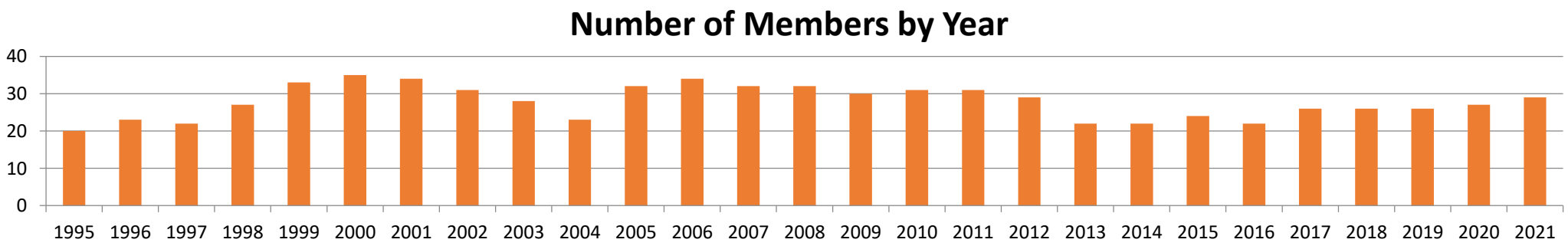
IBIS Chair's Report

Randy Wolff
Micron Technology
Chair, IBIS Open Forum

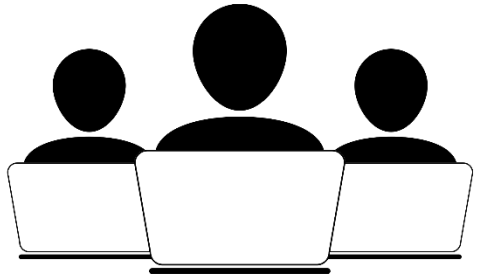
2021 Virtual Asian IBIS Summit – China
November 19, 2021

29 IBIS Members (Organization-based)

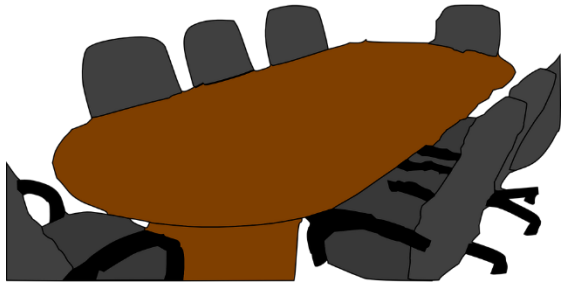


IBIS Officers June 2021- May 2022

Chair:	*Randy Wolff, Micron Technology*
Vice-Chair:	*Lance Wang, Zuken USA*
Secretary:	*Mike LaBonte, MathWorks (SiSoft)*
Treasurer:	*Bob Ross, Teraspeed Labs*
Librarian:	*Zhiping Yang, Google (Waymo)*
Postmaster:	*Curtis Clark, ANSYS*
Webmaster:	*Steve Parker, Marvell*



IBIS Meetings



- Weekly teleconferences
  - Quality task group (Tuesdays, 09:00 PT)
  - Advanced Technology Modeling (ATM) task group (Tuesdays, 12:00 PT)
  - Interconnect task group (Wednesdays, 08:00 PT)
    - Currently suspended for Editorial task group work on IBIS 7.1
  - Editorial task group (Wednesdays, 08:00 PT)
- IBIS Open Forum teleconference every 3 weeks (Fridays, 08:00 PT)
- IBIS Summit meetings (USA and international)
  - DesignCon, IEEE SPI, IEEE EMC+SIPI, Shanghai, Taipei, Tokyo (JEITA-organized)
- Participants: ~323 in 2020

SAE ITC

- SAE Industry Technologies Consortia is the parent organization of the IBIS Open Forum
- IBIS is assisted by SAE employees José Godoy, Phyllis Gross, and Laurie Strom
- SAE ITC provides financial, legal, and other services
- https://www.sae-itc.com/

Task Groups

- Advanced Technology Modeling Task Group
  - Chair: Arpad Muranyi, Siemens EDA
  - https://ibis.org/atm_wip/
  - Develop non-interconnect technical BIRDs
- Editorial Task Group
  - Chair: Michael Mirmak, Intel
  - https://ibis.org/editorial_wip/
  - Produce IBIS specification documents
- Interconnect Task Group
  - Chair: Michael Mirmak, Intel
  - https://ibis.org/interconn_wip/
  - Develop on-die/package/module/connector interconnect modeling BIRDs
- Quality Task Group
  - Chair: Mike LaBonte, MathWorks (SiSoft)
  - https://ibis.org/quality_wip/
  - Oversee IBISCHK parser testing and development

BIRD = Buffer Issue Resolution Document

IBIS Milestones

I/O Buffer Information Specification

- 1993-1994 **IBIS 1.0-2.1**:
  - Behavioral buffer model (fast simulation)
  - Component pin map (easy EDA import)
- 1997-1999 **IBIS 3.0-3.2**:
  - Package models
  - Electrical Board Description (EBD)
- 2002-2006 **IBIS 4.0-4.2**:
  - Receiver models
  - AMS languages
- 2007-2012 **IBIS 5.0-5.1**:
  - IBIS-AMI SerDes models
  - Power-aware model

I/O Buffer Information Specification

- 2013-2015 **IBIS 6.0-6.1**:
  - PAM4 multi-level signaling
  - Power delivery package models
- 2019 **IBIS 7.0**:
  - Back-channel time-domain support
  - Interconnect modeling using IBIS-ISS and Touchstone
- 2021 **IBIS 7.1 (Draft document introduced at October 29, 2021, IBIS Open Forum meeting)**
  - DDRx IBIS-AMI support
  - Electrical Module Description (EMD)
  - IBIS-AMI back-channel statistical optimization

Other Work

- 1995: **ANSI/EIA-656 (IBIS 2.1 International standard)**
- 1999: **ANSI/EIA-656-A (IBIS 3.2 International standard)**
- 2001: **IEC 62014-1 (IBIS 3.2 International standard)**
- 2003: **Interconnect Model Specification (ICM 1.0)**
- 2006: **ANSI/EIA-656-B (IBIS 4.2 International standard)**
- 2009: **Touchstone 2.0**
  - Official Touchstone donated from Agilent/Keysight
- 2011: **IBIS-ISS 1.0 (Interconnect SPICE Subcircuit)**
  - Subset of HSPICE
- **IBISCHK**: IBIS file syntax parser
  - Current version 7.0.2
  - Source code available for purchase
  - Compiled executables available free of charge
- **TSCHK2**: Touchstone 2.0 file syntax parser
  - Current version 2.0.1
  - Source code available for purchase
  - Compiled executables available free of charge

Planning for IBIS Version 7.1

Official BIRD content for IBIS 7.1 based on Open Forum vote held July 16, 2021.

BIRD ID	BIRD Title	Approval Date	Notes
195.1	Enabling [Rgnd] and [Rpower] Keywords for Input Models	August 31, 2018	IBIS-AMI
197.7	New AMI Reserved Parameter DC_Offset	February 21, 2020	IBIS-AMI (for DDRx)
198.3	Keyword Additions for On-Die PDN (Power Distribution Network) Modeling	August 7, 2020	Power Integrity
199	Fix Rx_Receiver_Sensitivity Inconsistencies	June 7, 2019	IBIS-AMI
200	C_comp Model Using IBIS-ISS or Touchstone	September 27, 2019	[Model] C_comp
201.1	Back-channel Statistical Optimization	July 17, 2020	IBIS-AMI
202.3	Electrical Descriptions of Modules	March 12, 2021	EMD (Next Gen EBD)
203	Submodel Clarification	April 24, 2020	Editorial
205	New AMI Reserved Parameter for Sampling Position in AMI_Init Flow	June 26, 2020	IBIS-AMI
206	Clarification of text "transition time"	September 18, 2020	Editorial
207	New AMI Reserved Parameters Component_Name and Signal_Name	October 9, 2020	IBIS-AMI (for DDRx)
208	Clock-Data Pin Relationship Keyword	January 8, 2021	IBIS clock/data relationship
209	Make Clock Times Output Required for Clock Executable Models	March 12, 2021	IBIS-AMI (for DDRx)
212	Clarification of PAM4_UpperThreshold, PAM4_CenterThreshold, PAM4_LowerThreshold	May 14, 2021	Editorial

Planning for IBIS Version 7.1

Additional BIRDs from Editorial Task Group for inclusion in IBIS 7.1

BIRD ID	BIRD Title	Approval Date	Notes
214	Change "bit_time" to "symbol_time"	October 8, 2021	Editorial
215	Back-channel Statistical Optimization Editorial Update	October 29, 2021	Supersedes BIRD201.1

Other BIRDs

BIRD ID	BIRD Title	Expected Status
166.4	Resolving problems with Redriver Init Flow	To be rejected (in favor of BIRD211.x)
181.1	I-V Table Clarifications	Delayed until future IBIS version
190	Clarification for Redriver Flow	To be rejected (in favor of BIRD211.x)
204	~~DQ_DQS GetWave Flow for Clock Forwarding Modeling~~	Superseded by BIRD209
210	New Redriver AMI Flow	To be rejected (in favor of BIRD211.x)
211.x	IBIS AMI Reference Flow Improvements	Delayed until future IBIS version
213	Extending IBIS-AMI for PAMn Analysis	Delayed until future IBIS version

What's Next for IBIS?

- IBIS participants have broad experience in SI and PI with unique perspectives of model creators, EDA tool vendors, system architects, and system-level simulation
- IBIS Open Forum's highly collaborative task groups are up for the challenge of addressing the SI and PI demands of new signaling technologies:
  - Expanded system-level perspective
    - Clock/data relationships, timing information, equalization training
  - PAMn (PAM3 duobinary, PAM5, etc.) including unique challenges of single-ended versions
  - Improved Power Supply Induced Jitter modeling
  - Potential for IBIS to enable improved modeling/analysis of PDN
    - Voltage regulator models
    - Chip power models

Participation in IBIS

- The success of IBIS depends on active participation and volunteering
- Bringing your ideas and talents to IBIS
  - Task groups for technical discussions and document editing
  - IBIS email reflectors
  - Open Forum teleconferences for event planning and voting
  - Summit presentations
  - IBIS Board and task group volunteering
  - Writing BIRDs – Buffer Issue Resolution Documents
    - Official method for submitting a proposed change to the IBIS specification
    - Many developed collaboratively in task groups
    - Discussed and voted on in Open Forum meetings

IBIS Website Resources

IBIS Summits

Task Group Info

Spec documents

BIRDs List

Email support

Syntax Parser Downloads

[Thank You]

IBIS Open Forum:
Web: https://ibis.org
Email: info@ibis.org

We welcome participation by all IBIS model makers, EDA tool vendors, IBIS model users, and interested parties.