Unconfirmed Meeting Minutes: IEEE 802.3 Ethernet for Automotive Imaging Sensors (ISAAC) Study Group
# September 27, 2023
# 802.3 ISAAC Study Group Interim (telephonic)

Prepared by George Zimmerman

IEEE 802.3 Ethernet for Automotive Imaging Sensors (ISAAC) Study Group meeting convened at 6:01 AM (PDT (Pacific Daylight Time, UTC-8), Thursday, September 27, 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_01_092723.pdf
**Presenter:**   Jon Lewis, Chair.

The Chair reviewed the agenda. Mr. Lewis turned to presentation agenda_ISAAC_01_092723.pdf.

The minutes needed a correction, not yet posted, so approval is deferred until the next meeting.

The Chair then resumed the review of presentation agenda_ISAAC_01_092723.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.


**Motion #1:   Approve the agenda from agenda_ISAAC_01_092723.pdf**

**Approved by unanimous consent**

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_01_092723.pdf](). (06:08 PDT)

Mr. Lewis asked if anyone had not seen the IEEE-SA copyright policy slide. None responded. He showed the IEEE SA copyright slides from
[agenda_ISAAC_01_092723.pdf]()

Mr. Lewis asked if anyone had not seen the IEEE-SA participant behavior policy slide. None responded. He showed the slide "Participant behavior" from
[agenda_ISAAC_01_092723.pdf,]() and read the slide.

Mr. Lewis asked if anyone had not seen the IEEE-SA participation policy slides on "individual process".  None responded.  Mr. Lewis showed and read the "individual process" slide ("Participants … shall act independently…'). 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.

The working group chair, Mr. Law, reminded the group of the importance of following the rules, including the individual participation policy.
(6:12 AM PDT)

Mr. Lewis advised the group of the IEEE SA (anti) dominance policy, showed, and read the slide "…activities shall allow the fair & equitable consideration" slide.  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 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. (6:19AM)

**Title:**      Sensor/ECU end-to-end Communication Required Features
**URL:** [https://www.ieee802.org/3/ISAAC/public/092723/Nagiub-IEEE_802.3_ISAAC.pdf]()
**Presenter:**   Mena Nagiub, Valeo

**Discussion**: The presenter discussed zonal system architecture, from a perspective of the zonal controller. He described requirements from the zonal architecture perspective.  The presentation covered the needs for full communication for imaging sensors, as well as the ECU. It also covered issues of latency, required functions and features for the physical and data link layers, and some features required for switching.

Discussion – Questions were asked and answered.  A participant asked for clarity, particularly whether the controller ports needed to support full rate communications in either direction.  The presenter confirmed this.  Another participant asked about the latency requirements.  The presenter clarified that he believed asymmetric data rates would impact the load balancing, and this may impact latency.  Another participant asked about whether all the zonal controller links were asymmetric, the presenter confirmed that in his point of view they were not. A participant noted that the proposed project was a physical layer project and switch architecture was out of scope for the project, and for the 802.3 working group.

(6:45 AM)
**Title:**        Camera and Sensors Protocols in Automotive IVN
**URL:**

https://www.ieee802.org/3/ISAAC/public/092723/lasry_isaac_sensor_protocols_20230912.pdf

**Presenter:**    Ariel Lasry, Qualcomm

**Discussion**: The presenter discussed some of the questions in the CFI, particularly, "• What does the evolution to zonal architecture need, Is the Camera side PHY same as the network side, and What data rate(s) are needed.  He also described the current architecture for Cameras/Sensors IVN, and some options for SerDes and aggregation of data.  He discussed data rates up to 32 Gbps from sensors and integrating to the MIPI CSI-2 (41 Gbps) interface in an SoC. He also discussed various paths the data might take, and an approach to migrating the architecture.

Discussion – Questions were asked and answered.


**Title:**        PAR and CSD Automotive vs. Industrial
**URL:** https://www.ieee802.org/3/ISAAC/public/092723/Dalmia_ISAAC_01_09272023.pdf
**Presenter:**    Kamal Dalmia, Aviva Links, Inc.

**Discussion**: The presenters discussed the question of whether building and industrial automation should be included in the PAR and CSD wording.  The presenter proposed some straw polls.

Discussion –The working group chair (Mr. Law) and the study group chair (Mr. Lewis) concurred that the CFI and study group scope wording focused on automotive, but didn't excluded discussion of other automation, stating, a physical layer specification "optimized for automotive end-node cameras". The presenter deferred the straw polls until the PAR/CSD discussion later in the meeting.

**Title:**       Sensors Data Rate Requirements
**URL:**        https://www.ieee802.org/3/ISAAC/public/092723/ringle_ISAAC_01_092723.pdf
**Presenter:**  Hayim Ringel, General Motors
**Discussion**: The presenter discussed needs for camera data rates greater than 10 Gbps, indicating a need for 20 Gbps, with an uplink of less than 100 Mbps.

Questions were asked and answered. A participant stated she didn't agree that a higher data rate was needed and requested either public market data or presentations from imaging vendors. The presenter clarified that some of the roadmaps were under NDA. A participant considered that the PAR scope might allow higher rates, but that a broad scope would not mandate the higher rate be developed. Another participant asked about future market projections. The presenter clarified that he expects to see more high-rate imagers in the future.

The chair indicated that the time had come for the announced 10 minute break.

**BREAK (7:45AM – 7:56AM)**

The meeting resumed presentations at 7:56AM PDT.

**Title:**       Comments on Other Applications Utilizing ISAAC
**URL:**
https://www.ieee802.org/3/ISAAC/public/092723/tazebay_ISAAC_01_09272023.pdf

**Presenter:**  Mehmet Tazebay, Broadcom
**Discussion**: The presenter discussed his opinion that non-automotive applications were out of scope and reviewed the reasons why.

A participant asked about the use of the technology for other applications, and the presenter clarified that a voluntary standard can't control what people use a technology for. Participants asked about the scope, and the presenter clarified that automotive was the focus, and didn't exclude other applications.

## PAR and CSD Review

The chair then moved to a working draft of the PAR and CSD. (PAR_ISAAC_01_0927.pptx) and edited during discussion.  Based on discussion with the working group chair and consistent with the discussion in the group, the presented PAR scope was to be "optimized for automotive end-node cameras". The Chair confirmed he believed the proposed scope did not preclude discussing other applications. Multiple participants supported increasing the downstream rate to up to 25 Gbps. Following the discussion, the chair took a straw poll:

**Straw Poll: (all on the call)**
I support changing the PAR speed from 10 Gbps to 25 Gbps (single choice):
Y: 23
N:13
A: 4


The chair noted there did not appear to be a 75% consensus to include 25 Gbps in the PAR Scope.  He also noted that due to the time the study group would have another interim meeting as announced.  There was an offer to change 10 Gbps to "greater than 1 Gbps".

The chair then moved on to the project need, there were no questions with the proposed need, and no objections noted.

The chair then moved to stakeholders, with 'building and industrial automation applications" left in.  During discussion, support was given for the addition, and "biomedical applications" was added to the list in the stakeholders section.

The chair then moved to the CSDs.  The chair urged the group to read the CSDs offline, and briefly reviewed the individual CSD responses from Campinas.  Minor editorial changes were made in the review.  There were no objections noted during the review.


## FUTURE MEETINGS
Mr. Lewis noted the PAR pre-circulation deadline of October 12, and reminded the group of the previously announced contingent interim of October 4, which he indicated WOULD take place.

The Chair reminded the group of the upcoming November 802 plenary, that registration and payment of a registration fee was required for participation, and that ISAAC was planned to meet Tuesday afternoon and Wednesday morning of the plenary week.

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Mr. Lewis adjourned the meeting at 8:51 AM PDT.

*Appendix A: Attendees at the IEEE 802.3 Ethernet for Automotive Imaging Sensors (ISAAC) Study Group Meeting, September 27, 2023*

| Name | Employer | Affiliation | IMAT | ZOOM |
|---|---|---|---|---|
| Akin, Sami | Volkswagen AG | Volkswagen Ag | X | X |
| Bar-Niv, Amir | Aquantia Corp | Marvell | X | X |
| Boyer, Rich | Aptiv - Signal and Power Solutions | Aptiv Signal and Power Solutions | X | X |
| Chini, Ahmad | Broadcom Corporation | Broadcom Corporation | X | X |
| Dalmia, Kamal | | AVIVA Links | X | X |
| Estrakh, Daniel | | Valens Semiconductor | X | X |
| Fellhauer, Felix | Robert Bosch GmbH | Robert Bosch GmbH | X | X |
| Fuller, Paul | | Marvell | | X |
| Gerl, Markus | MD Elektronik | MD Elektronik | X | X |
| Gorshe, Steven Scott | Microchip Technology, Inc. | Microchip Technology, Inc. | X | X |
| Goto, Hideki | Toyota Motor Corporation | Toyota Motor Corporation | 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 |
| Jones, Chad | Cisco Systems, Inc. | Cisco Systems, Inc. | | 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 |
| Kamiyama, Naoto | | ROHM Co., Ltd. | X | X |
| Kikuta, Tomohiro | Orbray Co., Ltd. | Orbray Co., Ltd. | X | X |
| Lasry, Ariel | Qualcomm Technologies, Inc | Qualcomm Technologies, Inc | X | X |
| Law, David | Hewlett Packard Enterprise | Hewlett Packard Enterprise | X | X |
| Lefkin, Peter | | MIPI Alliance | | 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 |
| 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 |
| Nagiub, Mena | Valeo | Valeo | | X |
| Nariya, Makoto | Sony Semiconductor Solutions Corporation | Sony Semiconductor Solutions Corporation | X | X |
| Neulinger, Christian | MD Elektronik | MD Elektronik | X | X |
| Ng, Hiok Tiaq | | Aviva Links Inc | X | X |
| NIIHARA, YOSHIHIRO | Fujikura Ltd. | Fujikura Ltd. | X | X |

| Name | Employer | Affiliation | IMAT | ZOOM |
|---|---|---|---|---|
| Pandey, Sujan | Huawei Technologies (Netherlands) B.V. | Huawei Technologies (Netherlands) B.V. | X | X |
| Pardo, Carlos | KDPOF | KDPOF | | X |
| Payne, Aaron | | TE Connectivity | X | X |
| Pischl, Neven | Broadcom Corporation | Broadcom Corporation | X | X |
| Razavi, Alireza | Marvell | Marvell | X | X |
| Reinhard, Michael | SEI ANTech-Europe GmbH | SEI ANTech-Europe GmbH | X | X |
| Ringel, Haim | General Motors Company | General Motors Company | X | X |
| Sedarat, Hossein | Ethernovia | Ethernovia | X | X |
| shirani, ramin | Ethernovia | Ethernovia | X | X |
| Steyer-Ege, Janik | Robert Bosch GmbH | Robert Bosch GmbH | X | X |
| Strohmeier, Heiko | 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 |
| Thompson, Geoffrey | GraCaSI S.A. | INDEPENDENT | X | X |
| Tofanicchio, Giuseppe | | STMicroelectronics | X | X |
| Turner, Max | Ethernovia | Ethernovia | X | X |
| Wang, Shun-Sheng | | Realtek | | X |
| Wienckowski, Natalie | None - Self-funded | General Motors Company | X | X |
| Wu, Peter | Marvell Semiconductor, Inc. | Marvell Semiconductor, Inc. | X | X |
| Zhuang, Yan | 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 |