Digital/smart road infrastructure
UNECE workshop, Geneva, 5 April 2018

Overview of the ITS standardization activities progressed by ITU-T SG20 (Internet of Things and Smart Cities and Communities)

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The expert groups of ITU-T SG20 ("Questions")

SG20 expert groups	Mandate of the SG20 expert groups
Working Party 1	
Question 1/20	End to end connectivity, networks, interoperability, infrastructures and Big Data aspects related to IoT and SC&C
Question 2/20	Requirements, capabilities, and use cases across verticals
Question 3/20	Architectures, management, protocols and Quality of Service
Question 4/20	e/Smart services, applications and supporting platforms
Working Party 2	
Question 5/20	Research and emerging technologies, terminology and definitions
Question 6/20	Security, privacy, trust and identification
Question 7/20	Evaluation and assessment of Smart Sustainable Cities and Communities

The SG20 standardization activities related to Intelligent Transport Systems (ITS) focus on the support provided to ITS by the Internet of Things (IoT) technologies

SG20 home page: http://www.itu.int/en/ITU-T/studygroups/2017-2020/20/Pages/default.aspx
Next SG20 meetings: 6-16 May 2018, Cairo, Egypt; Dec 2018, China (to be confirmed)
Contact at ITU Telecommunication Standards Bureau: cristina.bueti@itu.int

SG20 studies related to ITS – 6/04/2018 status

Question	Name	Provisional name	Work item type	Subject/title	Status	Approval	Hyperlink
Q2/20	Y.4116	Y.TPS-req	Rec.	**Requirements of transportation safety services including use cases and service scenarios**	Approved	Oct-17	http://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=13686
Q2/20	Y.4119	Y.AERS-reqts	Rec.	**Requirements and capability framework for IoT-based automotive emergency response system**	Approved	Feb-18	https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=14105
Q2/20		Y.IoT-ITS-framework	Rec.	**Framework of Cooperative Intelligent Transport Systems based on the Internet of Things**	Under study	Dec-18	http://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=13688
Q2/20		Y.IoT-UAS-Reqts	Rec.	**Use cases, requirements and capabilities of unmanned aircraft systems for Internet of Things**	Under study	Q1-19	https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=14303
Q3/20		Y.AERS-msd	Rec.	**Minimum set of data structure for automotive emergency response system**	Under study	Dec-20	https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=14502
Q3/20		Y.AERS-mtp	Rec.	**Minimum set of data transfer protocol for automotive emergency response system**	Under study	Dec-20	https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=14501
Q4/20		Y.TPS-afw	Rec.	**Architectural framework for providing transportation safety services**	Under study	May-18	http://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=13677

Y.4116 – 1/3

Y.4116 "*Requirements of transportation safety services including use cases and service scenarios*"

Motivation of the study

- Influence on transportation safety of transportation means (i.e., road, railway, maritime and air), environmental conditions (i.e., wind, snow, freezing conditions, etc.), status of transportation infrastructure (i.e., bridge, tunnel, road, etc.) and other (human errors).
- Transportation safety services making usage of IoT technologies can reduce and/or prevent the occurrence of accidents and disasters, and related human and property losses.

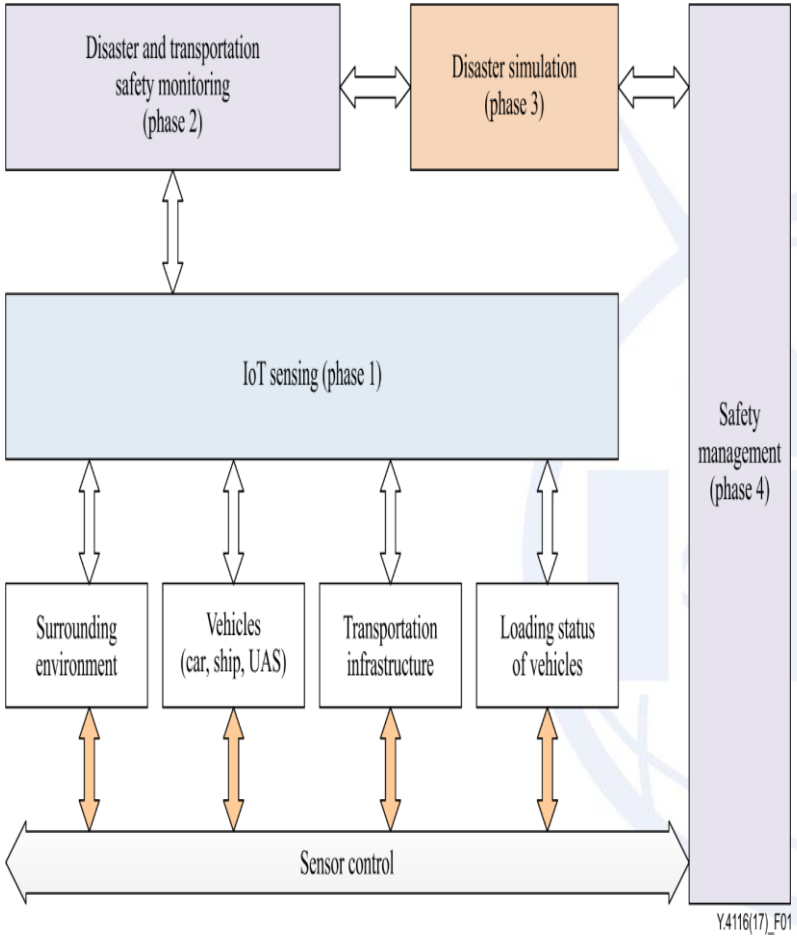
Scope of the Recommendation

- Requirements for providing transportation safety services based on IoT technologies. These requirements are applicable to various transportation means such as road, railway, maritime and air.

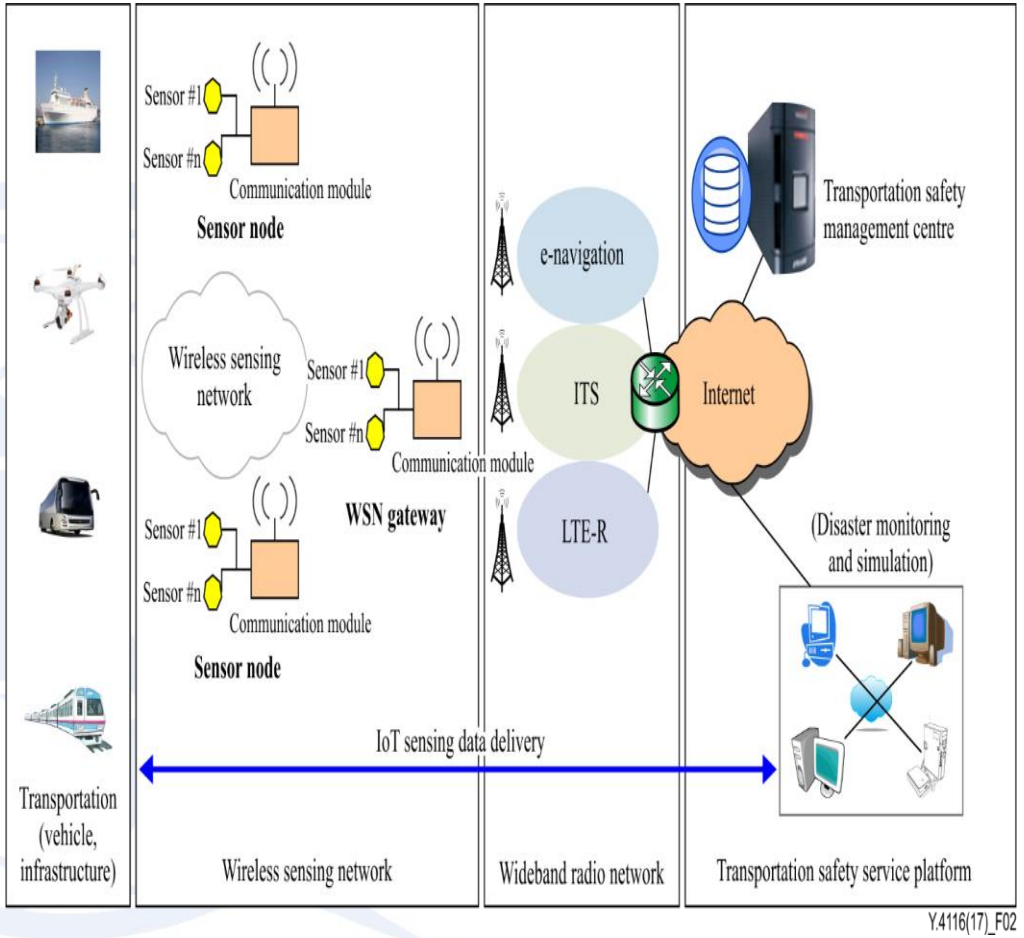
Structure of the Recommendation

- Introduction of the concept of transportation safety management according to the processing phases of IoT sensing data, and the necessary IoT sensing data for safety management.
- Example of hierarchy of decision making for transportation safety.
- Requirements for transportation safety services - described and classified according to the ITU-T IoT reference model [ITU-T Y.4000/Y.2060].
- Appendix I on use cases and related service scenarios used to extract requirements for the various transportation safety services.
- Appendix II on the relationship between the requirements provided in the body and the use cases described in appendix I.

Y.4116 – 2/3



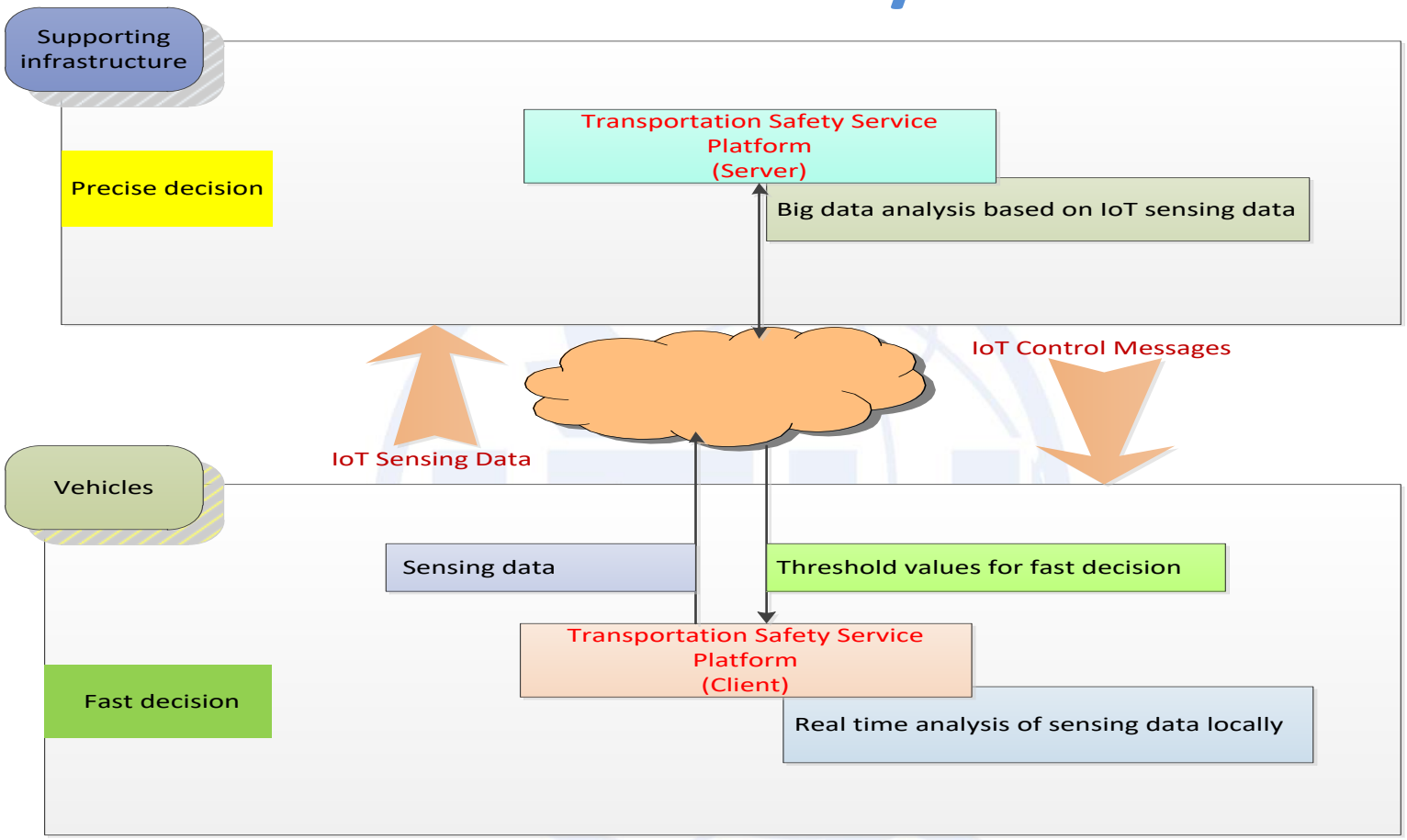
Concept of transportation safety management



System structure for transportation safety management

The transportation service platform monitors transportation safety relevant conditions and parameters, performs disaster simulations and decides the threshold values for disaster prediction and detection.
The transportation safety management centre monitors the safety status of vehicles and transportation infrastructure, and influences the operations of vehicles and infrastructure, by collaborating with the transportation safety service platform, including generation of alarms.

Y.4116 – 3/3



Example of decision making based on distributed processing technology

Vehicles locally process and compare sensing data to threshold values for fast decision.
Sensing data from vehicles and transportation infrastructure are delivered to the transportation safety service platform (server side).
Platform generates threshold values (e.g. safety indexes) for more accurate decision based on big data analysis.
Generated threshold values are delivered to vehicles for appropriate adjustment of local decision making process.

Y.TPS-afw – 1/2

Y.TPS-afw "*Architectural framework for providing transportation safety services*" – ongoing work

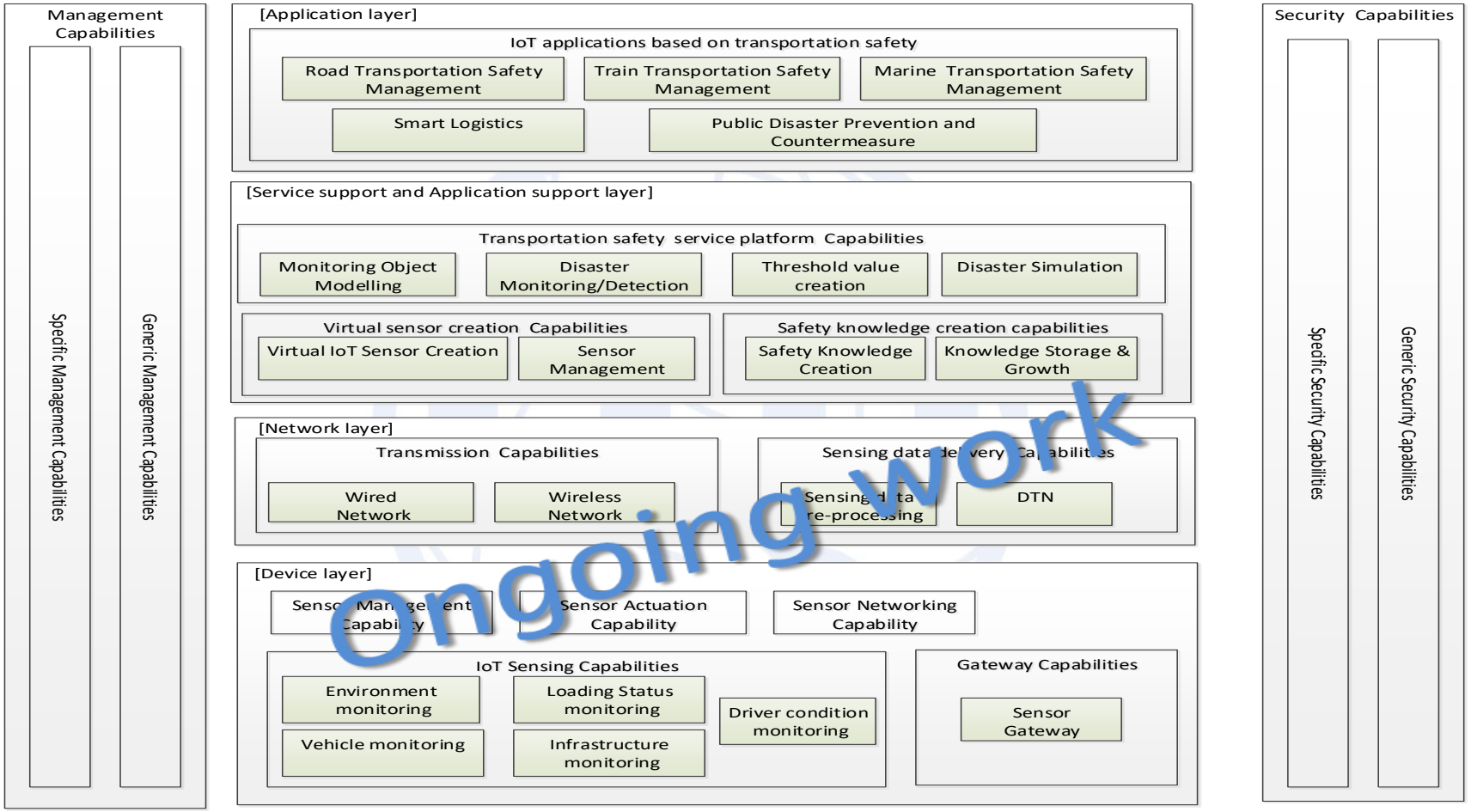
Motivation of the study

- See Y.4116 (ex-Y.TPS-req)

Scope of the Recommendation

- Transportation safety management model and architectural model

Y.TPS-afw – 2/2



Architectural model for transportation safety services

(described according the ITU-T IoT reference model [ITU-T Y.4000/Y.2060])

Y.4119 – 1/2

Y.4119 "*Requirements and capability framework for IoT-based automotive emergency response system*"

Motivation of the study

- Proper and efficient accident respond-rescue procedures are necessary to allow the transfer to the hospital of the victims of an automobile accident as quick as possible.
- An IoT-based automotive emergency response system (AERS) reports automobile accidents to an automotive emergency response center (AERC) by an automotive emergency detection device (AEDD) using vehicle sensors of the automobile and/or internal sensors installed on aftermarket devices such as navigation system, dashboard camera, smartphone, etc.
- 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.

Scope of the Recommendation

- Requirements of **IoT-based automotive emergency response system (AERS) for aftermarket devices** and capability framework of AERS.

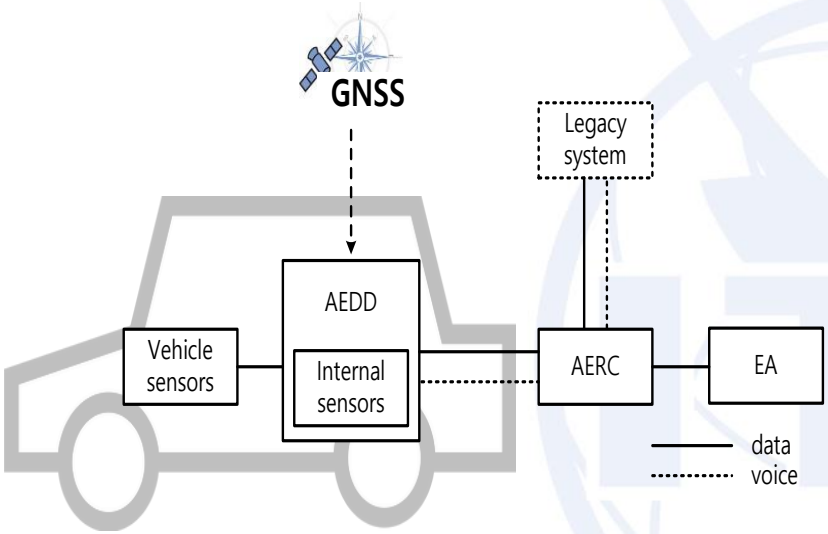
  NOTE 1 - AERS for OEM (original equipment manufacturer) pre-installed devices, such the pan-European eCall [CEN EN 16072], are out of scope of this Recommendation. Also, the operations of the emergency authority are out of scope of this Recommendation.

  NOTE 2 - **AERS can be considered as a third party service provider (TPSP) system [b-CEN EN 16102] in the pan-European eCall.**

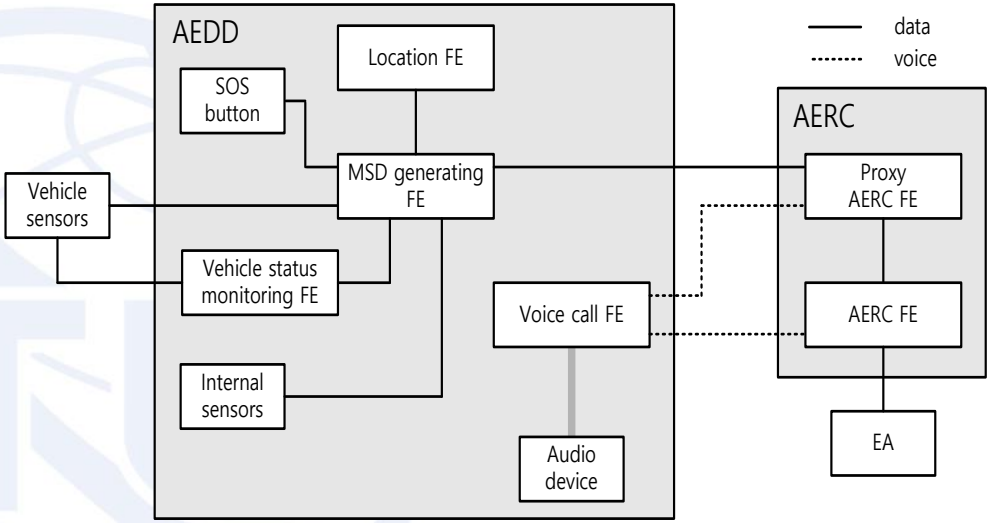
Structure of the Recommendation

- Overview of the AERS
- Requirements of the AERS
- Capability framework of the AERS

Y.4119 – 2/2



Overview of the AERS



Capability framework of the AERS

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

Y.IoT-ITS-framework

Y.IoT-ITS-framework "*Framework of Cooperative Intelligent Transport Systems based on the Internet of Things*" – ongoing work

Motivation of the study

- "Cooperative ITS based on the Internet of Things" are intended as advanced systems which - by the support of IoT technologies - aim to provide innovative individual, personalized services relating to different modes of transport and traffic management, in order to enable users to be better informed and to make safer, more coordinated, and "smarter" use of transport networks.

  Road operators, infrastructure, individual vehicles, individual drivers and other users cooperate to deliver the most efficient, safe, secure and comfortable journey. The vehicle-vehicle and vehicle-infrastructure co-operation contributes to these objectives beyond the improvements achievable with a stand-alone system.

Scope of the Recommendation

- Framework of cooperative Intelligent Transport Systems (ITS) based on the Internet of Things.

Structure of the Recommendation

- Conceptual framework of cooperative ITS based on the IoT
- Fundamental characteristics of cooperative ITS based on the IoT
- High-level requirements of cooperative ITS based on the IoT
- Reference model of cooperative ITS based on the IoT
- Use cases of cooperative ITS based on the IoT

Y.IoT-UAS-Reqts – 1/2

Y.IoT-UAS-Reqts "*Use cases, requirements and capabilities of unmanned aircraft systems for Internet of Things*" – ongoing work

Scope of the Recommendation

The draft Recommendation aims to describe use cases, requirements and capabilities of unmanned aircraft systems (UASs) for IoT.

UASs can act as a key part of IoT as wireless communication platforms in IoT.

Use cases are specified according to different communication scenarios.

Requirements and capabilities are also specified to satisfy the different use cases.

Regulation and supervision of UASs are out of scope of the Recommendation.

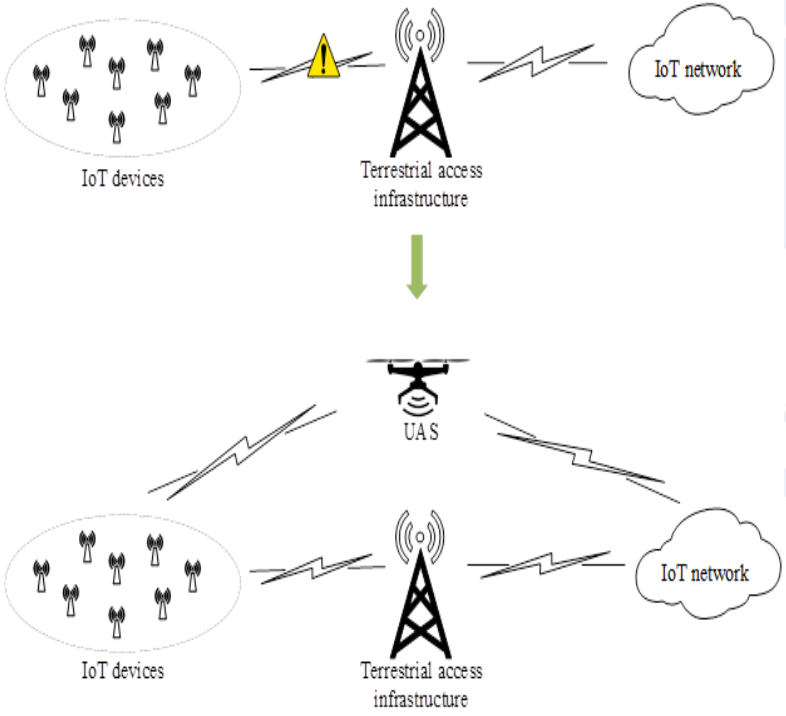
Structure of the Recommendation

- Classification of the use cases of UAS-aided communication
- Common and specific requirements of UASs for IoT
- Common and specific capabilities of UASs for IoT

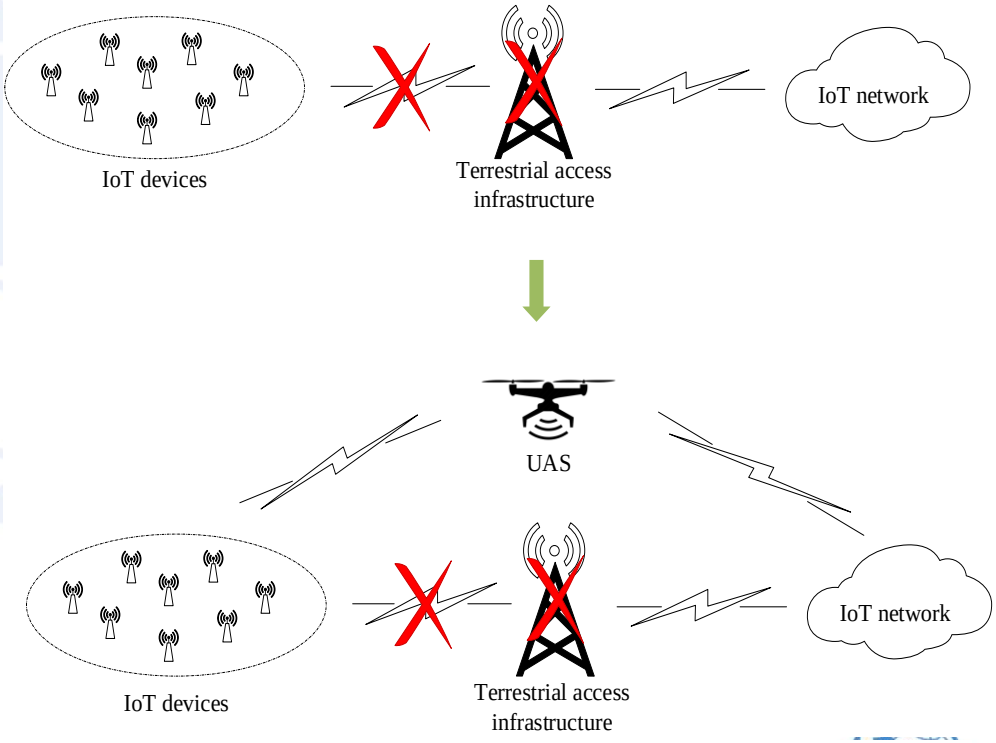
Y.IoT-UAS-Reqts – 2/2

Currently identified use cases

- UAS-aided offloading
- UAS-aided emergency response
- UAS-aided relaying
- UAS-aided information dissemination and data collection



UAS-aided offloading



UAS-aided emergency response

Y.AERS-msd

Y.AERS-msd *"Minimum set of data structure for automotive emergency response system"* – just started

Motivation of the study

The automotive emergency response system (AERS) for aftermarket devices defined in Recommendation Y.4119 is designed to bring rapid assistance to driver and/or passengers involved in an accident.

For the normal operation of this AERS, the accident related data (so-called minimum set of data, MSD) needs to be sent from the automotive emergency detection device (AEDD) to the automotive emergency response center (AERC).

The MSD includes essential information and additional information. The essential information of the MSD is a set of information that must be included in the MSD when the AEDD performs normal operation. The additional information of the MSD is a set of information about accident situations that can be additionally included to give more information to AERC.

Scope of the Recommendation

To define common structure and encoding rule for MSD for the interoperability of AERS.

In particular, the scope of the Recommendation includes:

- Overview of the MSD for AERS
- Essential information of MSD
- Additional information of MSD
- Encoding rule for MSD

Y.AERS-mtp

Y.AERS-mtp *"Minimum set of data transfer protocol for automotive emergency response system"* – just started

Motivation of the study

The automotive emergency response system (AERS) for aftermarket devices defined in Recommendation Y.4119 is designed to bring rapid assistance to driver and/or passengers involved in an accident.

For the normal operation of the AERS, the accident related data (so-called minimum set of data, MSD) transfer protocol between the automotive emergency detection device (AEDD) and the automotive emergency response center (AERC) needs to be defined.

Scope of the Recommendation

To specify a MSD transfer protocol for AERS.

In particular, the scope of the Recommendation includes:

- MSD transfer protocol parameters
- Messages format of MSD transfer protocol
- Sequence of MSD transfer protocol

Complementary information on ITU activities related to ITS

ITU standardization on ITS is conducted within multiple expert groups

Telecommunication Standardization Sector (ITU-T)

– Study Group 16 : Vehicle gateway and in car multimedia platforms
– Study Group 17 : ITS and automotive cybersecurity (remote SW update)
– Study Group 12 : Quality of Service of speech and audio in vehicles
– **Study Group 20 : Support to ITS of IoT and Smart Cities technologies**
– Study Group 2 : Numbering for In Car Emergency Communication (ICEC)

Radiocommunication Sector (ITU-R)

- Studies on harmonisation of frequency bands for ITS
- Techniques to transfer data over short distances between a roadside infrastructure and mobile units (V2V and V2X)
- Dedicated Short Range Communications (DSRC)
- Collision avoidance radar
- Sensor technologies for the monitoring and identifying of objects near vehicles
- Radar technologies for ITS
- Radiolocation systems
- Radionavigation-satellite service

Opportunity for collaboration: the *"Collaboration on ITS Communication Standards (CITS)"* initiative

- Initiative established by the ITU to provide a Platform for knowledge sharing and international coordination of ITS standardization
- Attended by international SDOs
- Three meetings per year, back to back with ITS-related regional events
- Aims for a coordinated set of interoperable ITS Standards

CITS home page: https://www.itu.int/en/ITU-T/extcoop/cits/Pages/default.aspx
Next CITS event: 6-7 Sep 2018, Nanjing, China
Contact at ITU Telecommunication Standards Bureau: stefano.polidori@itu.int

Thanks for your attention


ITU