

# Intelligent Transport Systems standardization in ITU

8-9 October 2018 Detroit Michigan USA





# international organization with global presence



*5 Elected Officials*

**~750 Staff from ~80 Countries**

**Membership driven (193 M.S., +700 private entities, +150 Academia)**

**6 UN Official Languages: Arabic, Chinese, English, French, Russian, Spanish**

**Headquarters in Geneva with Liaison Office in New York**

**Regional offices in Addis Ababa, Bangkok, Brasilia, Cairo**

**Area offices in Bridgetown, Dakar, Harare, Jakarta, Moscow, Santiago, Tegucigalpa, Yaoundé**



# Three Sectors (ITU-T, ITU-R, ITU-D): Standards, Radiocommunications & Development



**ITU-T Standardization**



**ITU-R Radiocommunication**



**ITU-D Development**



**Committed  
to Connecting  
the World**

# A Focus on the standardization work for Intelligent Transport Systems (ITS)



# ITU-T Recommendations

**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**F.749.1**

(11/2015)

SERIES F: NON-TELEPHONE TELECOMMUNICATION  
SERVICES

Multimedia services

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**Functional requirements for vehicle gateways**

Recommendation ITU-T F.749.1



**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**F.749.2**

(03/2017)

SERIES F: NON-TELEPHONE TELECOMMUNICATION  
SERVICES

Multimedia services

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**Service requirements for vehicle gateway  
platforms**

Recommendation ITU-T F.749.2



**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**X.1373**

(03/2017)

SERIES X: DATA NETWORKS, OPEN SYSTEM  
COMMUNICATIONS AND SECURITY

Secure applications and services – Intelligent  
transportation system (ITS) security

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**Secure software update capability for intelligent  
transportation system communication devices**

Recommendation ITU-T X.1373



**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**P.1100**

(03/2017)

SERIES P: TELEPHONE TRANSMISSION QUALITY,  
TELEPHONE INSTALLATIONS, LOCAL LINE  
NETWORKS

Communications involving vehicles

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**Narrowband hands-free communication in  
motor vehicles**

Recommendation ITU-T P.1100



**International Standards**

**Developed and adopted by 193 Member States, 700 Private Sector, and 150 Academia**

# Standardization on Intelligent Transport Systems (ITS): Multiple Study Group approach

## Radiocommunication Sector (ITU-R)

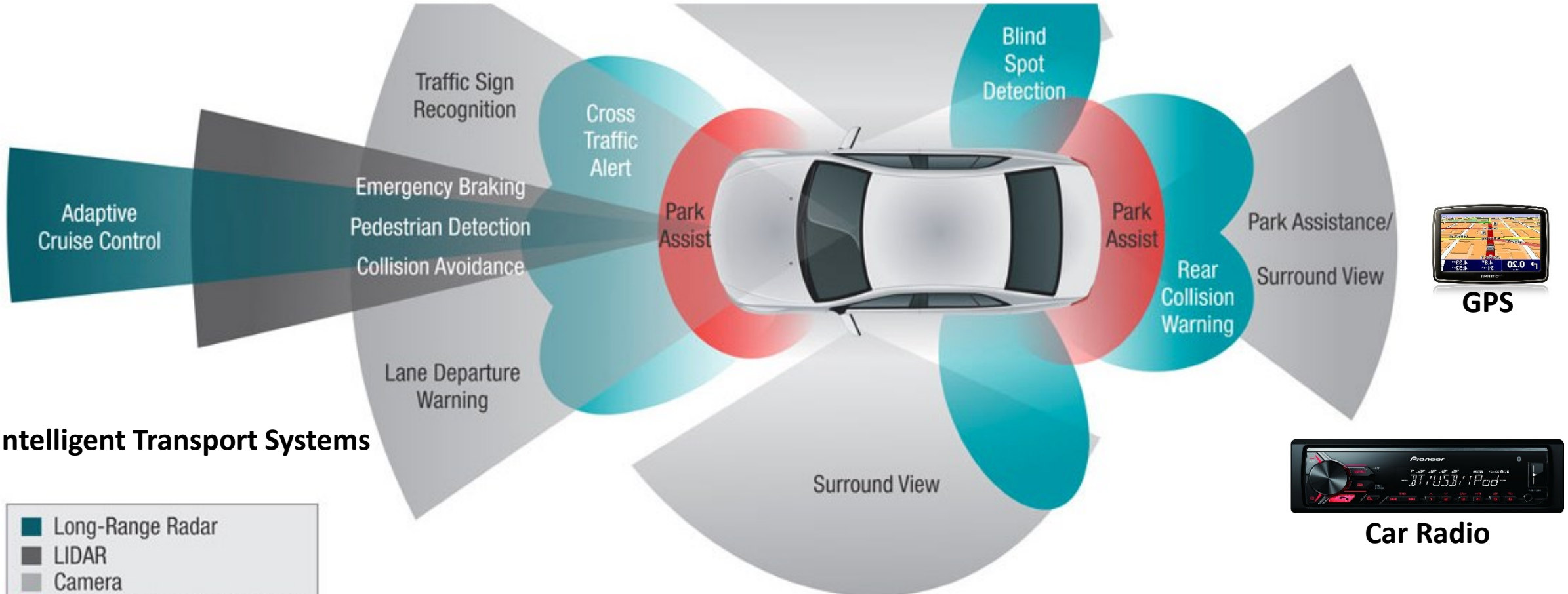
- Working Party 5A (spectrum allocation & harmonization, automotive radar)

## Telecommunication Standardization Sector (ITU-T)

- Study Group 17 : ITS and automotive cybersecurity (remote SW update)
- Study Group 12 : Quality of Service of speech and audio in vehicles
- Study Group 2 : Numbering for In Car Emergency Communication (ICEC)
- Study Group 20 : ITS and Internet of Things and Smart Cities
- Study Group 16 : Vehicle gateway and in car multimedia platforms
  - *ITU-T Focus Group on Vehicular Multimedia (FG-VM)*



# ITU allocates spectrum for vehicles



## Intelligent Transport Systems

- Long-Range Radar
- LIDAR
- Camera
- Short-/Medium Range Radar
- Ultrasound



Car Radio



Mobile communication and Internet access

# ITU-R: Radiocommunication and ITS (1/2)

## Radiocommunication Sector (ITU-R)

- Techniques to transfer data over short distances between a roadside infrastructure and mobile units (V2V and V2X) - [M.2084-0](#)
- Technologies and characteristics for Dedicated Short Range Communications (DSRC) - 5.8 GHz - [M.1453-2](#)
- System characteristics and applications for Automotive radar in various frequency bands) - [M.1452](#), [M.1453](#), [M.1890](#), [M.2057](#)
- System requirements for Millimetre wave radiocommunication (including Collision avoidance radar) ~ 60-80 GHz- [M.1452-2](#)
- Automotive Radar technologies and possible interference with incumbent services – 78 GHz - [M.2322-0](#)



# ITU-R: Radiocommunication and ITS (2/2)

## Radiocommunication Sector (ITU-R)

- Usage of ITS technologies, frequency bands, status of standardization, and related applications and deployments in ITU Member States **M.[ITS\_USAGE]**
- Studies on harmonisation of frequency bands for ITS services **M.[ITS\_FRQ]**
- Currently working on studies in preparation of **WRC-19**:
  - Plans to consider possible global or regional harmonized frequency bands for evolving ITS
  - Plans to take necessary actions to facilitate global or regional harmonized frequency bands to support railway radiocommunication systems

# Standardization on Intelligent Transport Systems (ITS): Multiple Study Group approach

## Radiocommunication Sector (ITU-R)

- Working Party 5A (spectrum allocation, automotive radar)

## Telecommunication Standardization Sector (ITU-T)

- Study Group 17 : ITS and automotive cybersecurity (remote SW update)
- Study Group 12 : Quality of Service of speech and audio in vehicles
- Study Group 2 : Numbering for In Car Emergency Communication (ICEC)
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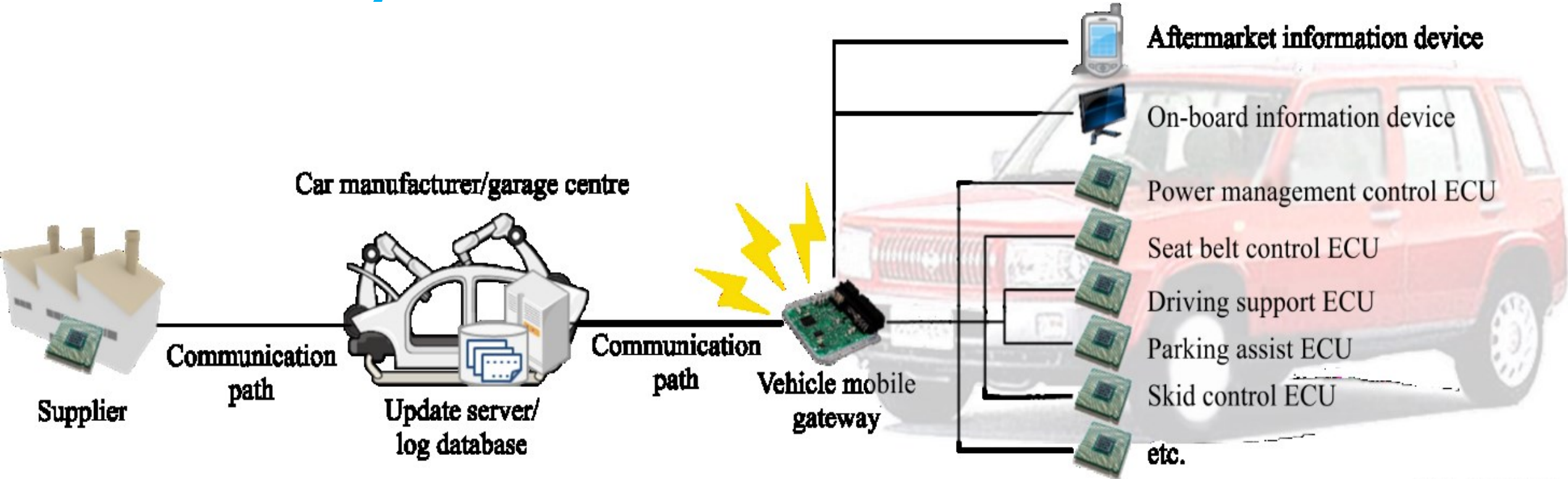
# SG17: ITU standards secure over-the-air software updates for vehicles



**ITU-T X.1373  
(2017-03)**

**A successful future automated driving car must ensure security and safety through cybersecurity mechanisms and secure over-the-air software updates**

# ITU-T Recommendation X.1373 “Secure software update capability for intelligent transportation system communication devices”



X.1373(17)\_F01

ECUs - Electronic control units

# SG17: Ongoing ITS Security standards work

- **X.itssec-2**: Security guidelines for V2X communication systems; (2018-09)
- **X.itssec-3**: Security requirements for vehicle accessible external devices; (2019-09)
- **X.itssec-4**: Methodologies for intrusion detection system on in-vehicle systems; (2020-03)
- **X.itssec-5**: Security guidelines for vehicular edge computing; (2020-03)

In ITS environment a vehicle may act as router to transmit to other vehicles. So the vulnerability of a vehicle can be propagated to the other vehicles

→ **Security is very important**

**ITU-T SG17** collaborate actively with **UNECE WP.29**

[\[UN Task Force on Cyber Security and OTA Issues \(CS/OTA\)\]](#)

Regulations for cyber security and over-the-air updates in progress



# SG12: ITU standards improve quality of hands-free communication in vehicles

<https://www.youtube.com/watch?v=x4dtjvLHXds>

ITU Telecom World 2017 Busan

ITU Telecom World 2016 Bangkok



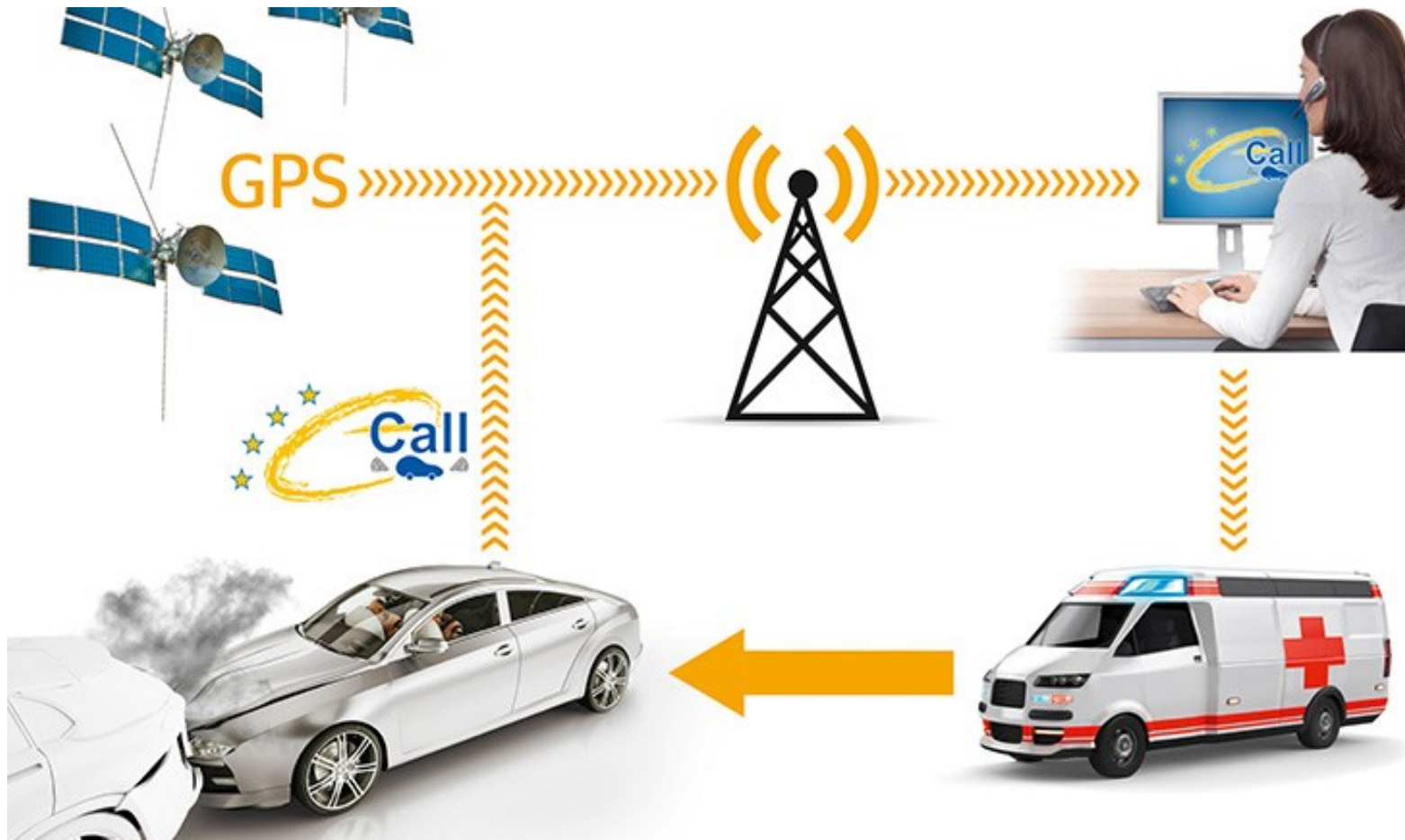
ITU-T P.1100  
ITU-T P.1110  
ITU-T P.1120  
ITU-T P.1130



ITU conducts test events of mobile phones and vehicle hands-free systems



# SG12: ITU standards make e-calls intelligible

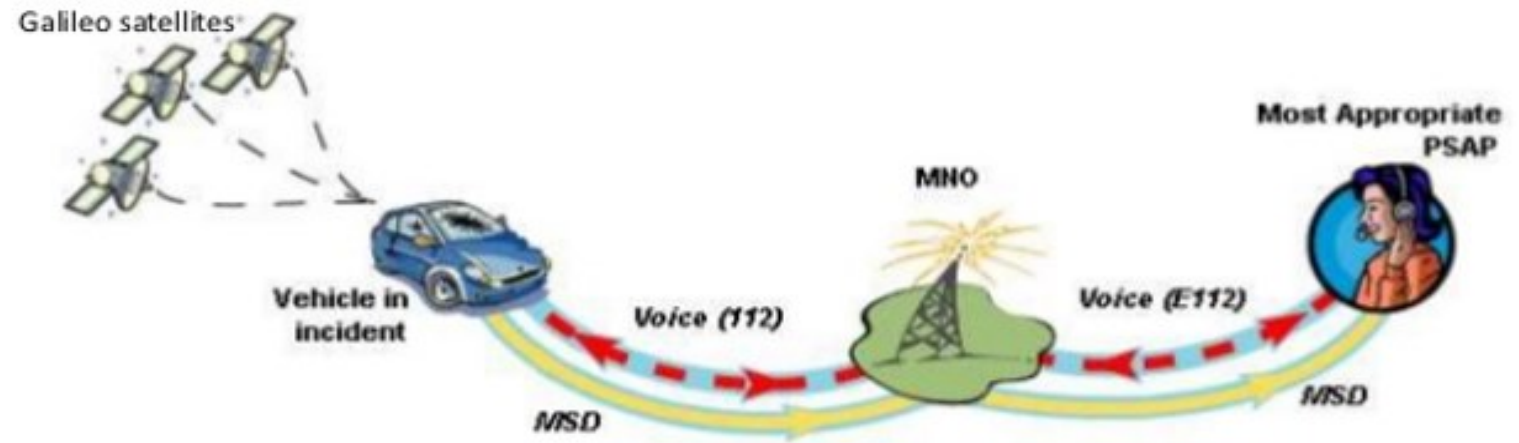


Source: [Continental](#) - Automatic Emergency Call

ITU-T P.1140 - Speech communication requirements for emergency calls originating from vehicles  
Referenced in new UN regulation on automatic emergency call system for road traffic accidents (UNECE WP.29)

# SG2: Numbering for In Car Emergency Communication (ICEC) calls

- Global numbering resources used for ICEC calls is under consideration.



MSD – Minimum Set of Data  
PSAP – Public Safety Answering Point

# SG20: Standards for IoT and Smart Cities

## Managing data in the connected car

- Today's cars are already connected and smart
- Built-in cameras, radars and lidars can be used for real-time analysis of the vehicle's environment
- Need solutions to processing the data efficiently. This will have a positive impact on safety, as well as improving assistance.
- Data transmitted from the infrastructures or from vehicle to vehicle enables both the vehicles and remote systems to manage potential dangers and issue warnings.
- Thanks to these warnings (road accidents, weather changes, faults in the road or blockages) → Vehicles will be able to reduce their speed prior to reaching them, which will increase safety and improve traffic flow.



**ITU-T SG20 - IoT and Smart Cities & Communities - develops international standards to enable the coordinated development of IoT technologies in smart cities, including related big data.**

# SG20: Standards for IoT and Smart Cities

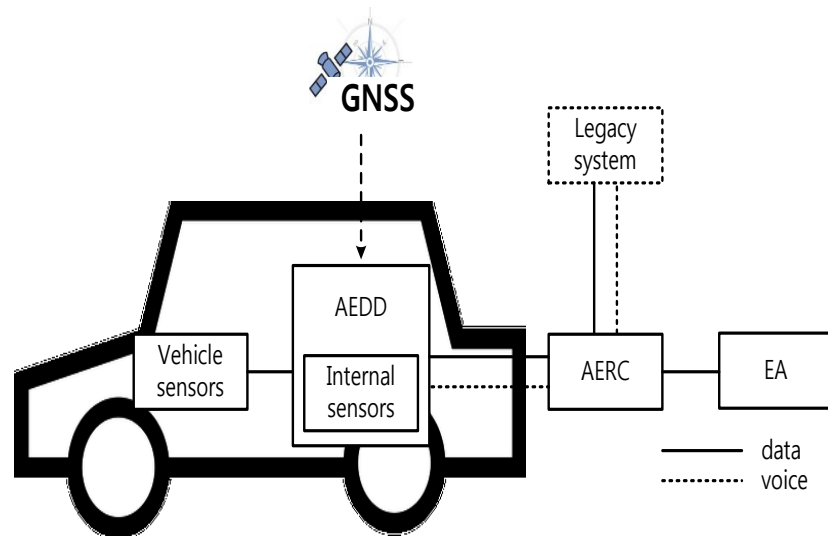
## Completed standards work

- [ITU-T Y.4116](#): Requirements of transportation safety services including use cases and service scenarios. (approved)
- [ITU-T Y.4119](#) - Requirements and capability framework for IoT-based automotive emergency response system (approved)

## Ongoing standards work:

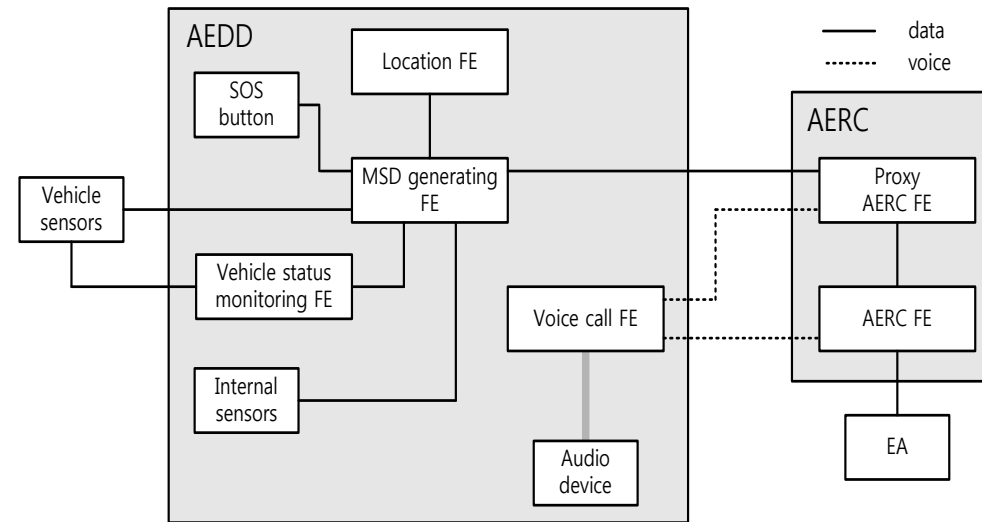
- [Y.IoT-ITS-framework](#): Framework of Cooperative ITS based on the IoT
- [Y.IoT-UAS-Reqts](#): Use cases, requirements and capabilities of unmanned aircraft systems for IoT
- [Y.AERS-mtp](#): Minimum set of data structure for automotive emergency response system
- [Y.AERS-mtp](#): Minimum set of data transfer protocol for automotive emergency response system
- [Y.SSC-AISE-arc](#): Reference architecture of artificial intelligence service exposure for smart sustainable cities
- [Y.TPS-afw](#): Architectural framework for providing transportation safety service
- [Y.FW.IC.MDSC](#): Framework of identification and connectivity of Moving Devices in Smart City

# SG20: Y.4119 “Requirements and capability framework for IoT-based automotive emergency response system”



**Overview of the AERS**

*AEDD* automotive emergency detection device  
*AERC* automotive emergency response center  
*EA* emergency authority  
*GNSS* global navigation satellite system



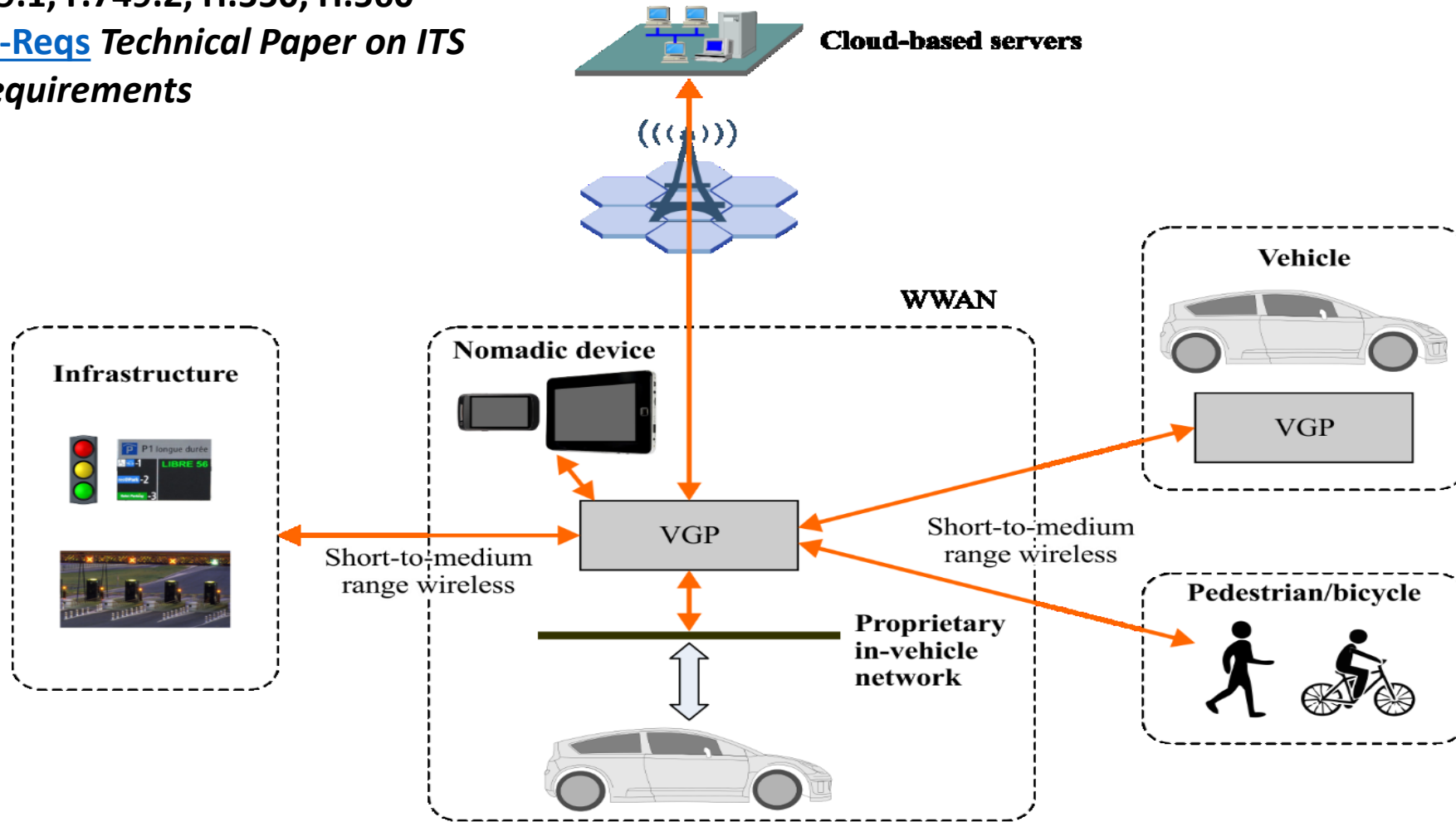
**Capability framework of the AERS**

An IoT-based automotive emergency response system is expected to reduce the automobile accident detection and reporting times using automatic accident detection-report procedures. Furthermore, since a sensor assisted geographical positioning allows the AERC to pinpoint the exact location of the accident, the time for rescue to reach the accident scene is expected to be shortened significantly.



# SG16: Vehicle gateway platform (VGP) functional and service requirements

- ITU-T F.749.1, F.749.2, H.550, H.560
- [HSTP-CITS-Reqs](#) *Technical Paper on ITS Comms Requirements*



# ITU-T SG16: ITS Standards for vehicle gateway platform (VGP)

## Vehicle gateway platform (VGP) Standards:

- **ITU-T F.749.1** "Functional requirements for vehicle gateways"
- **ITU-T F.749.2** "Service requirements for vehicle gateway platforms"
- **ITU-T H.550** "Architecture and functional entities of vehicle gateway platforms"
- **ITU-T H.560** "Communications interface between external applications and a vehicle gateway platform"

## ITS Technical Paper:

- [HSTP-CITS-Reqs \(2014\) "Global ITS Communication Requirements"](#)

# New ITU-T Focus Group on “Vehicular Multimedia” (FG-VM)

1/3

## Vehicular multimedia system

- 4<sup>th</sup> screen after *TV, PC & Mobile Phone*
- 3<sup>rd</sup> infotainment space after *home, office*

## Aim of FG-VM

- Integration of Terrestrial and Satellite networks
- Integration of Broadcasting and Internet services
- Reduce costs using converged networking
- Provide wide area coverage

## Challenges

- Integration and compatibility with mobile communication: 3, 4, 5G and beyond
- Software protocols and hardware specifications standardization and adoption
- Harmonization of Transport regulations
- Involve international experts and stakeholders



Source: <https://www.hlmediacomms.com>

# New ITU-T FG-VM “Vehicular Multimedia” 2/3

## FG-VM Goals

- (1) To study, gather information and develop a standards research orientation and standards research plan related to vehicular multimedia in the fields of intelligent voice interaction, interconnection between vehicular terminal and smart phone, connectivity for high precision navigation and various other applications;
- (2) To develop corresponding use cases and requirements of vehicular multimedia enabled by converged networks;
- (3) To study architectures, interfaces, protocols, data formats, interoperability, performance evaluation, security and protection of personal information for vehicular multimedia;
- (4) To produce a gap analysis of vehicular multimedia standardization in order to identify the relevant scope of possible future ITU-T Recommendations on these topics and develop a roadmap for vehicular multimedia;
- (5) To establish liaisons and relationships with other organizations which could contribute to the standardization activities for vehicular multimedia.

# New ITU-T FG-VM “Vehicular Multimedia” 3/3 (established on 20/07/2018) (Proposed by Tiaa )

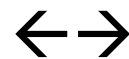
## FG-VM Management

- Chairman: Jun (Harry) Li (TIAA, China)
- Vice chairmen: Gaëlle Martin-Cocher (Blackberry, Canada)
- Interested candidates to join the management team as vice-chairs are requested to contact TSB at [tsbfgvm@itu.int](mailto:tsbfgvm@itu.int). Those candidatures will be evaluated and agreed by the FG-VM and announced at their meetings.

## FG-VM Meetings

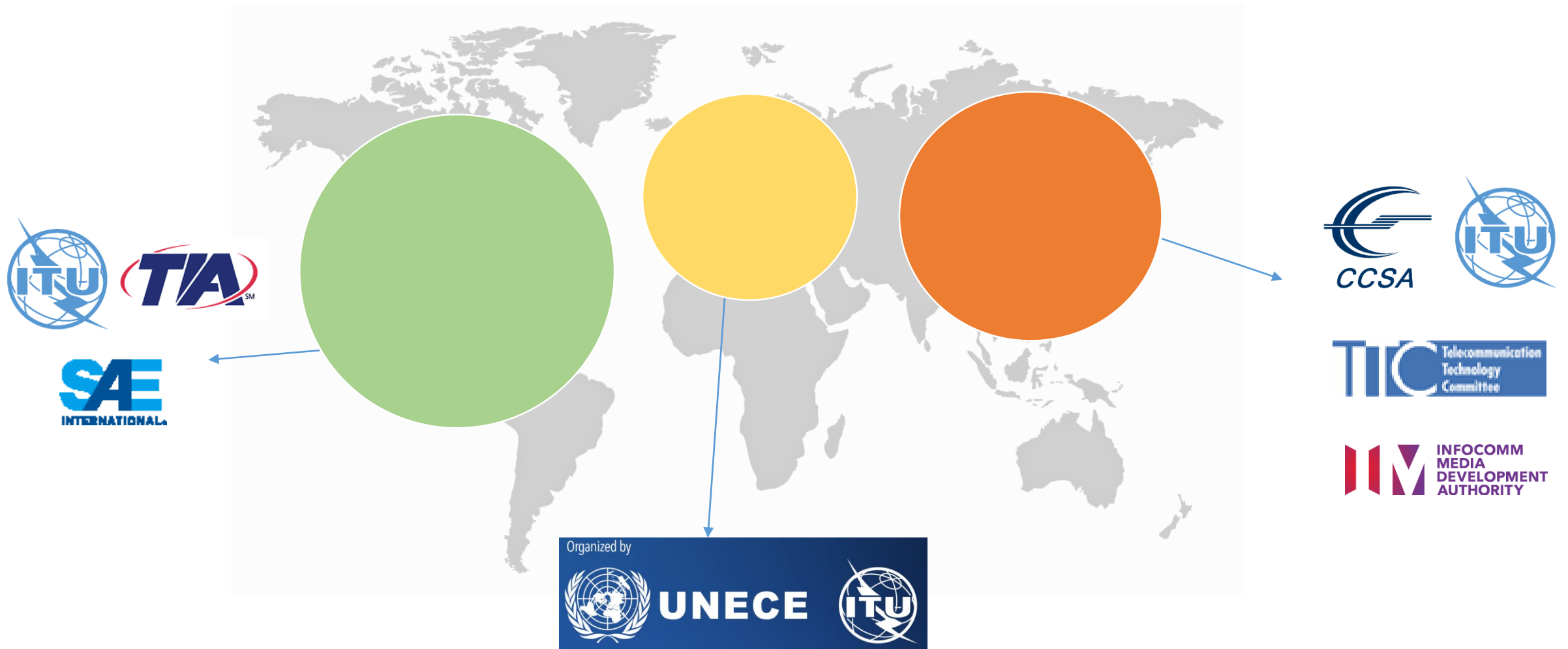
- Plans to meet 4 times a year
- Extensive use of remote meetings
- First meeting planned (TBC) on 10-11 October 2018, Detroit, USA

<https://www.itu.int/en/ITU-T/focusgroups/vm>



[tsbfgvm@itu.int](mailto:tsbfgvm@itu.int)

# ITU and Vehicle Connectivity: Yearly Events (EUROPE, ASIA, AMERICA)





# Successful 13th Symposium (FNC-2018) on the Future Networked Car (@ Geneva International Motor Show)

FNC Symposia organized since 2005 by ITU

14th edition:

**FNC-2019**

*Planned*

**(7 March 2019)**

<https://www.itu.int/en/fnc>



SYMPOSIUM  
**Future Networked Car**  
8 March 2018  
Geneva, Switzerland  
Geneva International Motor Show  
#ConnectedCar

Organized by  
UNECE ITU

# Recent & future ITS events organized by



- [ITU/C-ITS: International Forum on ITS \(ITS-2018\)](#)

*6-7 September 2018, Nanjing, China*

➤ [CITS meeting](#) (*7 Sept PM, Nanjing, China*)



- [ITU/SAE: Workshop on "How Communications will Change Vehicles and Transport"](#)

*8-9 October 2018, Detroit, USA*



- **FNC-2019**

*planned 7 March 2019*



<http://itu.int/go/ITScomms>

# Opportunities for Collaboration

## Collaboration on ITS Communication Standards (CITS)

- Established by the ITU to provide a Platform to share knowledge and coordinate ITS standardization
- Attended by worldwide SDOs
- Three meetings x year, back to back with the ITS-related regional events:  
Asia (~July), America (~Dec.) Geneva (~March)
- Aims for a coordinated set of interoperable ITS Communication Standards



<http://itu.int/go/ITScomms>

***Subscribe to the CITS mailing list!***



Please contact Stefano POLIDORI (Advisor at the ITU) for more information and opportunities for collaboration on:

- **Intelligent Transport Systems (ITS)** and
- **Future Networked Car activities**



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