

Unconfirmed Meeting Minutes: IEEE 802.3 Ethernet for Automotive Imaging Sensors
(ISAAC) Study Group
November 14-15, 2023
802.3 Plenary, Honolulu, Hawaii, USA

Prepared by George Zimmerman

IEEE 802.3 Ethernet for Automotive Imaging Sensors (ISAAC) Study Group meeting convened at 1:00 PM (HST (Hawaii Standard Time, UTC-10), Tuesday, November 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 01a 111423.pdf](#)

Presenter: Jon Lewis, Chair.

The Chair reviewed the agenda. Mr. Lewis turned to presentation [agenda ISAAC 01a 111423.pdf](#) and reviewed the agenda for the meeting (page 2).

Approval of Agenda:

The chair asked if there were objections, additions, or corrections to the agenda displayed. There were none. The chair announced that the agenda was considered approved.

Approval of (Prior) Minutes:

The chair asked if there were objections, additions, or corrections to the posted minutes for the October 25, 2023 meeting (https://www.ieee802.org/3/ISAAC/public/102523/Unconfirmed_minutes_ISAAC_102523.pdf). There were none. The chair announced that the minutes were considered confirmed.

Mr. Lewis then announced that there were two items being heard in the maintenance meeting relating to automotive Ethernet technology. He announced that the group would break at 2:20 PM, and resume after the break at 3:20pm. The meeting would run until 5pm.

The Chair then resumed the review of presentation [agenda ISAAC 01a 111423.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.

The Chair reviewed study group voting on motions. When motions could not be taken by unanimous consent, roll call votes would be taken.

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 01a 111423.pdf](#), and read the page entitled "Guidelines for IEEE-SA Meetings". (1:10 PM HST)

Mr. Lewis asked if anyone had not seen the IEEE-SA copyright policy slide. None responded. He showed the copyright slide. (1:10 PM)

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

Mr. Lewis asked if anyone had not seen the IEEE-SA participation policy slides on "individual process". None responded. Mr. Lewis read the individual process slide. 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. (1:12PM)

Mr. Lewis then read the dominance and ethics policy slides, there were no questions.

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 a liaison had been received from the Automotive Serdes Alliance, (https://www.ieee802.org/3/minutes/nov23/incoming/20231010_IEEE_liaison_v4_signed_Redacted.pdf) along with a copy of ASA Transceiver Specification. The letter indicated that the ASA-MLE specification was still in process.

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

The chair asked if there were any objections to hearing a late presentation in a suitable place in the discussion.

Rechartering the Study Group

The chair reminded the group that the study group is required to be rechartered meeting to meeting.

The following motion was made:

Motion #1:

Move that the Chair of the Ethernet for Automotive Imaging Sensors Study Group request a rechartering of the study group at the closing working group plenary meeting

M: Kirsten Matheus

S: Bob Voss

APPROVED by unanimous consent. (1:23 PM)

Liaison Response

The chair then displayed the liaison received from the Automotive Serdes Alliance.

He then moved to a draft reply to the liaison letter, for consideration by the study group.

Edits were made to correct editorial errors, and the following motion was made:

Motion #2:

Move to approve the liaison response to ASA in 1123_802d3_to_ASA_draft_Redacted.pdf .

M: Bob Voss

S: Kirsten Matheus

APPROVED by unanimous consent. (1:28 PM)

PRESENTATIONS

The Chair then moved to the presentations for the meeting. (1:28 PM)

Title: Potential Objectives

URL: https://www.ieee802.org/3/ISAAC/public/1123/Objectives_ISAAC_01_100423.pdf

Presenter: Jon Lewis, Dell Technologies

Discussion: The presenter discussed potential objectives for the project seeing where we had consensus. Discussion was interactive on slide by slide.

There was a question regarding the maximum frame size of Ethernet frames (1518 bytes), and whether it might be changed – the working group chair suggested that such a change would not be within the scope of a physical layer project.

There was some discussion of ways this might be accomplished, but anything involving the MAC would be outside the scope of the study group.

As a result of the discussion, the first two objectives were changed from “Preserve frame (format or size)” to “Support frame (format or size)”.

Additionally, support for optional auto-negotiation was moved to the objectives requiring further thought. (moved from page 2 to page 3)

There was discussion on the ‘do not preclude power delivery’ objective, but no alternative text offered, with potential for further discussion later.

The presentation was updated to 01a.

Motion #3:

Move to approve the objectives from Objectives_ISAAC_01a_100423.pdf page 2.

M: Peter Jones

S: Kamal Dalmia

(Technical 75%)

MOTION PASSES BY UNANIMOUS CONSENT.

Title: DRAFT CSD Responses

URL: https://www.ieee802.org/3/ISAAC/public/1123/802d3_ISAAC_CSD_V2p7.pdf

Presenter: Jon Lewis, Dell Technologies

Discussion: The presenter discussed draft responses to the CSDs for the project. Edits were made in the discussion (to broad market potential).

The chair indicated that the time to break for the maintenance meeting had arrived, and that the CSDs would be considered for motion after the break.

<BREAK 2:19PM HST, RESUME AT 3:20PM HST>

Following the break, discussion resumed, with some edits made, resulting in an updated version posted

https://www.ieee802.org/3/ISAAC/public/1123/802d3_ISAAC_CSD_111523.pdf

Title: DRAFT PAR Responses

URL: https://www.ieee802.org/3/ISAAC/public/1123/PAR_ISAAC_01a_111423.pdf

Presenter: Jon Lewis, Dell Technologies

Discussion: The presenter discussed draft PAR responses for the project.

Title: Observations on the State of Consensus in the ISAAC Study Group

URL: https://www.ieee802.org/3/ISAAC/public/1123/zimmerman_3ISAAC_02_1123.pdf

Presenter: George Zimmerman, CME Consulting/ADI, APL Gp, Cisco, Marvell, ON Semi, SenTekSe, Sony

Discussion: The presenter discussed states of agreement and consensus in the group and suggested focus on the objectives for the near term.

Title: Definitions of “PHY” and “link segment” relative to supporting both balanced and unbalanced media

URL: https://www.ieee802.org/3/ISAAC/public/1123/zimmerman_3ISAAC_01_1123.pdf

Presenter: George Zimmerman, CME Consulting/ADI, APL Gp, Cisco, Marvell, ON Semi, SenTekSe, Sony

Discussion: The presenter discussed how the definitions of PHY and link segment in 802.3 related to wording of objectives, and whether the group had 1 phy type per speed or 2, based on the need for both Coax & STP support. The presenter suggested how to modify wording to accommodate this.

There was discussion and concern that the PMA might not in fact be common, and that therefore it might be better to write the objectives as 2 PHYs rather than a common PCS/PMA and 2 PMDs.

Title: Considerations for supported link length(s)

URL: https://www.ieee802.org/3/ISAAC/public/1123/matheus_jonsson_dalmia_ISAAC_01_1411202327_v1.0.pdf

Presenter: Kirstin Matheus, BMW; Kamal Dalmia, Aviva Links; Ragnar Jonsson, Marvell

Discussion: The presenter discussed the need for both an objective for Coax & STP support on PHYs of 2.5Gb/s, 5 Gb/s, and 10 Gb/s, at up to 15m reach. The presenters proposed wording for an objective.

Questions were asked and answered. There was some desire to work the specific wording of the objective, which was planned offline. There were also questions on the numbers of connectors. Comments were generally supportive.

The chair ended for the day at 5:02PM, and announced that the next day’s session would start at 8AM.

<RECESS AT 5:03 PM HST, UNTIL 8 AM HST>

Meeting resumed at 8am HST 11/15/2023

Discussion resumed on the proposed objectives from the previous day.

Based on overnight reflector discussion, the wording of the proposed objective was modified and reflected in https://www.ieee802.org/3/ISAAC/public/1123/Dalmia_3ISAAC_01_15112023.pdf

During the discussion the following straw poll was offered. A straw poll was taken by roll call of every in attendance. Results are shown in Appendix B.

Straw Poll #1:

How many in-line connectors should we support in the objective as shown (Single Choice)*

2: 19

3: 2

4: 23

Abstain: 18

The following motion was offered.

Motion #4:

Move to adopt Dalmia_3ISAAC_01_15112023.pdf as objectives for the ISAAC project as shown on slides 2,3 and 4.

M: Kamal Dalmia

S: Kirsten Matheus

(Technical >75%)

Vote was taken by roll-call using Zoom polling (See Appendix E for roll call)

Y: 36 (78%)

N: 10

A: 17

Motion Passes

Several individuals noted that while there was consensus, it was weak, and that further information may change or solidify the consensus.

The group then reviewed the late presentation offered providing information on the 15m reach requirement.

Title: Automotive market data in respect to required link lengths

URL: https://www.ieee802.org/3/ISAAC/public/1123/matheus_ISAAC_03_1411202327v1.0b.pdf

Presenter: Kirstin Matheus, BMW

Discussion: The presenter discussed market data and reasons behind automotive need for 15m reach.

Questions were asked and answered, and there was discussion of what direction link lengths would likely take in the future.

Title: Considerations for a 1 Gbps downlink PHY

URL: https://www.ieee802.org/3/ISAAC/public/1123/matheus_ISAAC_01_14112023.pdf

Presenter: Kirstin Matheus, BMW

Discussion: The presenter discussed the possible need for a 1 Gbps/100 Mbps PHY, including use cases, possible link technologies, and implications on the PHY-MAC interface.

Questions were asked and answered. There was discussion about the portion of the market that 1 Gbps camera links included, and how much of this 1000BASE-T1 met. There was also discussion that 1000BASE-T1 did not operate on coax, which was important to the camera market.

The following straw poll was offered: (see Appendix C for roll call)

Straw Poll #2:

I would support including a 1 Gbps downlink / 100 Mbps uplink PHY in the project and would support a respective objective.

Y:24

N:10

A:8

Need More Information:15

<BREAK AT 10:15AM UNTIL 10:40AM>

The meeting resumed with the next presentation.

Title: Need for scalability beyond 10 Gbps

URL: https://www.ieee802.org/3/ISAAC/public/1123/20231114a_On_the_need_for_25Gbps.pdf

Presenter: Janik Steyer-Ege, Bosch; Ragnar Jonsson, Marvell

Discussion: The presenter discussed needs for scalability to rates beyond 10 Gbps, and potential efficient ways to accomplish it. The presenter concluded that the best option was to include 25 Gbps in both the PAR and objectives.

In discussion, several individuals indicated support for adding 25 Gbps and several indicated opposition, some wanting to see more market data. Some were concerned about delay to the project.

During the discussion, a straw poll was requested, and following the discussion, the following straw poll was taken:

Straw Poll #3:

I would support the following paths forward (Chicago Rules):

- A. Include 25Gbps in the PAR and the Objectives
- B. Include 25Gbps in Objectives, but PAR does not contain fixed rate limits for fast direction
- C. Include 25Gbps in the PAR, but not the Objectives
- D. Exclude 25Gbps from both the PAR and the Objectives
- E. Abstain

Results: (see Appendix D for roll call)

A:26/58 (45%)

B:24/58 (41%)

C:21/58 (36%)

D:17/58 (29%)

E:13/58 (22%)

FUTURE MEETINGS & PLANNING

Mr. Lewis then turned towards discussion of where we are and how many meetings we need to complete our project documentation. The chair reminded the group that the last day to pre-circulate for March was February 6, and that there was an upcoming IEEE 802.3 interim from January 22-25, 2024 in St. Petersburg, FL, USA.

He announced his intent to hold interim teleconferences during the first or second week of December, a meeting in the 2nd week of January, to build consensus. The chair indicated he wouldn't be bringing motions to the meetings, but that motions would be allowed. He also announced a contingent interim teleconference the first week in February. These are in addition to the planned meeting at the 802.3 interim January 22-25.

Mr. Lewis adjourned the meeting at 11:55AM HST.

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

Name	Employer	Affiliation	IMAT	Zoom
Baggett, Tim	Microchip Technology, Inc.	Microchip Technology, Inc.	X	
Bar-Niv, Amir	Aquantia Corp	Marvell	X	X
Benyamin, Saied	Ethernovia	Ethernovia	X	X
Boyer, Rich	Aptiv - Signal and Power Solutions	Aptiv Signal and Power Solutions	X	X
Brandt, David	Rockwell Automation	Rockwell Automation	X	X
Carlson, Steven	High-Speed Design Inc.	HSD, Robert Bosch GmbH, Ethernovia	X	
Carty, Clark	Cisco Systems, Inc.	Cisco Systems, Inc.	X	
Chini, Ahmad	Broadcom Corporation	Broadcom Corporation	X	X

Name	Employer	Affiliation	IMAT	Zoom
Choudhury, Mabud	OFS	OFS		X
Dalmia, Kamal	Aviva Links Inc	AVIVA Links	X	X
De Koos, Andras	Microchip	Microchip		X
Estrakh, Daniel	Valens Semiconductor	Valens Semiconductor	X	X
Fellhauer, Felix	Robert Bosch GmbH	Robert Bosch GmbH	X	X
Feyh, German	Broadcom Corporation	Broadcom Corporation	X	X
Gauthier, Claude	NXP Semiconductors	NXP Semiconductors	X	X
Gerl, Markus	MD Elektronik	MD Elektronik	X	X
Glanzner, Martin	SEI ANTech-Europe GmbH	SEI Automotive Europe GmbH	X	X
Goel, Sachin	Aviva Links Inc	Aviva Links Inc	X	X
Gorshe, Steven Scott	Microchip Technology, Inc.	Microchip Technology, Inc.	X	X
Goto, Hideki	Toyota Motor Corporation	Toyota Motor Corporation	X	X
Graba, James	Broadcom Corporation	Broadcom Corporation	X	X
Gubow, Martin	Keysight Technologies	Keysight Technologies	X	X
Harshbarger, Douglas		Corning Incorporated	X	X
Haydt, Mary Sue	Microchip Technology, Inc.	Microchip Technology, Inc.	X	X
Hogenmueller, Thomas	Robert Bosch GmbH	Robert Bosch GmbH	X	X
Hozeska, Charles	Cernitin Solutions	Cernitin Solutions	X	
HYAKUTAKE, YASUHIRO	Orbray Co., Ltd.	Orbray Co., Ltd.	X	
Jarosz, Patrycja	IEEE STAFF	IEEE STAFF	X	X
Jones, Chad	Cisco Systems, Inc.	Cisco Systems, Inc.	X	X
Jones, Peter	Cisco Systems, Inc.	Cisco Systems, Inc.	X	X
Jonsson, Ragnar	Marvell Semiconductor, Inc.	Marvell	X	
Kagami, Manabu	Nagoya Institute of Technology	Nagoya Institute of Technology (NITech)	X	X
Kaseda, Yugo		Nitto Inc, Marketing	X	X
Kikuta, Tomohiro	Orbray Co., Ltd.	Orbray Co., Ltd.	X	X
Kipness, Michael	IEEE STAFF	IEEE STAFF	X	X
Lennartsson, Kent	Kvaser AB	Kvaser AB	X	
Lewis, Jon	Dell Technologies	Dell Technologies	X	X
Lo, William	Marvell Semiconductor, Inc.	Axonne Inc.	X	X
Lou, Wei	Broadcom	Broadcom		X
Maguire, Valerie	Copperopolis	Copperopolis	X	
Malicoat, David	Independent	Senko		X
Mark, Simon	Wurth Elektronik Group	Wurth Elektronik Group	X	
Martino, Kjersti	Inneos	Inneos	X	
mash, chris	Nupero Ltd	Ethernovia Inc	X	X
Matheus, Kirsten	BMW Group	BMW Group	X	X
Mcclellan, Brett	Marvell Semiconductor, Inc.	Marvell Semiconductor, Inc.	X	X
Murray, Brian	Analog Devices Inc.	Analog Devices	X	X

Name	Employer	Affiliation	IMAT	Zoom
Neulinger, Christian	MD Elektronik	MD Elektronik	X	
Ng, Hiok Tiaq	Aviva Links Inc.	Aviva Links Inc	X	X
NIIHARA, YOSHIHIRO	Fujikura Ltd.	Fujikura Ltd.	X	X
Noseworthy, Bob	UNH-IOL	UNH-IOL		X
Paul, Michael	Analog Devices Inc.	Analog Devices	X	
Payne, Aaron		TE Connectivity	X	X
Peng, Semmy	Huawei	Huawei		X
Peters, Kevin	Inneos	Inneos	X	
Pineda, Luis		LP Tech Advisors, LLC	X	X
Pischl, Neven	Broadcom Corporation	Broadcom Corporation	X	X
Potterf, Jason	Cisco Systems, Inc.	Cisco Systems, Inc.	X	X
Razavi, Alireza	Marvell	Marvell	X	
Regev, Alon	Keysight Technologies	Keysight Technologies	X	X
Ringel, Haim	General Motors Company	General Motors Company	X	X
Sedarat, Hossein	Ethernovia	Ethernovia	X	X
Shiino, Masato	FURUKAWA ELECTRIC	FURUKAWA ELECTRIC	X	X
shirani, ramin	Ethernovia	Ethernovia	X	
sisk, jason	University of New Hampshire InterOperability Laboratory (UNH-IOL)	University of New Hampshire InterOperability Laboratory (UNH-IOL)	X	
Souvignier, Tom	Broadcom Corporation	Broadcom Corporation	X	X
Stewart, Heath	Analog Devices Inc.	Analog Devices Inc.	X	X
Steyer-Ege, Janik	Robert Bosch GmbH	Robert Bosch GmbH	X	X
Sun, Jingcong	Motorcomm	Motorcomm		X
Taguchi, Noritaka	Yazaki Corporation	Yazaki Corporation	X	X
Tanaka, Yuhei	Nitto	Nitto		X
TAZEBAY, MEHMET	Broadcom Corporation	Broadcom Corporation	X	X
Thompson, Geoffrey	GraCaSI S.A.	INDEPENDENT	X	
Torres, Luisma	Knowledge Development for Plastic Optical Fiber	Knowledge Development for Plastic Optical Fiber	X	
Tu, Mike	Broadcom Corporation	Broadcom Corporation	X	X
Turner, Max	Ethernovia	Ethernovia	X	X
Vanderlaan, Paul	UL LLC	UL Solutions	X	
Veloso Cauce, Gumersindo	BMW Group	BMW Group	X	X
Voss, Robert	Panduit Corp.	Panduit Corp.	X	X
Wang, Shun-Sheng	Realtek Semiconductor Corp.	Realtek Semiconductor Corp.	X	X
Watanabe, Yuji	AGC Inc.	AGC	X	X
Wu, Mau Lin	Mediatek	Mediatek		X
Wu, Peter	Marvell	Marvell		X
Yamada, Osamu		Yazaki Corporation	X	X
Zerna, Conrad	Fraunhofer IIS	Avivalinks Inc.	X	X

Name	Employer	Affiliation	IMAT	Zoom
Zhang, Tingting	Huawei Technologies Co., Ltd	Huawei Technologies Co., Ltd	X	X
Zimmerman, George	CME Consulting	CME Consulting/ADI, APL Group, Cisco, Marvell, OnSemi, SenTekSe LLC, Sony	X	X

Attendees at the IEEE 802.3 Ethernet for Automotive Imaging Sensors (ISAAC) Study Group Meeting, November 15, 2023

Name	Employer	Affiliation	IMAT	Zoom
Aronson, Joseph	Texas Instruments Inc.	Texas Instruments Inc.	X	X
Baggett, Tim	Microchip Technology, Inc.	Microchip Technology, Inc.	X	X
Benyamin, Saied	Ethernovia	Ethernovia	X	X
Borda, jamila josip	BMW Group	BMW Group	X	X
Boyer, Rich	Aptiv - Signal and Power Solutions	Aptiv Signal and Power Solutions	X	X
Brandt, David	Rockwell Automation	Rockwell Automation	X	X
Carty, Clark	Cisco Systems, Inc.	Cisco Systems, Inc.	X	X
Chini, Ahmad	Broadcom Corporation	Broadcom Corporation	X	X
Dalmia, Kamal	Aviva Links	Aviva Links		X
Estrakh, Daniel	Valens Semiconductor	Valens Semiconductor	X	X
Fellhauer, Felix	Robert Bosch GmbH	Robert Bosch GmbH	X	X
Feyh, German	Broadcom Corporation	Broadcom Corporation	X	X
Gauthier, Claude	NXP Semiconductors	NXP Semiconductors	X	X
Gerl, Markus	MD Elektronik	MD Elektronik	X	X
Glanzner, Martin	SEI ANTech-Europe GmbH	SEI Automotive Europe GmbH	X	X
Goel, Sachin	Aviva Links Inc	Aviva Links Inc	X	X
Gorshe, Steven Scott	Microchip Technology, Inc.	Microchip Technology, Inc.	X	X
Goto, Hideki	Toyota Motor Corporation	Toyota Motor Corporation	X	X
Graba, James	Broadcom Corporation	Broadcom Corporation	X	X
Gubow, Martin	Keysight Technologies	Keysight Technologies	X	X
Haasz, Jodi	ieee sa	IEEE Standards Association (IEEE-SA)	X	
Hajduczenia, Marek	Charter Communications	Charter Communications	X	X
Harshbarger, Douglas		Corning Incorporated	X	X

Name	Employer	Affiliation	IMAT	Zoom
Haydt, Mary Sue	Microchip Technology, Inc.	Microchip Technology, Inc.	X	X
Hogenmueller, Thomas	Robert Bosch GmbH	Robert Bosch GmbH	X	X
Hozeska, Charles	Cernitin Solutions	Cernitin Solutions	X	X
HYAKUTAKE, YASUHIRO	Orbray Co., Ltd.	Orbray Co., Ltd.	X	X
Jones, Chad	Cisco Systems, Inc.	Cisco Systems, Inc.	X	X
Jones, Peter	Cisco Systems, Inc.	Cisco Systems, Inc.	X	X
Jonsson, Ragnar	Marvell Semiconductor, Inc.	Marvell	X	X
Kagami, Manabu	Nagoya Institute of Technology	Nagoya Institute of Technology (NITech)	X	X
Kikuta, Tomohiro	Orbray Co., Ltd.	Orbray Co., Ltd.	X	X
Lackner, Hans	QoSCom GmbH	QoSCom GmbH	X	X
Lennartsson, Kent	Kvaser AB	Kvaser AB	X	X
Lewis, Jon	Dell Technologies	Dell Technologies	X	X
Lo, William	Marvell Semiconductor, Inc.	Axonne Inc.	X	X
Lou, Wei		Broadcom Corporation	X	X
Maguire, Valerie	Copperopolis	Copperopolis	X	X
Malicoat, David	Independent	Senko		X
Martino, Kjersti	Inneos	Inneos	X	X
mash, chris	Nupero Ltd	Ethernovia Inc	X	X
Matheus, Kirsten	BMW Group	BMW Group	X	X
Mcclellan, Brett	Marvell Semiconductor, Inc.	Marvell Semiconductor, Inc.	X	X
Neulinger, Christian	MD Elektronik	MD Elektronik	X	X
Ng, Hiok Tiaq	Aviva Links Inc.	Aviva Links Inc	X	X
NIIHARA, YOSHIHIRO	Fujikura Ltd.	Fujikura Ltd.	X	X
Nikolich, Paul	Paul Nikolich	Paul Nikolich; Representing myself	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
Payne, Aaron		TE Connectivity	X	X
Perez De Aranda Alonso, Ruben	Knowledge Development for POF SL	KDPOF	X	X
Peters, Kevin	Inneos	Inneos	X	X
Pineda, Luis		LP Tech Advisors, LLC	X	X
Pischl, Neven	Broadcom Corporation	Broadcom Corporation	X	X
Razavi, Alireza	Marvell	Marvell	X	X
Regev, Alon	Keysight Technologies	Keysight Technologies	X	X
Ringel, Haim	General Motors Company	General Motors Company	X	X

Name	Employer	Affiliation	IMAT	Zoom
Sedarat, Hossein	Ethernovia	Ethernovia	X	X
Shiino, Masato	FURUKAWA ELECTRIC	FURUKAWA ELECTRIC	X	X
shirani, ramin	Ethernovia	Ethernovia	X	X
sisk, jason	University of New Hampshire InterOperability Laboratory (UNH-IOL)	University of New Hampshire InterOperability Laboratory (UNH-IOL)	X	X
Souvignier, Tom	Broadcom Corporation	Broadcom Corporation	X	X
Steyer-Ege, Janik	Robert Bosch GmbH	Robert Bosch GmbH	X	X
Sun, jingcong		Motorcomm Electronic Technology Co	X	X
TAZEBAY, MEHMET	Broadcom Corporation	Broadcom Corporation	X	X
Thompson, Geoffrey	GraCaSI S.A.	INDEPENDENT	X	X
Torres, Luisma	Knowledge Development for Plastic Optical Fiber	Knowledge Development for Plastic Optical Fiber	X	X
Tu, Mike	Broadcom Corporation	Broadcom Corporation	X	X
Turner, Max	Ethernovia	Ethernovia	X	X
Vanderlaan, Paul	UL LLC	UL Solutions	X	X
Veloso Cauce, Gumersindo	BMW Group	BMW Group	X	X
Voss, Robert	Panduit Corp.	Panduit Corp.	X	X
Wang, Shun-Sheng	Realtek Semiconductor Corp.	Realtek Semiconductor Corp.	X	X
Withey, James	Fluke Corporation	Fluke Corporation	X	X
Wu, Mau-Lin	MediaTek Inc.	MediaTek Inc.	X	X
Wu, Peter	Marvell Semiconductor, Inc.	Marvell Semiconductor, Inc.	X	X
Yamada, Osamu		Yazaki Corporation	X	X
Zerna, Conrad	Fraunhofer IIS	Avivalinks Inc.	X	X
Zhuang, Yan	Huawei Technologies Co., Ltd	Huawei Technologies Co., Ltd	X	X

Appendix B: Straw Poll #1 (Connectors)

QUESTION:	How many in-line connectors should we support in the objective as shown?			
RESPONSE:	2	3	4	Abstain
POLL RESULT	19	2	23	17

Last Name	First Name	Affiliation	Response
Baggett	Tim	Microchip	2
Benyamin	saied	Ethernovia	2
Borda	Jamila	BMW	4
boyer	rich	Aptiv	3
Brandt	David	Rockwell Automation	Abstain
Carty	Clark	Cisco	Abstain
Chini	Ahmad	Broadcom	Abstain
Dalmia	Kamal	Aviva Links	4
Estrakh	Daniel	Valens	4
Feyh	German	Broadcom	4
Gauthier	Claude	NXP	4
Gerl	Markus	MD Elektronik	2
Glanzner	Martin	SEI Automotive Europe GmbH	Abstain
Goel	Sachin	Aviva Links	4
Gorshe	Steven	Microchip	Abstain
Goto	Hideki	Toyota	4
Hajduczenia	Marek	Charter	Abstain
Harshbarger	Doug	Corning	Abstain
Harshbarger	Douglas	Corning	Abstain (duplicate)
Haydt	Mary Sue	Microchip	2
Hogenmuller	Thomas	Bosch	2
Hyakutake,	Yasuhiro	Orbray Co., Ltd.	4
Jones	Peter	Cisco	Abstain
Jonsson	Ragnar	Marvell	2
Kikuta	Tomohiro	Orbray Co., Ltd.	4
Lennartsson	Kent	Kvaser	Abstain
Lo	William	Axonne	Abstain
Lou	Wei	Broadcom	4
Maguire	Valerie	Copperopolis	Abstain
Malicoat	David	Independent/Senko	Abstain
Mash	Chris	Ethernovia	2
Matheus,	Kirsten	BMW	3
McClellan	Brett	Marvell	2
Neulinger	Christian	MD Elektronik	2

Ng	Hok Tiaq	Aviva Links	4
Niihara	Yoshihiro	Fujikura Ltd.	4
Pandey	Sujan	Huawei	2
Payne	Aaron	TE Connectivity	2
Peters	Kevin	Inneos	4
Pineda	Luis	LP Tech Advisors, LLC	2
Pischl,	Neven	Broadcom	4
Razavi	Alireza	Marvell	4
Regev	Alon	Keysight Technologies	Abstain
Sedarat	Hossein	Ethernovia	2
Shiino	Masato	Furukawa Electric	4
shirani	ramin	Ethernovia	2
Sisk	Jason	UNHIOL	Abstain
Souvignier	Tom	Broadcom	4
Steyer-Ege	Janik	Bosch	2
Sun	jingcong	motorcomm	Abstain
Tazebay	Mehmet	Broadcom	4
Torres	Luisma	KDPOF	4
Tu	Mike	Broadcom	4
Turner	Max	Ethernovia	2
Veloso	Gumersindo	BMW AG	Abstain
Voss	Bob	Panduit	4
Wang	Frank	Realtek	2
Wu	Mau-Lin	MediaTek	2
Yamada	Osamu	YAZAKI	2
Zerna,	Conrad	Avivalinks	4
Zimmerman	George	CME Consulting/APL Gp, Cisco, Marvell, OnSemi, SenTekSe, Sony	4
	KP	*double for Kevin Peters/Inneos	Abstain

Appendix C: Straw Poll #2 (1 Gbps/100M Support)

QUESTION:	I would support including a 1 Gbps downlink /100 Mbps uplink PHY in the project and would support a respective objective.			
RESPONSE:	Y	N	Need more information	A
POLL RESULT:	24	10	15	8

Last Name	First Name	Affiliation	Response
Baggett	Tim	Microchip	N
Benyamin	saied	Ethernovia	N
Borda	Jamila	BMW	Y
boyer	rich	Aptiv	Y
Brandt	David	Rockwell Automation	Need more information
Carty	Clark	Cisco	Y
Chini	Ahmad	broadcom	Y
Dalmia	Kamal	Aviva Links	Y
Estrakh	Daniel	Valens	Y
Fellhauer	Felix	Bosch	Y
Feyh	German	Broadcom	Need more information
Gerl	Markus	MD Elektronik	Need more information
Glanzner	Martin	SEI Automotive Europe GmbH	A
Goel	Sachin	Aviva Links	Y
Gorshe	Steven	Microchip	Need more information
Goto	Hideki	Toyota	Y
Gubow	Marty	Keysight	Y
Haydt	Mary Sue	Microchip	Need more information
Hogenmuller	Thomas	Bosch	Y
Hozeska	Charles	Cernitin	Y
Hyakutake	Yasuhiro	Orbray Co., Ltd.	Y
Jones	Peter	Cisco	Need more information
Jonsson	Ragnar	Marvell	Need more information
Lackner	Hans	QoSCom	A
Lennartsson	Kent	Kvaser	Y
Lo	William	Axonne	N
Lou	Wei	Broadcom	Y
Maguire	Valerie	Copperopolis	A
Martino	Kjersti	Inneos	A
Mash	Chris	Ethernovia	N
Matheus	Kirsten	BMW	Y
McClellan	Brett	Marvell	N

Ng	Tiaq	Aviva Links	Y
Niihara	Yoshihiro	Fujikura Ltd.	A
Pandey	Sujan	Huawei	A
Pardo	Carlos	KDPOF	Y
Payne	Aaron	TE Connectivity	A
Peters	Kevin	Inneos	Need more information
Pineda	Luis	LP Tech Advisors LLC (LP's 12mini)	N
Pischl	Neven	Broadcom	Y
Razavi	Alireza	Marvell	Need more information
Ringel	Haim	GM	N
Sedarat	Hossein	Ethernovia	N
Shiino	Masato	Furukawa Electric	Y
shirani	ramin	Ethernovia	N
Sisk	Jason	UNH-IOL	A
Steyer-Ege	Janik	Bosch	Y
Sun	jingcong	motorcomm	Need more information
Torres	Luisma	KDPOF	Need more information
Tu	Mike	Broadcom	Y
Turner	Max	Ethernovia	N
Veloso	Gumersindo	BMW AG	Y
Voss	Bob	Panduit	Need more information
Wang	Frank	Realtek	Need more information
Wu	Peter	Marvell	Need more information
Zerna	Conrad	Avivalinks	Y
Zimmerman	George	CME Consulting/APL Gp, Cisco, Marvell, OnSemi, SenTekSe, Sony	Need more information

Appendix D: Straw Poll #3 (Higher than 10 Gbps Options)

QUESTION:	I would support the following paths forward (choose as many as you wish)						
	A. Include 25Gbps in the PAR and the Objectives						
	B. Include 25Gbps in Objectives, but PAR does not contain fixed rate limits for fast direction						
	C. Include 25Gbps in the PAR, but not the Objectives						
	D. Exclude 25Gbps from both the PAR and the Objectives						
RESPONSE:	A.	B.	C.	D.	Abstain		
POLL RESULT:	26	24	21	17	13		
Last Name	First Name	Affiliation	A.	B.	C.	D.	Abstain
Benyamin	saied	Ethernovia	X	X	X		
Borda	Jamila	BMW					X
boyer	rich	Aptiv				X	
Brandt	David	Rockwell Automation					X
Carty	Clark	Cisco	X		X		
Chini	Ahmad	broadcom			X		X
Dalmia	Kamal	Aviva Links				X	
Estrakh	Daniel	Valens	X	X	X		
Fellhauer	Felix	Bosch	X	X			
Feyh	German	Broadcom				X	
Gerl	Markus	MD Elektronik	X	X			
Glanzner	Martin	SEI Automotive Europe GmbH					X
Goel	Sachin	Aviva Links				X	
Gorshe	Steven	Microchip				X	
Goto	Hideki	Toyota			X	X	
Graba	Jim	Broadcom		X	X		
Gubow	Marty	Keysight	X	X	X		
Haydt	Mary Sue	Microchip		X		X	
Hogenmuller	Thomas	Bosch	X	X			
Hozeska	Charles	Cernitin	X				
Hyakutake	Yasuhiro	Orbray Co., Ltd.					X
Jones	Peter	Cisco	X		X		
Jonsson	Ragnar	Marvell	X	X	X		
Kikuta	Tomohiro	Orbray Co., Ltd.	X	X			
Lackner	Hans	QoSCom				X	
Lennartsson	Kent	Kvaser					X
Lo	William	Axonne	X	X	X		
Lou	Wei	Broadcom				X	
Martino	Kjersti	Inneos					X
Mash	Chris	Ethernovia	X	X	X		
Matheus	Kirsten	BMW				X	
McClellan	Brett	Marvell	X	X	X		
Ng	Hok Tiaq	Aviva Links				X	
Niihara	Yoshihiro	Fujikura Ltd.					X
Payne	Aaron	TE Connectivity					X
Pérez-Aranda	Rubén	KDPOF	X				

Peters	Kevin	Inneos	X	X			
Pischl	Neven	Broadcom					X
Razavi	Alireza	Marvell	X	X	X		
Ringel	Haim	GM	X				
Sedarat	Hossein	Ethernovia	X	X	X		
Shiino	Masato	Furukawa Electric			X		
shirani	ramin	Ethernovia	X	X	X		
Sisk	Jason	UNH-IOL					X
Souvignier	Tom	Broadcom					X
Steyer-Ege	Janik	Bosch	X	X	X		
Tazebay	Mehmet	Broadcom				X	
Thompson	Geoff	Independent/GraCaSI SA			X	X	
Torres	Luisma	KDPOF	X	X			
Tu	Mike	Broadcom				X	
Turner	Max	Ethernovia	X	X	X		
Vanderlaan	Paul	UL Solutions		X		X	
Veloso	Gumersindo	BMW AG					X
Voss	Bob	Panduit	X	X			
Wang	Frank	Realtek		X		X	
Wu	Peter	Marvell	X		X		
Zerna	Conrad	Avivalinks				X	
Zimmerman	George	CME Consulting/APL Gp, Cisco, Marvell, OnSemi, SenTekSe, Sony	X	X	X		

Appendix E: Motion #4

Move to adopt Dalmia_3ISAAC_01_15112023.pdf as objectives for the ISAAC project as shown on slides 2,3 and 4.

Result: Y: 36, N: 10, A: 17

Last Name	First Name	Affiliation	Motion #4
Baggett	Tim	Microchip	Y
Benyamin	saied	Ethernovia	N
Borda	Jamila	BMW	Y
boyer	rich	Aptiv	Y
Brandt	David	Rockwell Automation	Y
Carty	Clark	Cisco	Y
Chini	Ahmad	broadcom	Y
Dalmia	Kamal	Aviva Links	Y
Estrakh	Daniel	Valens	A
Fellhauer	Felix	Bosch	N
Feyh	German	Broadcom	Y
Gauthier	Claude	NXP	Y
Gerl	Markus	MD Elektronik	Y
Glanzner	Martin	SEI Automotive Europe GmbH	A
Goel	Sachin	Aviva Links	Y
Goto	Hideki	Toyota	Y
Hajduczenia	Marek	Charter	Y
Harshbarger	Douglas	Corning	A
Haydt	Mary Sue	Microchip	Y
Hogenmuller	Thomas	Bosch	N
Hozeska	Charles	Cernitin	Y
Hyakutake,	Yasuhiro	Orbray Co., Ltd.	Y
Jones	Peter	Cisco	Y
Jonsson	Ragnar	Marvell	A
Kikuta	Tomohiro	Orbray Co., Ltd.	Y
Lackner	Hans	QoSCom	A
Lennartsson	Kent	Kvaser	Y
Lo	William	Axonon	Y
Lou	Wei	Broadcom	Y
Maguire	Valerie	Copperopolis	A
Malicoat	David	Independent/Senko	A
Martino	Kjersti	Inneos	A
Mash	Chris	Ethernovia	A

Matheus,	Kirsten	BMW	Y
McClellan	Brett	Marvell	N
Ng	Hok Tiaq	Aviva Links	Y
Niihara	Yoshihiro	Fujikura Ltd.	Y
Pandey	Sujan	Huawei	A
Pardo	Carlos	KDPOF	A
Payne	Aaron	TE Connectivity	N
Peters	Kevin	Inneos	A
Pineda	Luis	LP Tech Advisors, LLC	N
Pischl,	Neven	Broadcom	Y
Razavi	Alireza	Marvell	Y
Regev	Alon	Keysight Technologies	Y
Sedarat	Hossein	Ethernovia	N
Shiino	Masato	Furukawa Electric	Y
shirani	ramin	Ethernovia	N
Sisk	Jason	UNH-IOL	A
Steyer-Ege	Janik	Bosch	N
Tazebay	Mehmet	broadcom	Y
Thompson	Geoff	GraCaSi S.A./Independent	A
Torres	Luisma	KDPOF	Y
Tu	Mike	Broadcom	Y
Turner	Max	Ethernovia	N
Veloso	Gumersindo	BMW AG	Y
Voss	Bob	Panduit	Y
Wang	Frank	Realtek	A
Wu	Mau-Lin	MediaTek	Y
Wu	Peter	Marvell	Y
Yamada	Osamu	YAZAKI	A
Zerna,	Conrad	Avivalinks	Y
Zimmerman	George	CME Consulting/APL Gp, Cisco, Marvell, OnSemi, SenTekSe, Sony	A