

도로교통분야 ITS 국제표준화 교육

C-ITS 분야 국제표준화 - 차량인터페이스 표준기술 동향

2016. 10. 21.

한국전자통신연구원
윤 현 정

ISO TC204 WG17 개요

- ISO TC204 WG17
- ISO TC204 WG17 표준 아이탬
 - Vehicle Interface
 - Road Guidance Protocol
 - P-ITS-S for Travelers
 - Indoor navigation
 - Emergency service support via P-ITS-S

ISO TC204 WG17 소개

Nomadic & Portable Devices for ITS Services

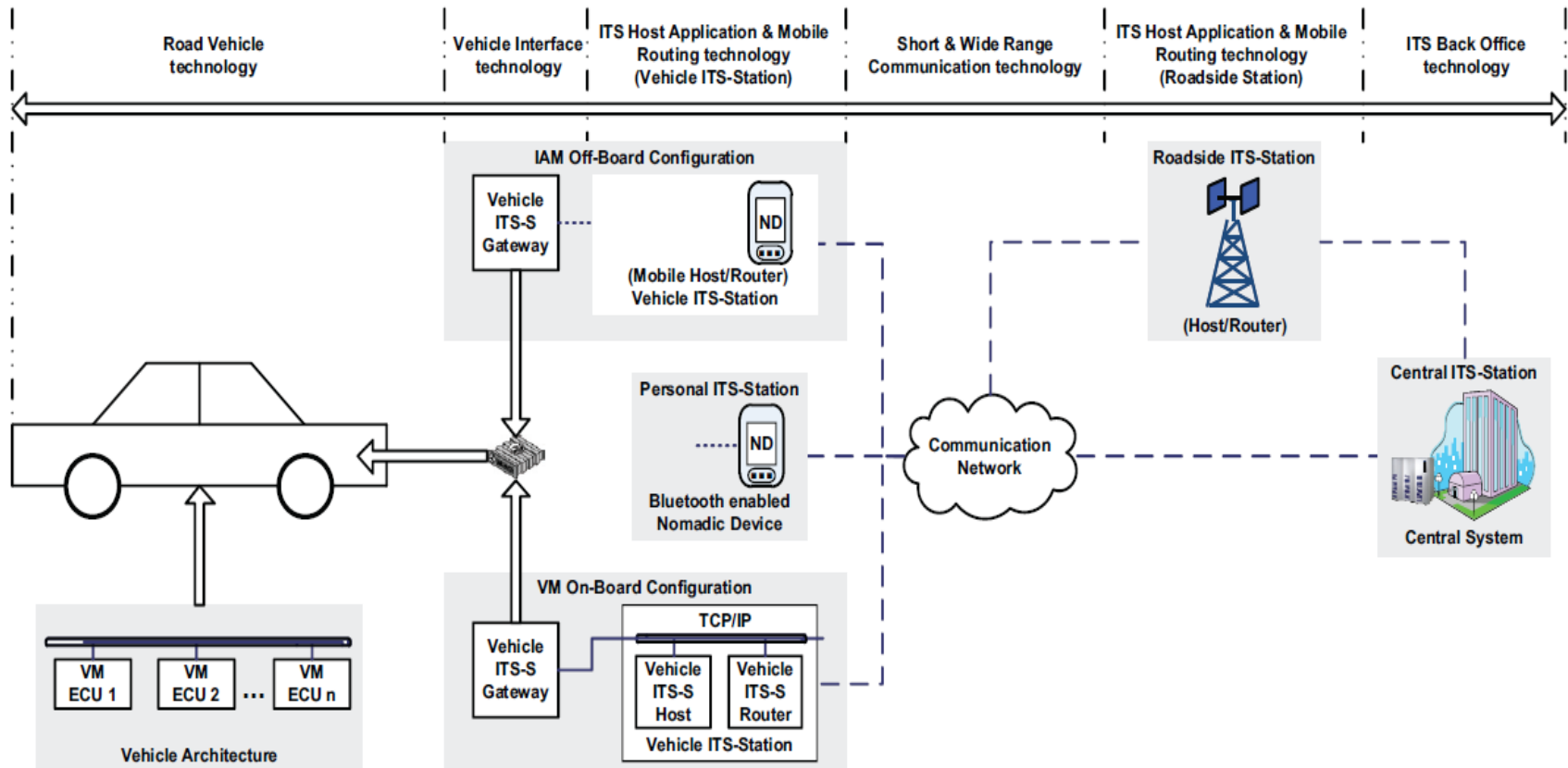
- 표준 범위: 차량/개인 휴대용 기기를 통해 차량 운전시 사고정보, 혼잡 정보 등 교통정보와 차량상태 모니터링을 위한 차량정보를 제공받고, 차량 밖에서 개인 휴대 시에 버스 정보, 주변 안내 정보, 영화/게임 등 종합 멀티미디어 서비스 실용화에 필요한 표준 개발

- Membership Status**

- Active Participation
 - Canada, Korea, Sweden, UK, USA, France, Norway, China, Japan, Germany, Czech Republic, South Africa
- Experts Nominated : 23
 - Germany, Japan, Korea, UK, USA, Sweden, France, Norway, China, Canada, Czech Republic
 - Liaison from TC22 (도로차량)

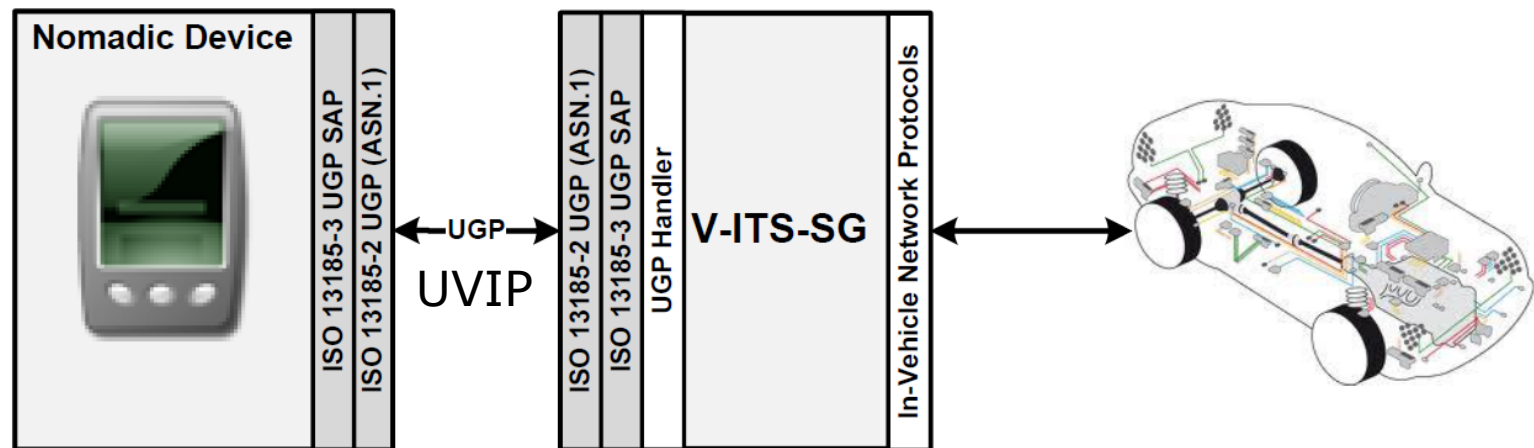
ISO TC204 ITS Stations

- Central ITS station
- Roadside ITS station
- Vehicle ITS station, Vehicle ITS Station Gateway
- Personal ITS station (nomadic & portable device)



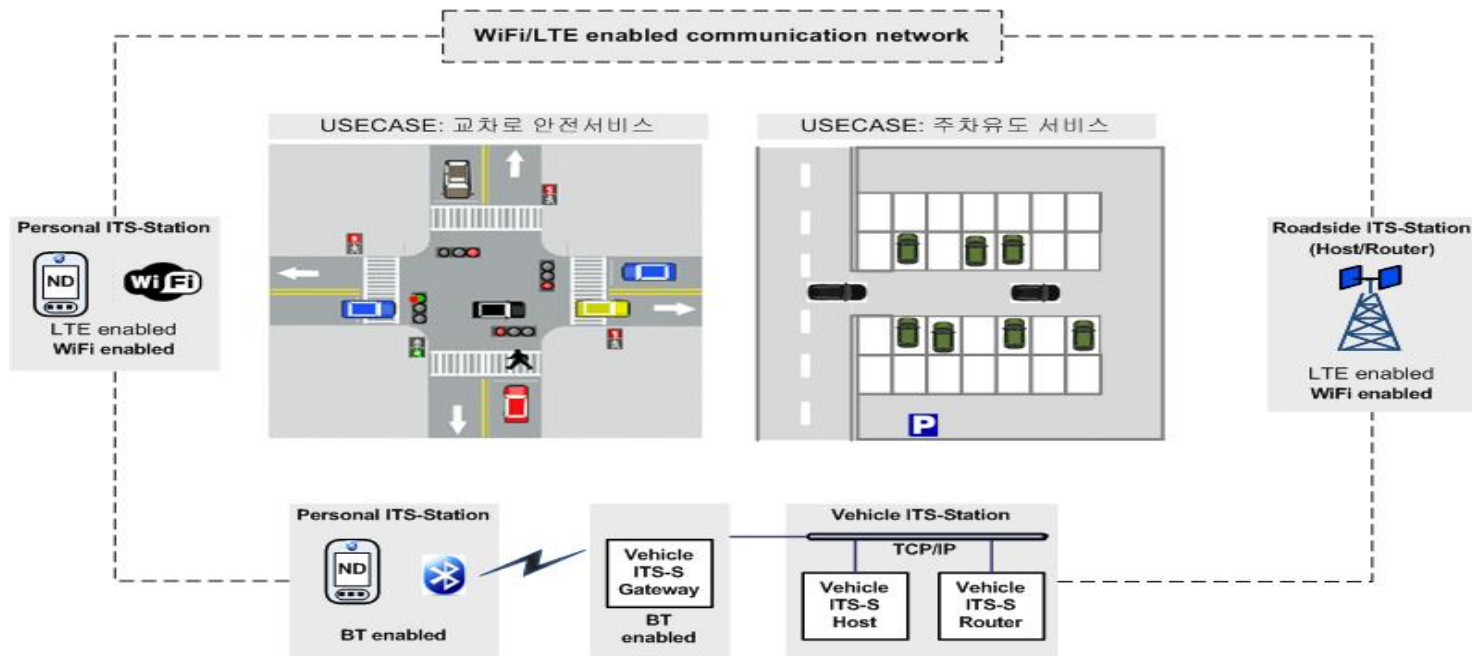
ISO TC204 WG17 표준 아이템 소개 [1]

- IS 13185-2 "Vehicle interface for provisioning and support of ITS services – Part 2: Unified gateway protocol (UGP) requirements and specification for vehicle ITS station gateway (V-ITS-SG) interface."
- CD 13185-3 "– Part 3 Unified Vehicle Interface Protocol (UVIP) server and client APIs"



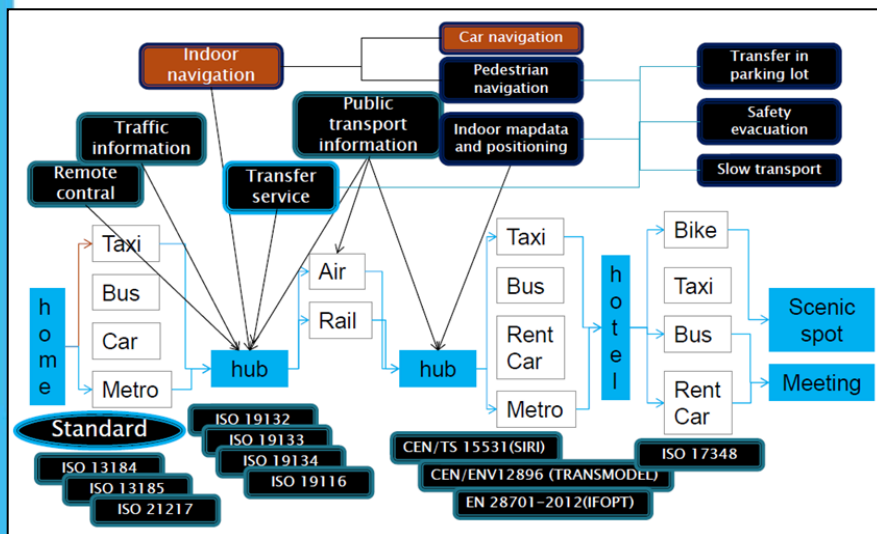
ISO TC204 WG17 표준 아이템 소개 [2]

- IS 13184-2 "Guidance protocol via P-ITS-S for advisory safety systems – Part 2 RGP requirements and specification."
- NP 13184-3 "Guidance protocol via P-ITS-S for advisory safety systems – Part 3 RGP test plan"



ISO TC204 WG17 표준 아이템 소개 (3)

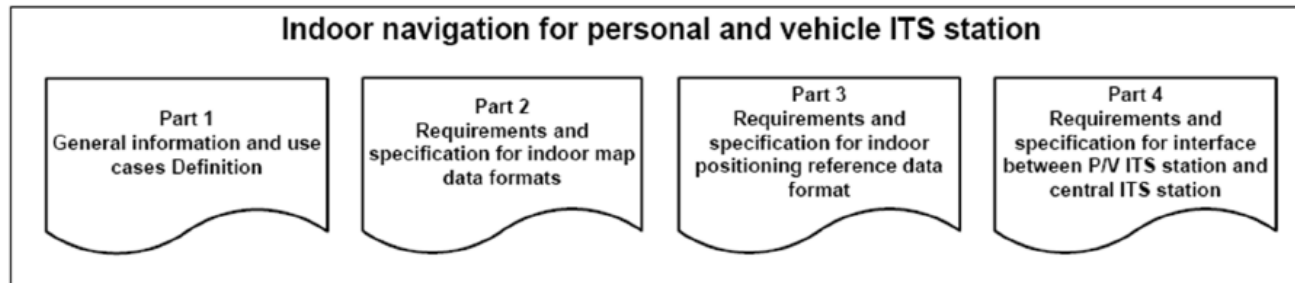
- FDIS 13111-1: The use of personal ITS station to support ITS service provision for travellers
 - the applications based on the personal ITS station to provide and maintain ITS services to travelers including drivers, passengers and pedestrians.
 - multi-modal transportation information service and multimodal navigation service
 - Slow transport information service and navigation service such as pedestrians, bicycles and disabilities (Wheelchair Accessible) navigation, as well as internal traffic navigation inside the local transport area.



ISO TC204 WG17 표준 아이템 소개 (4-1)

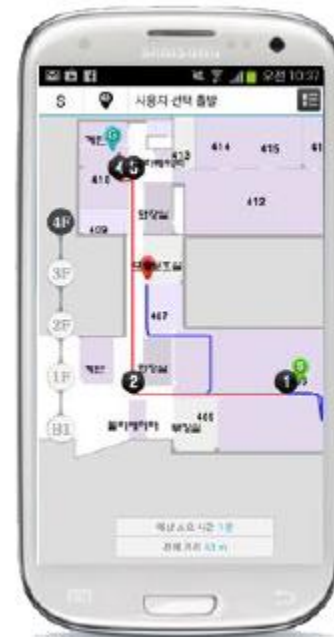
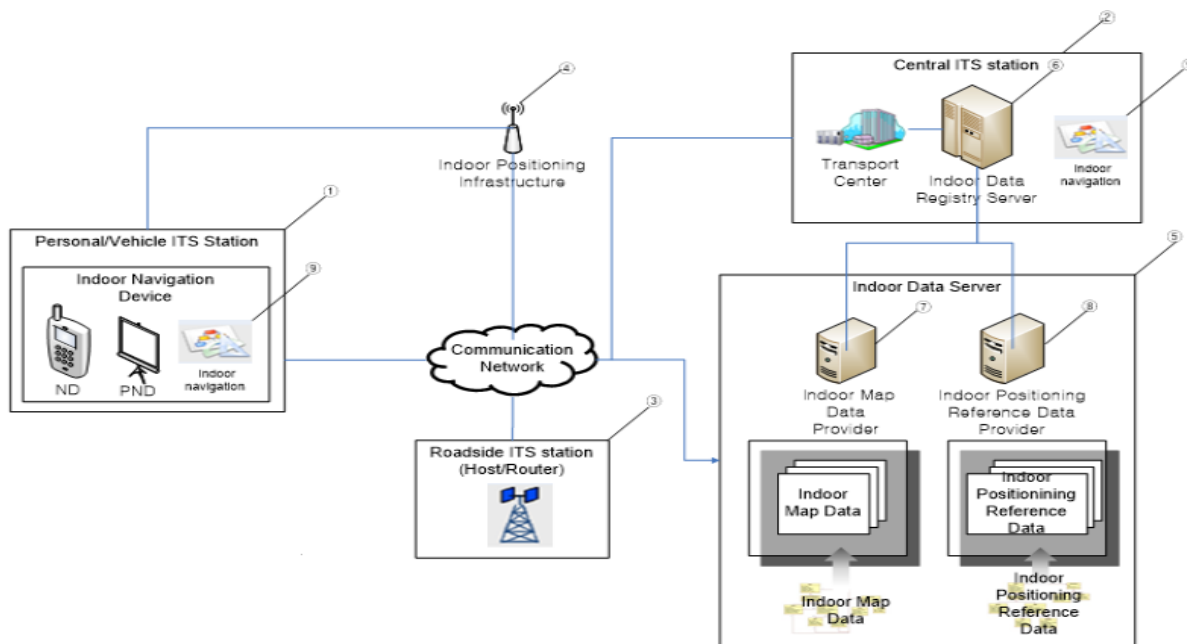
Overview ISO 17438

- ❖ ISO 17438: Intelligent transport systems(ITS) – Indoor navigation for personal and vehicle ITS station
- ❖ Purpose
 - To Provide service interfaces and specifications for ITS/Telematics applications via nomadic devices to enable the functionality of indoor navigation
- ❖ Proposed Structure
 - Part 1: General information and use cases definition
 - Part 2: Requirements and specification for indoor map data format
 - Part 3: Requirements and specification for indoor positioning reference data format
 - Part 4: Requirements and specification for interfaces between P/V and central ITS station



ISO TC204 WG17 표준 아이템 소개 [4-2]

- IS 17438-1: Indoor navigation for personal and vehicle ITS stations – Part 1: General information and use cases definition
- NP 17438-4 : Indoor navigation for personal and vehicle ITS stations – Part 4: Interface between PV-ITS-S to Local Center



ISO TC204 WG17 표준 아이템 소개 (4-3)

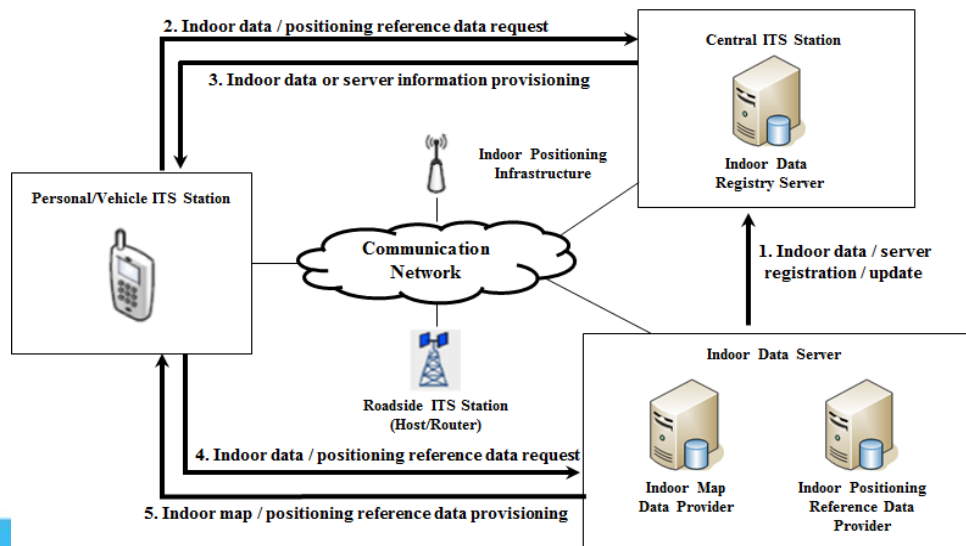
● NP 17438-4 : Indoor navigation for personal and vehicle ITS stations – Part 4: Interface between PV-ITS-S to Local Center

Scope: to specify interface requirements and spec. for map and indoor positioning infrastructure data related to the P/V and Central ITS stations

-How to publish indoor navigation data

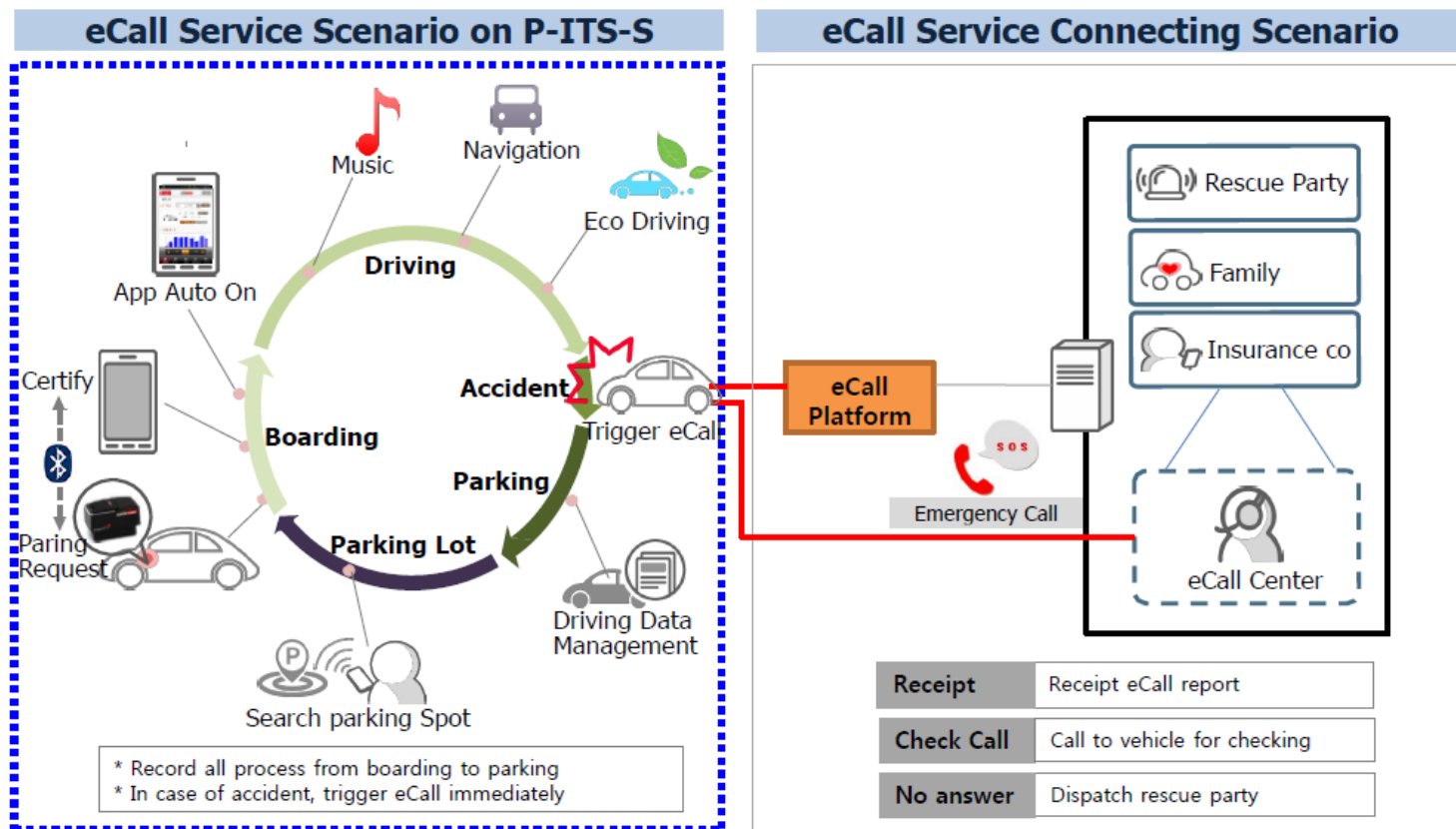
-How to find indoor navigation data for a specific indoor space

-How to access the specific indoor navigation data



ISO TC204 WG17 표준 아이템 소개 (5-1)

- NP 20530 : Information for emergency service support via Personal ITS station – General requirements and technical definition



ISO TC204 WG17 표준 아이템 소개 (5-2)

Contents of ISO/PWI 20530

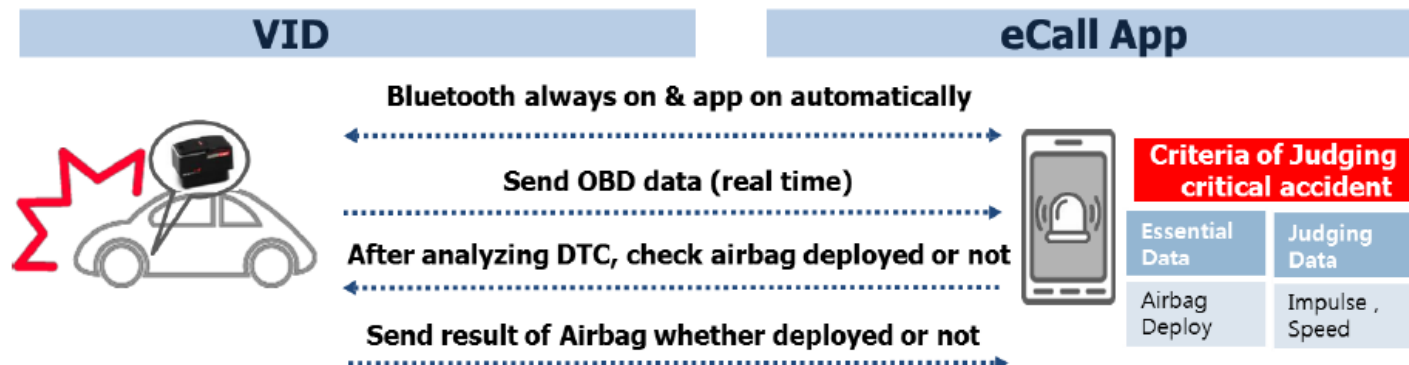
- Introduction
- Scope
- Purpose of standardization
- Use case definition of emergency service support via Personal ITS station
- General(System) requirements
- Technical information
 - ▣ *Collecting vehicle data through OBD connector using UGP*
 - ▣ *Analyzing the vehicle data*
 - ▣ *Vehicle accident judgement logic*
 - ▣ *Triggering eCall platform automatically*
 - ▣ *Report accident to eCall center (using MSD format)*

ISO TC204 HangZhou Meeting

2015-4-21

ISO TC204 WG17 표준 아이템 소개 (5-3)

Collecting vehicle data through OBD connector



OBD Data Processing & Transmission

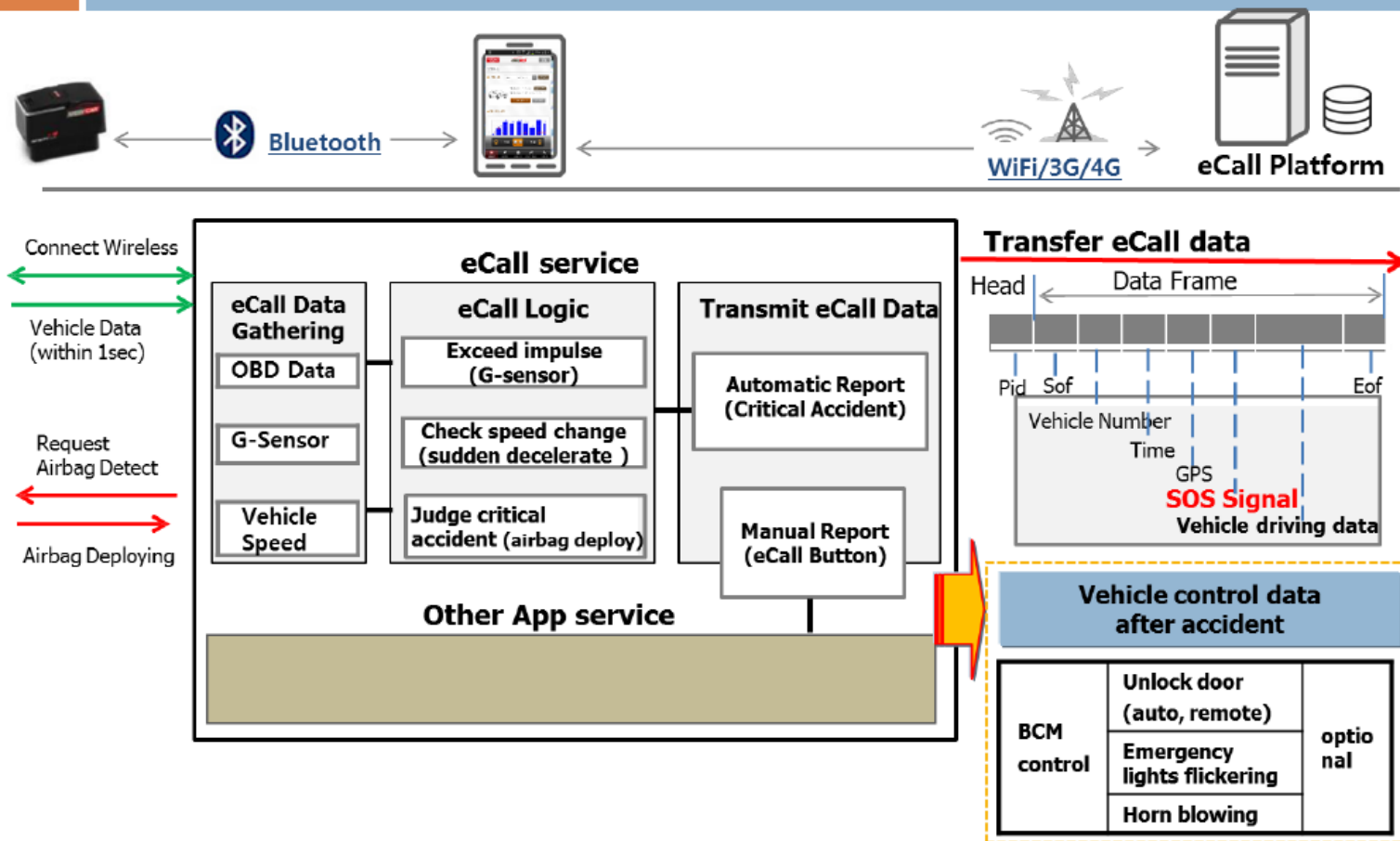
Vehicle Driving Information	speed, RPM, driving time, acceleration, deceleration, emission of CO2
Vehicle Trouble Information	engine, transmission, brake, airbag, heater, air conditioner, fuel tank, smart key, etc
Vehicle Accident Information	airbag deploying info (SRS communication by ISO 9141-2, ISO 14230-4 & CAN standard)

OBD data Receipt & Judgment

Analyzing	Impulse, speed, RPM, ac/deceleration,
Check airbag deployment	Ask OBD whether airbag deployed or not
Judge Critical accident	In case airbag deployed, considered as critical accident, report to eCall platform

ISO TC204 WG17 표준 아이템 소개 (5-4)

Analyzing the vehicle data & Judgement



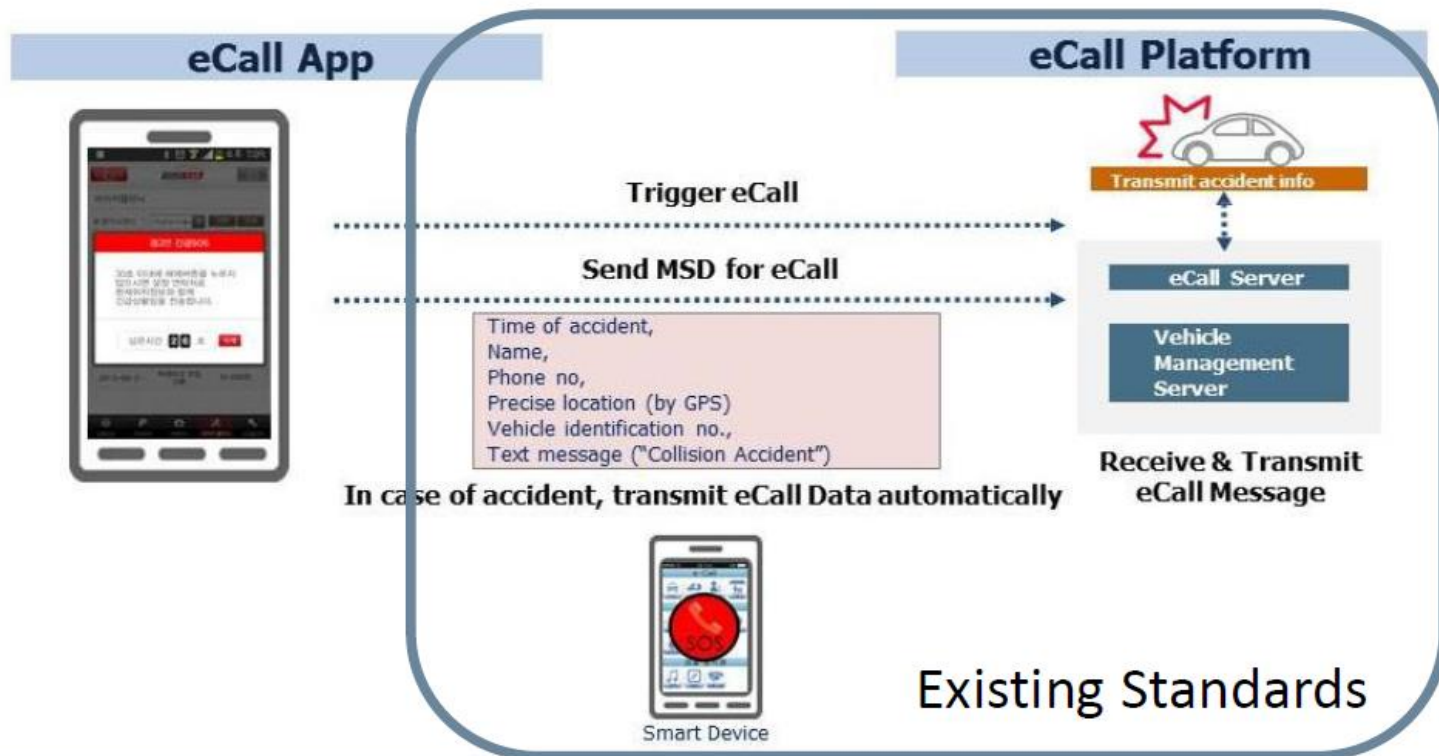
ISO TC204 HangZhou Meeting

2015-4-21

ISO TC204 WG17 표준 아이템 소개 (5-5)

Triggering eCall & Report accident to eCall center

MSD Transmitting Flow between eCall App & eCall Platform



ISO TC204 WG17 기타 아이템들

- “NETwork based Precise Positioning Infrastructure for Land Transportation : NETPPI-LT” by Korea Aerospace Research Institute (KARI)
- “ITS – Mobile second service application – General requirements and technical definition” by Korea Electronics Technology Institute (KETI)
 - Work Scope : This project develops the smart car services based on open SW Frameworks for convergence in mobile seconds. The 4 services : smart driving service, mood & entertainment service, ICT car related smart care service, and self vehicle maintenance service.

C-ITS 서비스를 위한 차량 인터페이스 표준화 동향

- V-ITS- TF 표준화 현황
- ISO 13185 차량 인터페이스 주요 논의 사항



차량인터페이스 개요

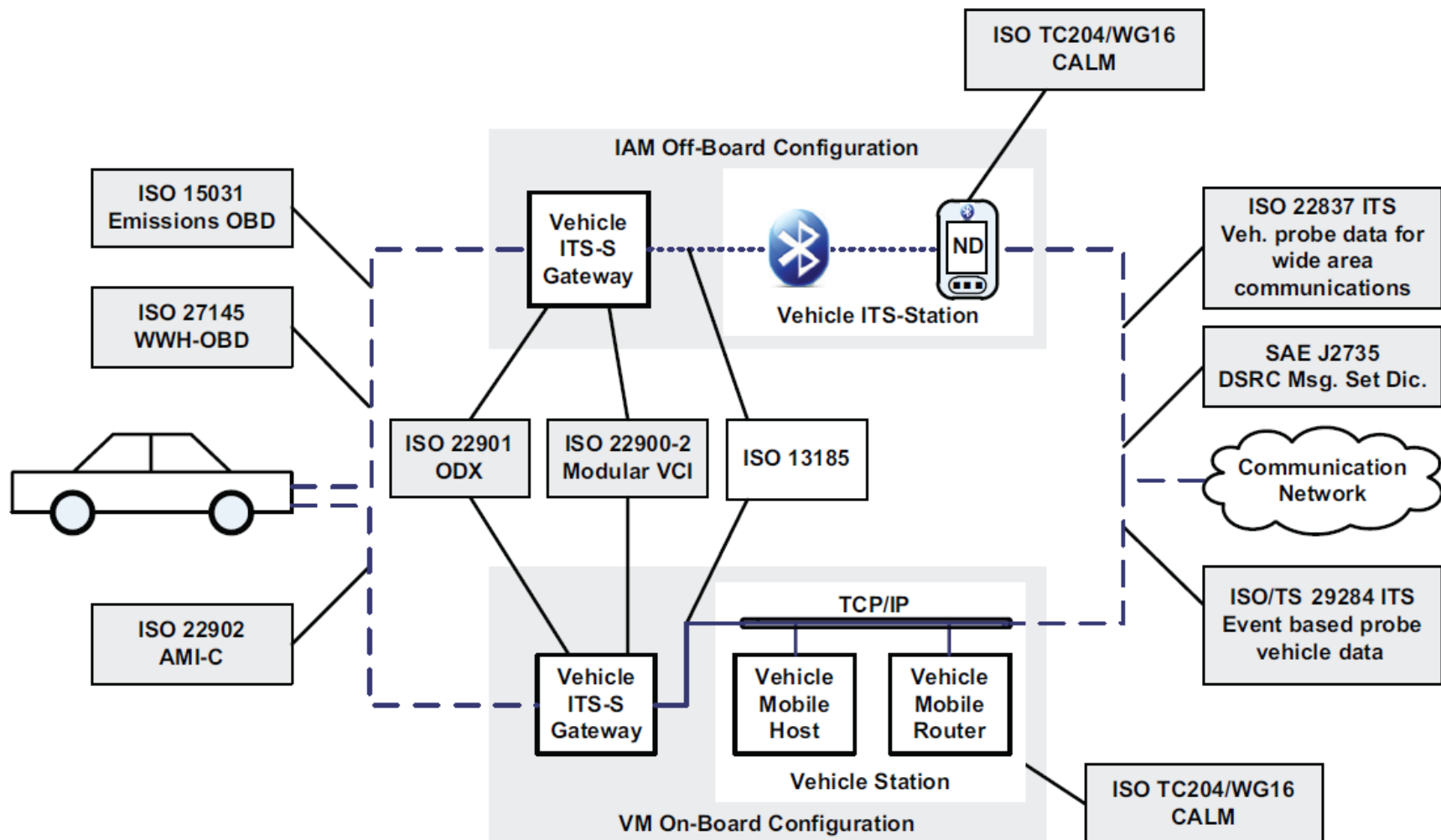
V-ITS-Communication TF 소개

Proposed V-ITS Interface Global Functional Diagram

TC22 SC31 Extended Vehicle 표준화 현황

TC204 Vehicle Interface 표준화 현황

Applicability of existing International Standards



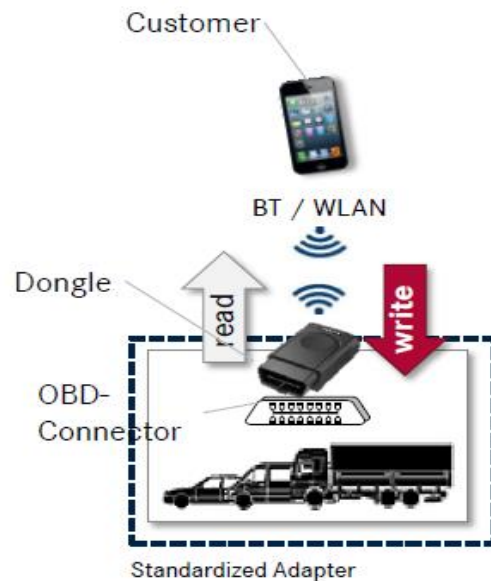
Reference: ISO 13185-1

Vehicle Interface

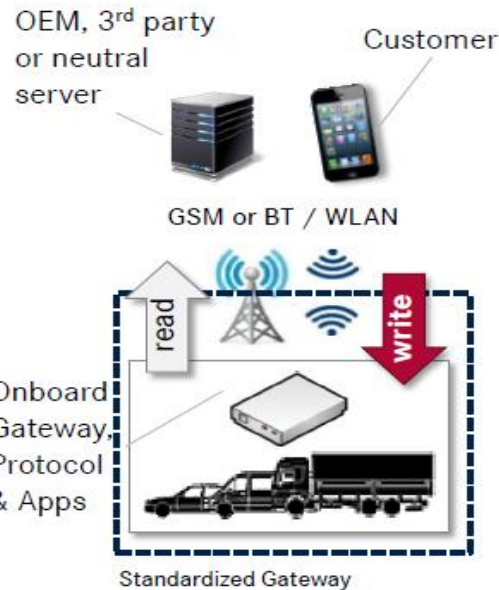
스마트카는 단독형 시스템에서 협력형 시스템으로 발전

**차량 내부 네트워크와 인프라 네트워크 결합을 위한
IVN-V2X 게이트웨이 기술 개발 및 표준화 진행 중**

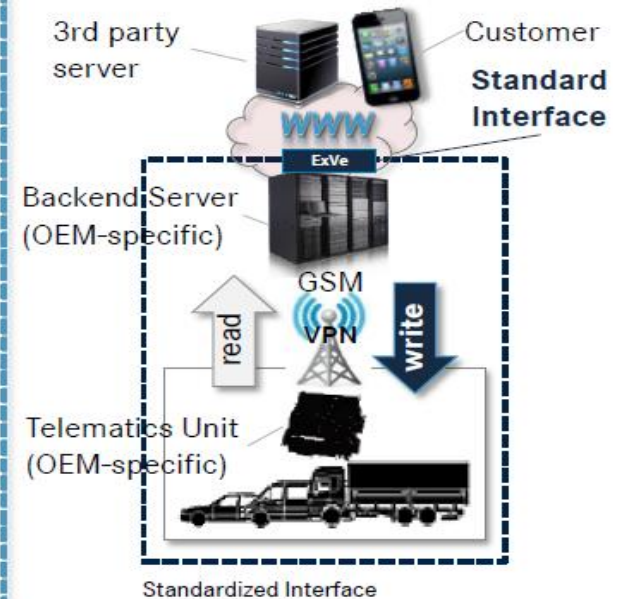
In-Vehicle Interface



Application Platform



Extended Vehicle



- Background

- ISO/TC204 is in charge of Intelligent Transport System (ITS). It consists in the standardization of information, communication and control systems in the field of urban and rural surface transportation.
- ISO/TC22 is in charge of in-vehicle transport information and control systems as elements of road vehicles.
- TC22 and TC204 have signed a MOU in 2014

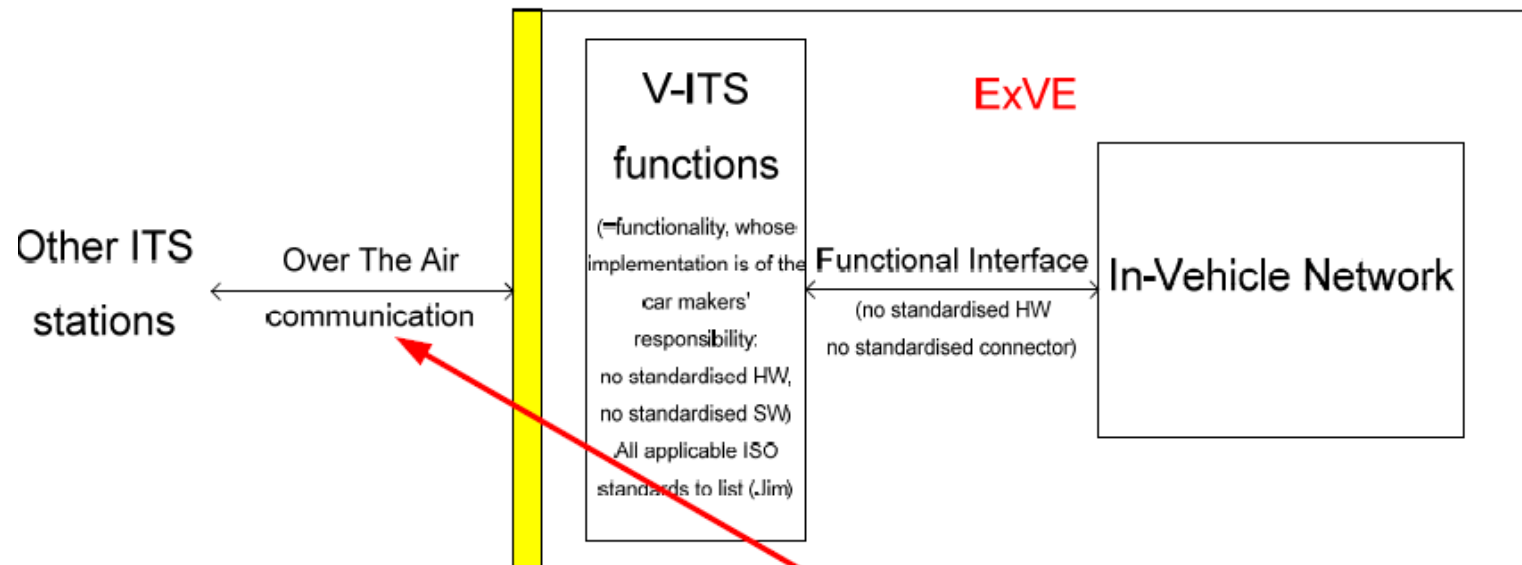
“Steps to be taken to harmonize new WI’s where there are overlapping interests between TC22 and TC204”

V-ITS-Communication TF

- TC22/TC204 Joint Working Group (JWG2)
 - The standardization of this interface between a communication device and the in-vehicle network was proposed within a JWG2 through the NWIP ISO/TC22/N3409 about the Vehicle Station Gateway.
 - The NWIP has been rejected in September 2014.
- In-vehicle gateway
 - Cooperative ITS are a “subset of overall ITS that communicates and shares information between ITS stations to give advice or facilitate actions with the objective of improving safety, sustainability, efficiency and comfort beyond the scope of stand-alone systems” (cf. ISO/TR 17465-1).
 - In order to implement C-ITS including road vehicles, [both TC22 and TC204 are evaluating the interest of an in-vehicle gateway.](#)

V-ITS Interface Global functional diagram

- TC22 Proposal



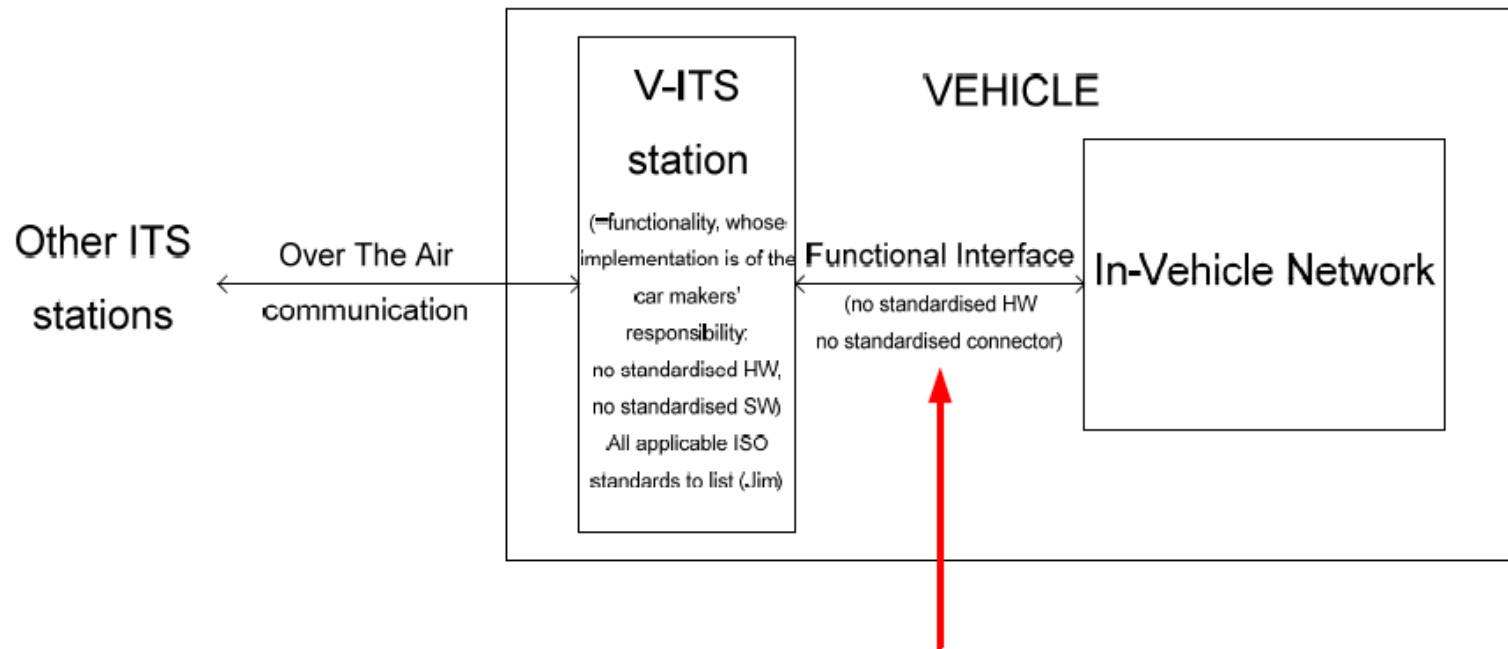
Place of the work of the TF = specification of the V-ITS interfaces

with other ITS stations

+ ExVE boundary: V-ITS function inside the Extended Vehicle

V-ITS Interface Global functional diagram

- TC204 Proposal



Place of the work of the TF = *specification of the V-ITS function*
inc. abstraction avoiding specification of HW/SW
+ ExVE boundary: *V-ITS function inside the Extended Vehicle*

• **ISO TC22 SC31 WG6**

- **Extended Vehicle concept**

Lionel FERRIERES (Renault)

Francois CROC (PSA)

Christian SCHEIBLICH (Daimler)

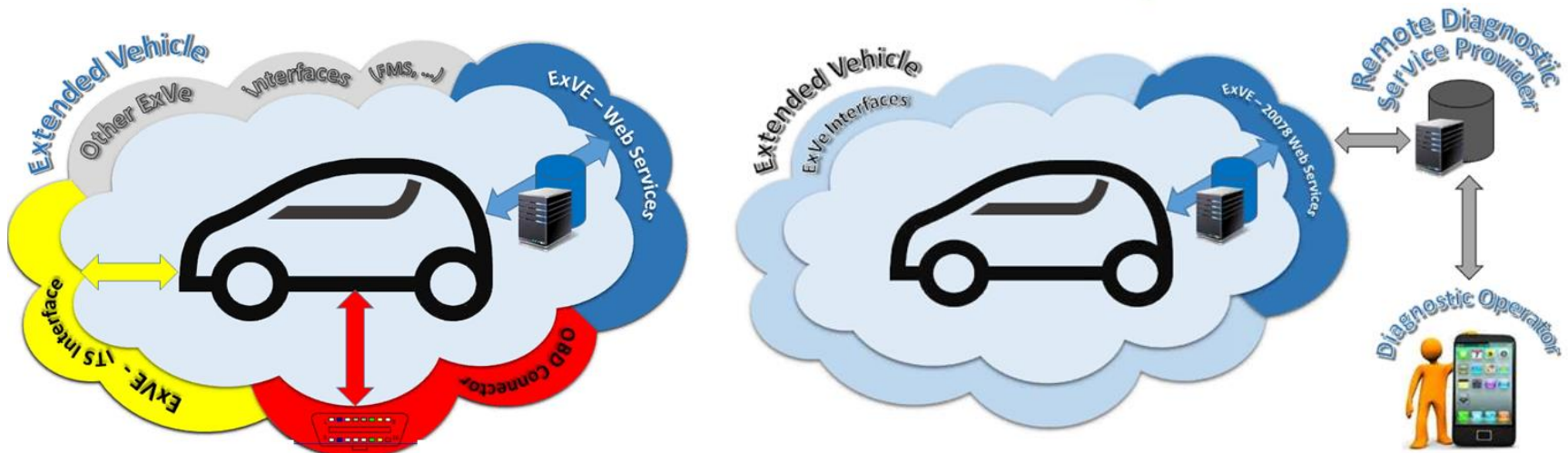
Extended Vehicle Concept

■ ExVe

Elements required by the VM manufacturer to ensure his liability

An entity, still in accordance with the specifications of the vehicle manufacturer, that extends beyond the physical boundaries of the road vehicle and consists of

- the road vehicle;
- off-board systems;
- external interfaces;
- the data communication between road-vehicle and the off-board systems.



Extended Vehicle related standards

ISO/CD 20077-1

Road Vehicles - Extended vehicle (ExVe) methodology -- Part 1: General information

ISO/WD 20077-2

Road Vehicles - Extended vehicle (ExVe) methodology -- Part 2: Methodology for designing the extended vehicle

ISO/NP 20078-1

Road vehicles -- Extended vehicle (ExVe) 'web services' -- Part 1: ExVe content

ISO/NP 20078-2

Road vehicles -- Extended vehicle (ExVe) 'web services' -- Part 2: ExVe access

ISO/NP 20078-3

Road vehicles -- Extended vehicle (ExVe) 'web services' -- Part 3: ExVe security

ISO/NP 20078-4

Road vehicles -- Extended vehicle (ExVe) 'web services' -- Part 4: ExVe control

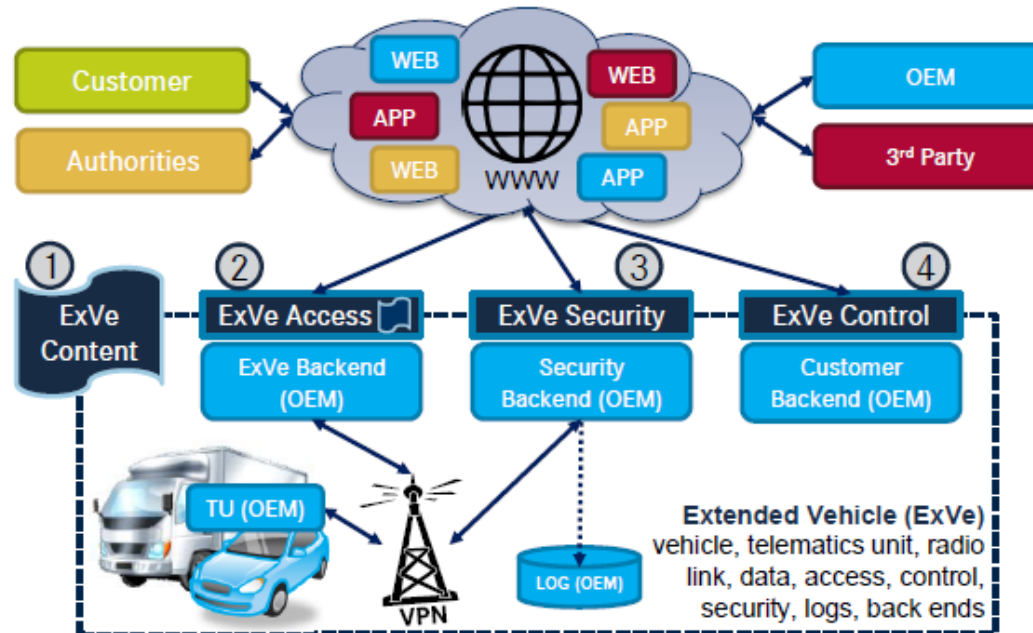
ISO/AWI 20080

Road vehicles -- Information for remote diagnostic support -- General requirements, definitions and use cases

Extended Vehicle – Web Service

The Extended Vehicle

New Standardization Project ISO 20078



- ① **ExVe Content:** Defining the data content by a human readable data format; e.g. XML.
- ② **ExVe Access:** Defining the mechanism to read and alter data; e.g. https by WWW.
- ③ **ExVe Security:** Defining an end-2-end security mechanism; e.g. a timed certificate for each vehicle.
- ④ **ExVe Control:** Defining the customer portal; protection of data privacy and OEM's representation.



ISO TC204

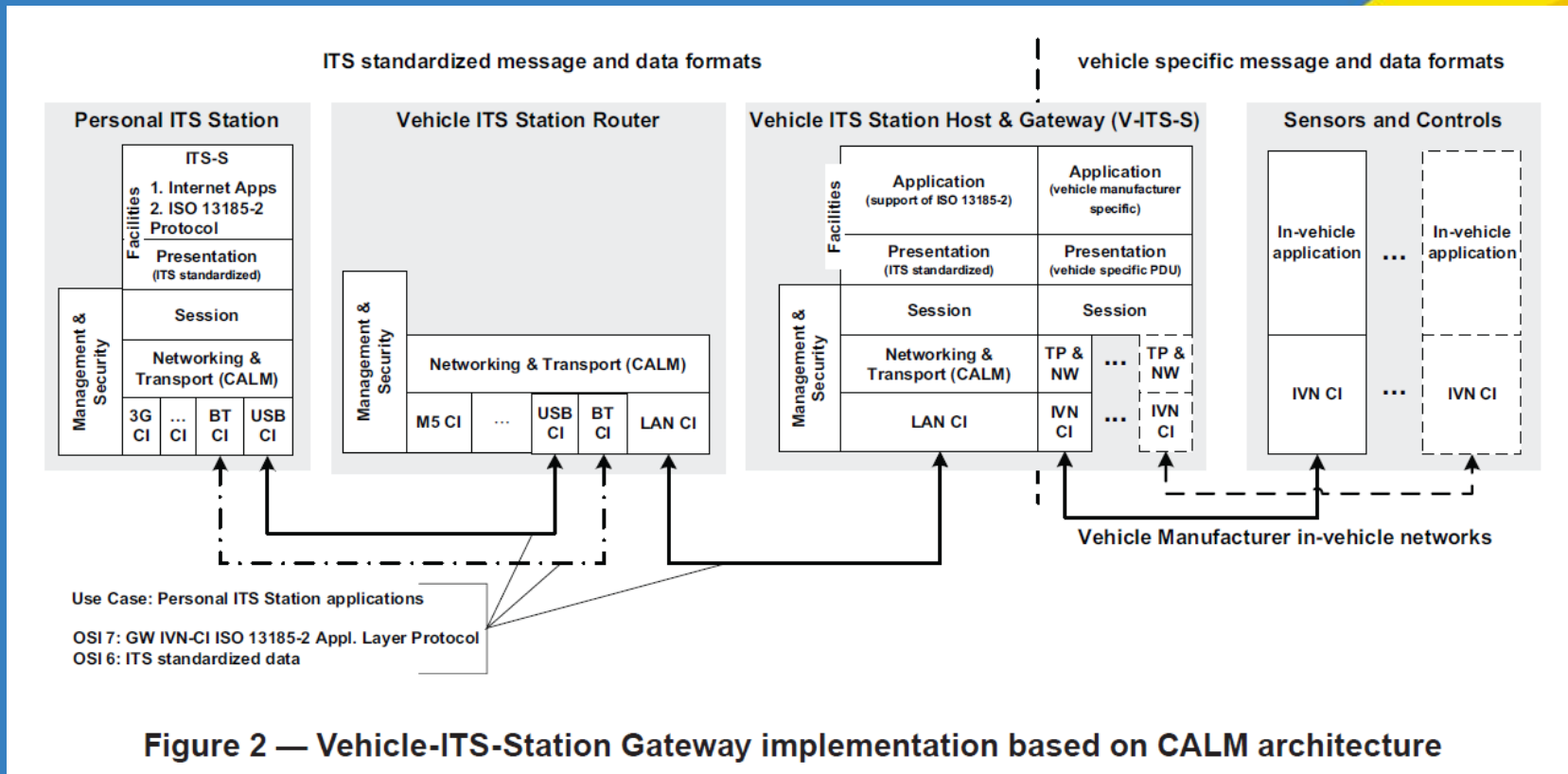
- **Vehicle Interface**

WG17: ISO 13185 series

WG18: ISO/AWI 21177, 21184, 21185

Vehicle interface (1)

- ISO 13185 ITS- Vehicle interface for provisioning and support of ITS services – Part 1: General information and use cases definition



Vehicle interface use cases

- ISO 13185 ITS- Vehicle interface for provisioning and support of ITS services – Part 1: General information and use cases definition

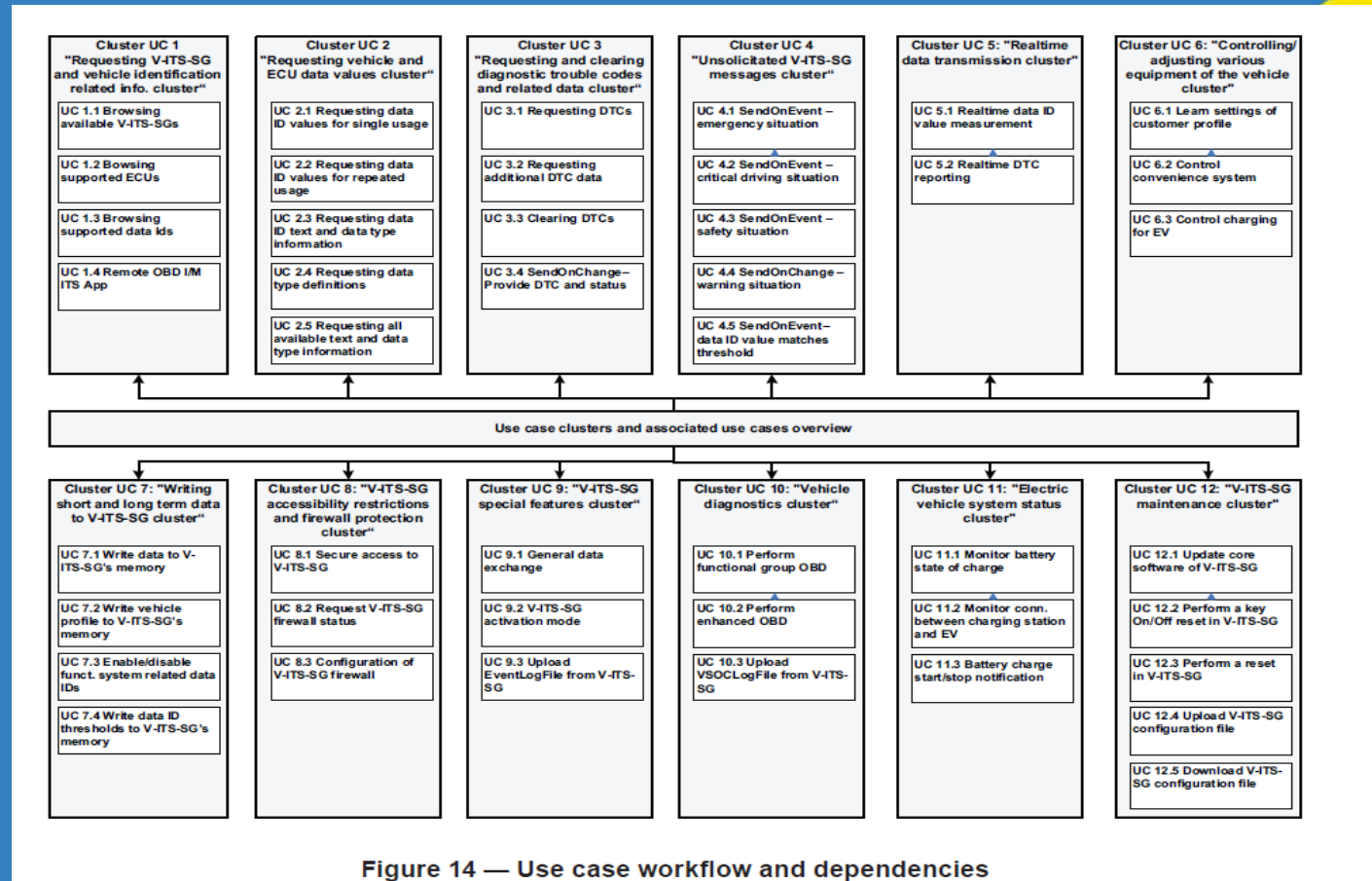
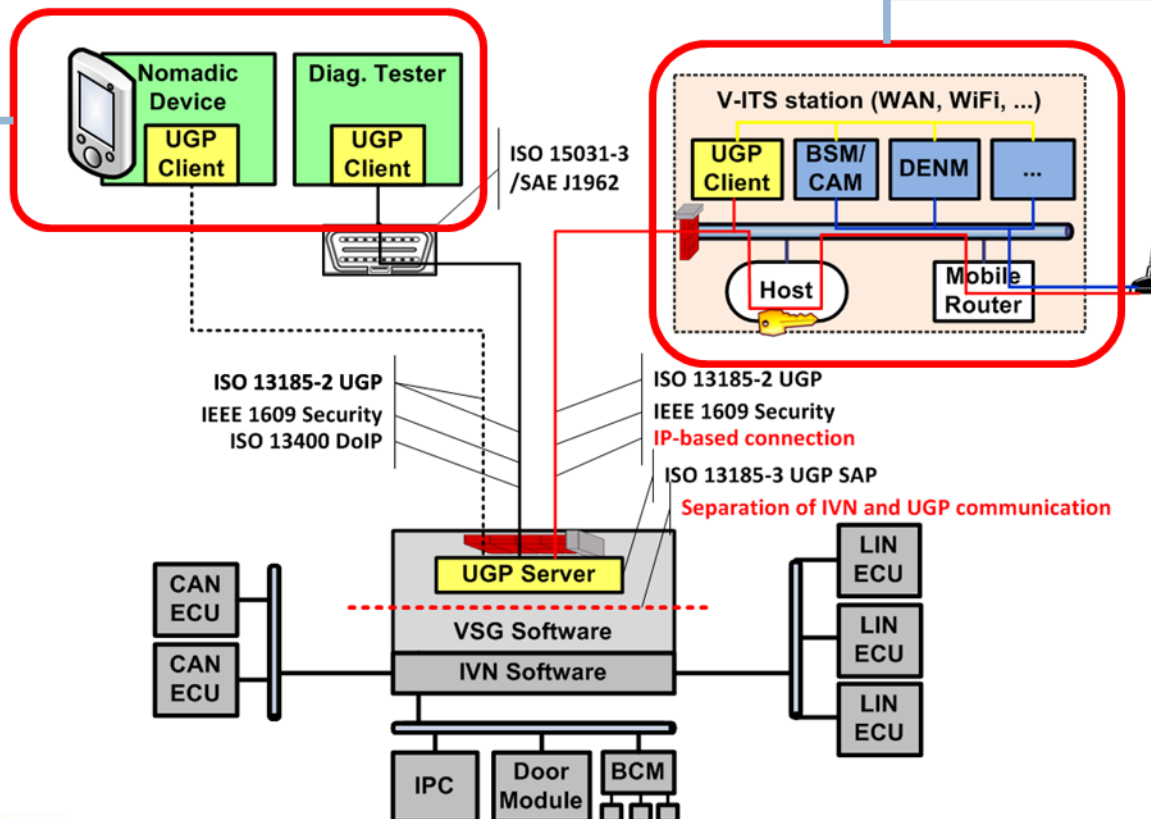


Figure 14 — Use case workflow and dependencies

UVIP: Standardized Gateway

UGP Clients

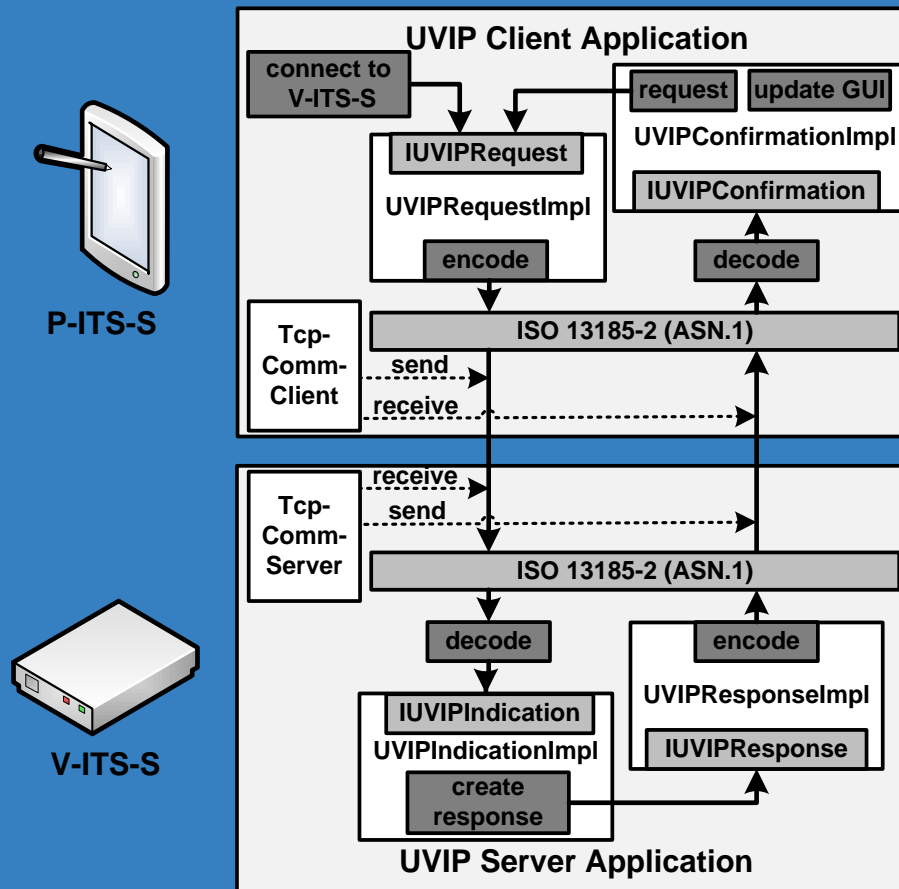
- Type1
- Remote diagnostic repair shop assistance
- Continuous remote OBD



- Type2
- Real-time to in-vehicle data for safety of life and property application(e.g. collision avoidance)
- Real-time access to in-vehicle data for event notification(DENM)

UVIP Server and Client APIs

- ISO 13185 ITS- Vehicle interface for provisioning and support of ITS services – Part 3: Unified Vehicle Interface Protocol(UVIP) server and client APIs



UVIP Server and Client APIs

UGP Facilities

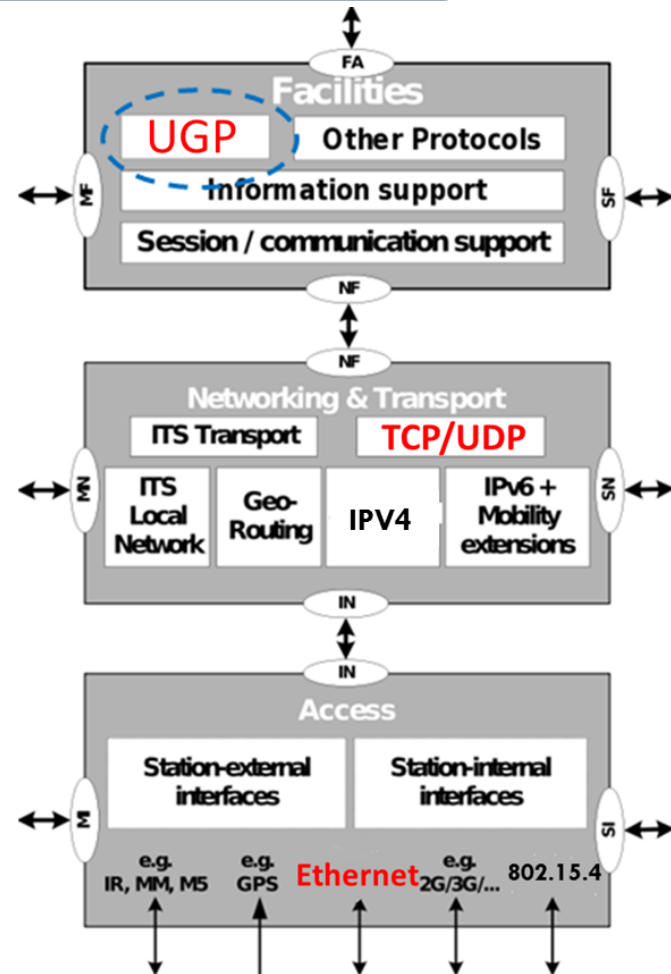
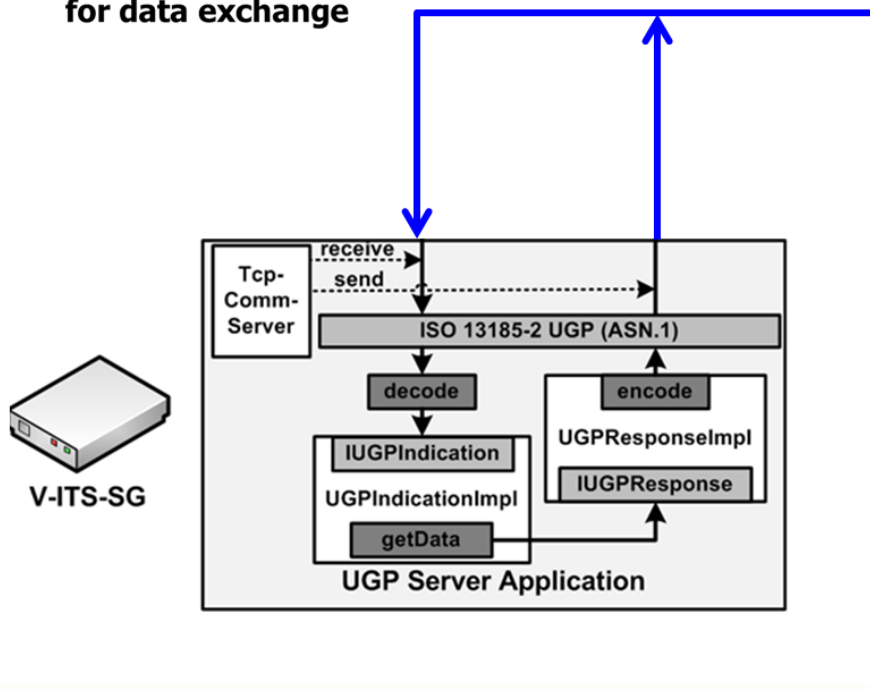
Interfaces for all four service primitives

- IUGPRequest
- IUGPIndication
- IUGPResponse
- IUGPConfirmation

ISO 13185-2 UGP ASN.1 for data exchange

Management
SAPs and API

- ISO 21217
- ISO 24102



ISO TC204 WG18 New Work Items

- ISO/NP 21185: Intelligent Transport Systems -- Secure vehicle interface -- Communication profiles for secure connection between an ITS-station and a vehicle
- ISO/NP 21184: Intelligent Transport Systems -- Secure vehicle interface -- Data dictionary of vehicle-based information for C-ITS applications
- ISO/NP 21177: Intelligent Transport Systems -- Secure vehicle interface -- ITS-station security services for secure session establishment and authentication

ISO TC204 WG18 New Work Items

- ISO/NP 21185: Intelligent Transport Systems -- Secure vehicle interface -- Communication profiles for secure connection between an ITS-station and a vehicle
 - This International Standard contains specifications for the use of existing ISO standardized communication protocols to connect an ITS-station to a vehicle enabling secure low-latency information exchange.
 - These specifications will be in the form of profiles for using existing protocols at the various OSI layers (physical, data link, network, transport, and session) for communication between the vehicle (IVN gateway) and the ITS station.
 - Such exchanges are essential for many C-ITS applications and services including time-critical safety applications and automated driving.

ISO TC204 WG18 New Work Items

- ISO/NP 21184: Intelligent Transport Systems -- Secure vehicle interface -- Data dictionary of vehicle-based information for C-ITS applications
 - This International Standard contains specifications for the dictionary of data elements to be exchanged between an ITS-station and a vehicle using secure low-latency communication resources.
 - These specifications will include ASN.1 specifications of data elements along with an encoding scheme (e.g. DER) which will provide a “common language” for IVN data exchange between a vehicle (IVN gateway) and an ITS station.
 - Such exchanges are essential for many C-ITS applications and services including time-critical safety applications and automated driving.

ISO TC204 WG18 New Work Items

- ISO/NP 21177: Intelligent Transport Systems -- Secure vehicle interface -- ITS-station security services for secure session establishment and authentication
 - This International Standard contains specifications for a set of security services required to ensure the authenticity and integrity of information exchanged between a vehicle and a V-ITS-S.
 - These services include authentication and secure session establishment which are required to exchange information between a vehicle and a V-ITS-S in a trusted and secure manner.
 - These services are essential for many C-ITS applications and services including time-critical safety applications and automated driving

Q & A

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