a variant of this flow. BIRD211 does not require changes to legacy AMI models to support the Redriver flow. BIRD211 confines any model and EDA tool changes to the few Tx2 cases that need them, i.e., Tx2 models that adapt their equalization based on the downstream channel.

Bob Ross noted that both proposals require one new AMI parameter. He noted that BIRD211 specified the use of Format Value, where BIRD210 used Format List. Fangyi said Format List is required because it's the EDA tool/user making the choice of whether to use the new flow or the old flow. Arpad Muranyi agreed. He said if the .ami file provides a Value, then the tool doesn't even show it to the user since there's no possibility of changing it. The tool simply passes the value to the model. If it's a List of possibilities (True, False in the case of Boolean), then the EDA tool or user makes the choice. Radek Biernacki noted that we did have other Reserved Parameters of Usage In for which a Value was provided in the .ami file, but it was a placeholder to be replaced by the EDA tool. Walter said this was a detail we could resolve in BIRD211. Randy Wolff said this was a discussion best left to the ATM task group.

Fangyi said BIRD210 doesn't make any assumptions about existing models, but BIRD211 changes the flow of information in the existing columns, so it makes assumptions about what existing models do. For example, it assumes Tx2 doesn't optimize based on the downstream response, or it assumes Rx2 doesn't optimize based on crosstalk. Walter said the existing IBIS 7.0 flow is a disaster, and if existing models are used with BIRD210 they only get the existing flow (because they don't know about the new columns). So BIRD210 doesn't work with existing models. Walter agreed that Tx2 models that optimize themselves have to be rewritten with BIRD211, but he said they're broken with the existing flow anyway. Fangyi said they're not necessarily broken, but it varies with different applications. Existing electrical Redriver channel Tx2 models are probably more focused on upstream channel information, but as data rates go up and optical Redrivers are used the focus will be more on the downstream information.

Radek Biernacki said he didn't find the argument that Tx1 and Rx2 models don't have to be



rewritten with BIRD211 to be compelling. He said as technology moves forward and data rates increase, it's likely all the models will need to be updated to the more comprehensive BIRD210 flow. Walter said the bottom line is that if someone has a Redriver channel simulation today, they cannot use the BIRD210 flow because existing models won't work with the BIRD210 flow. Fangyi said that's not quite true because, as Ambrish Varma had often noted, the current GetWave flow is perfectly fine. The only exception is when the terminal Rx (Rx2) does not have GetWave. He said there's probably only one Init Only terminal Rx model in existence, and it is probably obsolete at this point. Walter said there are lots of people who use the Init flow for their Redriver channels.

Arpad asked if there were any scenarios that one of the BIRDS handled and the other didn't. Aside from questions about implementation and whether models or tools had to change, was either one able to do something the other couldn't? Walter said BIRD211 deals with legacy models with the exception of a Tx2 that optimizes itself, and BIRD210 does not work with any legacy models. Arpad asked if, aside from legacy model issues, there were any other areas where one proposal had advantages in terms of consistency in model or tool implementation. Radek said he thought BIRD210 was far more consistent and did not have special cases and rules for a Redriver Tx that optimizes. He also said the issue of the second new impulse matrix column in BIRD210, which the model uses to return the filter's equalization response, is poorly handled in BIRD211. He said talk of passing in a unit impulse response, and the Rx2 model knowing to ignore it when optimizing, is vague and not well defined. Walter said the only reason you need a unit impulse response crosstalk column passed into a terminal Rx is if it does not have a GetWave. First, he said we all know it's trivial to add a GetWave to an Init Only model. Second, it's only a problem if a terminal Rx doesn't have a GetWave and it's using crosstalk column information for crosstalk cancellation or optimization, then the unit impulse response could be an issue. But these types of models that optimize based on crosstalk are being developed today. They don't exist yet. Walter said making sure these models include a GetWave or deal with the unit impulse response is a small price to pay for preserving the use of legacy models.

Arpad said that he thought in the past we'd occasionally gotten into trouble by attempting to tack on minor changes to address an immediate need but eventually painting ourselves into a corner. He said if we are saying that there aren't that many Redriver models out there now, then maybe we should consider adopting a more consistent solution that will be more radical now but offer benefits in the future. Perhaps we want to adopt a more consistent solution rather than attempting to accommodate existing models. Fangyi and Radek said this was exactly the motivation behind BIRD210. Bob asked if both approaches would work with optical channels. Walter said both would work.

Randy and Arpad said this discussion will continue in the ATM task group.

#### **BIRD210: NEW REDRIVER AMI FLOW**

No new discussion other than that which occurred above for BIRD211.

#### **BIRD166.4: RESOLVING PROBLEMS WITH REDRIVER INIT FLOW**

Discussion was tabled.

## **BIRD181.1: I-V TABLE CLARIFICATIONS**

Discussion was tabled.

## **BIRD190: CLARIFICATION FOR REDRIVER FLOW**

Discussion was tabled.

## **IBISCHK AND TSCHK PARSER AND BUG STATUS**

Bob Ross reported that there were no new BUGs for ibischk or tschk2.

-ibischk

Bob said the Quality task group is discussing the possibility of implementing the BUG214 and BUG215 enhancements for checking the linkage to IBIS-ISS and Touchstone files. Bob shared a draft contract under development for these parser enhancements. He said whether to add this to the IBIS 7.1 ibischk contract, or keep it as a separate contract, or not implement these enhancements with 7.1 at all is still TBD.

Bob noted that the BUGs themselves are written with respect to IBIS 7.0. However, the draft contract is written with respect to IBIS 7.0 plus additional linkage checks for the [C Comp Model] keyword and EMD modeling keywords expected to be in IBIS 7.1.

The overall checking will cover Interconnect Model Sets, multi-lingual constructs, [C Comp Model], EMD modeling keywords, and the Ts4file AMI Reserved Parameter for a 4 port linkage. Bob said this results in about ten pages of additional contract, and he reviewed some of the detailed information on what is to be checked and how. He said the question will be whether to append it to the 30 page contract for IBIS 7.1 or handle this separately in terms of getting quotes from the developer. He said he thought the parser developer would likely prefer to do everything at once. Mike LaBonte thanked Bob for all the time he'd spent on the details of the contract.

Randy Wolff asked if anyone in attendance would be against making these enhancements as part of the next version of ibischk. There were no objections. Mike said he thought it would be helpful if we could have quotes from the parser developer in time for the next Open Forum meeting. He said he thought it would be best to ask the parser developer for two quotes, one for IBIS 7.1 changes, and one for IBIS 7.1 changes plus these two enhancements. He thought both the cost and time estimates would be useful. He noted that the Quality task group is again trying to get things started prior to the formal ratification of IBIS 7.1 so that a parser is available as soon as possible after ratification. Randy noted that it's understood that BIRD210 or BIRD211 aren't yet approved, but they may end up in IBIS 7.1. Randy, Mike and Bob said the Quality task group can work toward getting estimates from the parser developer, but Bob said he'd like to have a little more detail in terms of the IBIS 7.1 changes before asking for estimates.

## **NEW TECHNICAL ISSUES**

- None.

## NEXT MEETING

The next IBIS Open Forum teleconference meeting will be held on April 23, 2021. The following teleconference meeting is tentatively scheduled for May 14, 2021.

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

=====

## NOTES

IBIS CHAIR: Randy Wolff (208) 363-1764

[rwolff@micron.com](mailto:rwolff@micron.com)

Principal Engineer, Silicon SI Group, Micron Technology, Inc.

8000 S. Federal Way

P.O. Box 6, Mail Stop: 01-720

Boise, ID 83707-0006

VICE CHAIR: Lance Wang (978) 633-3388

[lance.wang@ibis.org](mailto:lance.wang@ibis.org)

Solutions Architect, Zuken USA

238 Littleton Road, Suite 100

Westford, MA 01886

SECRETARY: Curtis Clark

[curtis.clark@ansys.com](mailto:curtis.clark@ansys.com)

ANSYS, Inc.

150 Baker Ave Ext

Concord, MA 01742

TREASURER: Bob Ross (503) 246-8048

[bob@teraspeedlabs.com](mailto:bob@teraspeedlabs.com)

Engineer, Teraspeed Labs

10238 SW Lancaster Road

Portland, OR 97219

LIBRARIAN: Zhiping Yang (650) 214-0868

[zhipingyang@google.com](mailto:zhipingyang@google.com)

Sr. Hardware Manager, Google LLC

1600 Amphitheatre Parkway

Mountain View, CA 94043

WEBMASTER: Steven Parker (845) 372-3294

[sparker@marvell.com](mailto:sparker@marvell.com)

Senior Staff Engineer, DSP, Marvell

2070 Route 52

Hopewell Junction, NY 12533-3507

POSTMASTER: Mike LaBonte  
[mlabonte@sisoft.com](mailto:mlabonte@sisoft.com)  
IBIS-AMI Modeling Specialist, SiSoft  
1 Lakeside Campus Drive  
Natick, MA 01760

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 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)).
- To subscribe to one of the task group email lists: [ibis-macro@freelists.org](mailto:ibis-macro@freelists.org), [ibis-interconn@freelists.org](mailto:ibis-interconn@freelists.org), or [ibis-quality@freelists.org](mailto:ibis-quality@freelists.org).
- 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: `ibischk6`, `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/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/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/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/s2ibis2/bugs2i2.txt>  
<http://www.ibis.org/bugs/s2iplt/bugspl.txt>

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

<http://www.ibis.org/>

Check the IBIS file directory on [ibis.org](http://www.ibis.org) for more information on previous discussions and results:

<http://www.ibis.org/directory.html>

Other trademarks, brands and names are the property of their respective owners.

## SAE STANDARDS BALLOT VOTING STATUS

Organization	Interest Category	Standards Ballot Voting Status	January	February	March 12,	April 02,
			29, 2021	19, 2021	2021	2021
ANSYS	User	Active	X	X	X	X
Applied Simulation Technology	User	Inactive	-	-	-	-
Broadcom Ltd.	Producer	Inactive	-	-	-	-
Cadence Design Systems	User	Active	X	X	X	-
Cisco Systems	User	Inactive	-	-	-	-
Dassault Systemes	User	Inactive	-	-	-	-
Ericsson	Producer	Inactive	-	-	-	-
Google	User	Active	X	X	X	X
Huawei Technologies	Producer	Inactive	-	-	-	-
Infineon Technologies AG	Producer	Inactive	-	-	-	-
Instituto de Telecomunicações	User	Inactive	-	-	-	-
IBM	Producer	Inactive	-	-	-	-
Intel Corp.	Producer	Active	X	X	X	X
Keysight Technologies	User	Active	X	X	X	X
Marvell	Producer	Inactive	X	X	-	-
Maxim Integrated	Producer	Inactive	X	-	-	X
Micron Technology	Producer	Active	X	X	X	X
MST EMC Lab	User	Inactive	-	-	-	-
NXP	Producer	Inactive	-	-	-	-
SerDesDesign.com	User	Inactive	-	-	-	-
Siemens EDA (Mentor)	User	Active	X	X	X	X
SiSoft	User	Active	X	X	X	X
Synopsys	User	Active	X	X	X	X
Teraspeed Labs	General Interest	Active	X	X	X	X
Xilinx	Producer	Inactive	-	-	-	-
ZTE Corp.	User	Inactive	-	-	-	-
Zuken	User	Active	X	X	X	X

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

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.