TECHNICAL REPORT

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Intelligent transport systems — Use of nomadic and portable devices to support ITS service and multimedia provision in vehicles —

Part 2: Definition and use cases for mobile service convergence

Systèmes intelligents de transport — Utilisation des dispositifs nomades et portables pour la prise en charge des services ITS et la mise à disposition d'applications multimédias dans les véhicules —

Partie 2: Définition et cas d'utilisation pour la convergence des services mobiles

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems.*

A list of all parts in the ISO/TR 10992 series can be found on the ISO website.

Introduction

ISO/TC 204 is designed to facilitate the development, promotion and standardization of the use of nomadic and portable devices to support ITS service provision and multimedia use such as passenger information, automotive information, driver advisory and warning systems, and entertainment system interfaces to ITS service providers and motor vehicle communication networks. The ISO 10992 series fosters the introduction of multimedia and telematics nomadic devices in the public transport and automotive world.

This project provides the convergence software framework to identify mobile cloud connectivity services while driving and related standards required to develop a nomadic device application with intelligent transport systems (ITS) technologies in vehicles.

Intelligent transport systems — Use of nomadic and portable devices to support ITS service and multimedia provision in vehicles —

Part 2:
Definition and use cases for mobile service convergence

1 Scope

This document specifies the introduction of multimedia and telematics nomadic devices in the public transport and automotive world to support intelligent transport systems (ITS) service provisions and multimedia use such as passenger information, automotive information, driver advisory and warning systems, and entertainment system interfaces to ITS service providers and motor vehicle communication networks.

This document focuses on the convergence software framework to identify mobile cloud connectivity services while driving utilizing nomadic device application for intelligent transport systems (ITS) technologies in vehicles.

The use cases described in this document include:

— IVI interaction configuration

This competence is provided by automatic application suppliers.

— Biosignal measurement configuration

This competence is provided by IT application companies.

— Cloud service configuration

This competence is provided by third-party providers such as parking service providers and insurance service providers.

This document includes the identification of existing International Standards for ITS in ISO/TC 204 and existing vehicle communication network access standards.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
nomadic device
ND
personal ITS station which provides communication connectivity via equipment such as cellular telephones, mobile wireless broadband (WIMAX, HC-SDMA, etc.), WiFi, etc. and includes short range links such as Bluetooth, Zigbee, etc. to connect portable devices to the motor vehicle communications system network

3.2
portable device
PD
handheld device or mobile device which is primarily a battery-powered device with base computing resources in the form of a processor, memory, and storage and network access

Note 1 to entry: The latest portable devices are thin and lightweight, making them easy to carry and hold. This was not the case for earlier attempts at portable computers.

3.3
in-vehicle selective gateway
in-vehicle infotainment
IVI
entertainment and information system which includes a device or a technology that provides a variety of services for navigating the internet, for enjoying a movie, and for playing games and social network services (SNS) in vehicles

3.4
vehicle station gateway
VSG
system that provides security and safety functionality in order to allow only authorized access to the in-vehicle networks (IVN)

Note 1 to entry: Vehicles will be electronically integrated into the IT infrastructure with the risk of unauthorized access. ISO (International Standardization Organization) is going to establish a joint working group standardizing the Vehicle Station Gateway (VSG).

4 Abbreviated terms

ITS Intelligent Transportation Systems

IVI In-Vehicle Infotainment

VSG Vehicle Station Gateway

VIN Vehicle Identification Number

UI User Interface

UX User eXperience

ND Nomadic Device

PD Portable Device

ICT Information and Communication Technology

5 Document overview and structure

This document provides all information and references required to support the implementation of the requirements related to standardized access to definition and use cases for mobile service convergence. The document consists of the following parts:

— Part 1: Overview

This part provides an overview of the communications architecture and generic requirements to enable the connectivity between the vehicle and the infrastructure or other vehicles by using nomadic links within the vehicle and devices introduced into the vehicle including the provision of connectivity via mobile devices to the infrastructure; the support of application services within the vehicle; and integration within the CALM architecture and in vehicle gateways.

— Part 2: Definition and use cases for mobile service convergence

This part specifies general requirements related to the integrated mobile service convergence to be used on nomadic devices and personal ITS stations. It provides an overview of the document set and structure along with the use cases definition and common set of resources (definitions, references), which are used for all subsequent parts.

6 General information

6.1 Purpose of this document

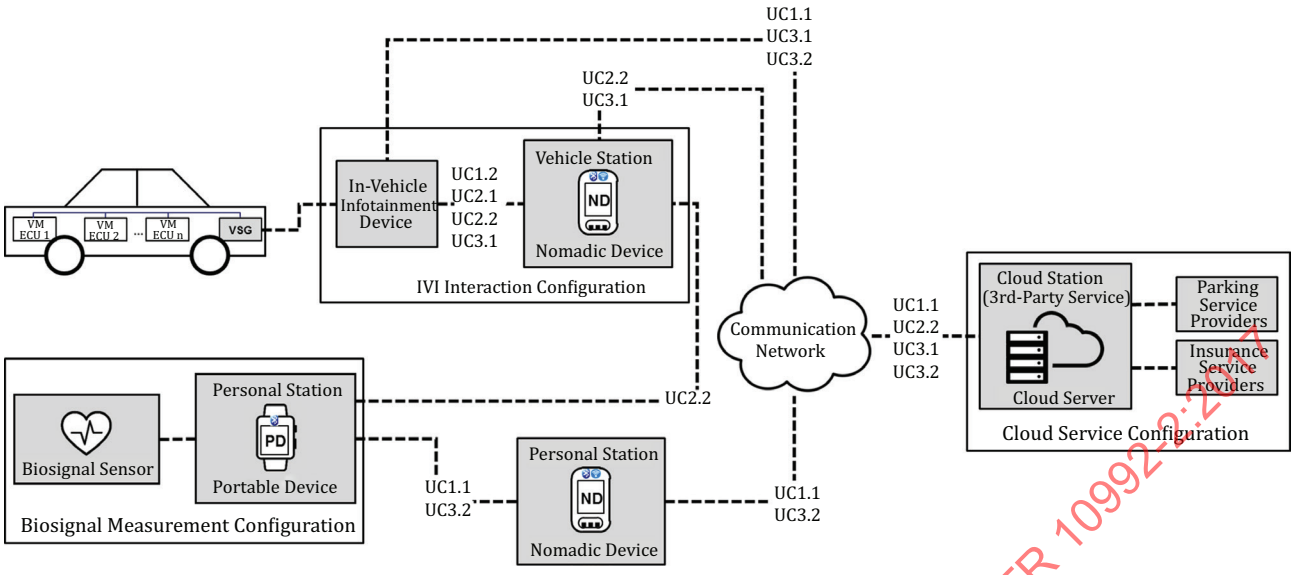
This document addresses two major areas:

— identify the method to describe the general information for all subjects related to mobile service convergence on the vehicle station interfaced with personal station, and cloud service station;

— specify the general use cases that should be included for the mobile service convergence.

6.2 Overview of mobile service convergence

Conceptual aspects of the mobile service convergence should be considered as illustrated in Figure 1.



Key

1 vehicle station

2 personal station (nomadic/portable device)

3 cloud station (third-party service)

Figure 1 — System architecture

The background and challenges of mobile service convergence are:

— Mobile services would not be limited to mobile phone applications but be extended to service convergence with different business areas including automobile, medical, housing, educational, etc. for creating new vales of consumers.

— New service models and standards framework with related to the business models of vehicle and mobile service convergence would be under discussion in the existing business areas influenced by mobile and information and communication technologies.

The issues for the proposition of mobile service convergence are as follows.

— Vehicle station:

The vehicle station plays a role of connecting the vehicle and the external devices for interfacing vehicle information and external data with the vehicle control requested by the driver. This station also includes both the IVI device connected with VSG and the nomadic device communicated by the IVI device.

— Personal station:

The personal station plays a role of an end-device by collecting driver information such as bio signals, sending it to the cloud server, and providing services to the driver. This station includes both the portable device collecting driver bio signals and the nomadic device providing data interface and services.

— Cloud station:

The cloud station plays a role of storing data from vehicles and users in order to provide services requested by the vehicle station and/or the personal station before, while, and after driving. This station includes both the cloud server for data storing and manipulating and the third-party service.

7 Use cases overview and definitions

7.1 General

The main purpose for developing standards is to define the service platform with the related use cases.

7.2 Use cases overview

7.2.1 Basic principles for use cases

Basic principles have been established as a mobile service convergence to define the use cases:

— The use cases of mobile service convergence describe the interaction between the IVI, nomadic device and cloud service.

— The use cases in this document define sample cases to mobile service convergence for before and after market users.

The Mobile service convergence may include the following group of use cases:

— Before Driving: Smart start service, photo tagging-navigation service, etc.

— While Driving: User eXperience (UX) mirroring service, driver emotion care service, etc.

— After Driving: Parking concierge service, car security monitoring service, etc.

7.2.2 Use cases clusters

Table 1 provides an overview about the different use cases categories. The use cases are grouped into use case clusters.

Table 1 — Use cases clusters and associated use cases overview

# – Title of use cases cluster	Brief description
1. Before Driving	Two use cases prior to getting on board: to support driver with remote engine start and to route choices to destination. — UC 1.1 – Smart Start Service — UC 1.2 – Photo tagging-Navigation Service
2. While Driving	Two use cases while driving: to provide driver with optimized UI mirroring of in-vehicle-infotainment (IVI) and emotional driving care services. — UC 2.1 – User eXperience(UX) Mirroring Service — UC 2.2 – Driver Emotion Care Service
3. After Driving	Two use cases after getting off the car: to provide parking navigation and security monitoring services. — UC 3.1 – Parking Concierge Service — UC 3.2 – Car Security Monitoring Service

The detailed definition of each use case is defined in 7.2.

Figure 2 shows the use case clusters and associated use cases.

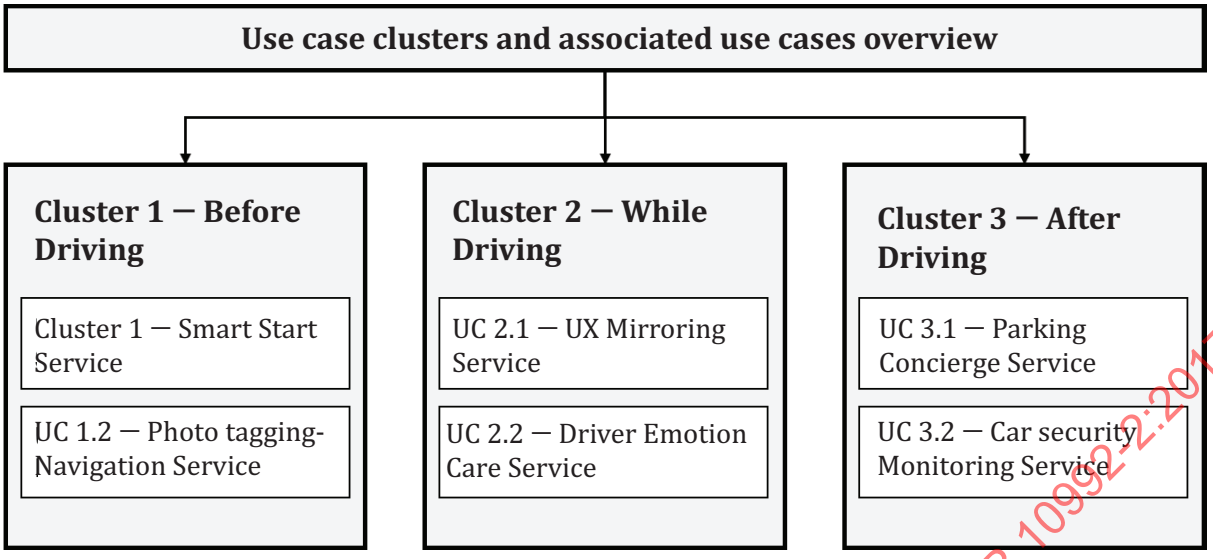


Figure 2 — Use case clusters and associated use cases

7.3 Use cases definition

7.3.1 UC cluster 1 — Before Driving

a) System architecture **b) Demonstration system**

Figure 3 — UC cluster 1

7.3.1.1 UC 1.1 Smart start service

Table 2 shows the use case 1.1 Smart Start Service, in order to support driver with remote engine start prior to getting on board.

Table 2 — UC 1.1 Smart start service

Use case name	Smart start service
Actor	Nomadic device (initiated by user interaction or automatically), Portable device, IVI device, Cloud server
Goal	Vehicle Remote Control

Table 2 *(continued)*

Use case input	Remote Control Request by Nomadic Device
Use case output	Vehicle Status Data Display on Nomadic Device
Brief description	The nomadic device plays a role of a carrier to upload the remote control information requested by the portable device to the cloud server, after authorizing it. The cloud server sends this request to the IVI device in order for transferring it to VSG. This information may include: — Vehicle Identification Number (VIN) — Nomadic/Portable Device Identification

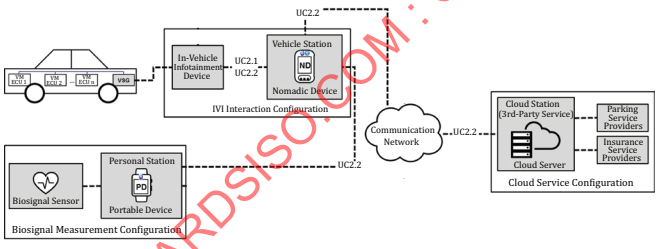
7.3.1.2 UC 1.2 Photo tagging-navigation service

Table 3 shows the use case 1.2 Photo Tagging Navigation Service, in order to support driver with route choices to destination prior to getting on board.

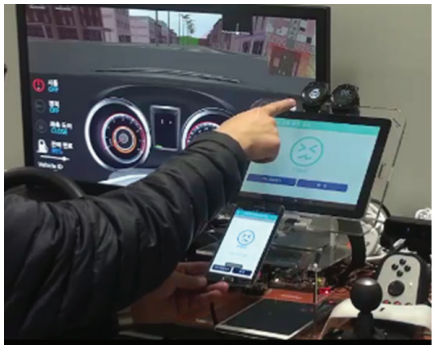
Table 3 — UC 1.2 Photo tagging- navigation service

Use case name	Photo tagging-navigation service
Actor	Nomadic device (initiated by user interaction or automatically), IVI device
Goal	Route Choice to Destination
Use case input	Photo(included GPS data)
Use case output	Route Guidance Display on Nomadic Device
Brief description	The destination is to be set by selecting the photo tagged by GPS data on nomadic device. This information may include: — GPS Data

7.3.2 UC cluster 2 — While Driving



a) System architecture



b) Demonstration system

Figure 4 — UC cluster 2

7.3.2.1 UC 2.1 UX mirroring service

Table 4 shows the use case 2.1 UX Mirroring Service, in order to provide driver with optimized UI mirroring of in-vehicle-infotainment (IVI) while driving.

Table 4 — UC 2.1 UX mirroring service

Use case name	UX mirroring service
Actor	Nomadic device (initiated by user interaction or automatically), IVI device
Goal	Variable IVI Display Formation by Users
Use case input	User Information and Demand
Use case output	IVI Display on Demand
Brief description	The IVI device connected with the nomadic device changes user interface (UI) display on it according to the user information stored in the nomadic device. This information may include: — User Information and Demand: Age, Sex, Life Style, etc.

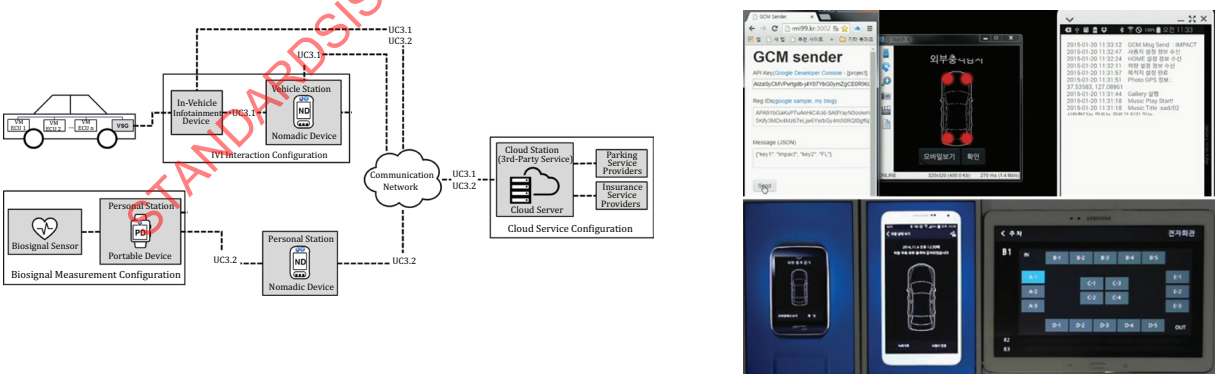
7.3.2.2 UC 2.2 Driver emotion care service

Table 5 shows the use case 2.2 Driver Emotion Care Service, in order to provide driver with emotional driving care services while driving.

Table 5 — UC 2.2 Driver emotion care service

Use case name	Driver emotion care service
Actor	Nomadic device (initiated by user interaction or automatically), Portable device (include biosignal sensor), IVI device, Cloud server
Goal	Driving Care Contents by User Emotions
Use case input	Driver Bio Signals
Use case output	Driving care contents including media play on/off, temperature setting, etc. for making driver being cautious
Brief description	The portable device sends the bio signal information of a driver collected by the sensors to the nomadic device. The nomadic device estimates user emotions by analysing the driver bio signals and sends it to the cloud server in order to figure out the most appropriate contents being selected by the driver on nomadic device. This information may include: — Driver Bio Signals

7.3.3 UC cluster 3 — After Driving



a) System architecture **b) Demonstration system**

Figure 5 — UC cluster 3