

6G Technology for Connectivity & Telecom Systems Industry Connections Activity Initiation Document (ICAID)

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IC22-007-01 Approved by the CAG 12 October 2022

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: Mehmet Ulema
Email Address: : Mehmet.ulema@manhattan.edu
Employer: Manhattan University
Affiliation: Entity Name(s)

Name: Ashutosh Dutta
Email Address: Ashutosh.dutta@ieee.org
Employer: Entity Name
Affiliation: Johns Hopkins University Applied Physics Lab

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).

Individual-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.

6G, as the name suggests, is the sixth generation of mobile connectivity. It's still unclear what final form 6G will take until it is standardized. But it isn't too early to speculate which technologies will be included and which characteristics they will have. The high-level vision for 6G is to deepen the connection and integration between the digital, physical, and human worlds.

5G promises download speeds many times faster than current 4G LTE networks and significantly lower latency times. But 6G is set to raise the bar even higher, with speeds estimated at 100-times faster than 5G. It also promises increased bandwidth to keep consumers more connected than ever before.

6G will benefit from the backend changes made to mobile networks to power 5G. Technology trends seen with 5G, like virtualized networks, are setting the stage already by enabling things like specialized deployments. Operators have densified radio networks with more antennas. Now, it's easier to get a signal, especially indoors, while cloud technologies and edge computing mean data can be processed closer to users—even at scale—so latency is much lower.

Essentially, 6G will build on this foundation and introduce new capabilities far beyond the limits of 5G. 6G will use more advanced radio equipment and a greater volume and diversity of airwaves than 5G. This includes the use of an extremely high frequency (EHF) spectrum that delivers ultra-high speeds and huge capacity over short distances.

In terms of coverage, 6G could become universal. 6G satellite technology and intelligent surfaces capable of reflecting electromagnetic signals will deliver low latency, multi-gigabit connectivity. This is especially transformative for the parts of the world where it has been too difficult or too expensive to reach with conventional mobile networks. Remote parts of the globe, the skies, and the oceans could all be connected. 5G already harnesses AI for optimization, dynamic resource allocation, and data processing. But extreme-low latency of less than one millisecond and distributed architecture mean 6G will be able to deliver global, integrated intelligence.

6G will also be more efficient than its predecessor and consume less power. Energy efficiency is critical for a more sustainable mobile industry because of the anticipated growth in data generation.

Faster speeds, greater capacity, and lower latency will:

- Free applications from the constraints of local processing power.

- Connect more devices to the network.
- Blur the lines between the physical, human, and digital worlds.

Terabit speeds will inevitably make streaming more enjoyable and video calls less painful. Universal coverage and more connected things will change the way we interact with technology—and potentially the world itself. 6G will also enable location and context-aware digital services, as well as sensory experiences, such as truly immersive extended reality (XR) and high-fidelity holograms. Instead of today’s video conferences, it will be possible to speak to people in real-time in virtual reality (VR), using wearable sensors so users have the physical sensation of being in the same room together. And because 6G is so much more power-efficient than 5G, it may be even possible for low-power IoT devices to be charged over the network. This would transform the economics of mass deployments and aid sustainability.

The technologies that are envisioned for 6G technology including Virtualized RAN (Open RAN), universal connectivity (Rural Communications), energy savings, sustainable future are already being considered/developed by IEEE- SA and thus it gives us a good opportunity to start the activities pertaining to 6G technology now.

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.).

- Next G Alliance
- ITU (International Telecommunication Union)
- 3GPP ((3rd Generation Partnership Projects)
- 6G SNS IA
- Hexa X
- FNI (Future Networks Initiative)

3.3 Previously Published Material

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

See the publications from the above alliances/standards group

3.4 Potential Markets Served

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

- Any communication and information processing ecosystem and architecture

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

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

- Achieve IEEE’s goal of developing a framework that is open, flexible, scalable, and adaptable.
- Achieve IEEE’s goal of becoming the leader in the connectivity and telecom space.
- New projects to be delivered across diverse sectors

- New activities, projects, and programs can be the outcome of the program. This is an excellent opportunity to extend the reach and depth of future generation applications and services across several industries.
- Practices/guidelines that will help solution deployment across different interfaces, vendors, and frameworks.
- Lead to better cyber security and privacy for protecting person/human data.

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: 09/2024

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.

All of the below aspects can be considered

- Proposals for Standards based on the identification of issues – 2023
- RRSA (Rapid Reaction Standardization Activity) for faster standards/PAR adoption– 2022, 2023
- Identification and developing technologies for 6G -2023, 2024
- Workshops and Events for community building and promotion– 2022, 2023, 2024
- Webinars for community building and promotion of ideas – 2022, 2023, 2024
- Collaboration initiatives with other organizations- 2022, 2023, 2024

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? No

Not known at this time

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.

No expenses are anticipated apart from the basic support from IEEE.

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

If yes, indicate the IEEE committee's name and its chair's contact information.

IEEE Committee Name: 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.).

The executive Committee of this program will manage the activities.

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.

Option (b) Abridged IC 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.

Service Providers, Semiconductor Manufacturers, OEMs, ODMS Telcos, Technology Providers, 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.

~25 Individuals

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 individual-based activity:

Individual Name	Employer	Affiliation
Alex Gelman	NETovations LLC	NETovations LLC
Nick Carter	Analog Devices	Analog Devices
Narendra Mangra	GlobeNet LLC	GlobeNet LLC
Sandeep Agrawal	C-DOT	C-DOT
Vikas Malhotra	WOPLLI Technologies	WOPLLI Technologies

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

If yes, indicate the IEEE committee’s name and its chair’s contact information.

IEEE Committee Name: IEEE Communication Society Network Softwarization and Virtualization Standard Committee (COM/NetSoft-SC)

Chair's Name: Mehmet Ulema

Chair's Email Address: m.ulema@ieee.org

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