

IEEE, Standards and Automotive Industry Related Initiatives

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IEEE:

World's Largest Professional Association Advancing
Technology for Humanity

GLOBAL REACH



420,000⁺
WORLDWIDE MEMBERS

46

TECHNICAL SOCIETIES &
COUNCILS



160⁺ COUNTRIES
INVOLVED

TECHNICAL BREADTH

1,800⁺ ANNUAL
CONFERENCES



4⁺ MILLION
TECHNICAL DOCUMENTS

180⁺
TOP-CITED
PERIODICALS





Collaboration is our *Foundation*

In Academia

In Industry

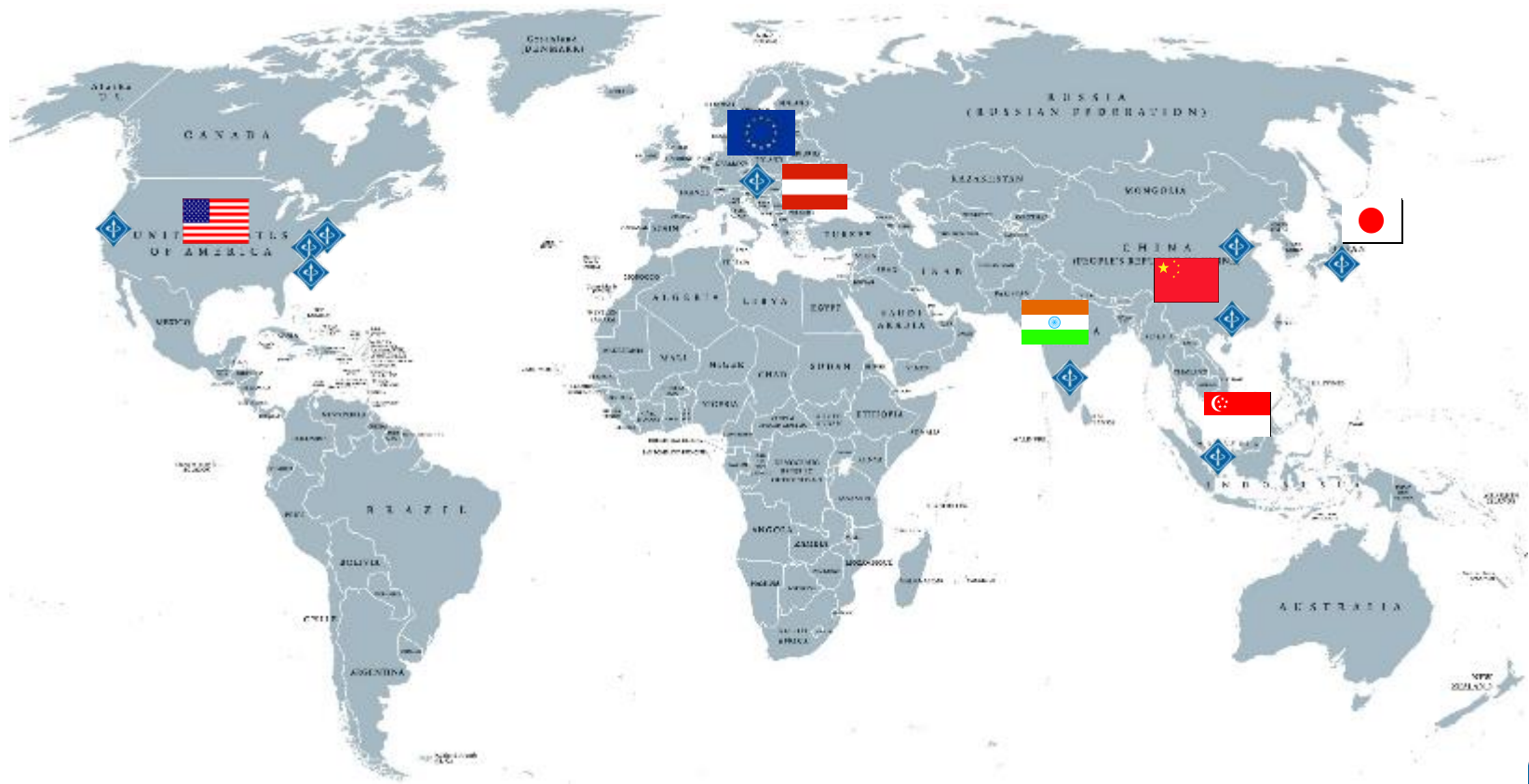
In The Field



**IEEE brings people and technology
together for mutual benefit**



Worldwide IEEE Offices



IEEE in Europe Snapshot

- IEEE has had a long history in Europe and opened the European Office in Vienna in September 2017
 - ~60,000 IEEE members in Europe
- IEEE-SA holds 2 of its 6 governance meetings a year in Europe; in 2018
- Support European technical communities in industry, academia, research, and governmental institutions
- Engage and participate in public policy by facilitating dialogue between European technologists and policy makers
- Facilitate the commercialization of European research results by developing globally accepted standards



IEEE Standards Association (IEEE-SA)

- ▶ **Mission:** Provide a high-quality, market-relevant standardization environment, respected worldwide



20,000
STANDARDS DEVELOPERS

160⁺ COUNTRIES
INVOLVED

1200⁺
ACTIVE STANDARDS

600⁺ STANDARDS
UNDER DEVELOPMENT

IEEE standards span a broad spectrum of technologies, such as

- Aerospace Electronics
- Broadband Over Power Lines
- Broadcast Technology
- Clean Technology
- Cognitive Radio
- Design Automation

- Electromagnetic Compatibility
- Green Technology
- Ethernet/WLAN
- Medical Device Communications
- Nanotechnology
- Organic Components

- Portable Battery Technology
- Power Electronics
- Power & Energy
- Radiation/Nuclear
- Reliability
- Transportation Technology

IEEE Foundational Standards

IEEE standards are building blocks for IoT, manufacturing, intelligent vehicles, healthcare, smart grid, smart cities, and more

Internet of
Things (IoT)

IEEE P2413™



eHealth

IEEE 11073™
Family



Networking/
WLAN

IEEE 802™
Family



Intelligent
Vehicles

IEEE 1609™
IEEE
2030.1.1™



Smart Grid

100+ active or
in-progress IEEE
standards are
relevant to the
smart grid



Complete Business Lifecycle



IEEE-SA provides industry a framework of solutions to ensure rapid introduction of new technologies to market

Challenges for the Automotive/Transportation Industry



Technology

V2x communication,
Security,
Fog/cloud computing,
Reliability,
Availability,
Levels of autonomy,
etc.



Economics

Mobility as a service,
Car sharing,
Data prosumer,
etc.



Politics/Society

Safety,
Sustainability,
Efficiency,
Alignment with moral
values and ethical
principles,
etc.



Advancing the Technologies for Connected Vehicles through Consensus Building

IEEE P2030.1.1

Standard Technical Specifications of a DC Quick and Bi-directional Charger for Use with Electric Vehicles

IEEE P2690

Standard for Charging Network Management Protocol for Electric Vehicle Charging Systems

Transportation Electrification

IEEE 2030 and its related standards are the first all-encompassing standards series providing alternative approaches and best practices for achieving smart grid interoperability.

IEEE 1547 Series

A series of standards for distributed power to maximize the benefits of interconnection.

IEEE P1562

Standard for array and battery sizing.

IEEE 1901 Series

Standards relating to broadband connectivity over electric power lines.

Intelligent Transportation Systems

IEEE 1609

A family of standards defining the architecture, services and standard interfaces for secure vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) wireless communications.

IEEE 1616

Standards for motor vehicle event data recorders.

IEEE 802.11

WLAN to support communication between vehicles and the roadside and between vehicles while operating at speeds up to a maximum of 200 km/h for communication ranges up to 1000 meters.

Traffic Safety

IEEE 1512

Multiple standards for traffic safety, hazardous materials and public safety incident communications.

Cooperative, Autonomous and Automated Driving

IEEE P2040 Series

A series of standards for connected, automated and intelligent vehicles.

Smart Rail

A wide range of standards relating to electric rail operation including IEEE 11-2000, IEEE 16-2004, P1653.1, P1791, P1833, P1883, P1884, P1887, P1898, P2406, 1536, 1558, 1568, 1570, 1628, 1629, 1630, 1653 series, and 1698. As well as a series of standards relating to communication for rail transit systems, including IEEE 1473, 1474, 1475, 1476, 1477, 1482.1, and 1483.

And more...

IEEE Standards Coordinating Committee on Transportation (SCC42) leads the coordination of IEEE standardization activities for technologies related to transportation.

Connectivity

IEEE 802.3

Defining the physical layer and data link layer's media access control of wired Ethernet, in local area networks and wide area network applications.

IEEE 802.15

Wireless personal area networks allows the use of wearable and other short-range wireless devices (such as health monitors).

IEEE 802.20/802.21/802.22 Series

Communications standards for connecting vehicles to 802 systems.

IEEE P2020

Standard for Automotive System Image Quality

IEEE P7001

Transparency of Autonomous Systems

IEEE P2048.11

In-Vehicle Augmented Reality

The IEEE Global Initiative for Ethical Considerations in Artificial Intelligence and Autonomous Systems


An incubation space for new standards and solutions, certifications and codes of conduct, and consensus building for ethical implementation of intelligent technologies




INDUSTRY CONNECTIONS

The IEEE Global Initiative for Ethical Considerations in Artificial Intelligence and Autonomous Systems

ICAID 

Download the IEEE Global Initiative *Ethically Aligned Design* document 

Download the IEEE Global Initiative brochure 

NEWS AND EVENTS

ABOUT

The purpose of this Initiative is to ensure every technologist is educated, trained, and empowered to prioritize ethical considerations in the design and development of autonomous and intelligent systems.

- [View specifics regarding the Mission and deliverables for the Initiative.](#)
- [See a list of The Initiative's Executive and other Committees.](#)
- [Learn more from Frequently Asked Questions.](#)

Ethically Aligned Design, Version 1 - Request For Input

Ethically Aligned Design: A Vision for Prioritizing Human Wellbeing with Artificial Intelligence and Autonomous Systems represents the collective input of over one hundred global thought leaders from academia, science, government and corporate sectors in the fields of Artificial Intelligence, ethics, philosophy, and policy.



General Principles (*Ethically Aligned Design*)

WIRED

**HACKERS FOOL TESLA S'S
AUTOPILOT TO HIDE AND
SPOOF OBSTACLES**



▶ Principle 4 - Transparency

- “For disruptive technologies, such as driverless cars, a certain level of transparency to wider society is needed to build public confidence in the technology, promote safer practices, and facilitate wider societal adoption.”

▶ Principle 5 - A/IS Technology Misuse and Awareness of It

- “New technologies give rise to greater risk of misuse, and this is especially true for A/IS. A/IS increases the impact of risks such as hacking, the misuse of personal data, “gaming,” or exploitation (e.g., of vulnerable users by unscrupulous parties). These are not theoretical risks. Cases of A/IS hacking have already been widely reported, such as with driverless cars.”



Affective Technology

▶ IEEE Global Initiative Affective Committee

- Ethical aspects of “robotic nudging”
- Disclosure and informed consent necessary to build trust

▶ IEEE Global Initiative Personal Data Committee

- Need user controlled data exchange models to build trust
- Legal issues, re: driver / rider liability

<http://go.affective.com/auto>



- > **Monitor levels of driver fatigue and distraction** to enable appropriate alerts and interventions that correct dangerous driving. An audio or display alert instructs the driver to remain engaged; the seat belt vibrates to jolt the driver to attention.
- > **Address handoff challenge** between driver and car in semi-autonomous vehicles. When sensing driver fatigue, anger or distraction, the autonomous AI can determine if the car must take over control. And when the driver is alert and engaged, the vehicle can pass back control.
- > **Monitor driver anger** to enable interventions or route alternatives that avoid road rage. A virtual assistant guides the driver to take a deep breath, the driver's preferred soothing playlist comes on, the GPS suggests a stop along the way.

IEEE P7000 Standards Working Groups

IEEE P7000™ - Model Process for Addressing Ethical Concerns During System Design

- Values-Based Design to better assess end user / rider values in design

IEEE P7001™ - Transparency of Autonomous Systems

- Provide accountability and traceability to increase safety and trust for consumers

IEEE P7005™ - Standard on Employer Data Governance

- Provide clarity for access and distribution of employee / consumer data in public spaces

IEEE P7006™ - Standard on Personal Data AI Agent Working Group

- Provides riders “Values By Design” machine-readable personalized choices for riding

IEEE P7007™ - Ontological Standard for Ethically driven Robotics and Automation Systems

- Ontology for robotic systems including autonomous vehicles

IEEE P7008™ - Standard for Ethically Driven Nudging for Robotic and Autonomous Systems

- Provides foundational platform for users to distinguish recommendations from manipulation

IEEE P7009™ - Standard for Fail-Safe Design of Autonomous and Semi-Autonomous Systems

- “Human-in-the-loop” priority for autonomous vehicles

IEEE P7012™ - Standard for Machine Readable Personal Privacy Terms

- Provides “beyond GDP” platform for honouring user / driver data and choice





2019 IEEE-SA Ethernet & IP @ Automotive Technology Day

2019 Host: Hyundai
Seoul, South Korea
Fall 2019





Thank you!

IEEE Standards Association

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<http://standards.ieee.org>

