IBIS Open Forum Minutes

Meeting Date: **June 23, 2017**
Meeting Location: **Teleconference**

VOTING MEMBERS AND 2017 PARTICIPANTS

ANSYS	Curtis Clark*, Toru Watanabe
Applied Simulation Technology	(Fred Balistreri)
Broadcom	Bob Miller
Cadence Design Systems	Brad Brim, Sivaram Chillarige, Debabrata Das Ambrish Varma*
CST	Stefan Paret, Matthias Troescher, Burkhard Doliwa Danilo Di Febo, Alexander Melkozerov
Ericsson	Zilwan Mahmod
GLOBALFOUNDRIES	Steve Parker
Huawei Technologies	(Jinjun Li)
IBM	Luis Armenta, Adge Hawes, Greg Edlund
Infineon Technologies AG	(Christian Sporrer)
IO Methodology	Lance Wang
Keysight Technologies	Radek Biernacki*, Pegah Alavi, Fangyi Rao Stephen Slater, Jian Yang
Maxim Integrated	Joe Engert, Don Greer, Yan Liang, Hock Seow
Mentor, A Siemens Business (formerly Mentor Graphics)	Arpad Muranyi*, Nitin Bhagwath, Praveen Anmula Fadi Deek, Raj Raghuram, Dmitry Smirnov Bruce Yuan, Carlo Bleu
Micron Technology	Randy Wolff*, Justin Butterfield
NXP	(John Burnett)
Qualcomm	Tim Michalka, Kevin Roselle
Raytheon	Joseph Aday
Signal Integrity Software	Mike LaBonte*, Walter Katz*, Todd Westerhoff
Synopsys	Kevin Li, Ted Mido*, John Ellis, Scott Wedge
Teraspeed Labs	Bob Ross*
Xilinx	(Raymond Anderson)
Zuken	Ralf Bruening, Michael Schaeder, Alfonso Gambuzza

OTHER PARTICIPANTS IN 2017

Accton	Raul Lozano
ASUS	Nick Huang, Bin-chyi Tseng
Cisco Systems	(Bidyut Sen)
Continental AG	Stefanie Schatt
eASIC	David Banas

Extreme Networks	Bob Haller
Ghent University	Paolo Manfredi
Hamburg University of Technology	Torsten Revschel, Torsen Wendt
IdemWorks	Michelangelo Bandinu
Independent	Dian Yang
Intel Corporation	Michael Mirmak*, Hsinho Wu*, Eddie Frie Gianni Signorini, Barry Grquinovic
John Baprawski, Inc.	John Baprawski
KEI Systems	Shinichi Maeda
Lattice Semiconductor	Maryam Shahbazi, Dinh Tran
Leading Edge	Pietro Vergine
Politecnico di Torino	Claudio Siviero, Stefano Grivet-Talocia, Igor Stievano
SAE International	(Thomas Munns)
Signal Metrics	Ron Olisar
SPISim	Wei-hsing Huang
STMicroelectronics	Fabio Brina, Olivier Bayet
Toshiba	Yasuki Torigoshi
Université Blaise Pascal	Mohamed Toure
Université de Bretagne Occidentale	Mihai Telescu
ZTE Corporation	(Shunlin Zhu)

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
July 14, 2017	624 999 876	IBISfriday11

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

    http://tinyurl.com/zeulerr

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
Randy Wolff declared that a quorum was reached and the meeting could begin.

CALL FOR PATENTS

Mike LaBonte called for declaration of any patents or pending patents related to the IBIS 3.2, IBIS 4.2, IBIS 5.1, IBIS 6.1, Touchstone 2.0, IBIS-ISS 1.0 or ICM 1.1 specifications. No patents were declared.

REVIEW OF MINUTES AND ARS

Randy Wolff called for comments on the minutes of the June 2, 2017 IBIS Open Forum teleconference. Curtis Clark moved to approve the minutes. Arpad Muranyi seconded the motion. There were no objections.

Randy reviewed ARs from the previous meeting.

1. Mike LaBonte to add website link to training materials, maybe under "Support" [AR]. Mike reported this as done. The link is under "Support" and goes to a directory listing of training materials.

ANNOUNCEMENTS, **CALL FOR ADDITIONAL AGENDA ITEMS**

Randy Wolff mentioned that there were new drafts submitted for BIRD186.3 and BIRD189.4 after the meeting announcement went out to the mailing list.

MEMBERSHIP STATUS AND TREASURER'S REPORT

Bob Ross reported that we have 23 members with three pending renewals and a possible half-year membership. Our account balance is at $18,794 for 2017. Actual cash flow of $17,044 has been collected in 2017.

WEBSITE ADMINISTRATION

Mike LaBonte reported that there have been changes to the events page including adding EDI CON as well as changes to the Policies and Procedures document.

MAILING LIST ADMINISTRATION

Curtis Clark reported that we had one address that went stale and was removed from the IBIS ATM mailing list.

LIBRARY UPDATE

No update.

INTERNATIONAL/EXTERNAL ACTIVITIES

- Conferences

EDI CON – Electronic Design Innovation Conference & Exhibition will be held in Boston, MA on

September 11-13, 2017. An IBIS Summit at this event is planned. More information is available at:

http://www.ediconusa.com

EPEPS – The 26th IEEE Conference on Electrical Performance of Electronic Packaging and Systems will be held in San Jose, CA on October 15-18, 2017. An IBIS Summit at this event is planned. More information is available at:

http://www.epeps.org/

- Press Update
None.

- Related standards
None.

SUMMIT PLANNING AND STATUS
- EDI CON
EDI CON will be held in Boston, MA on September 11-13, 2017. The IBIS Summit will be held from 1:00 p.m. to 5:00 p.m. on Wednesday, September 13, 2017. Mike LaBonte reported that a barter agreement has been drafted but not signed yet. They are providing us most of what we need, so it may be a fairly low cost Summit meeting for us, such as only paying for an afternoon coffee break. EDI CON is offering a discount code of 60%. Mike will update the discount offer on the webpage [AR]. Bob Ross noted that there was a request in the barter agreement to put on the website a logo of EDI CON and a discount link. The first announcement deadline is July 12, 2017. Arpad Muranyi asked if sponsorship for EDI CON and EPEPS was going to be based on voluntary sign-ups or email solicitations/requests. Bob said potential sponsors are welcome to contact him, but he will also send out emails requests. Mike LaBonte noted sponsorship could be offered to cover more than one meeting. Arpad was interested in reducing the number of invoices and money transfers needed for sponsorship.

- EPEPS
EPEPS will be held in San Jose, CA on October 15-18, 2017. The IBIS Summit will be held on Wednesday afternoon, October 18, 2017. Bob noted he needs to start contacting people to let them know about the meeting and ask for sponsorship.

- Asian IBIS Summits
Bob noted that the motion for voting on the Summits from the last meeting was fine tuned to include all three in the November timeframe. Monday, November 13, 2017, Wednesday, November 15, 2017 and Monday, November 20, 2017 are fixed dates with rooms held.

Bob moved to hold three IBIS Asian Summit meetings in Shanghai, Taipei and Tokyo in November 2017, with costs not to exceed $17,500. Randy Wolff seconded the motion. There were no objections to the vote.

The roll call vote tally was:
ANSYS – yes

Broadcom – yes (by email)
Cadence – yes
GLOBALFOUNDRIES – yes (by email)
Infineon – yes (by email)
IO Methodology – yes (by email)
Keysight – yes
Mentor – yes
Micron – yes
SiSoft – yes
Synopsys – yes
Teraspeed – yes

Bob Ross noted that ZTE voted yes by email, but they are not an official member. Bob also commented that it would be best to only announce the companies that have pre-voted by email but not their vote choice until during the roll call vote.

The roll call vote concluded with a vote tally of Yes – 12, No – 0, Abstain – 0. The motion passed.

Sponsorship opportunities for all upcoming IBIS summits are available, with sponsors receiving free mentions in the minutes, agenda, and other announcements. Contact the IBIS Board for further details.

QUALITY TASK GROUP
Mike LaBonte reported that the group is meeting on Tuesdays at 8:00 a.m. PT. Ongoing discussion is about IBISCHK development.

The IBISCHK6 user guide work in progress can be reviewed at:

> http://www.ibis.org/ibischk6/ibischk_6.1.3_UserGuide_wip1.pdf

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 is meeting regularly on Tuesdays at 12:00 p.m. PT. The group conducted a strawman poll about the repeater/redriver BIRDs in the last meeting. Both BIRDs 166 and 190 were put on the tabled list, and a proposal from Fangyi Rao of Keysight will be discussed further. Bob Ross noted that BIRD158 needs to be discussed once it is available as a priority item.

Task group material can be found at:

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

INTERCONNECT TASK GROUP

Michael Mirmak reported that the group is suspended, but some discussion of BIRD189 has occurred in the Editorial task group.

Task group material can be found at:

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

EDITORIAL TASK GROUP

Michael Mirmak reported that meetings are now taking place during the Interconnect task group time slot at 8:00 a.m. PT on Wednesdays. The group is tackling both BIRD189 and BIRD186, which have some interactions. Both are now consistent and voted out for submittal to the Open Forum. Per Bob Ross, there is still some interaction between these BIRDs and BIRD158.

Task group material can be found at:

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

NEW ADMINISTRATIVE ISSUES

- 2017 IBIS Officer Elections

Radek Biernacki reported that the elections are over. He sent out an announcement on June 16, 2017 noting that the entire previous board was reelected. Ambrish Varma congratulated the new officers and thanked them for their service.

- Second revision of IBIS Policies and Procedures

Mike LaBonte noted that there has been some activity recently. We received SAE's legal review of the latest draft. We accepted most of their changes, some grammatical. There was one change they suggested, but we chose not to accept it. This related to officer elections. We prefer that anyone may make an officer nomination, versus restricting it to only members to make the nominations. The new draft is available for review on the webpage, and we are soliciting review comments. We'll have a ratification vote in an upcoming meeting eventually. Bob Ross noted that we want this ratified and in place well before the 2018 officer elections. Radek asked if there was a document showing changes from the previous version. Mike LaBonte will prepare a document showing differences from the previous version [AR].

The Policy and Procedures document can be found at:

http://www.ibis.org/policies/

BIRD190: CLARIFICATION FOR REDRIVER FLOW

Ambrish Varma introduced the BIRD. He noted that there was a lot of discussion on how the redriver flow should work with Init-only and GetWave-only models. There was confusion of how an RX model works if there was no AMI_Init function. The BIRD adds a note in the Init flow

section of the time domain flow that equalization will not work correctly. The Rx AMI_Init function will not be able to perform accurate optimization in the absence of the upstream channel characteristics and /or equalization effects. Bob Ross noted that there was a straw poll in the ATM task group that suggested tabling discussion on this BIRD.

Walter Katz commented that the fundamental issue is the statistical flow for redriver channels in IBIS 6.1 gives the wrong answer, which was motivation for BIRD166. This BIRD reinforces that incorrect flow. Walter believes Fangyi's BIRD will also give a wrong answer in this case. He believes the decision in the ATM task group was to make a motion to table BIRD166 and BIRD190, but also that people would make presentations for pros and cons on their various proposals. He has a presentation to give at this meeting if there is time.

Radek Biernacki commented that this BIRD gives a warning about the issue. Arpad Muranyi commented that the intent was not to fix anything, just to warn people that the problem exists.

BIRD186.3: FILE NAMING RULES

Bob Ross noted that there were no technical changes from previous versions. We went through in more detail being consistent with new file naming terminology. There were editorial changes such as changing "must" to "shall" and changing "file_name" to "file reference" for column headings. Changes were made in four identical sections of the external model sections. Mike LaBonte noted that much of the work on the BIRD saves work for the Editorial task group. Bob commented that people should review and comment on the BIRD.

Michael Mirmak moved to schedule a vote at the next Open Forum meeting. Walter Katz seconded the motion. Radek commented that he wondered if more time was needed for review. Bob commented that this forces review, and if anything significant is found, the vote can be delayed. With no objections, the motion passed.

Michael commented that BIRD186 should be voted on before BIRD189.

Michael asked if non-paid members are allowed to make motions to schedule votes. Bob noted that this is not prohibited. Mike clarified that only members can respond to votes, but there is no prohibition on making motions on BIRDs.

BIRD189.4: INTERCONNECT MODELING USING IBIS-ISS AND TOUCHSTONE

Michael Mirmak noted the major focus of revisions to the BIRD was to make the language related to file names and extensions consistent with BIRD186 language.

Walter Katz moved to schedule a vote on the BIRD at the August 4, 2017 Open Forum meeting. Michael seconded the motion. There were no objections.

BIRD158.5: AMI TS4FILE ANALOG BUFFER MODELS

Radek Biernacki noted that the BIRD needs minor revisions to be consistent with BIRD186. The changes need to be reviewed by the ATM task group and resubmitted to the Open Forum. Walter Katz noted that this should be discussed in the next ATM meeting. Ambrish Varma

asked what the second minor change is. Radek noted there is language to clarify handling of the interconnect model based on comments from Michael Mirmak. Bob Ross noted that this BIRD allows for a Touchstone file linkage, but it may or may not be clear with packages that this does not interact with the Interconnect BIRD in any way. Language is needed to clarify this.

BIRD166.2: RESOLVING PROBLEMS WITH REDRIVER INIT FLOW
Walter Katz shared a presentation "Redriver Flows That Give the Wrong Answers for Statistical Simulations". The presentation is available at:

> http://ibis.org/minutes/min2017/m062317_docs/IBIS_6.1_BIRD_190_BIRD_Fangyi_BIRD_166.pdf

Walter stated that this relates to the IBIS 6.1 redriver flow, BIRD190, BIRD166, and Fangyi's BIRD proposal. BIRD190 says that "the impulse response that is presented to the Rx AMI_Init function does not include the effects of the upstream equalization". Michael Mirmak asked if everything is LTI, is there an ordering necessary. Walter responded that if everything is LTI and one is convolving various blocks, there is no ordering. In AMI, if there is some dependency in the Rx that something is dependent on its input, then there is an ordering dependency.

Ambrish commented that the issue is with the current specification. The point of BIRD190 is to note that there are certain simulations that cannot be done with the IBIS 6.1 flow. Walter noted that this reinforces that the IBIS 6.1 flow is an error. BIRD190 reinforces the error in IBIS 6.1 flow that causes wrong results if the downstream Rx has a DFE. Arpad noted that the existing specification is incorrect. Walter noted he did not want to reinforce the specification being wrong, but instead to fix it.

Walter showed an example showing that BIRD166 is right and IBIS 6.1 is wrong, even without Rx2 optimization. The problem is that the output of Rx1 scales the DFE equalization. Ambrish asked what are chances that Rx1 and Rx2 models are both Init models. Walter noted that this requires that both Rx models are Init models. Ambrish noted that BIRD190 makes changes in the time domain flow.

Walter stated that Fangyi's BIRD does not fix the problem, because if AMI_Init functions are not enhanced, the flows are the same as in IBIS 6.1 and will continue to give the wrong answers. If Init-only models are made dual models, then the flow is corrected. Ambrish commented that this cannot be stated as a requirement in the specification.

Walter showed a diagram of a corrected flow for statistical processing and time domain processing. Walter noted he supports Fangyi's BIRD because it does eliminate deconvolution for both normal and redriver channels when the model has GetWave_Exists=False. Arpad noted that BIRD166 gives the correct answers only if all models are dual models. Walter said this is true, but in the case where Tx1 and Rx1 have GetWave and Tx2 and Rx2 do not have GetWave, then BIRD166 has a correct flow as well based on a specific interpretation of the existing specification.

Ambrish commented that BIRD190 is already in the specification. He also commented that BIRD190 should not be related to statistical flow in Walter's conclusions. Radek commented that the flows get much more complicated if there are multiple redrivers in a channel, and

Fangyi's proposal fixes these flows.

BIRD125.1: MAKE IBIS-ISS AVAILABLE FOR IBIS PACKAGE MODELING
Discussion was tabled.

BIRD145.3: CASCADING IBIS I/O BUFFERS WITH [EXTERNAL CIRCUIT]S USING THE [MODEL CALL] KEYWORD
Discussion was tabled.

BIRD161.1: SUPPORTING INCOMPLETE AND BUFFER-ONLY [COMPONENT] DESCRIPTIONS
Discussion was tabled.

BIRD163: INSTANTIATING AND CONNECTING [EXTERNAL CIRCUIT] PACKAGE MODELS WITH [CIRCUIT CALL]
Discussion was tabled.

BIRD164: ALLOWING PACKAGE MODELS TO BE DEFINED IN [EXTERNAL CIRCUIT]
Discussion was tabled.

BIRD165: PARAMETER PASSING IMPROVEMENTS FOR [EXTERNAL CIRCUIT]S
Discussion was tabled.

BIRD181.1: I-V TABLE CLARIFICATIONS
Discussion was tabled.

IBISCHK6 PARSER AND BUG STATUS
Bob Ross reported that the parser contractor has issued two parser packages, but in each case, we discovered at the last minute significant bugs or changes in the code from the previous version that was released. We just got word that the latest problem has been fixed and the developer will release a new package. Mike LaBonte noted the developer updated the spreadsheet showing all the error and warning messages of the parser. Bob noted that Mike posted the new executables on the website, but they might not be ready. Mike will remove those files after the meeting.

Bob added that there are possibly two more bugs to be reported once the new parser is finalized.

NEW TECHNICAL ISSUES

None.

NEXT MEETING

The next IBIS Open Forum teleconference meeting will be held July 14, 2017. A vote on BIRD186.3 is scheduled. The following IBIS Open Forum teleconference meeting is tentatively scheduled on August 4, 2017. A vote on BIRD189.4 is scheduled.

Radek Biernacki moved to adjourn. Ambrish Varma seconded the motion. The meeting adjourned.

===
NOTES

IBIS CHAIR: Mike LaBonte
        mlabonte@sisoft.com
        IBIS-AMI Modeling Specialist, Signal Integrity Software
        6 Clock Tower Place, Suite 250
        Maynard, MA 01754

VICE CHAIR: Lance Wang (978) 633-3388
        lwang@iometh.com
        President/CEO, IO Methodology, Inc.
        PO Box 2099
        Acton, MA 01720

SECRETARY: Randy Wolff (208) 363-1764
        rrwolff@micron.com
        Principal Engineer, Silicon SI Group Lead, Micron Technology, Inc.
        8000 S. Federal Way
        P.O. Box 6, Mail Stop: 01-711
        Boise, ID 83707-0006

TREASURER: Bob Ross (503) 246-8048
        bob@teraspeedlabs.com
        Engineer, Teraspeed Labs
        10238 SW Lancaster Road
        Portland, OR 97219

LIBRARIAN: Anders Ekholm (46) 10 714 27 58, Fax: (46) 8 757 23 40
        ibis-librarian@ibis.org
        Digital Modules Design, PDU Base Stations, Ericsson AB
        BU Network
        Färögatan 6

164 80 Stockholm, Sweden

WEBMASTER: Mike LaBonte
mlabonte@sisoft.com
IBIS-AMI Modeling Specialist, Signal Integrity Software
6 Clock Tower Place, Suite 250
Maynard, MA 01754

POSTMASTER: Curtis Clark
curtis.clark@ansys.com
ANSYS, Inc.
150 Baker Ave Ext
Concord, MA 01742

This meeting was conducted in accordance with ANSI guidance.

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

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

SAE STANDARDS BALLOT VOTING STATUS

Organization	Interest Category	Standards Ballot Voting Status	May 10, 2017	May 12, 2017	June 2, 2017	June 23, 2017
ANSYS	User	Active	-	X	X	X
Applied Simulation Technology	User	Inactive	-	-	-	-
Broadcom Ltd.	Producer	Inactive	-	-	-	X
Cadence Design Systems	User	Inactive	-	-	X	X
CST	User	Inactive	X	-	-	-
Ericsson	Producer	Inactive	X	-	-	-
GLOBALFOUNDRIES	Producer	Active	-	X	X	X
Huawei Technologies	Producer	Inactive	-	-	-	-
IBM	Producer	Active	-	X	X	-
Infineon Technologies AG	Producer	Inactive	-	X	-	X
IO Methodology	User	Active	-	X	X	X
Keysight Technologies	User	Active	-	X	X	X
Maxim Integrated	Producer	Inactive	-	-	-	-
Mentor, A Siemens Business	User	Active	X	X	X	X
Micron Technology	Producer	Active	-	X	X	X
NXP	Producer	Inactive	-	-	-	-
Qualcomm	Producer	Inactive	-	-	-	-
Raytheon	User	Inactive	-	-	-	-
Signal Integrity Software	User	Active	-	X	X	X
Synopsys	User	Active	-	X	X	X
Teraspeed Labs	General Interest	Active	-	X	X	X
Xilinx	Producer	Inactive	-	-	-	-
Zuken	User	Inactive	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.