IEEE IoT Sensors Advisory Committee

Industry Connections Activity Initiation Document (ICAID)

Version 1.0, 10 February 2023

IC23-001-01 Approved by the CAG on 22 March 2023

Instructions

- Instructions on how to fill out this form are shown in red. Please leave the instructions in the final document and simply add the requested information where indicated.
- Spell out each acronym the first time it is used. For example, "United Nations (UN)."
- Shaded Text indicates a placeholder that should be replaced with information specific to this ICAID, and the shading removed.
- Completed forms, in Word format, or any questions should be sent to the IEEE Standards Association (IEEE SA) Industry Connections Committee (ICCom) Administrator at the following address: industryconnections@ieee.org.
- The version number above, along with the date, may be used by the submitter to distinguish successive updates of this document. A separate, unique Industry Connections (IC) Activity Number will be assigned when the document is submitted to the ICCom Administrator.

1. Contact

Provide the name and contact information of the primary contact person for this IC activity. Affiliation is any entity that provides the person financial or other substantive support, for which the person may feel an obligation. If necessary, a second/alternate contact person's information may also be provided.

Name: Julian Chang
Email Address: julian.k.chang@boeing.com
Employer: Boeing
Affiliation:

Name: Sridhar Kowdley
Email Address: Sridhar.Kowdley@hq.dhs.gov
Employer: DHS (US Dept. of Homeland Security)
Affiliation:

IEEE collects personal data on this form, which is made publicly available, to allow communication by materially interested parties and with Activity Oversight Committee and Activity officers who are responsible for IEEE work items.

2. Participation and Voting Model

Specify whether this activity will be entity-based (participants are entities, which may have multiple representatives, one-entity-one-vote), or individual-based (participants represent themselves, one-person-one-vote).

Entity-Based

3. Purpose

3.1 Motivation and Goal

Briefly explain the context and motivation for starting this IC activity, and the overall purpose or goal to be accomplished.

Internet of Things (IoT) sensors have experienced explosive growth during the last decade and are poised for continued mass-scale adoption in smart cities, manufacturing, energy, healthcare, and automotive industries, including the forthcoming autonomous vehicles markets. This explosive growth has exposed issues that are beginning to negatively affect the adoption of IoT sensors in many industries.

Network interoperability and cybersecurity are the two most important issues consistently identified in sensors industry surveys and market reports and they are the biggest impediments to market growth. These issues manifest themselves in increased implementation costs, added complexity to systemwide cybersecurity solutions, and result in closed-loop/proprietary systems that limit free-market competition. Another major concern is the sustainability of sensors.

The industry experts from leading companies and IEEE have already identified requirements on what needs to be done to mitigate or resolve problems. The requirements were gathered from the IEEE survey, from three ICAP webinars, and from experts attending the IEEE Roundtable.

The primary goal of this activity will be to reduce, if not eliminate, the interoperability and cybersecurity problems. This will be accomplished by developing implementation guidelines, data dictionaries, standardized sensors data sheets, certification, sensor registry, educational programs, and other services.

3.2 Related Work

Provide a brief comparison of this activity to existing, related efforts or standards of which you are aware (industry associations, consortia, standardization activities, etc.).

The SDOs (Standards Development Organizations) such as IEEE, ISO, IEC and several consortia have developed numerous standards and several consortia have developed proprietary specifications in this space. However, many of these standards have not been adopted by the industry. Many sensor devices implement standards partially or with proprietary extensions.

3.3 Previously Published Material

Provide a list of any known previously published material intended for inclusion in the proposed deliverables of this activity

IEEE White Paper: Interoperability and Cybersecurity for IoT enabled sensor devices.
Developed under the auspices of ICAP (IEEE Conformity Assessment Program).

3.4 Potential Markets Served

Indicate the main beneficiaries of this work, and what the potential impact might be.

The main beneficiaries are sensor implementors and users (industrial and consumers), government agencies, sensor and router manufacturers, integrators, and software (communication protocols and application) developers. This applies to industrial and consumer markets.

Key benefits:

-MEMS IoT sensor implementors and users will not be constrained to buy sensors that only work with specific sensor routers.
Currently, the sensor and router/gateway manufacturers collaborate at the design phase to ensure that their products are interoperable and cybersecure. This limits the number of sensors that work with the router, typically to sensors from only one manufacturer.
-MEMS sensor buyers will benefit from having a choice of certified sensors and routers.
-Sensor manufacturers will not be dependent on sensor routers/servers to sell their products.
The market will transition from the “closed” systems to the “open” systems.

3.5 How will the activity benefit the IEEE, society, or humanity?

Describe how this activity will benefit the IEEE, society, or humanity.

This effort needs an organization with access to technical and business experts, global outreach and a trustworthy reputation to succeed. IEEE meets these criteria. This activity will bring financial and marketing benefits. There will be membership and publication fees, certifications, and educational programs. Participation from US government agencies, leading global companies and academia will provide great marketing exposure to IEEE.

4. Estimated Timeframe

Indicate approximately how long you expect this activity to operate to achieve its proposed results (e.g., time to completion of all deliverables).

Expected Completion Date: 03/2025

IC activities are chartered for two years at a time. Activities are eligible for extension upon request and review by ICCom and the responsible committee of the IEEE SA Board of Governors. Should an extension be required, please notify the ICCom Administrator prior to the two-year mark.

5. Proposed Deliverables

Outline the anticipated deliverables and output from this IC activity, such as documents (e.g., white papers, reports), proposals for standards, conferences and workshops, databases, computer code, etc., and indicate the expected timeframe for each.

The following is a list of planned deliverables:
-White paper - Q4 2023
-Implementation guides (for different types of sensors using different communication protocols) – Q3 2024
-Cybersecurity architecture guidelines – Q4 2023
-Test Plans for ICAP (ICAP will develop and operate the conformity assessment program) – Q4 2024
-Standardized datasheet - Q2 2024
-Educational programs and outreach - 2023-2024
-On-line data dictionary - Q3 2024
-Sensor registry (operated by IPAC) – 2023 and 2024

An Implementation Plan (deliverables and milestones) will be developed by the activity participants upon its creation that will finalize the planned deliverables and milestones.

5.1 Open Source Software Development

Indicate whether this IC Activity will develop or incorporate open source software in the deliverables. All contributions of open source software for use in Industry Connections activities shall be accompanied by an approved IEEE Contributor License Agreement (CLA) appropriate for the open source license under which the Work Product will be made available. CLAs, once accepted, are irrevocable. Industry Connections Activities shall comply with the IEEE SA open source policies and procedures and use the IEEE SA open source platform for development of open source software. Information on IEEE SA Open can be found at https://saopen.ieee.org/.

Will the activity develop or incorporate open source software (either normatively or informatively) in the deliverables? Yes

Yes, it may be a set of APIs (Application Programming Interfaces) or a complete stack of open-source code.

6. Funding Requirements

Outline any contracted services or other expenses that are currently anticipated, beyond the basic support services provided to all IC activities. Indicate how those funds are expected to be obtained (e.g., through participant fees, sponsorships, government, or other grants, etc.). Activities needing substantial funding may require additional reviews and approvals beyond ICCom.

There is a significant interest in this activity from government agencies and multinational companies.

It is anticipated that this activity can apply for government grants, and sponsorships, and participants will pay membership fees.

7. Management and Procedures

7.1 Activity Oversight Committee

Indicate whether an IEEE Standards Committee or Standards Development Working Group has agreed to oversee this activity and its procedures.

Has an IEEE Standards Committee or Standards Development Working Group agreed to oversee this activity? No

IEEE Committee Name:
Chair's Name: Full Name
Chair's Email Address: who@where

Additional IEEE committee information, if any. Please indicate if you are including a letter of support from the IEEE Committee that will oversee this activity.

IEEE collects personal data on this form, which is made publicly available, to allow communication by materially interested parties and with Activity Oversight Committee and Activity officers who are responsible for IEEE work items.

7.2 Activity Management

If no Activity Oversight Committee has been identified in 7.1 above, indicate how this activity will manage itself on a day-to-day basis (e.g., executive committee, officers, etc.).

This activity will be overseen jointly by the SC and the ICAP.

A Sensor Advisory Committee shall be created from key participants and IEEE personnel. It is envisioned that current members of the Roundtable Operating Committee will transition to the advisory committee. The Sensors Advisory committee will oversee four sub-committees (Cybersecurity, Interoperability, Sustainability, and Data and Architecture).

7.3 Procedures

Indicate what documented procedures will be used to guide the operations of this activity; either (a) modified baseline *Industry Connections Activity Policies and Procedures* (entity, individual), (b) *Abridged Industry Connections Activity Policies and Procedures* (entity, individual), (c) Standards Committee policies and procedures accepted by the IEEE SA Standards Board, or (d) Working Group policies and procedures accepted by the Working Group's Standards Committee. If option (a) is chosen, then ICCom review and approval of the P&P is required. If option (c) or (d) is chosen, then ICCom approval of the use of the P&P is required.

(b) Abridged Industry Connections Activity Policies and Procedures

8. Participants

8.1 Stakeholder Communities

Indicate the stakeholder communities (the types of companies or other entities, or the different groups of individuals) that are expected to be interested in this IC activity and will be invited to participate.

Sensor and actuators manufacturers
Sensor Routers/gateway
Integrators
User companies
Software (communication protocols, applications. cloud services)
Cybersecurity providers
SDOs, consortia
US government agencies
Academia

8.2 Expected Number of Participants

Indicate the approximate number of entities (if entity-based) or individuals (if individual-based) expected to be actively involved in this activity.

Approx. 100+.

8.3 Initial Participants

Provide a few of the entities or individuals that will be participating from the outset. It is recommended there be at least three initial participants for an entity-based activity, or five initial participants (each with a different affiliation) for an individual-based activity.

Use the following table for an entity-based activity:

Entity Name	Primary Contact Name	Additional Representatives
US DHS (Dept. of Homeland Security)	Sridhar Kowdley	
Boeing	Julian Chang	
Lockheed Martin	Ray Boncek	
Hitachi	Kyoko Roberts	
MIT	Bruce Hecht	
Northeastern University	Ravinder Dahija	
Memstronics	Brent Lunceford	

8.4 Activity Supporter/Partner

Indicate whether an IEEE committee (including IEEE Societies and Technical Councils), other than the Oversight Committee, has agreed to participate or support this activity. Support may include, but is not limited to, financial support, marketing support and other ways to help the Activity complete its deliverables.

Has an IEEE Committee, other than the Oversight Committee, agreed to support this activity?
Yes, the Sensors Council in partnership with ICAP and relevant standards committees.

IEEE Committee Name: Sensors Council
Chair's Name: Troy Nagle
Chair's Email Address: t.nagle@ieee.org

Please indicate if you are including a letter of support from the IEEE Committee.