# IBIS Open Forum Minutes

**Meeting Date: April 03, 2020**
Meeting Location: **Teleconference**

## VOTING MEMBERS AND 2020 PARTICIPANTS

| | |
|---|---|
| ANSYS | Curtis Clark*, Wei-hsing Huang, Marko Marin Shai Sayfan-Altman, Zilwan Mahmod |
| Applied Simulation Technology | (Fred Balistreri) |
| Broadcom | James Church |
| Cadence Design Systems | Zhen Mu*, Ambrish Varma, Jared James Kumar Keshavan, Ken Willis |
| Cisco Systems | Stephen Scearce, Hong Wuf |
| Dassault Systemes (CST) | Stefan Paret |
| Ericsson | Anders Ekholm, Sungjoo Yu, Thomas Ahlstrom |
| Google | Zhiping Yang, Shuai Jin, Zhenxue Xu |
| Huawei Technologies | (Hang (Paul) Yan) |
| IBM | Michael Cohen* |
| Infineon Technologies AG | (Christian Sporrer) |
| Instituto de Telecomunicações | (Abdelgader Abdalla) |
| Intel Corporation | Hsinho Wu*, Michael Mirmak*, Adrien Auge Fernando Mendoza, Taeyoung Kim, Wendem Beyene Oleg Mikulchenko, Nhan Phan, Ifiok Umoh Subas Bastola |
| Keysight Technologies | Radek Biernacki*, Hee-Soo Lee, Todd Bermensolo Graham Riley, Pegah Alavi, Fangyi Rao Stephen Slater |
| Marvell | Steve Parker*, Johann Nittmann |
| Maxim Integrated | Joe Engert, Charles Ganal, Dzung Tran, Yan Liang* |
| Mentor, A Siemens Business | Arpad Muranyi*, Raj Raghuram, Todd Westerhoff Weston Beal |
| Micron Technology | Randy Wolff*, Justin Butterfield |
| NXP | John Burnett |
| SerDesDesign.com | John Baprawski |
| SiSoft (MathWorks) | Mike LaBonte*, Walter Katz*, Graham Kus |
| Synopsys | Ted Mido*, Andy Tai |
| Teraspeed Labs | Bob Ross* |
| Xilinx | Ravindra Gali |
| ZTE Corporation | (Shunlin Zhu) |
| Zuken | Michael Schäder, Kazunari Koga |
| Zuken USA | Lance Wang* |

**OTHER PARTICIPANTS IN 2020**

| | |
|---|---|
| Accton | Tariq Abou-Jeyab |
| Achronix Semiconductor | Hansel Dsilva |
| Apollo Giken Co. | Satoshi Endo |
| Kandou Bus | Sherman Chen |
| KEI Systems | Shinichi Maeda |
| Kioxia Corporation | Yasuo Otsuka |
| OmniVision | Sirius Tsang |
| Qualcomm | Kevin Roselle, Sunil Gupta |
| Renesas | Genichi Tanaka |
| RITA Electronics | Takahide Nozaki |
| SAE ITC | Jose Godoy |
| Samsung | Wonsuk Choi |
| San Jose State University | Vincent Tam |
| Seagate | Preetesh Rathod, Alex Tain, Karthik Chandrasekar Emmanuel Atta |
| Signal Metrics | Ron Olisar |
| Silvaco Japan Co. | Yoshiharu Furui |
| SK Hynix Memory Solutions | Jongchul Shin, Alex Lee, James Yu |
| Socionext | Matsumura Motoaki, Shinichiro Ikeda Takafumi Shimada |
| SPISim | [Wei-hsing Huang] |
| Teradyne | Dongmei Han, Edward Pulscher, Sheri Zhuang Tomoo Tashiro, Paul Carlin, Tao Wang |

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 bridge numbers for future IBIS teleconferences are as follows:

| Date | Meeting Number | Meeting Password |
|---|---|---|
| April 24, 2020 | 627 261 744 | Friday1 |

For teleconference dial-in information, use the password at the following website:

   https://tinyurl.com/IBISfriday-new

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
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 13, 2020 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.  Randy to provide an update on the JEDEC JESD204C.1 request to use text from the IBIS specification and the legal discussion with SAE ITC [AR].
    Randy reported that SAE-ITC legal had not yet responded to the questions from the head of JEDEC about the SAE ITC copyright agreement.  Randy said that he would provide an update at the next meeting [AR].

2.  Randy to provide Steve Parker with an updated BIRD197.7 containing the accepted date [AR].
    Randy reported that this had been done.


## ANNOUNCEMENTS, CALL FOR ADDITIONAL AGENDA ITEMS
Randy Wolff noted that he had received an update to BIRD198 that morning.  BIRD198.1 is introduced and discussed in the Technical Discussion section of these minutes.


## MEMBERSHIP STATUS AND TREASURER'S REPORT
Bob Ross reported that the financial books for 2019 had been adjusted upward by $3,000 because SAE had reported a parser payment from Dassault (CST) that was realized in 2019.  We had $25,227 cash flow for 2019 and an adjusted balance of $26,727 for 2019.

We now have 26 members, and Bob noted that he was still working with a potential new member.  Thus far, sixteen organizations have paid for 2020 membership (15 renewals, and one new member).  Existing members will carry over through May of 2020, and their membership will end then unless they renew for 2020.  We have $8,378 cash flow for 2020 and an $8,728 adjusted balance for 2020.

Bob noted that he is working with SAE ITC to track down membership payments.  He reported that most SAE ITC personnel are now working from home, and SAE ITC is migrating to a new accounting system.  Therefore, Bob is not receiving receipts for paid membership invoices in

real time.  Please check with Bob if there are any questions about the status of your membership renewal.


**WEBSITE ADMINISTRATION**

Steve Parker reported that the website was up to date with respect to ATM, Interconnect, and Quality task group minutes and documents.  Minutes from the first CRF meeting had been posted, and the IBIS Summit at SPI had been added to the upcoming events page for 2021 (tentatively for May 2021).

Steve said that while working on the website he had noticed a feature called site backup pro.  He had searched to find the backups and couldn't, so he had contacted Bluehost to ask how he could find them.  Bluehost had investigated and reported back that site backups had been having issues for the past few weeks.  Steve said that as a precaution he had made a complete backup of everything in the site's public_html folder (approximately 4GB) and saved it on his laptop.  Mike LaBonte said that he tested the site backups at one point a year or more ago, and they had worked at that time.  Mike noted that he had also been periodically rsync-ing public_html to his computer as a backup.  Steve said he was following up with Bluehost.

Steve reported that he had been working to streamline and automate the process of publishing minutes and work files.  Previously he had to ssh to the site, create directories, manually upload the files and run a make.  He has now implemented a system based on Jenkins that automates this process, creates the directories, uploads the files, extracts meta data that is captured in the file system of the website, and runs the make.  This allows him to post minutes quickly instead of waiting to post them in batch mode.  He has workflows created for ATM, Interconnect, Quality and Open Forum minutes.  He will be working on similar flows for posting work archive documents.  The Jenkins based process is currently running on his laptop, but the long term goal is to expose it to others.

Curtis Clark noted that various task groups have different date formats and other syntax differences in their meeting minutes, and this had probably made Steve's automation task more difficult.  Steve agreed, but said he already addressed the differences so there was no immediate need to consider standardizing the groups' minutes.  He asked that groups not change the formats of their minutes without consulting with him.

Mike asked if this process replaces the existing perl scripts on the website.  Steve said that it does provide equivalent functionality.  Mike said this was good, and he asked if this process could potentially be run on the website itself.  Steve said Jenkins is written in Java and runs a webservice.  It could potentially be run on the website, and Jenkins has a comprehensive user management system.  So, eventually we could get to the point that individuals could upload their own minutes, though that is not the immediate goal.  Mike and Randy Wolff said this was a great step forward.

Bob Ross asked if upcoming events were similarly automated.  Steve said no, they are hand edited.  Bob noted that we have now tentatively scheduled November 13, 2020 for the IBIS Summit in Japan.  Similarly, DesignCon is tentatively scheduled for Friday, January 29, 2021.  Steve to update the Japan and DesignCon IBIS summits on the Upcoming Events page [AR].  Bob asked if the perl scripts for other website features had been affected.  Steve said he had not changed the perl scripts, and his Jenkins process did not do anything incompatible with the

existing perl scripts.


**MAILING LIST ADMINISTRATION**
Mike LaBonte reported that mailing lists were operating smoothly.  He said that anyone who wants to know what lists they are subscribed to can email him, and he will generate a list.


**LIBRARY UPDATE**
No update.


**INTERNATIONAL/EXTERNAL ACTIVITIES**
- Conferences
24th IEEE Workshop on Signal and Power Integrity (SPI 2020, May 17-20, Cologne, Germany)
Randy Wolff noted that this has been officially postponed until 2021.

> https://spi2020.uni-siegen.de/


2020 IEEE International Symposium on EMC + SIPI (July 27-31, Reno, NV)
Randy Wolff and Bob Ross noted that this had not been postponed.

> https://www.emc2020.emcss.org/


- Press Update
None.

- Related standards
IEC 63055/IEEE 2401, JEITA "LPB"
No update.

JEDEC JESD204C.1
Randy had noted in the ARs section that SAE ITC legal had not yet replied to the questions from the head of JEDEC about the SAE ITC copyright agreement.  Randy said he would provide an update at the next meeting [AR].


**SUMMIT PLANNING AND STATUS**
- IEEE SPI Summit 2020 (May 17-20, Cologne, Germany)
Randy Wolff and Bob Ross noted that IEEE SPI has been officially postponed until 2021.  It will be held in the same location and at a similar date in late May of 2021.  Bob noted that the IEEE SPI Summit had been moved to the Upcoming Events page for 2021.

- IEEE EMC + SIPI Symposium (July 27-31, Reno, NV)
Bob noted that a slot has been reserved for us on Friday, July 31st in the afternoon.  It will be

provided at no cost to us and includes the room, AV equipment, and light refreshments.  Randy said that the primary interest here is introducing IBIS to a new audience.  Michael Mirmak confirmed that he would be able to attend assuming travel is permitted at that time.  Bob said our backup plan is to host the meeting as a teleconference.  Randy noted that the organizers said they would have that set up for us.  Randy said that we typically send out the first announcement about 6 weeks before the meeting.


## QUALITY TASK GROUP

Mike LaBonte reported that the group is meeting on Tuesdays at 8:00 a.m. PT.  The group continues to focus on ibischk.  Mike reported that the task group continues to work on BUG210, which was filed because of confusing error messages produced about "orphan" keywords.  The group also worked on BUG211, which is introduced and discussed in the Technical Discussion section of these minutes.

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

> 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 had recently been discussing Fangyi Rao's proposal for a new GetWave() type function for clock forwarded DDR simulations, and Walter Katz was scheduled to present an alternative proposal at the next meeting.  The group is expecting a BIRD draft from Hansel Dsilva addressing the topic of his DesignCon IBIS Summit presentation "Gap in IBIS for sampling with statistical mode AMI models" and providing a way for the model to tell the EDA tool where to place the UI relative to the impulse response.

Task group material can be found at:

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


## INTERCONNECT TASK GROUP

Randy Wolff reported that the group meets at 8:00 a.m. PT on Wednesdays.  He noted that the focus is still on the EMD proposal (BIRD202).  He reported that they are still working through another draft of BIRD202.1, and there are additional keywords being added.  The new keywords are for defining the parts list containing the parts on a module.

Task group material can be found at:

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


## EDITORIAL TASK GROUP

Randy Wolff reported the task group remains suspended.

Task group material can be found at:

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

**CHINA REGIONAL FORUM**

Lance Wang noted that the second meeting of the CRF had been scheduled for Friday, March 27, 2020.  Only Kevin Li had called in, so the meeting had been cancelled.  Randy Wolff asked if there had been any discussion on scheduling the next one.  Lance said he would check with Kevin.

China Regional Forum material can be found at:

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

**NEW ADMINISTRATIVE ISSUES**

None.

**BIRD198.1: KEYWORD ADDITIONS FOR ON DIE PDN (POWER DISTRIBUTION NETWORK) MODELING**

Randy Wolff reported that the authors had submitted the new version shortly before the meeting.  Randy said he would send it to Steve Parker for posting [AR].  Randy said he had briefly reviewed the BIRD, and that it should be reviewed and discussed in the ATM task group.  Randy noted that there had been significant review in ATM and correspondence between the authors and ATM last year.  The authors had presented an update at the DesignCon summit, and all the discussed changes were part of this BIRD198.1.

Randy summarized the BIRD and noted that it defines a simple PDN on-die decoupling model and introduces two new keywords [PDN Domain] and [PDN Model].  The Sub-params C_pdn, R_pdn, and R_leak define the topology of the two-terminal model by defining a capacitance, equivalent series resistance, and leakage resistance.  Connections are identified between the two terminals and bus_labels or signal_names.  Randy noted that the BIRD allows multiple PDN models in parallel.  The authors provide some examples.  For example, you might have an on-die decoupling design utilizing two different types of capacitors.  You might want them in separate RC models that the EDA tool would create in parallel.

Randy and Bob Ross said that there are some technical details to review.  Randy said the proposal requires all three Sub-params to be defined, even if you only wanted one or two of them.  Arpad Muranyi noted that one of the example's R_leak units used "g" for the scaling factor when it should be "G" for giga.  Bob agreed and said that the parser would ignore the unknown scaling factor "g" and report a 1 ohm leakage resistance instead of 1 giga ohm.  Radek Biernacki noted that Figure 1 should refer to nodes, not ports.  Randy agreed.  Bob said that the Background Information/History section should be updated to include information about this latest version.

Bob and Randy said this proposal appeared to address all of the comments from ATM on the

previous drafts.

## BIRD201: BACK-CHANNEL STATISTICAL OPTIMIZATION

Walter Katz said that this BIRD had been introduced a few months earlier, and he had received no feedback or questions. Walter moved to schedule a vote on BIRD201 at the April 24, 2020 IBIS Open Forum teleconference. Bob Ross seconded. There were no objections. Randy to send an email to the Open Forum announcing the vote [AR].

## BIRD203: SUBMODEL CLARIFICATIONS

Randy Wolff noted that this had been introduced at the previous meeting. He had not received any feedback. Randy created this BIRD to add clarifying language regarding the relationship between model and submodel data during extraction and in simulation.

The BIRD introduces two new sentences to the Usage Rules of [Add Submodel]:
*"Top-level model I-V and V-T data extraction is self-consistent and done with all submodels removed or de-embedded. Submodel behaviors are added in simulation according to the submodel mode described below."*

Arpad Muranyi asked if this BIRD affected the parser or EDA tools or if it was just a clarification. Randy said that it is just a clarification to bring the language into alignment with what the parser is doing. There is no change to the parser behavior, but it clears up the confusion that had led to BUG207. Radek Biernacki said that the real waveform's endpoints will depend on the submodels. Randy agreed that submodels will affect the levels in simulation, but their effects should not appear in the top level model's data.

Bob Ross moved to schedule a vote on BIRD203 at the April 24, 2020 IBIS Open Forum teleconference. Mike LaBonte seconded. There were no objections. Randy to send an email to the Open Forum announcing the vote [AR].

## 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.

## BIRD202: ELECTRICAL DESCRIPTIONS OF MODULES

Discussion was tabled.

**IBISCHK PARSER AND BUG STATUS**

Bob Ross noted that BUG210 had been introduced previously, and the Quality task group is still working on the suggested ibischk message changes to resolve it. Mike LaBonte said they had broadly divided the messages into 6 categories. Some messages were similar and differed only in referring to different keywords. Randy Wolff said the discussions had also noted other confusing messages. They were outside the scope of BUG210 but might result in another cleanup BUG being filed later.

Bob introduced BUG211, which had been filed by Michael Mirmak. The parser currently displays a warning message if power or ground clamp values exceed 10A at -1.5V. Bob had investigated the history of this warning all the way back to discussions surrounding BUG5 filed in 1997. Bob noted that those were the days of 3.3V and 5V VCCs. He said that many EDA tools' output formats defaulted to units of mA instead of the IBIS default of A, so a common error at the time was IBIS models with clamp tables implying 10A instead of 10mA.

Bob said the real issue with this defect is that the model in this case has -VCC to 2*VCC range of -1V to 2V. So, a warning being thrown about something happening at -1.5V is outside the range that should be checked. Bob said the change to resolve this BUG will be to no longer extrapolate beyond the range of the clamp tables. The test point will be changed to -1.5V or the minimum value of V in the power clamp and ground clamp tables. The warning will be reduced to a caution.

Bob moved to classify the defect as annoying, medium priority, to be fixed in next release. Radek Biernacki seconded. There were no objections. Bob to update the status of BUG211 [AR].

Bob noted that we might consider an ibischk7.0.2 parser update to address four or five current BUGs. He said we may choose not to resolve BUG202.

**NEW TECHNICAL ISSUES**

None.

**NEXT MEETING**

The next IBIS Open Forum teleconference meeting will be held on April 24, 2020, and votes are scheduled for BIRD201 and BIRD203. The following teleconference meeting is tentatively scheduled for May 15, 2020.

Curtis Clark moved to adjourn. Michael Mirmak seconded the motion. The meeting adjourned.

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**NOTES**

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This meeting was conducted in accordance with SAE ITC guidelines.

All inquiries may be sent to 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 and/or ibis-users@freelists.org email lists (formerly ibis@eda.org and ibis-users@eda.org).
- To subscribe to one of the task group email lists: ibis-macro@freelists.org, ibis-interconn@freelists.org, or 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

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/bugsplt.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 for more information on previous discussions and results:

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

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## SAE STANDARDS BALLOT VOTING STATUS

| Organization | Interest Category | Standards Ballot Voting Status | January 31, 2020 | February 21, 2020 | March 13, 2020 | April 03, 2020 |
|---|---|---|---|---|---|---|
| ANSYS | User | Active | X | X | X | X |
| Applied Simulation Technology | User | Inactive | - | - | - | - |
| Broadcom Ltd. | Producer | Inactive | X | - | - | - |
| Cadence Design Systems | User | Active | X | X | - | X |
| Cisco Systems | User | Inactive | X | - | - | - |
| Dassault Systemes | User | Inactive | X | - | - | - |
| Ericsson | Producer | Inactive | X | - | - | - |
| Google | User | Inactive | X | X | - | - |
| Huawei Technologies | Producer | Inactive | - | - | - | - |
| Infineon Technologies AG | Producer | Inactive | - | X | - | - |
| Instituto de Telecomunicações | User | Inactive | - | - | - | - |
| IBM | Producer | Active | - | X | X | X |
| Intel Corp. | Producer | Active | X | X | X | X |
| Keysight Technologies | User | Active | X | X | X | X |
| Marvell (GLOBALFOUNDRIES) | Producer | Active | X | X | X | X |
| Maxim Integrated | Producer | Active | X | X | X | X |
| Mentor, A Siemens Business | User | Active | X | X | X | X |
| Micron Technology | Producer | Active | X | X | X | X |
| NXP | Producer | Inactive | X | - | - | - |
| SerDesDesign.com | User | Inactive | X | - | - | - |
| SiSoft | User | Active | X | X | X | X |
| Synopsys | User | Active | X | X | - | X |
| Teraspeed Labs | General Interest | Active | X | X | X | X |
| Xilinx | Producer | Inactive | X | - | - | - |
| ZTE Corp. | User | Inactive | - | - | - | - |
| Zuken | User | Active | 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.