Approved Meeting Minutes: IEEE 802.3 Ethernet for Automotive Imaging Sensors (ISAAC) Study Group
September 14, 2023
802.3 Interim, Campinas, Brazil

Prepared by George Zimmerman

IEEE 802.3 Ethernet for Automotive Imaging Sensors (ISAAC) Study Group meeting convened at 8:00 AM (BST (Brasilia Standard Time, UTC-3), Thursday, September 14, 2023, by Jon Lewis, IEEE 802.3 Ethernet for Automotive Imaging Sensors (ISAAC) Study Group Chair.

Attendance is listed in Appendix A

ADMINISTRATIVE MATTERS
Presentation: agenda_ISAAC_1a_091423.pdf
Presenter: Jon Lewis, Chair.

The Chair reviewed the agenda. Mr. Lewis turned to presentation agenda_ISAAC_1a_091423.pdf and reviewed the schedule of presentations for the meeting.

Motion #1:   Approve the agenda from agenda_ISAAC_1a_091423.pdf

Approved by unanimous consent

Motion #2: Approve the minutes from the August 28 meeting, posted at https://www.ieee802.org/3/ISAAC/public/082823/Unconfirmed_minutes_ISAAC_082823.pdf
Approved by unanimous consent

The Chair then resumed the review of presentation agenda_ISAAC_1a_091423.pdf :

- Mr. Lewis noted that there should be no recording or photography without permission.
- Mr. Lewis asked if anyone was attending from the press including those who would run a public blog on this meeting – none responded.

Mr. Lewis then continued review of the presentation, Big Ticket items for this meeting, to develop PAR, 5 Criteria, and Objectives for ISAAC.

Mr. Lewis reviewed the goals for the meeting, access to the reflector and website, and ground rules.

IEEE Patent Policy, Mr. Lewis asked if anyone in the meeting had not either heard the patent policy this week or pre-read it from the agenda. None responded, therefore, he showed the patent policy slides for patent policy for study groups from agenda_ISAAC_1a_091423.pdf, and read the page page entitled "Guidelines for IEEE-SA Meetings". (08:09 BST)

Mr. Lewis asked if anyone had not seen the IEEE-SA copyright policy slide. None responded.

Mr. Lewis asked if anyone had not seen the IEEE-SA participant behavior policy slide. None responded.

Mr. Lewis asked if anyone had not seen the IEEE-SA participation policy slides on "individual process". None responded. Mr. Lewis asked if anyone objected to the individual process and if so to leave the meeting. There were no participants that left the meeting.

Attendance, Mr. Lewis advised the group of the IEEE meeting attendance tool and procedures.

Mr. Lewis reviewed the standards development process for IEEE and where this study group is in the process.

LIAISONS
The Chair moved to liaisons and noted that there were no liaisons for the Study Group at this time.

Mr. Lewis reviewed the procedure and time constraints for presentations for this meeting.

PRESENTATIONS
The Chair then moved to the presentations for the meeting. (8:18AM)

Title: Unifying Automotive Zonal E/E Architectures
URL:
https://www.ieee802.org/3/ISAAC/public/091423/arndt_3ISAAC_01_090723.pdf
Presenter: Christoph Arndt, Continental

Discussion: Questions were asked and answered. Some participants asked specifically about the different display needs, that might drive higher rates in both directions for future proofing. There was also discussion that these might benefit from their own solution, or existing solutions, as they tended to be connected with high-performance displays, and could potentially complicate the camera links. The presenter clarified that he wanted to cover applications on the display side, but with an eye towards not making things 'too complicated'. Additional participants asked about security and content protection protocols, and powering considerations. The presenter clarified that latency was application latency.

Title: Feasibility of Evolution from Domain to Zonal Architecture
URL: https://www.ieee802.org/3/ISAAC/public/091423/jonsson_3ISAAC_02_091423.pdf
Presenter: Ragnar Jonsson, Marvell

Discussion: Questions were asked and answered. A participant asked what was needed to support IEEE 1722 besides support for Ethernet packets. The presenter confirmed that was all but highlighted the "and associated protocols" on slide 4, which might involve signaling from the camera. Another participant asked whether the zonal architecture envisioned multi-port PHYs integrated with a switch. The presenter confirmed this, but outlined the 3 different phys in the presentation, single phys for receiving video, single phys for transmitting video, and multiple phys integrated into the switch. There was a question regarding operation of IEEE 1722, and the presenter summarized various concepts in IEEE 1722. Another participant asked about the possible application of 'Synchronous Ethernet' which the presenter confirmed could be considered during task force. A previous presenter on the subject of transitioning to Ethernet zonal clarified she was trying to address resistance she perceives in car manufacturers to changing networking technologies, somewhat different from what this contribution was addressing.

Title: Automotive camera side PHY requirements study from CMOS Image Sensor (CIS) perspective
URL: https://www.ieee802.org/3/ISAAC/public/091423/2023-09-06_Automotive%20camera%20PHY%20requirements%20study_V2.1.pdf
Presenter: Mario Heid, Omnivision

Discussion: Questions were asked and answered. Individuals asked questions about the technical results for thermal impact. These related to integration techniques. A participant remarked that in his opinion the presentation showed technical feasibility for monolithic integration of physical layers with cmos image sensors. The presenter confirmed this. A participant asked about rates greater than 5 Gbps, the presenter answered that in his opinion that for quite some time (5 yrs) the volume required for integration was only seen for lower resolution cameras needing 5 Gbps or less. There was also discussion of the presenter's opinion on an upper limit of power consumption – he suggested a 200mW target, but it could allow up to 300mW. A participant asked about the PHY area assumption, (1mm^2) and the presenter suggested that might be a little smaller than what he expected. Another participant asked whether power supply voltages and regulation was needed, time for discussion expired before the discussion was complete and Mr. Lewis asked that the discussion be continued on the reflector.

Title: Asymmetric Physical Layer A Feasibility Overview
URL: https://www.ieee802.org/3/ISAAC/public/091423/sedarat_isaac_202309.pdf
Presenter: Hossein Sedarat, Ethernovia

Discussion: Questions were asked and answered. Participants confirmed that the presenter was supporting technical feasibility of an automotive asymmetric PHY. Another participant asked about situations where rates became more symmetrical. The presenter responded that efficiency would be reduced, and he suggested that such situations would be special cased in his opinions (another participant later confirmed that he would also support such cases being options). Another participant asked about whether the computations for FDD included a hybrid – the presenter confirmed.

BREAK

The chair reconvened the meeting at 10:58AM.
Presentations resumed at 11:00 AM.

Title: Addressing some Good Questions for ISAAC Study Group
URL: https://www.ieee802.org/3/ISAAC/public/091423/ISSAC_Brazil_D_Pal_onsemi_Sep_2023.pdf
Presenter: Debu Pal, ON Semiconductor

Discussion: Questions were asked and answered. A participant questioned the conclusion regarding ASA-ML because of the high baud rate in the low-rate direction. The presenter responded that he was comparing relative to existing symmetric solutions.

There was a question to the chair regarding discussion of the ASA-ML specification, and the WG Chair responded, in his opinion, quoting a specification that was not publicly available at a reasonable cost was not a 'path to success'. The chair clarified that he interpreted the presentation as indicating yet another path to meet technical feasibility.

Several participants wanted to see more analysis for the conclusions of the systems. There was some discussion of liaising or otherwise communicating the information regarding the ASA-ML document in the future.

Title: PHY Technical Options
URL: https://www.ieee802.org/3/ISAAC/public/091423/Lo_01_0923.pdf
Presenter: William Lo, Axonne

Discussion: Questions were asked and answered. A participant asked about the buffering and buffer size. The presenter answered that the low-rate direction could be large but was on the (less constrained) 'network' side. Other participants asked about the RS and use of the MII. The presenter indicated that either the existing MII could be used for the 100 Mbps direction or a high-rate xMII with some kind of mac-pausing signal (like EEE uses) could be used to avoid buffer overrun. Another participant remarked that it was good to see multiple presentations confirming technical feasibility.

Title: Interrelation between an Asymmetric Camera Link and IEEE 802.1(DG)
URL: https://www.ieee802.org/3/ISAAC/public/091423/matheus_ISAAC_01_14092023.pdf
Presenter: Kirsten Matheus, BMW

Discussion: Questions were asked and answered. Questions centered on applications, the presenter clarified several technical points, including aspects of startup and security. Another participant asked about latency and multiple hops in the implementation, and whether the group was likely to adopt an objective for a constant latency PHY.

BREAK FOR LUNCH (12:30-13:45)

Due to availability of the presenter, the chair swapped the order of the next 2 presentations.

Title: Line Side Duplexing Options for ISAAC
URL:
https://www.ieee802.org/3/ISAAC/public/091423/chini_tazebay_ISAAC_01_09142023.pdf
Presenter: Ahmad Chini, Broadcom ; coauthor: Mehmet Tazebay, Broadcom

Discussion: Questions were asked and answered. A participant asked to confirm that the additional details to be discussed and analyzed were for the task force when considering proposals and were not considered barriers to technical feasibility. The presenter confirmed. Another participant asked whether the presenter considered the other solutions as technically feasible, given the statement of preference for TDD. The presenter confirmed that understanding.

Title: General Feasibility of Key Goals
URL: https://www.ieee802.org/3/ISAAC/public/091423/jonsson_3ISAAC_01_091423.pdf
Presenter: Ragnar Jonsson, Marvell

Discussion: Questions were asked and answered. One participant asked whether the power over coax was only in simulation. The presenter responded that it also involved lab results and more information could be provided if needed.

Title: Comments on PAR and Objectives for ISAAC
URL:

https://www.ieee802.org/3/ISAAC/public/091423/chini_tazebay_dalmia_ISAAC_01_09142023.pdf
Presenter: Mehmet Tazebay, Broadcom; co-authors: Kamal Dalmia, Avivalinks & Ahmad Chini, Broadcom

Discussion: Questions were asked and answered. One participant asked about CISPR and FCC requirements vs. automotive environments, and whether they were redundant. The presenter confirmed that they have different applications but can overlap somewhat. Presenters offered some opinions on the proposed objectives for generating a local clock from the remote end, and whether a latency objective was appropriate. The presenter clarified that these are possible proposals and they were soliciting feedback. There was substantial discussion among multiple participants on several of the proposals, particular on the proposed reaches presented, with call for additional analysis.

Title: Suggested PAR and CSD item wording
URL:

https://www.ieee802.org/3/ISAAC/public/091423/dalmia_jones_zimmerman_3ISAAC_01_091423.pdf (presented)
https://www.ieee802.org/3/ISAAC/public/091423/dalmia_jones_zimmerman_3ISAAC_01a_091423.pdf (edited during presentation)
Presenter: George Zimmerman, CME Consulting/APL Gp, Cisco, Marvell, ON Semi, SenTekSe; co-authors: Kamal Dalmia, Aviva Links, Peter Jones, Cisco Systems

Discussion: The presenter discussed proposed wording for the PAR Scope, PAR Stakeholders, from Peter Jones, reflecting and CSD responses. Presentation was updated to combine a planned presentation from Kamal Dalmia (https://www.ieee802.org/3/ISAAC/public/091423/Dalmia_ISAAC_01_09142023.pdf) and input built consensus. Key issues the presenter highlighted for decision included whether to include (short reach) building and industrial automation applications explicitly in the PAR & CSD language, and whether to remove a 100 Mbps upstream rate limitation from the upstream. Discussion edited the document to produce the output document (01a)

Questions were asked and answered during the presentation, resulting in the output document. As a result of the discussion, the language was generalized to not specify the rate of the lower-data-rate direction, but the issue of whether to include building and industrial automation applications.

During the discussion, the following straw poll was taken (all participants could vote):

I support including language in the PAR/CSD to enable the TF to consider addressing the needs of similar applications in the building and industrial automation markets.

Y: 12 + 11 = 23
N: 1 + 10 = 11
Need more information: 1 + 4 = 5
A: 1 + 10 = 11

FUTURE MEETINGS

Mr. Lewis reviewed future meetings from the agenda presentation and announced the next meeting to be telephonic on September 27, 2024 followed by a contingent telephonic interim meeting on October 4, 2024.

The Chair reminded the group of the upcoming November 802 plenary and that the early-registration deadline.

The Chair announced he would take the output from the discussion and produce 2 versions of the PAR & CSDs, one with the industrial and building automation scope, and the other with only automotive for consideration at the next study group meeting.

The Chair asked if there was any objection to hearing the two late presentations. There were objections based on the late time and a hard stop at 6pm, there was little time for the late presentations.

Mr. Lewis adjourned the meeting at 5:43 PM BST.

Appendix A: Attendees at the IEEE 802.3 Ethernet for Automotive Imaging Sensors (ISAAC) Study Group Meeting, September 14, 2023 (count 57)

Name	Employer	Affiliation	IMAT	Zoom
Akin, Sami	Volkswagen AG	Volkswagen Ag	X	X
Alwishah, Abbas	Molex Incorporated	Molex Incorporated	X	X
Amrani, Yarden		Nvidia		X
Araki, Nobuyasu	Yazaki Corporation	Yazaki Corporation	X	X
Arndt, Christoph		Continental		X
Baggett, Tim		Microchip		X
Bierschenk, Jens		Robert Bosch GmbH		X
Boyer, Rich	Aptiv - Signal and Power Solutions	Aptiv Signal and Power Solutions	X	X
Chini, Ahmad		Broadcom Corporation	X	X
Cohen, Edo		Valens Semiconductor	X	X
Dalmia, Kamal		AVIVA Links	X	X
Estrakh, Daniel		Valens Semiconductor	X	X
Fellhauer, Felix	Robert Bosch GmbH	Robert Bosch GmbH	X	X
Ferretti, Vincent	Corning Incorporated	Corning Incorporated	X	X
Freeman, Zeph		Microchip Technology		X
Goto, Hideki	Toyota Motor Corporation	Toyota Motor Corporation	X	X
Haasz, Jodi	IEEE SA	IEEE SA		X
Hogenmueller, Thomas	Robert Bosch GmbH	Robert Bosch GmbH	X	X
Hopf, Daniel	Continental Automotive Technologies GmbH	Continental Automotive Technologies GmbH	X	X
Hoshino, Masayuki		Continental Automotive	X	X
HYAKUTAKE, YASUHIRO	Orbray Co., Ltd.	Orbray Co., Ltd.	X	X
Jin, Edward		Molex		X
Jones, Peter	Cisco Systems, Inc.	Cisco Systems, Inc.	X	X
Jonsson, Ragnar	Marvell Semiconductor, Inc.	Marvell	X	X
Kamiyama, Naoto		ROHM Co., Ltd.	X	X
Kershner, Kevin		Keysight		X
Kikuta, Tomohiro	Orbray Co., Ltd.	Orbray Co., Ltd.	X	X
Klaus-Wagenbrenner, Jochen		CARIAD		X
Koeppendoerfer, Erwin	LEONI Kabel GmbH	LEONI	X	X

Name	Employer	Affiliation	IMAT	Zoom
Lasry, Ariel	Qualcomm Technologies, Inc	Qualcomm Technologies, Inc	X	X
Law, David	Hewlett Packard Enterprise	Hewlett Packard Enterprise	X	X
Lefkin, Peter	MIPI Alliance	MIPI Alliance	X	X
Lewis, Jon	Dell Technologies	Dell Technologies	X	X
Liebl, Chistian		Conti		X
Lo, William	Marvell Semiconductor, Inc.	Axonne Inc.	X	X
Maguire, Valerie	Copperopolis	Copperopolis	X	X
Matheus, Kirsten	BMW Group	BMW Group	X	X
Mcclellan, Brett	Marvell Semiconductor, Inc.	Marvell Semiconductor, Inc.	X	X
Nagiub, Mena		Valeo		X
Neulinger, Christian	MD Elektronik	MD Elektronik	X	X
NIIHARA, YOSHIHIRO	Fujikura Ltd.	Fujikura Ltd.	X	X
Pan, Dongcheng		Huawei		X
Pandey, Sujan	Huawei Technologies (Netherlands) B.V.	Huawei Technologies (Netherlands) B.V.	X	X
Pardo, Carlos	Knowledge Development for POF SL	KDPOF	X	X
Perez De Aranda Alonso, Ruben	Knowledge Development for POF SL	KDPOF	X	X
Razavi, Alireza	Marvell	Marvell	X	X
Ringel, Haim	General Motors Company	General Motors Company	X	X
Sedarat, Hossein	Ethernovia	Ethernovia	X	X
Steyer-Ege, Janik	Robert Bosch GmbH	Robert Bosch GmbH	X	X
TAKEUCHI, JUNICHI	JAE Electronics, Inc	JAE Electronics, Inc.	X	X
TAZEBAY, MEHMET	Broadcom Corporation	Broadcom Corporation	X	X
Geoff Thompson	GraCaSI	GraCaSI		X
Turner, Max	Ethernovia	Ethernovia	X	X
Wienckowski, Natalie	None - Self-funded	General Motors Company	X	X
Zhang, Sen		Huawei		X
Zhang, Tingting	Huawei Technologies Co., Ltd	Huawei Technologies Co., Ltd	X	X
Zimmerman, George	CME Consulting	CME Consulting/APL Group, Cisco, Marvell, OnSemi, SenTekSe LLC	X	X