TECHNICAL SPECIFICATION

ISO/TS 15638-19

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Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) —

Part 19: Vehicle parking facilities (VPF)

Systèmes intelligents de transport — Cadre pour applications télématiques collaboratives pour véhicules de fret commercial réglementé (TARV) —

Partie 19: Installations de parcage du véhicule (VPF)

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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. www.iso.org/directives.

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The committee responsible for this document is ISO/TC 204, *Intelligent transport systems*

ISO 15638 consists of the following parts, under the general title *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV)*:

— *Part 1 Framework and architecture*

— *Part 2: Common platform parameters using CALM*

— *Part 3: Operating requirements, 'Approval Authority' procedures, and enforcement provisions for the providers of regulated services*

— *Part 5: Generic vehicle information*

— *Part 6: Regulated applications* [Technical Specification]

— *Part 7: Other applications*

— *Part 8: Vehicle access monitoring (VAM)* [Technical Specification]

— *Part 9: Remote electronic tachograph monitoring (RTM)* [Technical Specification]

— *Part 10: Emergency messaging system/eCall (EMS)* [Technical Specification]

— *Part 11: Driver work records (work and rest hours compliance) (DWR)* [Technical Specification]

— *Part 12: Vehicle mass monitoring (VMM)* [Technical Specification]

— *Part 14: Vehicle access control (VAC)* [Technical Specification]

— *Part 15: Vehicle location monitoring (VLM)* [Technical Specification]

— *Part 16: Vehicle speed monitoring (VSM)* [Technical Specification]

— *Part 17: Consignment and location monitoring (CLM)* [Technical Specification]

— *Part 18: ADR (Dangerous Goods) transport monitoring (ADR)* [Technical Specification]

— *Part 19: Vehicle parking facilities (VPF)* [Technical Specification]

— The following parts are under preparation:

— *Part 4: System security requirements* [Technical Specification]

— *Part 13: 'Mass' information for jurisdictional control and enforcement*

Introduction

Many ITS technologies have been embraced by commercial transport *operators (4.34)* and freight owners, in the areas of fleet management, safety and security. *Telematics (4.46)* applications have also been developed for governmental use. Such regulatory services in use or being considered vary from *jurisdiction (4.30)* to *jurisdiction*, but include electronic on-board recorders, digital *tachograph (4.45)*, on-board *mass (4.32)* monitoring, *''mass' data for regulatory control and management (4.33)*, vehicle *access (4.1)*, *hazardous goods* tracking and *eCall (4.21)*. Additional applications with a regulatory impact being developed include, fatigue management, speed monitoring and heavy vehicle penalties imposed based on location, distance and time.

In such an emerging environment of regulatory and *commercial applications (4.14)*, it is timely to consider an overall *architecture (4.10)* (business and functional) that could support these functions from a single platform within a commercial freight vehicle that operate within such regulations. International Standards will allow for a speedy development and *specification (4.44)* of new applications that build upon the functionality of a generic specification platform. A suite of standards documents is required to describe and define the *framework (4.24)* and requirements so that the on board equipment and back office systems can be commercially designed in an open market to meet common requirements of *jurisdictions (4.30)*.

This suite of standards addresses and defines the *framework (4.24)* for a range of cooperative *telematics (4.46)* ITS service applications for *regulated commercial freight vehicles (4.39)* (such as *access (4.1)*, driver fatigue management, speed monitoring, on-board *mass (4.32)* monitoring, *''mass' data for regulatory control and management (4.33)*). The overall scope includes the concept of operation, legal and regulatory issues, and the generic cooperative provision of services to *regulated commercial freight vehicles (4.39)*, using an on-board ITS platform. The *framework* is based on a (multiple) *service provider (4.42)* oriented approach with provisions for the *approval (4.7)* and *auditing (4.11)* of *service providers*.

This suite of standards documents will:

- provide the basis for future development of cooperative ITS *telematics (4.46)* applications for *regulated commercial freight vehicles (4.39)*. Many elements to accomplish this are already available. Existing relevant standards will be referenced, and the *specifications (4.44)* will use existing standards (such as *CALM*) wherever practicable.
- allow for a powerful platform for highly cost-effective delivery of a range cooperative ITS *telematics* applications for *regulated commercial freight vehicles (4.39)*.
- a business *architecture (4.10)* based on a (multiple) *service provider (4.42)* oriented approach
- address legal and regulatory aspects for the *approval (4.7)* and *auditing (4.11)* of *service providers.*

This suite of standards deliverables is timely as many governments (Europe, North America, Asia and Australia/New Zealand) are considering the use of *telematics (4.46)* for a range of regulatory purposes. Ensuring that a single in-vehicle platform can deliver a range of services to both government and industry through open standards and competitive markets is a strategic objective.

This part of the ISO 15638 family of standards documents provides *specifications (4.44)* for Vehicle parking Facility.

NOTE 1 The definition of what comprises a 'regulated' vehicle is regarded as an issue for national decision, and may vary from *jurisdiction (4.30)* to *jurisdiction*. This suite of standards documents does not impose any requirements on nations in respect of how they define a *regulated vehicle (4.39)*.

NOTE 2 The definition of what comprises a 'regulated' service is regarded as an issue for national decision, and may vary from *jurisdiction (4.30)* to *jurisdiction*. This suite of standards documents does not impose any requirements on nations in respect of which services for *regulated vehicle*s *(4.39) jurisdictions* will require, or support as an option, but will provide standardised sets of requirements descriptions for identified services to enable consistent and cost efficient implementations where implemented.

Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) —

Part 19:
Vehicle parking facilities (VPF)

1 Scope

This part of ISO 15638 addresses the provision of *'Vehicle Parking Facility'* and specifies the form and content of such data required to support such systems, and *access methods (4.2)* to that data.

This part of ISO 15638 provides *specifications (4.44)* for common communications and data exchange aspects of the *application service (4.4)* 'Vehicle Parking Facility' that a *regulator (4.40)* may elect to require or support as an option, including:

a) high level definition of the service that a s*ervice provider (4.42)* has to provide (the service definition describes common service elements, but does not define the detail of how such an *application service (4.4)* is instantiated, not the acceptable value ranges of the data concepts defined);

b) means to realise the service

c) application data, naming content and quality that an *IVS (4.26)* has to deliver.

The definition of what comprises a 'regulated' service is regarded as an issue for national decision, and may vary from *jurisdiction (4.30)* to *jurisdiction*. This document does not impose any requirements on nations in respect of which services for *regulated vehicle*s *jurisdictions* will require, or support as an option, but provides standardised sets of requirements descriptions for identified services to enable consistent and cost efficient implementations where instantiated.

ISO 15638 has been developed for use in the context of regulated commercial freight vehicles [hereinafter referred to as 'regulated vehicles' *(4.39)*]. There is nothing, however, to prevent a jurisdiction extending or adapting the scope to include other types of regulated vehicles, as it deems appropriate.

2 Conformance

Requirements to demonstrate conformance to any of the general provisions or specific *application services (4.4)* described in this part of ISO 15638 shall be within the regulations imposed by the *jurisdiction (4.30)* where they are instantiated. Conformance requirements to meet the provisions of this International Standard are therefore deemed to be under the control of, and to the specification of, the *jurisdiction* where the *application service*(s) is/are instantiated.

The protocols defined in this part of ISO 15638 have been independently tested. Annex A (Informative) provides results of these tests. In any conformance assurance process undertaken by candidate systems, where appropriate the results may be used as part of its process of conformance compliance.

3 Normative references

The following referenced documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 15638-1 *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 1: Framework and architecture*

ISO 15638 -2 *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 2: Common platform parameters using CALM*

ISO 15638 -3 *Intelligent transport systems — Framework for collaborative telematics applications for regulated commercial freight vehicles (TARV) — Part 3: Operating requirements, 'Approval Authority' procedures, and enforcement provisions for the providers of regulated services*

ISO 15638 -4 *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 4: System security requirements*[1]

ISO 15638 -5 *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 5: Generic vehicle information*

ISO 15638 -6 *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 6: Regulated applications*

ISO 15638 -11 *Intelligent transport systems — Framework for cooperative Telematics Applications for Regulated Vehicles (TARV) — Part 11: Driver work records (work and rest hours compliance) (DWR)*

4 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15638-1 and the following apply.

4.1
access
admittance, entry, permit to use the road network and/or associated infrastructure (bridges, tunnels etc.)

NOTE This can also mean an ability to use data.

4.2
access methods
procedures and protocols for the provision and retrieval of data

4.3
app
small (usually) *Java™ (4.29)* applets, organised as software bundles, that support *application services (4.4)* by keeping the *data pantry (4.18)* provisioned with up-to-date data

4.4
application service
service provided by a *service provider (4.42)* enabled by accessing data from the *IVS (4.26)* of a *regulated vehicle (4.39)* via a wireless communications network

[1] Under preparation.

4.5
application service provider
ASP
party that provides an *application service (4.4)*

4.6
app library
separately secure area of memory in *IVS (4.26)* where apps are stored [with different access controls to *data pantry (4.18)*]

4.7
approval
formal affirmation that an applicant has satisfied all the requirements for appointment as an *application service provider (4.5)* or that an application service delivers the required service levels

4.8
approval agreement
written agreement made between an *approval authority (regulatory) (4.9)* and a *service provider (4.42)*

NOTE An *approval authority (regulatory) (4.9)* approval agreement recognises the fact that a *service provider (4.42),* having satisfied the *approval authority's* requirements for appointment as a *service provider,* is appointed in that capacity, and sets out the legal obligations of the parties with respect to the ongoing role of the *service provider*.

4.9
approval authority (regulatory)
organisation (usually independent) which conducts *approval (4.7)* and ongoing *audit (4.11)* for *service providers (4.42)* on behalf of a *jurisdiction (4.30)*

4.10
architecture
formalized description of the design of the structure of *TARV* and its *framework (4.24)*

4.11
audit/auditing
review of a party's capacity to meet, or continue to meet, the initial and ongoing *approval agreements (4.8)* as a *service provider (4.42)*

4.12
basic vehicle data
data that shall be maintained/provided by all *IVS (4.26)* [regardless of *jurisdiction (4.30)*]

4.13
CALM communications access for land mobiles
layered solution that enables continuous or quasi continuous communications between vehicles and the infrastructure, or between vehicles, using such (multiple) wireless telecommunications media that are available in any particular location, and which have the ability to migrate to a different available media where required and where media selection is at the discretion of *user (4.47)* determined parameters by using a suite of standards based on ISO 21217 (*CALM* architecture) and ISO 21210 (*CALM* networking) that provide a common platform for a number of standardised media using *ITS-stations (4.28)* to provide wireless support for applications, such that the application is independent of any particular wireless medium

4.14
commercial application(s)
ITS applications in *regulated vehicles (4.39)* for commercial (non-regulated) purposes

EXAMPLE Asset tracking, vehicle and engine monitoring, cargo security, driver management etc.

4.15
consignment
shipment of goods/cargo to a destination

4.16
cooperative ITS
C-ITS
ITS applications for both regulatory and commercial purposes that require the exchange of data between uncontracted parties using multiple *ITS-stations (4.28)* communicating with each other and sharing data with other parties with whom they have no direct contractual relationship to provide one or more *ITS services (4.27)*

4.17
core data
basic vehicle data (4.12) plus any additional data required to provide an implemented *regulated application service (4.38)*

4.18
data pantry
secure area of memory in *IVS (4.26)* where data values are stored [with different access controls to *app library (4.6)*]

4.19
driver
person driving the *regulated vehicle* at any specific point in time

4.20
driver work records
DWR
collection, collation, and transfer of *driver (4.19)* work and rest hours data from an *in-vehicle system (4.26)* to an *application service provider (4.5)*

4.21
eCall
specialised instantiation of an *EMS (4.22)* that provides incident messaging and communication with a public service assistance point via priority wireless telephone communications using its emergency call capabilities

4.22
emergency message system
EMS
collection, collation, and transfer of emergency message data from an *in-vehicle system (4.26)* to an *application service provider (4.5)*

4.23
facilities
layer that sits on top of the communication stack and helps to provide data interoperability and reuse, and to manage applications and enable dynamic real time loading of new applications

NOTE These are organised areas offering support capability for driver rest and safe keeping of vehicle and its *consignment (4.15).*

4.24
framework
particular set of beliefs, ideas referred to in order to describe a scenario or solve a problem

4.25
global navigation satellite system
GNSS
comprises several networks of satellites that transmit radio signals containing time and distance data that can be picked up by a receiver, allowing the user to identify the location of its receiver anywhere around the globe

4.26
in-vehicle system
IVS
ITS-station (4.28) and connected equipment on board a vehicle

4.27
ITS service
communication functionality offered by an *ITS-station (4.28)* to an *ITS-station* application

4.28
ITS-station
ITS-s
entity in a communication network, comprised of application, *facilities (4.23)*, networking and access layer components specified in ISO 21217 that operate within a bounded secure management domain

4.29
Java™
object oriented open source operating language developed by SUN systems

4.30
jurisdiction
government, road or traffic authority which owns the r*egulatory applications (4.37)*

EXAMPLE Country, state, city council, road authority, government department (customs, treasury, transport), etc.

4.31
local data tree
LDT
frequently updated data concept stored in the on on-board *data pantry (4.18)* containing a collection of data values deemed essential for either a) *TARV regulated application service (4.38)*, or b) *cooperative intelligent transport systems (4.16)*

4.32
mass
mass of a given heavy vehicle as measured by equipment affixed to the *regulated vehicle (4.39)*

4.33
'mass' data for regulatory control and management
MRC
collection, collation, and transfer of vehicle *mass (4.32)* data from an *in-vehicle system (4.26)* to an *application service provider (4.5)* to enable data provision to *jurisdictions (4.30)* for the control and management of equipped vehicles based on the *mass* of the *regulated vehicle (4.39),* or use of such data to enable compliance with the provisions of regulations

4.34
operator
fleet manager of a *regulated vehicle*

4.35
prime mover
heavy-duty commercial vehicle tractor unit which serves as a method of moving trailers (most often semi-trailers) by coupling to the trailer using some sort of mechanical lock system, usually a fifth wheel coupling

NOTE Tractor units can couple to different types of trailers.

4.36
prime service provider
service provider (4.42) who is the first contractor to provide *regulated application services (4.38)* to the *regulated vehicle (4.39),* or a nominated successor on termination of that initial contract

NOTE The *prime service provider (4.36)* is also responsible to maintain the installed *IVS (4.26)*; if the *IVS* was not installed during the manufacture of the vehicle, the *prime service provider (4.36)* is also responsible to install and commission the *IVS (4.26).*

4.37
regulated/regulatory application
application arrangement using TARV utilised by *jurisdictions (4.30)* for granting certain categories of commercial vehicles rights to operate in regulated circumstances subject to certain conditions, or indeed to permit a vehicle to operate within the *jurisdiction*

NOTE This may be mandatory or voluntary at the discretion of the *jurisdiction.*

4.38
regulated application service
TARV application service to meet the requirements of a regulated application that is mandated by a regulation imposed by a *jurisdiction (4.30),* or is an option supported by a *jurisdiction*

4.39
regulated commercial freight vehicle/regulated vehicle *(4.39)*
vehicle that is subject to regulations determined by the *jurisdiction (4.30)* as to its use on the road system of the *jurisdiction* in regulated circumstances, subject to certain conditions, and in compliance with specific regulations for that class of regulated vehicle

NOTE At the option of *jurisdictions*; this may require the provision of information via *TARV* or provide the option to do so.

4.40
regulator
agent of the *jurisdiction (4.30)* appointed to regulate and manage *TARV* within the domain of the *jurisdiction*

NOTE This may or may not be the approval authority (regulatory) (4.9).

4.41
remote tachograph monitoring
RTM
collection, collation, and transfer of data from an on-board electronic *tachograph (4.45)* system to an *application service provider (4.5)*

4.42
service provider
party which is approved by a approval *authority (regulatory) (4.9)* as suitable to provide regulated or commercial ITS *application services (4.4)*

4.43
session
wireless communication exchange between the *ITS-station (4.28)* of an *IVS (4.26)* and the *ITS-station* of its *application service provider (4.5)* to achieve data update, data provision, upload apps, or otherwise manage the provision of the *application service (4.4),* or a wireless communication provision of data to the *ITS-station* of an *IVS (4.26)* from any other *ITS-station*

4.44
specification
explicit and detailed description of the nature and functional requirements and minimum performance of equipment, service or a combination of both

4.45
tachograph
sender unit mounted to a vehicle gearbox, a tachograph head and a digital driver card, which records the *regulated vehicle (4.39)* speed and the times at which it was driven and aspects of the *driver's (4.19)* activity selected from a choice of modes

4.46
telematics
use of wireless media to obtain and transmit (data) from a distant source

4.47
user
individual or party that enrols in and operates within a regulated or *commercial application (4.14) service (4.4)*

Example *Driver (4.19),* transport *operator (4.34),* freight owner, etc.

4.48
vehicle access control
VAC
control of *regulated vehicle*s ingress to and egress from controlled areas and associated penalties and levies

4.49
vehicle access management
VAM
monitoring and management of *regulated vehicle*s approaching or within sensitive and controlled areas

4.50
vehicle location monitoring
VLM
collection, collation, and transfer of vehicle location data from an *in-vehicle system (4.26)* to an *application service provider (4.5)*

4.51
vehicle mass monitoring
VMM
collection, collation, and transfer of vehicle *mass (4.32)* data from an *in-vehicle system (4.26)* to an *application service provider (4.5)*

4.52
vehicle parking facility
VPF
system for booking and *access (4.1)* to and egress from a *vehicle parking facility (VPF) (4.52)*

4.53
vehicle speed monitoring
VSM
collection, collation, and transfer of vehicle speed data from an *in-vehicle system (4.26)* to an *application service provider (4.5)*

5 Symbols (and abbreviated terms)

app
applet (JAVA™ application or similar) *(4.3)*

AS
application service

ASP
application service provider (4.5)

ASS
Application service system

CALM
communications access for land mobiles (4.13)

C-ITS
cooperative intelligent transport systems (4.16)

DWR
driver work records (4.20)

eDL
electronic *driver (4.19)* licence

EMS
emergency message system (4.22)

GNSS
global navigation satellite system (4.25)

HMI
human/machine interface

ID
identity

IP
internet protocol

ITS-S
ITS station (4.28)

IVS
In-vehicle system (4.26)

LDT
local data tree (4.31)

RTM
remote tachograph monitoring (4.41)

SE
service element

TARV
telematics (4.46) applications for *regulated vehicles (4.39)*

VPF
vehicle parking facility facility (4.52)

WORM
write once read many times

6 General overview and framework requirements

ISO TS 15638-1 provided a *framework (4.24)* and *architecture (4.10)* for *TARV*. It provided a general description of the roles of the actors in *TARV* and their relationships.

To understand clearly the *TARV* framework, *architecture (4.10)* and detail and *specification (4.44)* of the roles of the actors involved, the reader is referred to ISO TS 15638-1.

ISO TS 15638-6 provides the core requirements for all regulated applications. To understand clearly the general context in to which the provision of this application service, the reader is referred to ISO TS 15638-6.

In order to be compliant with this part of ISO 15638, the overall architecture employed shall comply to ISO 15638-1.

In order to be compliant with this part of ISO 15638, the communications employed shall comply to ISO 15638-2.

In order to be compliant with this part of ISO 15638, the operating requirements employed shall comply to ISO 15638-3.

In order to be compliant with this part of ISO 15638, the security employed shall comply to ISO 15638-4[2].

In order to be compliant with this part of ISO 15638, the basic vehicle data shall comply to ISO 15638-5.

In order to be compliant with this part of ISO 15638, the generic conditions for this application service shall comply to ISO 15638-6.

ISO 15638 has been developed for use in the context of regulated commercial freight vehicles. There is nothing however to prevent a jurisdiction extending or adapting the scope to include other types of regulated vehicles, as it deems appropriate.

7 Requirements for services using generic vehicle data

The means by which the access commands for generic vehicle information specified in ISO 15638-5 can be used to provide all or part of the data required in order to support a *regulated application service (4.38)* shall be as defined in ISO 15638-6.

8 Application services that require data in addition to basic vehicle data

8.1 General

Shall be conducted as defined in ISO 15638-6.

8.2 Quality of service requirements

This part of ISO 15638 contains no general requirements concerning quality of service. Such aspects shall be determined by a *jurisdiction (4.30)* as part of its *specification (4.44)* for any particular *regulated application service (4.38).* However, where a specified *regulated application service (4.38)* has specific Q of S requirements essential to maintain interoperability, these aspects shall be as specified in Clause 10.

NOTE This part of ISO 15638 is designated 'vehicle parking facility' with the specific objective that parallel but different approaches and methodologies are not taken for 'secure' parking facilities and other general organised parking facilities, especially in respect of reservations, ingress and egress.

8.3 Test requirements

This part of ISO 15638 contains no general requirements concerning test requirements. Such aspects shall be determined by a *jurisdiction (4.30)* as part of its *specification (4.44)* for any particular *regulated application service (4.38),* and issued as a formal test requirements *specification* document. However, where a specified *regulated application service (4.38)* has specific test requirements essential to maintain interoperability, these aspects shall be as specified in Clause 10 relating to this *regulated application service,* or in a separate standards document referenced within that Clause. And where multiple *jurisdictions* recognise a benefit to common test procedures for a specific *regulated application service,* this shall be the subject of a separate standards document.

2 Under preparation.

8.4 Marking, labelling and packaging

This part of ISO 15638 has no specific requirements for marking labelling or packaging.

However, where the privacy of an individual may be potentially or actually compromised by any instantiation based on the ISO 15638 family of Standards, the contracting parties shall make such risk explicitly known to the implementing *jurisdiction (4.30)* and shall abide by the privacy laws and regulations of the implementing *jurisdiction* and shall mark up or label any contracts specifically and explicitly drawing attention to any loss of privacy and precautions taken to protect privacy. Attention is drawn to ISO TR 12859 in this respect.

9 Common features of regulated TARV application services

9.1 General

The details of the instantiation of *regulated application service (4.38)* are as designed by the application service system to meet the requirements of a particular *jurisdiction (4.30)* and are not defined herein. ISO 15638-6 specifies the generic roles and responsibilities of actors in the systems, and instantiations that claim compliance with this part of ISO 15638 shall also be compliant with the requirements of ISO 15638-6.

The means by which data is provisioned into the *data pantry (4.18)*, and the means to obtain the *TARV LDT (4.31)* and *core data (4.17)* are described in Clause 8 of ISO 15638-6.

In order to minimise demand on the *IVS (4.26)* (which it is assumed will be performing multiple *application services (4.4)* simultaneously, as well as supporting general safety related cooperative vehicle systems), and because national requirements and system offerings will differ, a ‘cloud’ approach has been taken in defining *TARV regulated application services (4.38)*.

The *TARV* approach is for the on-board *app (4.3)* supporting the application service to collect and collate the relevant data, and at intervals determined by the *app,* or on demand from the *application service provider (4.5) (ASP),* pass that data to the *ASP.* All of the actual application service processing shall occur in the mainframe system of the *ASP* (in the ‘cloud’).

For further information see Clause 9 of ISO 15638-6.

At a conceptual level, The *TARV* system is therefore essentially simple, as shown in Figure 1. The process is similar to that for CoreData, but data is supplied to a different on-board file in the *data pantry (4.18)*.

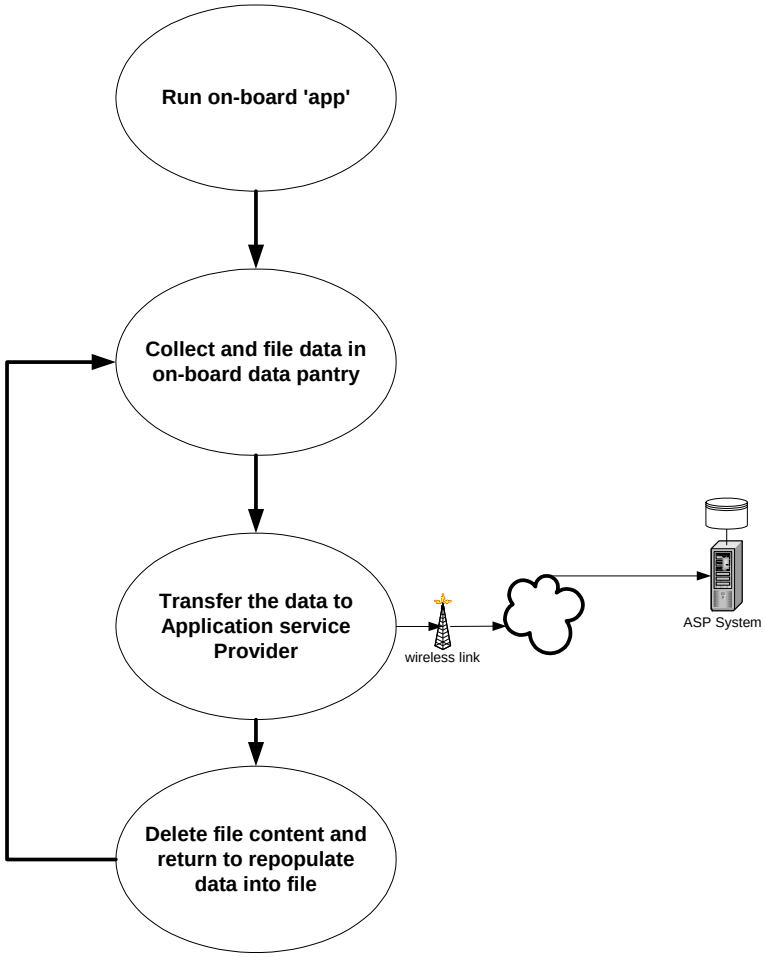

Figure 1 — TARV Regulated application service on-board procedure

At a common generic functional level for this application service, the process may be seen as shown in Figure 2 below, however the connected equipment may/may not be required in all cases.

9.2 Common role of the jurisdiction, approval authority, service provider and user

The Common role of the jurisdiction, approval authority, application service provider and user shall be as defined in ISO 15638-6.

9.3 Common characteristics for instantiations of regulated application services

The common characteristics for instantiations of regulated application services shall be as defined in ISO 15638-6.

9.4 Common sequence of operations for regulated application services

The Common sequence of operations for regulated application services shall be as defined in ISO 15638-6.

9.5 Quality of service

Generic quality of service provisions for *application services (4.4)* shall be as defined in ISO 15638-6.

9.6 Information security

Information security shall be as defined in ISO 15638-6.

9.7 Data naming content and quality

Data naming and quality shall be as defined in ISO 15638-6.

Variations specific to the Vehicle parking Facility *application service* *(4.4)* shall be as defined below.

9.8 Software engineering quality systems

Software engineering quality systems shall be as defined in ISO 15638-6.

9.9 Quality monitoring station

The availability of Quality monitoring stations shall be as defined in ISO 15638-6.

9.10 Audits

Audits shall be as defined in ISO 15638-6.

9.11 Data access control policy

To protect the data and information held by the *application service provider* *(4.5),* each provider shall adopt a risk based data access control policy for employees of the provider.

9.12 Approval of IVSs and service providers

Generic provisions for the *approval* *(4.7)* of *IVSs* and *service providers* *(4.42)* shall be as specified in ISO 15638-3 (*TARV* –Operating requirements, approval procedures, and enforcement provisions for the providers of regulated services). Detailed provisions for specific *regulated applications* *(4.37)* shall be as specified by the regime of the *jurisdiction* *(4.30).*

10 TARV Vehicle parking facility (*VPF*)

10.1 TARV VPF service description and scope

10.1.1 TARV VPF use case

Modern society is increasingly regional and global. It is taken for granted that produce and products are moved rapidly across not just *jurisdictions* *(4.30)*, but across continents, and between continents. Once a load arrives in, or is created in a location, it is increasingly likely that all or some of its movement to its consignee will be made via road transport. Other parts of ISO 15638 *(TARV)* 15638 provide Standards for data collection regarding management of load content, truck loading and routing etc. Combined with stricter driving hours and route restrictions, there is a significant and continuing growth of long distance transport that involves the requirement for overnight or rest period stops. There is growing concern about a growing trend of attacks on cargo and vehicles, coupled with the lack of adequate rest facilities for *drivers* *(4.19)*. ‘Vehicle Parking Facilities’ therefore recognises that the establishment of (especially secure) truck parking sites and associated information services is becoming increasingly important to help reduce crime and improve *driver* working conditions.

This *TARV* profile does not define the detail of a secure truck parking system. Such systems are being defined around the world, and will vary in detail according to local regulations and practices. This Part of ISO15638

specifies the generic data collection and exchanges required for such systems, so they can be supported from a standard platform within any equipped vehicle.

Within the *TARV architecture (4.10)* (see ISO 15638-1) the provision of such services are provided to a '*user (4.47)*' (vehicle *operator (4.34)* and/or *driver (4.19)*) by a *service provider (4.42)* (*SP*), operating within a regulatory *framework (4.24)* determined by a *jurisdiction (4.30)*, and in the case of vehicle parking, by managers of *(often secure) parking facilities (4.52)* (*VPF*) which in some *jurisdictions* may require licensing or *approval (4.7)*, although in other *jurisdictions* may simply be a commercial unregulated service provision.

The *service provider (4.42) architecture (4.10)* for *TARV VPF* is more complex than for some other *TARV* services, in that there will almost always be multiple classes of *application service provider*.

Class A *SP* : The provider of *application services (4.4)* to the *operator (4.34)*/vehicle (which is not part of a fleet management system)

Class B *SP* : The provider of *application services (4.4)* to the *operator (4.34)*/vehicle (which is part of a fleet management system)

Class C *SP* : The provider of a *vehicle parking facility (4.52)* (such as' Move & Park SAS')

Class D *SP* : The provider of a booking reservation, payment management, or multi-site management of vehicle parking providers (such as www.truckinform.eu)

Use cases include:

a) A *user (4.47)* (vehicle *operator (4.34)* or driver) may use the *application service provider (4.5)* (with whom he obtains or contracts for other *TARV* service provision) to arrange vehicle parking. This *application service provider* may in some circumstances achieve this via a general vehicle parking service (such as truckinform.eu) or may make the reservation directly with the selected *vehicle parking facility (4.52)*.

b) If the *user (4.47)* utilises a fleet management and tracking service, the *user* may rely on that *application service provider (4.5)* to make appropriate vehicle parking reservations.

c) A *user (4.47)* may directly *access (4.1)* a general vehicle parking service (such as truckinform.eu) or may make the reservation directly with the selected *vehicle parking facility* (4.52).

Whichever of these options are used, the service may be required to support pre-planned (pre-trip) parking reservations which have been pre-planned by the truck *operator (4.34)* or its fleet management system provider according to the planned route schedule, or the service may be requested on demand (by the *driver (4.19),* fleet *operator (4.34)*, or fleet management system *operator (4.34)*, and occasionally by the agents of the *jurisdiction (4.30)*), as the *regulated vehicle (4.39)* proceeds on its journey.

Unlike most *TARV* regulated services, where there is a direct regulation between the *jurisdiction (4.30)* and the *user (4.47)*, in many cases, for this service, any 'regulation' is more likely to be regulation, by the *jurisdiction,* of the *vehicle parking facility (4.52)* and its manager (in order to provide quality and security assurance to the *users* and police), and is unlikely involve a direct regulatory relationship between the *jurisdiction* and *user*, except where the *jurisdiction* has regulation in place that controls the parking of certain classes of goods. In these cases there will be regulation requiring a user to use an approved 'secure' parking facility when these classes of goods are in transit and there is need to park for driver rest periods or overnight, etc.

This part of ISO 15638 recognises that practices and the regulation environment will vary from *jurisdiction* to *jurisdiction,* and in some *jurisdictions* there may be no regulatory involvement whatsoever.

The *TARV architecture (4.10)* in overview shown in Figure 2 adapts the generic *TARV architecture* to show the multiple *service provider (4.42)* relationships.

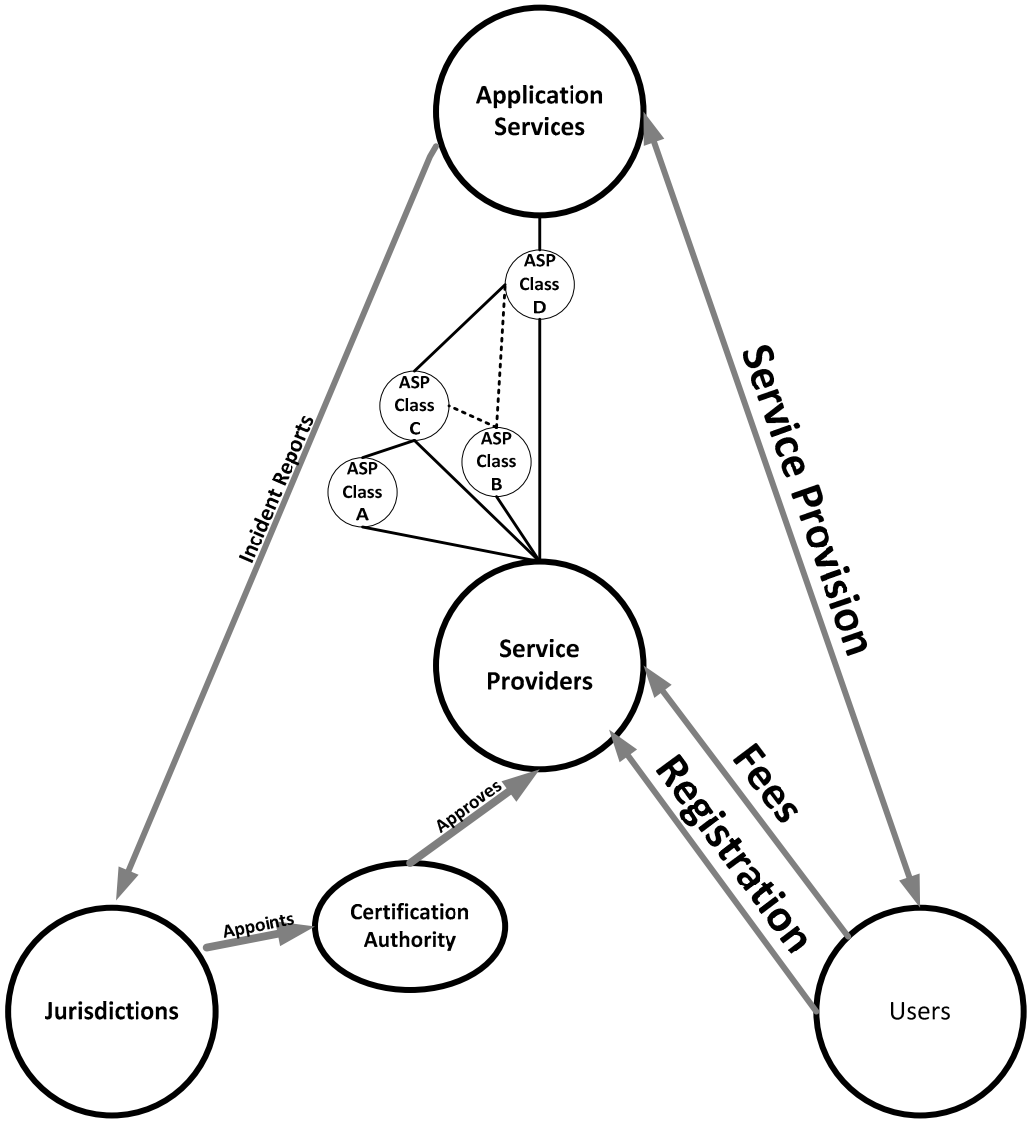

Figure 2 — The TARV Architecture for VPF

This part of ISO 15638 characterises the generic features for such systems, and the generic inputs from and outputs to the *regulated vehicle (4.39)*.

The relationship between the *jurisdiction (4.30), service providers (4.42)*, and vehicle *operators (4.34)* is recognised but the relationship and transactions between these parties will vary according to local legislation/regulations, commercial service offerings and specific contracts between vehicle *operators* and *commercial service providers (4.42)*.

From the **view of a vehicle *operator* *(4.34)***, the general objectives for the *vehicle parking facility (4.52)* application service include:

- Improve safety
- Reduce insurance costs
- Improved fleet management and logistics management
- Meet employers requirements for working conditions
- Ability to make requests for "Parking Slots", specifying the time of day required, the duration required, the type of vehicle and goods, either reserved pre-trip, or on-demand during the trip.

From the **view of a *TARV* vehicle *driver*** *(4.19),* the general objectives for the *vehicle parking facility* *(4.52)* application service include:

- Support to the truck *drivers* *(4.19)* in respecting traffic and driving regulations
- Relief from responsibility for finding a secure and safe location to park the *regulated vehicle* *(4.39)* during overnight and rest periods
- Assist the *driver* *(4.19)* to find socially acceptable resting *facilities* *(4.23)*
- Ability to make requests for "Parking Slots", specifying the time of day required, the duration required, the type of vehicle and goods, on-demand during the trip.

From the **view of a *jurisdiction*** *(4.30),* and its police, the general objectives for the *vehicle parking facility* *(4.52)* application service include:

- Solve the safety problems due to *regulated vehicle*s, being parked in dangerous locations (such as shoulders), posing high risk for both passing traffic and parked vehicle
- Reduce policing costs to prevent crime (for example, goods of a value of Euro €7 billion are stolen in Europe from trucks each year [source EC Directorate General for Energy and Transport, Faber Maunsell, AECOM, Project SETPOS])
- Achieve political objectives for environmental sustainability.

From the **view of a *vehicle parking facility*** **manager**, the general objectives for the *vehicle parking facility* *(4.52)* (*VPF*) application service include:

- Provide a pre-booked service for vehicle parking to quality of service requirements defined by its operational policy or imposed by the *jurisdiction* *(4.30)* within which it is situated, or to commercial requirements

NOTE: en-route on-demand bookings are short notice pre-bookings within this context

- At the discretion of the parking facility to provide an at-gate booking service
- Identify the arrival of the *regulated vehicle* *(4.39)* at the parking zone and activate any *access* *(4.1)* mechanism to allow the *regulated vehicle* to park
- Provide and manage the *vehicle parking facility* to quality of service requirements defined by its operational policy or imposed by the *jurisdiction* within which it is situated or to commercial requirements
- Identify and enable the legitimate departure of the *regulated vehicle* from the parking zone and activate any *access* *(4.1)* mechanism to allow the *regulated vehicle* to depart.

From the **view of a vehicle parking reservation system**, the general objectives for the *vehicle parking facility* *(4.52)* application service include:

- Provide a pre-booked reservation system (probably but not necessarily an internet based reservations service) for vehicle parking to quality of service requirements defined by its operational policy or imposed by the *jurisdiction* *(4.30)* within which it is situated, or to commercial requirements
- At the discretion of the parking facility to provide an at-gate booking service
- Manage fee collection and other payments
- Obtain pre-trip load and security information and provide to *vehicle parking facility* manager.

As stated above, and consistent with other Parts of ISO 15638, this Part of ISO 15638 does not specify the requirements or features for any particular instantiation of a *vehicle parking facility* *(4.52)* or service; it is not intended to, nor does it, define nor specify any specific vehicle parking application service *(4.4)* nor reservation service application. This Part of ISO15638 specifies the generic data collection and exchanges required for such systems, so they can be supported from a standard platform within any equipped vehicle.

This part of ISO 15638 generically supports such service provision, however it is defined. Communication *sessions* *(4.43)* and interchanges between a vehicle *operator* *(4.34)* and VPF *service provider* *(4.42)* are

assumed to be normally fulfilled using normal 'landline' communications means (internet, telephone, fax, etc.) defined by the *service providers* and are outside the scope of this document. This document is designed to specify and standardise only the generic data exchange possibilities between the communications platform (*IVS (4.26)*) in a vehicle on the road and a *VPF (4.52) service provider (4.42)* (*ITS-station (4.28) – ITS-station communication*) or, in order to support such service provision.

This document therefore specifies the information (data concepts) that are required from the *regulated vehicle (4.39)* on the road, and when, and what, data concepts require to be provided to the *regulated vehicle (4.39)* (abstracted at a high level, not detailed content, which may vary from one *service provider (4.42)* to another), so that these transactions can be supported within the *architecture (4.10)*, and therefore provided/supported by any *TARV* equipped vehicle without the requirement for additional equipment, or instantiation specific software.

Driver (4.19) identification is an important feature of most envisaged vehicle parking systems. Where the *TARV* vehicle is equipped with a means to identify the *driver (4.19),* such facility shall capable to be utilised by the system as part of the information available from the *regulated vehicle (4.39)*. However, not all *TARV* equipped vehicles will support *driver* identification and so this facility is an option within this *specification (4.44)* and vehicle parking *facilities (4.23)* and their supporting system software may need to also provide a manual system for establishing *driver* identification.

Vehicle parking places for trucks and commercial vehicles are listed as a high priority by many *jurisdictions (4.30)*. For example, in the *'ITS Action Plan*' and, specifically, the *ITS Directive 2010/40/EU. Action Area 3: ITS Road safety and security applications* under:

(e) the provision of information services for safe and vehicle parking places for trucks and commercial vehicles;

(f) the provision of reservation services for safe and vehicle parking places for trucks and commercial vehicles.

10.1.2 Description of TARV VPF regulated application service

The 'vehicle parking facility' service options offered by a facility will vary according to local regulations and will in most circumstances be a commercial offering, which may vary according to the nature of the local market; although in some circumstances may be a facility operated by the *jurisdiction (4.30)* in order to control parking in a particular vicinity, or to control parting of certain classes of *regulated vehicle (4.39)* or regulated goods. This part of ISO 15638 does not define the service in detail nor its management procedures or detailed software requirements, but characterises the generic features for such systems, and the generic inputs from, and outputs to, the *regulated vehicle*.

- The *VPF (4.52)* shall be able to process the parking request and to generate a list of possible parking zones with indication of available parking slot or a response indicating that no slot in the requested or optimum parking zone is available.

  NOTE: According to system design it may or may not offer alternative parking location
- The *regulated vehicle* shall be able to identify itself when approaching the perimeter with the intent to enter a defined parking zone and inform the parking system
- The *regulated vehicle* shall identify when it is within a defined perimeter/ distance of the Parking Zone and inform the parking system
- The *regulated vehicle* shall be able to identify itself when approaching the perimeter with the intent to leave a defined parking zone and provide the *VPF (4.52)* manager with information required to enable it to egress from the site.

Issues of perimeter security, entrances and exits and their physical control systems, layout and identification of parking areas, CCTV and surveillance, general internal procedures and administration and other security measures, are, with the exception of where they require information from the *regulated vehicle (4.39)*, or provide information to the *regulated vehicle*, deemed to be local service facility functions and are outside the scope of this document.

However, it is envisaged that some *VPF*s *(4.52)* will allocate a particular parking bay to a vehicle, and need therefore to be able to have the option to provide that data to the *driver (4.19)* of the *regulated vehicle (4.39)* via its *ITS-station (4.28)*/*IVS (4.26)*.

NOTE Verification that a vehicle has parked in the correct parking bay could also theoretically be made via *ITS-station (4.28)-ITS-station* communication, however the complexities and precision required to achieve this reliably are considerable, and therefore not included in this part of ISO 15638, and it is assumed that a simpler and lower cost solution can be made manually using video surveillance, or automatically using *ANPR* cameras that can also discriminate and pair with bay markings, or by using embedded presence sensors.

10.2 Concept of operations for TARV VPF

10.2.1 General TARV VPF concept

The business process and generic sequence of operations for *vehicle Parking Facility (4.52)* (*TARV VPF*) is shown in Figure 3.

In understanding Figure 3, as it has already clearly been stated, this document defines only the key sequences and essential data exchanges required to provide *TARV VPF*. Commercial offerings of the *facilities (4.23)* or their booking reservation systems may have additional features to gain commercial advantage, or may be required by some *jurisdictions (4.30)* to provide additional service features. These *application services (4.4)* are not defined within this part of ISO 15638 and for this part of ISO 15638, at a generic level, Figure 3 shows the 'business process' to collate the required data to gain access to the *application service* (normally as specified by the on-board *app (4.3)*), and provide a uniquely named file containing that data to the appropriate Class A,B,C or D *service provider (4.42)* system (see 10.1. above) via its ITS-station wireless interface.

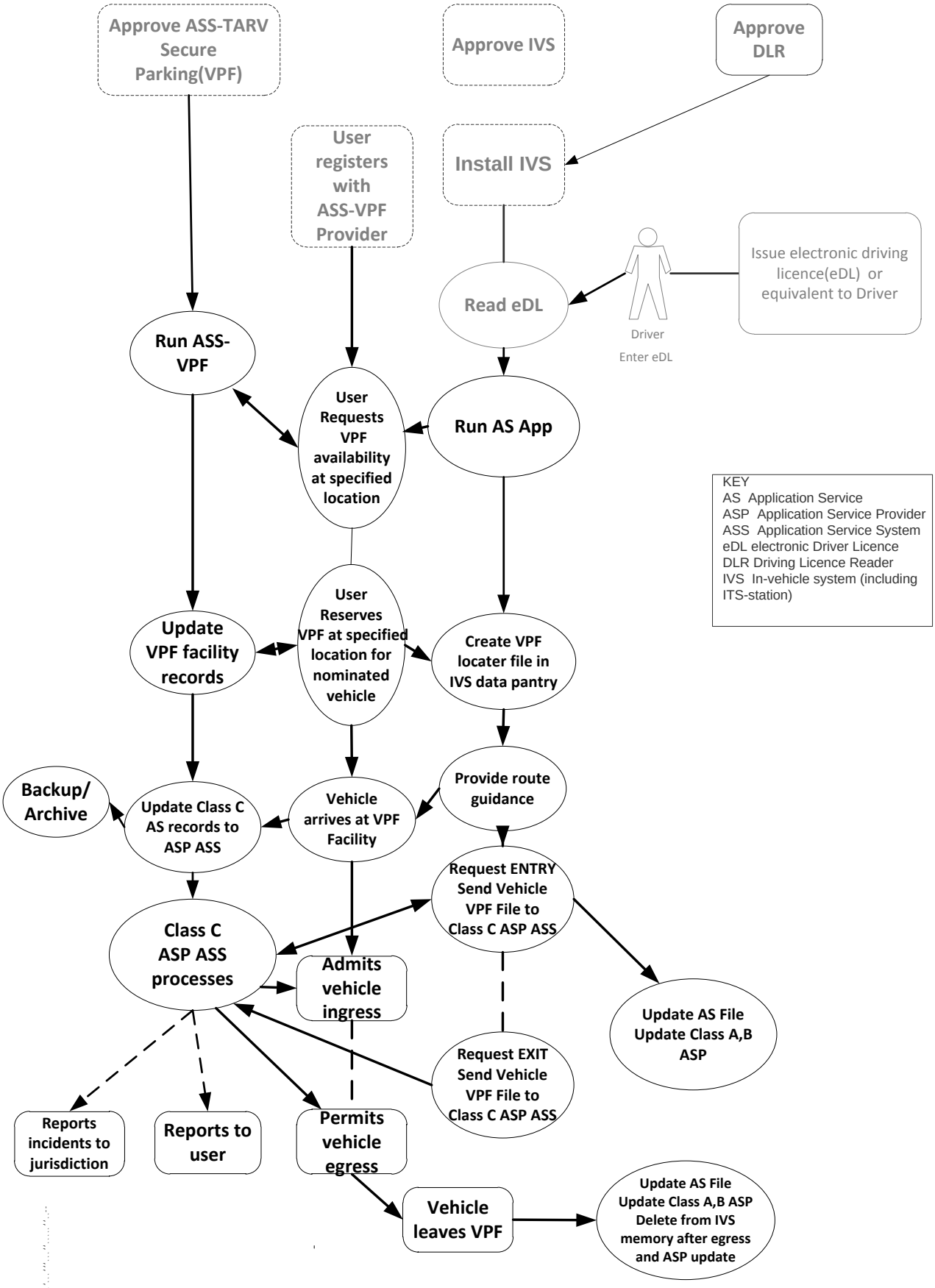

Figure 3 — Generic TARV VPF application service business process and procedure

10.2.2 Statement of the goals and objectives of the system

Figure 4 — 'Secure Parking' notice

Secure parking provides parking to a controlled level of security. It may be booked online or at site or possibly directly by a vehicle approaching a recognised and approved *vehicle parking facility (4.52)*. Figure 4 shows a typical roadside advance notice of a secure parting facility.

This part of ISO 15638 does not define any specific vehicle parking *application service (4.4),* but the general characteristics for vehicle parking *application services* (especially secure parking facilities) are described in order to identify the input/output requirements for data from/to the *regulated vehicle (4.39)* *ITS-station (4.28)*.

NOTE: Terms used in the lists below are defined in Clause 4.

10.2.2.1 Service Group 1: Information to users and fleet managers

This is a service provided by a booking reservation service providing data to *application service providers (4.5)* advising availabilities in requested locations. It is a direct service provided between *application service providers* (Class A and Class B as described in 10.1.1 above) and is outside the scope of this part of ISO 15638.

10.2.2.2 Service Group 2: Information to drivers on the road

This is a service provided by a booking reservation service providing data to *drivers (4.19)* en-route advising the availability of vehicle parking at nominated or closest-to provided location. The form of this application service is not defined but the essential data required from the *driver (4.19)* shall be at least:

a) *Desired parking location country (4.34)*
b) *Desired parking location town (4.35)*, town/road combination or *(4.52)* name
c) Vehicle identification and classification, (*basic vehicle data (4.12)* as defined in ISO 15638-5)
d) Requested time of arrival
e) Requested time of departure
f) Any data required by local *jurisdiction (4.30).*

10.2.2.3 Service Group 3: Pre-booking by application service provider or user

This is a transaction between an *application service provider (4.5)* (*ASP* Class A,B) or a vehicle *operator (4.34)*, and a booking reservation service (*ASP* Class D) to make a reservation to park within a defined *vehicle parking facility (4.52)* (*ASP* Class C). It is a direct service provided between *service providers (4.42)* (Class A - D as described in 10.1.1 above) and is outside the scope of this part of ISO 15638.

However, once the reservation is confirmed, the *ASP* Class C shall, either directly or via the *ASP* Class D, provide at least the following information to the *ASP* Class A or B as appropriate:

a) Booking reference number or code
b) Booking confirmation details
c) *GNSS (4.25)* coordinates for arrivals gate
d) Any additional data required by the *driver (4.19)* to gain *access (4.1)* to the facility (e.g. password, gate keycode).

and the *ASP* Class A or B shall find an acceptably safe means to convey this information to the *ITS-station (4.28)* of the *regulated vehicle (4.39)*, or to the *driver (4.19)* of the *regulated vehicle*.

10.2.2.4 Service Group 4: Pre-booking by driver via ASP Class A or ASP Class B

This is a transaction instigated by the *driver (4.19)* from his vehicle *ITS-station (4.28)* routed through his principle *ASP* Class A or *ASP* Class B *service provider (4.42)*, in which the *ITS-station* shall have an *app (4.3)* preloaded into *app* library of the on-board *IVS (4.26)*. The design of that *app* is at the determination of the *application service provider (4.5),* and the safe interface with the *driver* and its *HMI* is also a function of *app* design by the *application service provider.* However, it shall provide at least the following information to the *VPF SP* (*SP* Class C):

a) *Desired parking location country (4.34)*
b) *Desired parking location town (4.35)*, town/road combination or *VPF (4.52)* name
c) Vehicle identification and classification, *basic vehicle data (4.12)* as defined in ISO 15638-5)
d) Is vehicle sealed (yes/no)
e) Requested time of arrival
f) Requested time of departure
g) Any data required by local *jurisdiction (4.30).*

This data, together with the identification of the *driver (4.19),* shall be provided to the *ASP* Class D or *ASP* Class C as appropriate in order to make the registration.

While not requiring nor defining its content, it is preferable that some additional information that has not passed over the wireless communication link is also provided to the *ASP* Class D system

If the *in-vehicle system (4.26)* is equipped by a device to identify the *driver (4.19)* (See ISO 15638-11, *driver work records (4.20)* -*TARV DWR*), then this means shall be used to provide *driver* identification, otherwise the *application service provider (4.5)* (Class A or B) shall determine its own means to provide that data to the *ASP* Class C.

Once the reservation is confirmed, the *ASP* Class C shall, either directly or via the *ASP* Class D, provide at least the following information to the *ASP* Class A or B as appropriate:

a) Booking reference number or code
b) Booking confirmation details
c) *GNSS (4.25)* coordinates for arrivals gate
d) Any additional data required by the *driver (4.19)* to gain *access (4.1)* to the facility (e.g. password, gate keycode)

and the *ASP* Class A or B shall find an acceptably safe means to convey this information to the *ITS-station (4.28)* of the *regulated vehicle (4.39)*, or use other means to provide to the *driver (4.19)* of the *regulated vehicle (4.39)*.

10.2.2.5 Service Group 5: Pre-booking by driver directly via ASP Class D

This is a pre-booking transaction instigated by the *driver (4.19)* from his vehicle *ITS-station (4.28)* routed directly to a Class D secure parking service reservation system. However, if contacted directly by the *driver (4.19),* an *ASP* Class C may also perform the pre-booking functions of an *ASP* Class D booking registration system.

Although the physical means to make this transaction is not herein defined, it is a requirement that the *HMI* aspects of any such system shall be safe and shall respect the safety of both the *driver (4.19)* and other road *users (4.47)*. This may require that the *ASP (4.5)* Class D is provided with the means to load an *app (4.3)* into the *app* library of the *IVS (4.26)* on-board the *regulated vehicle (4.39)* (and the means by which this is achieved is not specified within this part of ISO 15638), or may be by means other than the *IVS* (for example SMS to the *driver's* mobile phone). Usage restrictions, such as permitting use only when the *regulated vehicle (4.39)* is stationary, or has left the carriageway of the road (identified by *GNSS (4.25)* location) may be considered (but no specific means is defined in this part of ISO 15638).

The design of this *app (4.3),* or other means of communication, is at the determination of the *application service provider (4.5),* and the safe interface with the *driver (4.19)* and its *HMI* is also a function of *app* design by the *application service provider.* However, whether via the *regulated vehicle (4.39) ITS-station (4.28)* or other means, the *driver (4.19)* shall provide at least the following information to the *ASP* Class D:

a) *Desired parking location country (4.34)*
b) *Desired parking location town (4.35)*, town/road combination or *(4.52)* name
c) Vehicle identification and classification, *basic vehicle data (4.12)* as defined in ISO 15638-5)
d) Requested time of arrival
e) Requested time of departure
f) Any data required by local *jurisdiction (4.30).*

If the *regulated vehicle (4.39)* is equipped with a means to identify the *driver (4.19), driver* identification shall also be provided to the *ASP* (4.5) Class D in order to make the registration.

In these circumstances, it will not normally be possible for the *driver (4.19)* to provide some additional information that has not passed over the wireless communication link to the *ASP (4.5)* Class D system, and in these circumstances it is preferable that wherever practicable, the *ASP* Class C holds some other information from the *driver (4.19),* that has not been passed via the wireless link (for example a requirement for the *driver (4.19)* to be previously registered as a client and have a memorable name, or code or some other data which never passes through the internet, which can be provided for confirmation at the gate).

If the *in-vehicle system (4.26)* is equipped by a device to identify the *driver (4.19)* (See ISO 15638-11, *driver work records (4.20) -TARV DWR*), then this means shall be used to provide *driver* identification, otherwise the *ASP (4.5)* (Class A or B) shall determine its own means to provide that data to the *ASP* Class D, and the *VPF (4.52) manager* (*ASP* Class C) shall have its own criteria as to what constitutes acceptable *driver* indication and shall make that requirement clearly and freely known when advertising its *VPF (4.52)*.

Once the reservation is confirmed, the *ASP* Class C shall, either directly to the *driver (4.19)* or via the *ASP* Class D, provide at least the following information to the *driver* via an acceptably safe means (this may be via the *ITS-station (4.28)* or may be by means other than the *ITS-station,* for example SMS to the *driver's* mobile phone) to convey this information to the *driver* of the *regulated vehicle (4.39)*, or use other communications means to provide to the *driver* of the *regulated vehicle*:

a) Booking reference number or code
b) Booking confirmation details
c) *GNSS (4.25)* coordinates for arrivals gate
d) Any additional data required by the *driver* to gain *access (4.1)* to the facility (e.g. password, gate keycode).

10.2.2.6 Service Group 6: On-demand access request by driver directly via ASP Class C

This is a transaction instigated by the *driver (4.19)* from his vehicle *ITS-station (4.28)* routed directly to a Class C *VPF SP* on approach to the '*Vehicle parking facility (4.52)*'.

One option here is to lay up off the road and use the 'Service Group 5' procedure. However, some *VPF*s *(4.52)* may allow a vehicle without a reserved parking slot to *access (4.1)* the *VPF* facility. The physical means to do

this is not herein defined and a matter for the *VPF* manager. Entry may be by physical interaction /paper means, which is outside the scope of *TARV*. However, the *VPF* receptionist may be able to request that the *driver (4.19)* sends the key data (possibly including *driver* ID) via the in-vehicle *ITS-station (4.28)* to a destination address provided by the *VPF* receptionist. In this case the normal security provisions for *TARV* shall be followed. i.e. The request shall be acknowledged, the communication *session (4.43)* closed. The on-board *ITS-station (4.28)* shall open a *session (4.43)* with its predetermined *application service provider (4.5)* and provide its *basic vehicle data (4.12)* and *VPF* reservation data to its *application service provider,* who shall immediately forward to the address provided by the *VPF* manager, once it has been validated by the *ASP*. If so used, the *regulated vehicle (4.39) ITS-station (4.28)* shall provide at least the following information to the *VPF* system (*SP* Class C):

a) Vehicle identification and classification ‘,*basic vehicle data (4.12)*’ as defined in ISO 15638-5)
b) Requested time of departure
c) Required local *jurisdiction (4.30)* data
d) Presence of cargo seal (yes/no).

If the *regulated vehicle (4.39)* is equipped with a means to identify the *driver (4.19), driver* identification shall also be provided.

If the *in-vehicle system (4.26)* is equipped by a device to identify the *driver (4.19)* (See ISO 15638-11, *driver work records (4.20) -TARV DWR*), then this means shall be used to provide *driver* identification, otherwise the *service provider (4.42)* (Class C) shall determine its own means to obtain that information and the *driver* will most probably be required to physically provide this data at the entry gate prior to being permitted *access (4.1)*.

The *VPF (4.52)* manager may also require sight of the cargo documentation, and may make other security provisions, but such provisions are not determined in this part of ISO 15638.

10.2.2.7 Service Group 7: Entry ingress to *VPF*

Excluding the special, and most likely site specific arrangements for ‘Service Group 6’ entry, *access (4.1)* to the site is a function for the *VPF (4.52)* manager to determine and this document does not attempt to require or predetermine his security arrangements. Most probably the reservation details specified in the above clauses will be requested/required.

NOTE In respect of ‘secure’ parking facilities, many *VPF managers (4.34)* are likely to also require that vehicles are properly sealed on arrival to the truck park (or may offer a service to seal on entry). On leaving the truck park the seal is to be checked to demonstrate that it has not been broken. This procedure enables a transport *operator (4.34)* to clearly identify exactly where an incident has occurred. If the seal has not been broken, then no goods have been removed from the *regulated vehicle (4.39)*. However there are no specific requirements in this part of ISO 15638 other than provision of a data field to advise that a seal is/is not present.

Where a vehicle is *TARV* equipped, and where a reservation has been made via service groups 3 – 5, if the *VPF (4.52)* manager provides an *ITS-station (4.28)* at the ingress portal, that ITS station may request data from the on-board *ITS-station* of the arriving *regulated vehicle (4.39)*. In this case the normal security provisions for *TARV* shall be followed. i.e. The request shall be acknowledged, the communication *session (4.43)* closed. The on-board ITS station shall open a *session* with its predetermined *application service provider (4.5)* and provide its *basic vehicle data (4.12)* and *VPF* reservation data to its *application service provider,* who shall immediately forward to the address provided by the *VPF manager* in its request, once it has been validated by the *ASP* . See Figure 5.

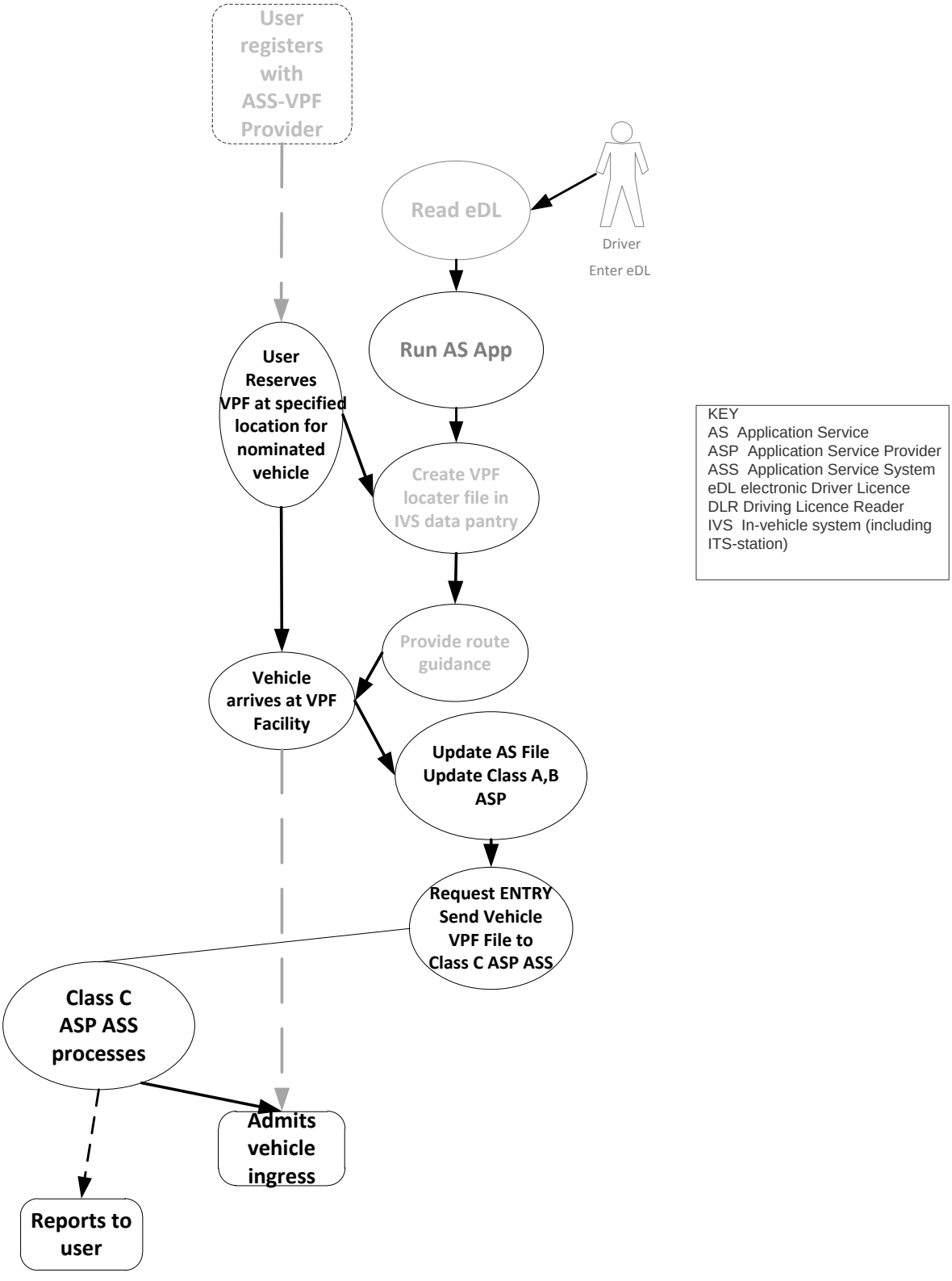

Figure 5 — TARV SP file transfer sequence (Ingress)

10.2.2.8 Service Group 8: Management within *VPF*

Management of processes and data internal to the *vehicle parking facility (4.52)* is a matter for the *VPF* manager and in some circumstances the *jurisdiction (4.30)* and is generally outwith the scope of this part of ISO 15638.

However, an option may exist to provide specific allocated parking bay data to the *IVS (4.26)* of the *regulated vehicle (4.39)* via an *ITS-station (4.28)* – *ITS-station* communication.

10.2.2.9 Service Group 5: Egress from *VPF*

Management of processes and data internal to the *vehicle parking facility (4.52)* is a matter for the *VPF* manager and in some circumstances the *jurisdiction (4.30)* and is outwith the scope of this part of ISO 15638. This includes conditions for egress from the site.

However, while not mandatory, nor specifying the egress control system, where a vehicle is *TARV* equipped, capability shall exist for the *IVS (4.26) ITS-station (4.28)* of the *regulated vehicle (4.39)* to be addressed by an *ITS-station (4.28)* operated by the *VPF (4.52)* manager whose *ITS-station (4.28)* may request data from the on-board *ITS-station*, before allowing the *regulated vehicle* to egress from the *VPF*. In this case the normal security provisions for *TARV* shall be followed. i.e. The request shall be acknowledged, the communication *session* closed. The on-board ITS station shall open a *session* with its predetermined *application service provider (4.5)* and provide its *basic vehicle data (4.12)* and *VPF* reservation data and request for permission to leave the *VPF* to its *application service provider.* The *ASP* (4.5) shall immediately forward the agreed data to the address provided by the *VPF* manager in its request, once it has been validated by the *ASP*.

In this manner the *VPF (4.52)* manager can obtain the detail that it requires to permit egress, and at the same time provide the *ASP* with the facility to confirm permission to sanction egress. See Figure 6.

NOTE The *VPF (4.52)* manager will probably also require a physical check of the *driver (4.19)* ID, physical inspection of the *regulated vehicle (4.39)* seal (if marked as present), however these details are at the discretion of the *VPF* facility operating system design, and are outwith the provisions of this part of ISO 15638.

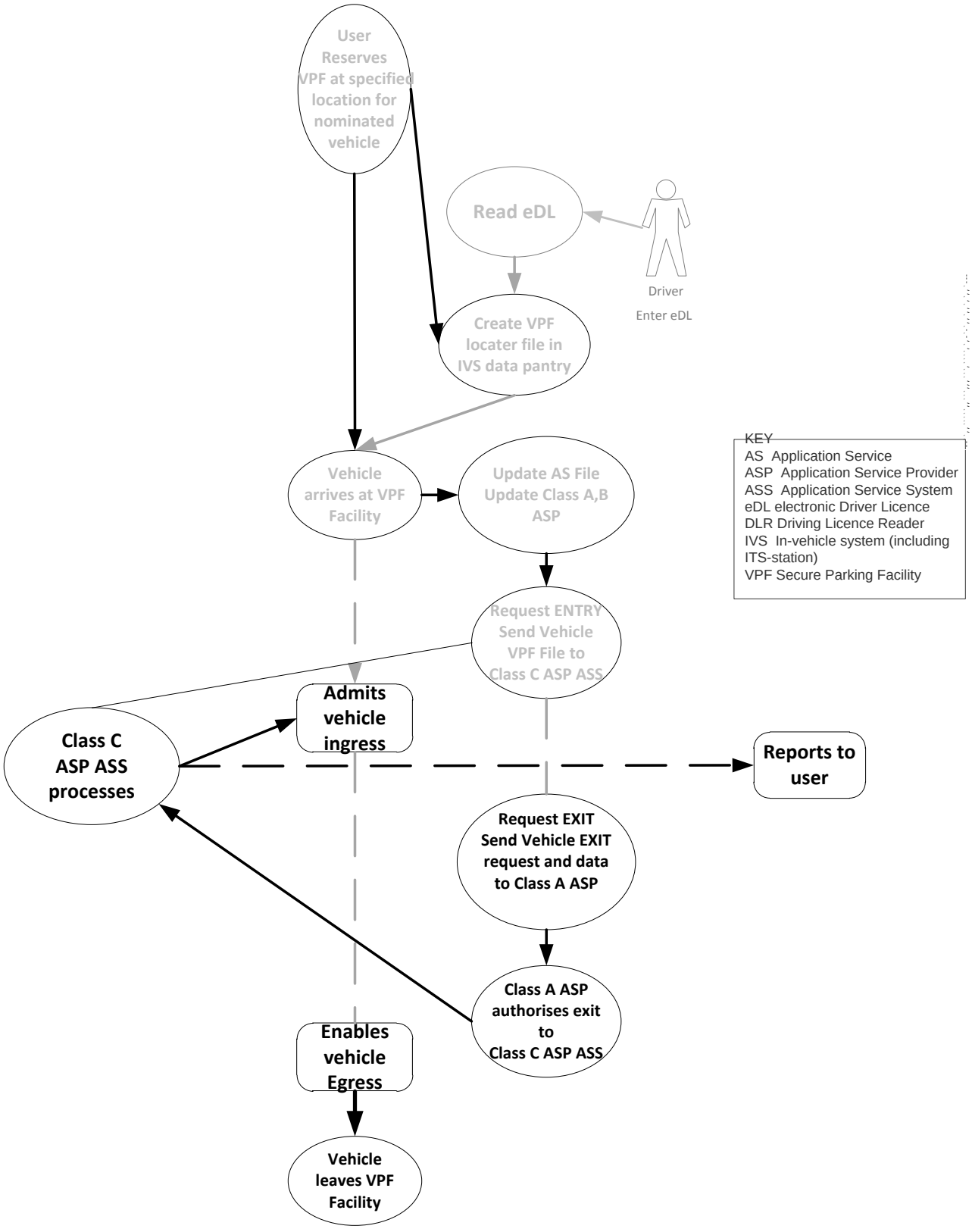

Figure 6 — TARV VPF file transfer sequence (Egress)

10.2.3 Strategies, tactics, policies, and constraints affecting the system

The underlying assumption of the system is that the *regulated vehicle (4.39)* is *TARV* equipped with an *ITS-station (4.28)*, but whether the *regulated vehicle* can physically provide *driver (4.19)* identification shall depend on ancillary equipment linked to the on-board *IVS (4.26)*. The ability to incorporate *driver* identification will affect the degree of automation at check-in/check-out to/from the *vehicle parking facility (4.52)*.

A fundamental policy constraint shall be that it is the responsibility of the provider of any on-board equipment/interface/app used to acquire input data from the *driver (4.19)* or provide output data to the *driver* to ensure that it shall be safe and shall be used only in situations where the *HMI* is safe and abides within all vehicle/*driver HMI* regulations in the *jurisdiction (4.30)* where they are being operated. Any reliance on non-*ITS-station (4.28)* equipment (such as mobile telephones to receive voice communication or SMS messages or phone hosted 'apps' etc.) shall do so in a safe way that complies with all regulations of the *jurisdiction.*

The extent of the automation of the system within the *vehicle parking facility (4.52)* will depend on the sophistication of the system. It is assumed, though not required, that the system shall have at least unambiguously marked and numbered parking places, and that the *GNSS (4.25)* location of each parking bay can be provided to the on-board *ITS-station (4.28)* of the *regulated vehicle (4.39)*. There will be some *VPFs (4.52)*, particularly small *VPFs*, where, although quite sophisticated pre-booking can be provided, once within site, only physically visible signage and manual control is provided.

10.2.4 Organisations, activities, and interactions among participants and stakeholders

The architectural relationship has been described in 10.1.1 above and in Figure 2 above.

The general booking interactions are defined in 10.2.3 above.

Physical *access (4.1)* arrangements and procedures will vary from facility to facility, but the characteristics of generic procedures, and the essential generic data exchanges and essential application data are defined in 10.2.6 below.

It should be noted that an entity may perform multiple roles and in doing so takes on the responsibility to perform the functions described under those roles.

Table 1 provides a list of the actors involved, their activities and interactions.

Table 1 — TARV VPF actors, activities and interactions

ACTOR	ROLE	ACTIVITIES	INTERACTIONS
Jurisdiction **(J)** *(4.30)*	Sets minimum requirements for *vehicle parking facilities (4.52)*	Publishes *specifications (4.44)*	ALL
		Appoints *Approval Authority* where appropriate	CA: Contract. Instruct . Receive reports
		Monitors reports	
Approval authority **(CA)** *(4.9)*	Implements *jurisdiction* policy	Approves *vehicle parking facilities*	*VPF*SP: Approve and audit faciltiy
Prime service provider **(PSP)** *(4.36)*	Responsibility for *IVS (4.26)*	Installs and/or commissions *IVS*	CA: May Apply to approve *IVS* equipment Op; Installation
		Maintains *IVS* & reader	Op: Maintain *IVS* & reader
Application service provider (***ASP*** **Class A or B**) *(4.5)*		Provides appropriate software to vehicle for *VPF (4.52)*	
		Contracts with *users (4.47)* and *VPF* (4.52)	Op: Contracts

ACTOR	ROLE	ACTIVITIES	INTERACTIONS
Vehicle parking Facility Service Provider (*VPF*SP) (*SP* Class C) (4.42)	Provides *Vehicle parking Facility* Service	Provides service to *operators (4.34)* and *drivers*	Op: Contracts
			Dr: Access
VPF **booking reservation service (*ASP* Class D) (*VPF*BR)** (4.52)	Provides *VPF* booking reservation service	Provides service to *VPF manager*s (*ASP* Class C) and to *operator*s and *drivers*	*VPF*SP: Contracts, receives service Op: Booking service Contracts, receives service Dr: Booking service Contract, receives service
***operator* (Op)** *(4.34)*	*Provides regulated vehicle (4.39)*	'Employs'/contracts *drivers*	Dr: Employs/Contracts
	Uses *regulated vehicle* for commerce and logistics	Operates *regulated vehicle*	PSP: Contracts, receives service *ASP* Class A,B,C,D :Contracts, receives service, pays for service
***Driver* (Dr)** *(4.19)*	Drives *regulated vehicle* to instruction of *operator*	Drives regulated vehicle	Op: to instructions *ASP* Class D: Booking service Contract, receives service *ASP* Class C: *VPF* receives service

10.2.5 Clear statement of responsibilities and authorities delegated for TARV VPF

10.2.5.1 The *jurisdiction (4.30)* shall be responsible for the regime and any regulations for the operation of *VPF*s *(4.52)* within its *jurisdiction.*

10.2.5.2 Within a *jurisdiction (4.30)* where *VPF*s *(4.52)* are regulated by the *jurisdiction,* the *jurisdiction* shall employ a *approval authority (regulatory) (4.9)* or otherwise provide its function.

10.2.5.3 The *prime service provider (4.36)* (*ASP* Class A) shall install/commission *IVS (4.26)* and maintain *IVS* and any associated equipment (such as that required for *driver (4.19)* identification).

10.2.5.4 The *application service provider (4.5)* (*ASP* Class A or B) shall develop the *TARV VPF* application service or use a *VPF* application service provided by the *ASP* Class C or D.

10.2.5.5 The *vehicle parking facility (4.52) service provider (4.42)* (*VPF*SP) (*ASP* Class C or D) shall develop its *VPF* application service and associated on-line software.

10.2.5.6 The *application service provider (4.5)* (*ASP* Class A or B) shall contract with the *user (4.47)* (normally *operator (4.34)* but in some instantiations also with *driver (4.19)*).

10.2.5.7 The *user (4.47)*, possibly via the *ASP* Class A or B shall contract with the *VPF manager* (*ASP* Class C or D) and make arrangements for payment of relevant fees for using the *VPF*.

10.2.5.8 The *service provider (4.42)* Class C shall be responsible to provide the application service to the *user (4.47)* as specified in its service offering.

10.2.5.9 The *operator (4.34)* shall be responsible to provide the *regulated vehicle (4.39)*.

10.2.5.10 The *operator (4.34)* shall be responsible to pay fees required by *jurisdiction (4.30), prime service provider (4.36)*, *application service provider (4.5),* and *VPF (4.52) service provider (4.42).*

10.2.5.11 The *driver (4.19)* shall be responsible to follow instructions.

10.2.5.12 Security seal(s) where used shall clearly display signs of any unauthorised access, either visually and/or physically. The *operator (4.34)* shall be responsible for seals used throughout the journey. However, for unsealed vehicles, the *VPF (4.52)* manager may choose to offer temporary sealing at the *VPF* entry point.

10.2.5.13 The *ASP* Class C shall determine its own classification of vehicles, but shall make that classification and associated tariffs clear in advertising *ITS services (4.27)*. However, where 'Axle Group Identifiers' are used to identify individual axle groups and hence the combination of the *regulated vehicle (4.39)* and its classification, each 'Axle Group ID' shall uniquely identify an axle group, and the same types of axle groups shall have the same alphanumeric prefix of length three (Table 2). For example, prefixes PS1, PD2, T43 and T23 shall indicate a standard B-double.

Table 2 — Axle Group ID prefixes

Axle group type	Number of axles	Axle Group ID prefix
Rigid Steer	1	RS1
Rigid Steer	2	RS2
Rigid Drive	1	RD1
Rigid Drive	2	RD2
Rigid Drive	3	RD3
Prime mover (4.35)	1	PS1
Prime mover (4.35)	1	PD1
Prime mover (4.35)	2	PD2
Prime mover (4.35)	3	PD3
Dolly	1	DO1
Dolly	2	DO2
Dolly	3	DO3
Pig Trailer	1	PT1
Pig Trailer	2	PT2
Pig Trailer	3	PT3
Trailer 20 foot	1	T21
Trailer 20 foot	2	T22
Trailer 20 foot	3	T23
Trailer 20 foot	4	T24
Trailer 40 foot	1	T41
Trailer 40 foot	2	T42
Trailer 40 foot	3	T43
Trailer 40 foot	4	T44
Special	(to be determined)	SPE

10.3 TARV VPF service procedures

10.3.1 Registration procedures incoming vehicles

The registration procedures required for *access (4.1)* to and use of an *VPF (4.52)* shall be a matter of commercial decision and the requirements of the local *jurisdiction (4.30),* and this part of ISO 15638 does not specify such systems nor their total requirements. However, for interoperability and the ability to support communications between *VPF* managers, *IVS (4.26)* of vehicles, and *application service providers (4.5)* (Class A,B, and D) some capabilities shall, if they are required, be specified and presented in a consistent way as determined herein.

It will be required in most cases that registration procedures will include the logging of licence plate number of truck/tractor and trailer. Within an *VPF (4.52)* the *driver (4.19)* and vehicle have to be clearly linked to ensure that *drivers* do not leave with a different prime mover or trailer(s), and so *driver* identification has to be specified and presented consistently.

The registration of both vehicles and pedestrians at the entrances and exits is likely to be an essential operation for a secure truck park. These are the main points of flow within a truck park. Therefore, procedures may be expected to cover the logging of the licence plate number of a vehicle and trailer. This part of ISO 15638 specifies only data concepts that may be used to communicate between the *VPF (4.52)* manager and the *regulated vehicle (4.39)*.

NOTE How this is achieved is a decision for the truck park *operator (4.34)*. e.g. a simple system may just issue a ticket to a *driver (4.19)* and only that ticket will allow the *regulated vehicle (4.39)* to leave the truck park. Other systems may offer communication with the *regulated vehicle IVS (4.26)*, and measures such as measuring the weight of the *regulated vehicle* to determine that the load has remained the same may be used.

10.4 Sequence of operations for TARV VPF - Service elements

10.4.1 VPF SE1: Service Group 1: Information to users and fleet managers

Not specified: outside the scope of this Part of ISO 15638.

10.4.2 VPF SE2: Service Group 2: Information to drivers on the road

Booking reservation service providing data to *drivers (4.19)* en-route advising the availability of vehicle parking at nominated or closest-to provided location. The form of this application service advertisement is not defined. However, in order to provide customised detail of available vehicle parking the *driver (4.19)* (or *ASP* Class A or B on his behalf) shall provide at least:

Desired parking location country (4.34) code as	<*VPF*1><country>
Desired parking location town or town/road combination (4.35)	<*VPF*2><parkingLocation>
Vehicle identification and classification ‘	<*VPF*3><basicVehicleData>
Requested time of arrival	<*VPF* 4><arrTime>
Requested time of departure	<*VPF* 5><depTime>
Required local *jurisdiction (4.30)* data	<*VPF* 6><jurData>

10.4.3 VPF SE3: Service Group 3: Pre-booking by application service provider or user

Not specified: outside the scope of this Part of ISO 15638.

10.4.4 VPF SE4: Service Group 4: Pre-booking by driver via ASP Class A or ASP Class B

Pre-booking by *driver (4.19)* via *ASP* Class A or *ASP* Class B. In order to provide customised detail of available vehicle parking the *driver* or his *application service provider (4.5)* shall provide at least:

Desired parking location country (4.34) code as	<*VPF*1><country>
Desired parking location town or town/road combination (4.35)	<*VPF*2><parkingLocation>
Vehicle identification and classification ‘	<*VPF*3><basicVehicleData>
Requested time of arrival	<*VPF* 4><arrTime>
Requested time of departure	<*VPF* 5><depTime>
Required local *jurisdiction (4.30)* data	<*VPF* 6><jurData>
Driver (4.19) Identification	<*VPF*7><driverId>

While not requiring nor defining its content, it is preferable that some additional information that has not passed over the wireless communication link is also provided to the *ASP* Class D system.

Once the reservation is confirmed, the *ASP* Class C shall, either directly or via the *ASP* Class D, provide at least the following information to the *ASP* Class A or B as appropriate:

Booking reference number or code	<*VPF*8><bookRef>
Booking confirmation detail	<*VPF*9><bookDetail>
Location of Ingress	<*VPF*10><IngressLoc>
Any additional data required by the *driver (4.19)* to gain *access (4.1)* to the facility (e.g. password, gate keycode)	<*VPF* 11><accessData>

10.4.5 VPF SE5: Service Group 5: Pre-booking by driver directly via ASP Class D

Pre-booking by *driver (4.19)* directly via *ASP* Class D. Shall provide at least the following information to the *Application service provider (4.5)*:

Desired parking location country (4.34) code as	<*VPF*1><country>
Desired parking location town or town/road combination (4.35)	<*VPF*2><parkingLocation>
Vehicle identification and classification ‘	<*VPF*3><basicVehicleData>
Requested time of arrival	<*VPF* 4><arrTime>
Requested time of departure	<*VPF* 5><depTime>
Required local *jurisdiction (4.30)* data	<*VPF* 6><jurData>
Driver (4.19) Identification	<*VPF*7><driverId>

Once the reservation is confirmed, the *ASP* Class C shall, either directly to the *driver (4.19)* or via the *ASP* Class D, provide at least the following information to the driver

Booking reference number or code	<*VPF*8><bookRef>
Booking confirmation detail	<*VPF*9><bookDetail>
Location of Ingress	<*VPF*10><IngressLoc>
Any additional data required by the *driver (4.19)* to gain *access (4.1)* to the facility (e.g. password, gate keycode)	<*VPF* 11><accessData>

10.4.6 VPF SE6: Service Group 6: Parking location within *VPF*

Where appropriate, Iif parking location data is to be provided to the *IVS (4.26)* of the *regulated vehicle (4.39)*, it shall be in the form:

Parking Bay location coordinates	<*VPF*12><pbLoc>
Parking Bay Reference number	<*VPF*13><pbRef>

10.4.7 VPF SE6: ‘Interrogated’ request for vehicle consignment data

10.4.7.1 An interrogating ITS-station shall request ADR specific data as determined in ISO15638-6 clauses 7.1 and 8.1.2.

10.4.7.2 In the event that the IVS of a vehicle receives a wireless interrogation requesting vehicle data, the interrogator shall also provide at the time of the request, a unique 8 byte reference number (URef), and a destination IPv6 address (ReqDest) where it requests the data to be sent.

10.4.7.3 On receipt of the request the IVS shall acknowledge the request with the appropriate ACKnowledgement defined in 8.3.5 of ISO15638-6, <F>, which acknowledges that a request for vehicle data has been received.

10.4.7.4 The IVS shall then close the communication session.

10.4.7.5 The IVS shall then open a new communication session using an available and appropriate CALM wireless medium.

10.4.7.6 The IVS shall then send the datafile (as defined in 10.4 above) to a predetermined destination IPv6 (internet) address that has previously been stored in the memory of the data pantry by its ASP, together with the URef and ReqDest provided by the interrogator.

10.4.7.7 On successful receipt of the data, the recipient at the predetermined destination IPv6 address shall send an acknowledgement <VPX> to the IVS.

10.4.7.8 On receipt of the acknowledgement <VPX> the IVS shall close its communication session.

10.4.7.9 The ASP shall be responsible to verify that the interrogation is legitimate, appropriate and from an accepted source, and having verified this, shall be responsible to send the data to the interrogator requested IPv6 address. The means and detail of how this is achieved is outside the scope of this part of ISO 15638.

10.5 Generic TARV VPF data naming content and quality

The process to obtain *basic vehicle data (4.12)* (*TARV LDT (4.31)*) data content shall be as defined in 8.3 of ISO 15638-6 and ISO 15638-5.

10.6 Specific TARV VPF data naming content and quality

The process to obtain *basic vehicle data (4.12)* (*TARV LDT (4.31)*) data content shall be as defined in 8.3 of ISO 15638-6 and Clause 8.4 of ISO 15638-5.

The electronic records declared and stored by the *IVS (4.26)* shall be authenticated, have integrity and be secure from interception or corruption.

The formal data content of a *VPF* record shall be as shown in Table 3.

Table 3 — Formal data content of a VPF record

FILE TYPE		Format of file name	Notes/Source
VPF	Mandatory	<*VPF*><YYMMDD><hhmmss><vehicle registration number> Example *VPF* 110316 070603 KV76WRR As: *VPF*110316 070603KV76WRR	Clause 10. (Vehicle Parking Facility file [*VPF* file])

Number	Data concept name	Use	Format	Notes/Source
VPF0	IVS ID	Mandatory	AN (9)	IVS identifier as defined in ISO 15638-5
*VPF*1	<country>	Mandatory	*Desired parking location country (4.34)* code as <*VPF*-1><alphanumeric, 3>	3 digit telephone country code <*VPF*1>N(3)
*VPF*2	<parkingLocation>	Mandatory	*Desired parking location town or town/road combination (4.35)* <*VPF*2><alphanumeric, 30> Example <*VPF*2><Bordeaux A10-A63;>	Up to 30 character alphanumeric with ';' terminator <*VPF*2>AN(30)
*VPF*3	, <basicVehicleData>	Mandatory	Vehicle identification and classification '<*VPF*3><*basic vehicle data (4.12)*' as defined in ISO 15638-5, Clauses 8.3.6, 8.3.7 and 8.4)>	<*VPF*3>AN(<LENGTH>)<data>
*VPF*4	<arrTime>	Mandatory	Requested time of arrival <*VPF* 4><yyyymmddhhmm>	<*VPF*4>N(12)

*VPF*5	<depTime>	Mandatory	Requested time of departure <*VPF* 5><yyyymmddhhmm>	<*VPF*5>N(12)
*VPF*6	<jurData>	Mandatory	Required local *jurisdiction (4.30)* data (as determined by local *jurisdiction*) <*VPF* 6><LENGTH as number of alphanumeric characters including spaces><data>	<*VPF*6>AN(<LENGTH>)<data>
*VPF*7	<driverId>	Mandatory	*Driver (4.19)* licence identification As <*VPF7*><driverlicencenumber><country> <AN(20)> <telephone countrycode <N(3)>> EXAMPLE <WILLI502139RK9MA85><440> As <*VPF*7>WILLI502139RK9MA85440	. <*VPF7*>AN(23)
*VPF*8	<bookRef>	Mandatory	Booking reference number or code (as determined by *VPF manager*) <*VPF*8><LENGTH><alphanumeric, LENGTH>	<*VPF*8>AN(<LENGTH>)<data>
*VPF*9	<bookDetail>	Mandatory	Booking details (as determined by *VPF manager*) <*VPF*9><LENGTH><alphanumeric, LENGTH>	<*VPF*9>AN(<LENGTH>)<data>
*VPF*10	<IngressLoc>	Mandatory	Location of Ingress location shall be calculated as specified in ISO 15638-5 Clauses 8.3.11 and 8.4	<*VPF*10>AN(<LENGTH>)<data>
*VPF*11	<accessData>	Mandatory	Any additional data required by the *driver (4.19)* to gain access to the facility (e.g. password, gate keycode) as determined by *VPF manager*) <*VPF*8><LENGTH><alphanumeric, LENGTH>	<*VPF*11>AN(<LENGTH>)<data>
*VPF*12	<Parking Bay location coordinates>	Optional	Location of Parking Bay location shall be calculated as specified in ISO 15638-5 Clauses 8.3.11 and 8.4	<*VPF*12>AN(<LENGTH>)<data>
VPF 13	<Parking Bay Reference Number>	Optional	Location of Parking bay, internal reference position as per physical marking	<*VPF*13>AN(<LENGTH>)<data>
VPF14	IVS ID	Mandatory	AN (9)	IVS identifier as defined in ISO 15638-5 (to indicate end of *consignment (4.15)* data, as this data will vary from journey to journey)

In the event that data is sent in response to an interrogation requesting data, the following data shall be appended:

Number	Data concept name	Use	Format	Notes/Source

VPF15	Uref	Mandatory	AN (8)	An 8 byte reference provided by the interrogator requesting the data. The alphanumeric or binary content of which is unspecified by ISO 15638, but is intended to be used by the interrogator to provide a unique reference to its request for data
VPF16	ReqDes	Mandatory	35 Bytes	Requested Destination IPv6 address for the data to be sent as: scheme://domain:port/path?query_string#fragment_id i.e.: The scheme name (commonly called protocol), followed by :// then, depending on scheme, a domain name (alternatively, IP address) : a port number, and / the path of the resource to be fetched or the program to be run. If the scheme name is http, the 'http://' is assumed e.g: www.example.com/path/to/name https://example.com/47.35868 telnet://192.0.2.16:80/

10.7 TARV VPF application service specific provisions for quality of service

The integrity of the data is important, and other sensors as well as parameters may then be required based on the approaches and techniques used to provide assurance of the quality of the data. The generic quality of service provisions that are specified in 10.4 are defined in ISO 15638-6 and ISO 15638-5.

Instantiation specific requirements shall be part of the regulation of the *jurisdiction (4.30).* However, in defining such requirements *jurisdictions* shall wherever possible, use performance based or functionally *specifications (4.44)* in order to avoid locking requirements into technologies that will become obsolete.

NOTE Having prescribed integrity and its parameters into an operational system, it is harder to move to other integrity indicators when new technologies come along.

See also Clause 9 above for general quality of service requirements.

10.8 TARV VPF application service specific provisions for test requirements

There are no specific provisions for test requirements specified in this Technical Specification version of this document.

10.9 ADRm application specific rules for the approval of IVSs and 'Service Providers'

As 9.16.

11 Declaration of patents and intellectual property

This part of ISO 15638 contains no known patents or intellectual property other than that which is implicit in the media standards referenced herein and in ISO 15638-2. While the *CALM* standards themselves are free of patents and intellectual property, *CALM* in many cases relies on the use of public networks and IPR exists in many of the public network media standards. The reader is referred to those standards for the implication of any patents and intellectual property.

Application services (4.4) specified within this part of ISO 15638 and ISO 15638-7 contain no direct patents nor intellectual property other than the copyright of ISO. However, national, regional or local instantiations of any the applications services defined in this part of ISO 15638 and ISO 15638-7, or of the generic vehicle information defined in ISO 15638-5, the security requirements contained in ISO 15638-4, or the requirements of ISO 15638-3, may have additional requirements which may have patent or intellectual property implications. The reader is referred to the regulation regime of the *jurisdiction (4.30)* and its regulations for instantiation in this respect.

Annex A
(informative)

Independent testing of the protocols defined in this Part of ISO 15638

A.1 Objectives

To test the validity of TARV standards it is necessary to simulate the TARV transactions. These are of two types:

I. Instigation

a) The IVS of a vehicle establishes a new communication using one of (and must be tested for each of) several wireless media defined below.

b) The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address

c) The vehicle sends the datafile to the predetermined destination IPv6 (internet) address

d) Recipient address sends acknowledgement

e) IVS closes the communication on receipt of acknowledgement

II. Interrogation

III. The IVS of a vehicle receives a wireless interrogation requesting a packet of data.

a) The IVS of a vehicle is switched on but is not connected

b) The IVS of a vehicle receives a wireless interrogation requesting a packet of data.

c) On receipt it acknowledges the request (ACK)

d) It closes the communication

e) Opens a new communication session using one of (and must be tested for each of) several wireless media defined below.

f) Sends the datafile to a predetermined destination IPv6 (internet) address

g) Recipient address sends acknowledgement

h) IVS Closes the communication on receipt of acknowledgement

These scenarios need to be tested using each of 2G, 3G, WiFi, 5.9GHz (IEEE802.11) using the same data

A number of different datafiles (of different length) and acknowledgements need to be sent, which differ according to the application service. Each of the sequences defined below need to be tested.

In respect of ‘interrogation’ scenarios the ability to receive the interrogation on one medium (esp. 5.9 GHz) and to instigate the subsequent message using a different medium needs to be tested.

Preconditions, Assumptions and Simulations

1. The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.)

2. CALM and media choice are assumed, and not s.u.t.

3. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, Mesh WiFi, 5.9GHz (IEEE 802.11p)

4. The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated

5. The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

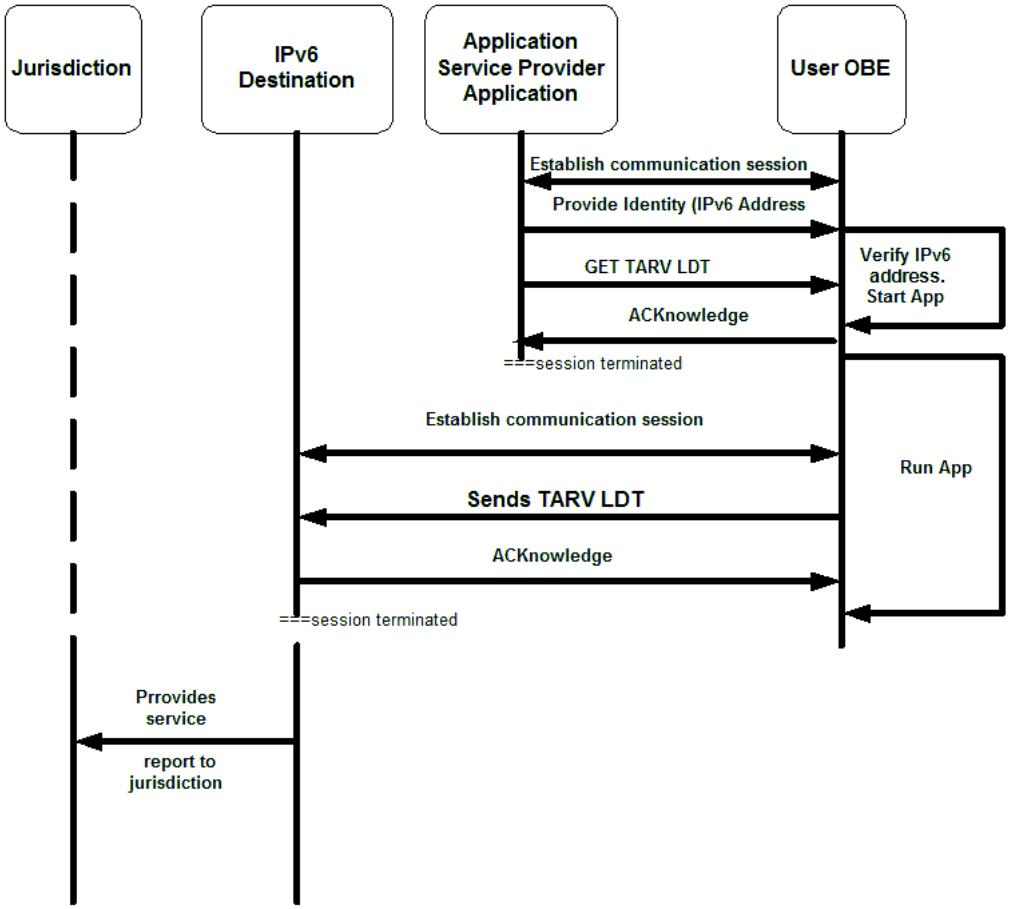

Figure 1 — Communications sequences to obtain TARV LDT

Application Services where the verity of the communication needs to be physically tested

VAM	*vehicle access monitoring*
RTM	*remote electronic tachograph monitoring*
EMS	*emergency messaging system*

DWR *driver work records* (work and rest hours compliance)

VMM *vehicle mass monitoring*

MRC *'mass' data for regulatory control and management (no test - data as VMM)*

VAC *vehicle access control (no test - data as VAM)*

VLM *vehicle location monitoring*

VSM *vehicle speed monitoring*

CLM *consignment and location monitoring*

ADR *Accord Dangereuses par Route (Dangerous Goods) monitoring*

VPF *vehicle parking facilities*

A.2 TEST SCRIPT SERVICE: VPF

TEST 11.1 .1: VPF– via 2G. Instigated

STEP 11.1.1.1 IVS instigates a communication session using 2G media to predetermined destination IP address
AS API IPv6 address
As AS 00000000 00000000 xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx
Example: PSP 128..16511 1050:0000:0000:0000:0005:0600:300c:326b

Using ',' as a datafield separator

Table A.1 — Formal data content of a VPF record

FILE TYPE		Format of file name	Notes/Source
VPF	Mandatory	<*VPF*><YYMMDD><hhmmss><vehicle registration number> Example *VPF* 110316 070603 KV76WRR As: *VPF*110316 070603KV76WRR	Clause 21. (Vehicle Parking Facilities file [*VPF* file])

Number	Data concept name	Use	Format	Notes/Source
VPF0	IVS ID	Mandatory	AN (9)	IVS identifier as defined in ISO 15638-5
*VPF*1	<country>	Mandatory	*Desired parking location country (4.34)* code as <*VPF*-1><alphanumeric, 3>	3 digit telephone country code <*VPF*1>N(3)

*VPF*2	<parkingLocation>	Mandatory	*Desired parking location town or town/road combination (4.35)* <*VPF2*><alphanumeric, 30> Example <*VPF2*><Bordeaux A10-A63;>	Up to 30 character alphanumeric with ';' terminator <*VPF*2>AN(30)
*VPF*3	, <basicVehicleData>	Mandatory	Vehicle identification and classification '<*VPF*3><*basic vehicle data (4.17)*' as defined in ISO 15638-5, Clauses 8.3.6, 8.3.7 and 8.4)>	<*VPF*3>AN(<LENGTH>)<data>
*VPF*4	<arrTime>	Mandatory	Requested time of arrival <*VPF* 4><yyyymmddhhmm>	<*VPF*4>N(12)
*VPF*5	<depTime>	Mandatory	Requested time of departure <*VPF* 5><yyyymmddhhmm>	<*VPF*5>N(12)
*VPF*6	<jurData>	Mandatory	Required local *jurisdiction (4.52)* data (as determined by local *jurisdiction*) <*VPF* 6><LENGTH as number of alphanumeric characters including spaces><data>	<*VPF*6>AN(<LENGTH>)<data>
*VPF*7	<driverId>	Mandatory	*Driver (4.36)* licence identification As <*VPF* 7><driverlicencenumber><country> <AN(20)> <telephone countrycode <N(3)>> EXAMPLE <WILLI502139RK9MA85><440> As <*VPF*7>WILLI502139RK9MA85440	. <*VPF*7>AN(23)
*VPF*8	<bookRef>	Mandatory	Booking reference number or code (as determined by *SPF manager*) <*VPF*8><LENGTH><alphanumeric, LENGTH>	<*VPF*8>AN(<LENGTH>)<data>
*VPF*9	<bookDetail>	Mandatory	Booking details (as determined by *SPF manager*) <*VPF*9><LENGTH><alphanumeric, LENGTH>	<*VPF*9>AN(<LENGTH>)<data>
*VPF*10	<IngressLoc>	Mandatory	Location of Ingress location shall be calculated as specified in ISO 15638-5 Clauses 8.3.11 and 8.4	<*VPF*10>AN(<LENGTH>)<data>
*VPF*11	<accessData>	Mandatory	Any additional data required by the *driver (4.36)* to gain access to the facility (e.g. password, gate keycode) as determined by *SPF manager*) <*VPF*8><LENGTH><alphanumeric, LENGTH>	<*VPF*11>AN(<LENGTH>)<data>
*VPF*12	<Parking Bay location coordinates>	Optional	Location of Parking Bay location shall be calculated as specified in ISO 15638-5 Clauses 8.3.11 and 8.4	<*VPF*12>AN(<LENGTH>)<data>

VPF 13	<Parking Bay Reference Number>	Optional	Location of Parking bay, internal reference position as per physical marking	<*VPF*13>AN(<LENGTH>)<data>
VPF14	IVS ID	Mandatory	AN (9)	IVS identifier as defined in ISO 15638-5 (to indicate end of consignment data, as this data will vary from journey to journey)

FILENAME: <VPF110316 070603KV76WRR>

FILE CONTENT:

<D0o3M45S,44,LUTON^M1^J9;,AaaSs0,0,xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx,128..16511,1G1JF27W8 GJ178227,000000,1297339499,0x0A5D3770, 0x027E2938,0000,Sat8,0,123,Ign 1,000,000,010326 UKPeter Jones,01,02,03a,h1,120325,010326 124538 Peter Jones 01,02,h1,120325, 201205011840,201205020700, 9,localdata, WILLI402137RK9MA85,440,6,bkg001,16,mybookingdetails, s0123110316 x0A5D3770 0x027E2938 >0123, 7,key0123,30, s0123110316 x0A5D3770 0x027E2938 >0123, 3,N27,D0o3M45S >

STEP 11.1.1.2 IVS sends file named <VPF110316 070603KV76WRR>

<D0o3M45S,44,LUTON^M1^J9;,AaaSs0,0,xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx,128..16511,1G1JF27W8 GJ178227,000000,1297339499,0x0A5D3770, 0x027E2938,0000,Sat8,0,123,Ign 1,000,000,010326 UKPeter Jones,01,02,03a,h1,120325,010326 124538 Peter Jones 01,02,h1,120325, 201205011840,201205020700, 9,localdata, WILLI402137RK9MA85,440,6,bkg001,16,mybookingdetails, s0123110316 x0A5D3770 0x027E2938 >0123, 7,key0123,30, s0123110316 x0A5D3770 0x027E2938 >0123, 3,N27,D0o3M45S >

STEP 11.1.1.3 Destination address sends ACK <VPX>

STEP 11.1.1.4 IVS receives ACK <VPX>

STEP 11.1.1.5 IVS closes communication session

CTP 11.1.1 Instigated Vehicle Parking Facilities using 2G

SUT Reference	Instigated send of Vehicle Parking Facilities using 2G
CTP/11.1.1	
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SUT Test Objective	The IVS of a vehicle establishes a new communication using one of (and must be tested for each of) several wireless media defined below The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address The vehicle sends the datafile to the predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS closes the communication on receipt of acknowledgement
CTP Origin	CSI
Reference requirement	ISO 15638-19
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulate The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
11.1.1.1	1	IVS instigates a communication session using selected media (2G) to predetermined destination IP address	Session established
11.1.1.2	2	IVS sends file named <VPF110316 070603KV76WRR> <START> <D0o3M45S,44,LUTON^M1^J9;,AaaSs0,0,xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx,128..16511,1G1JF27W8GJ178227,000000,1297339499,0x0A5D3770, 0x027E2938,0000,Sat8,0,123,Ign 1,000,000,010326 UKPeter Jones,01,02,03a,h1,120325,010326 124538 Peter Jones 01,02,h1,120325, 201205011840,201205020700, 9,localdata, WILLI402137RK9MA85,440,6,bkg001,16,mybookingdetails, s0123110316 x0A5D3770 0x027E2938 >0123, 7,key0123,30, s0123110316 x0A5D3770 0x027E2938 >0123, 3,N27,D0o3M45S > <END>	File sent and arrives correctly at destination

11.1.1.3	3	Destination address sends ACK <VPX>	
11.1.1.4	4	IVS receives ACK <VPX>	File received and ACK <VPX> sent
11.1.1.5	5	IVS closes communication session	Communication session closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

.

TEST RESULT: CTP 11.1.1	PASS / FAIL	Date: 29th June 2102
Signature/initials 	PASS	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

CTP 11.1.2 Interrogated Vehicle Parking Facilities using 2G

SUT Reference	Interrogated send of Vehicle Parking Facilities using 2G
CTP/11.1.2	
SUT Test Objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data. The IVS of a vehicle is switched on but is not connected to an active wireless communication session The IVS of a vehicle receives a 2G wireless interrogation requesting a packet of data. On receipt it acknowledges the request (ACK) It closes the communication Opens a new communication session using one of (and must be tested for each of) several wireless media defined below. Sends the datafile to a predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS Closes the communication on receipt of acknowledgement
CTP Origin	CEN
Reference requirement	ISO 15638-19
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
11.1.2.1	1	session connected (incoming call)	Call in progress
11.1.2.2	2	Caller sends data request command (GPRS, EDGE etc) GET VPF	Data request sent
11.1.2.3	3	IVS acknowledges request by returning ACKnowledgement <P>	ACK<P> received
11.1.2.4	4	IVS closes communication session	Communication session closed
11.1.2.5	5	IVS instigates a communication session using selected media to predetermined destination IP address	Communication session successfully opened
11.1.2.5	6	IVS sends file named <VPF110316 070603KV76WRR> <START> <D0o3M45S,44,LUTON^M1^J9;,AaaSs0,0,xxxx:xxxx:xxxx:xx	File sent and arrives correctly at destination

		xx:xxxx:xxxx:xxxx:xxxx,128..16511,1G1JF27W8GJ178227,000000,1297339499,0x0A5D3770, 0x027E2938,0000,Sat8,0,123,Ign 1,000,000,010326 UKPeter Jones,01,02,03a,h1,120325,010326 124538 Peter Jones 01,02,h1,120325, 201205011840,201205020700, 9,localdata, WILLI402137RK9MA85,440,6,bkg001,16,mybookingdetails, s0123110316 x0A5D3770 0x027E2938 >0123, 7,key0123,30, s0123110316 x0A5D3770 0x027E2938 >0123, 3,N27,D0o3M45S > <END>	
11.1.2.6	7	Destination address sends ACK <VPX>	
11.1.2.7	8	IVS receives ACK <VPX>	File received and ACK <VPX> sent
11.1.2.8	9	IVS closes communication session	Communication session closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

.

TEST RESULT: CTP 11.1.2	PASS / FAIL	Date: 29th June 2102
Signature/initials 	PASS	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

CTP 11.1.3 Interrogated Vehicle Parking Facilities using 5.9GHz and responding using 2G or 3G

SUT Reference	Interrogated Vehicle Parking Facilities using 5.9 GHz and send of Vehicle Parking Facilities using 2G or 3G
CTP/11.1.3	
SUT Test Objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data. The IVS of a vehicle is switched on but is not connected to an active wireless communication session The IVS of a vehicle receives a 5.9GHz (IEEE 802.11p) wireless interrogation requesting a packet of data. On receipt it acknowledges the request (ACK) It closes the communication Opens a new communication session using 2G or 3G. Sends the datafile to a predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS Closes the communication on receipt of acknowledgement
CTP Origin	CEN
Reference requirement	ISO 15638-19
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
11.1.3.1	1	session connected (incoming call) using 5.9 Ghz (IEEE 802.11p)	Call in progress
11.1.3.2	2	Caller sends data request command GET VPF	Data request sent
11.1.3.3	3	IVS acknowledges request by returning ACKnowledgement <P>	ACK<P> received
11.1.3.4	4	IVS closes communication session	Communication session closed
11.1.3.5	5	IVS instigates a communication session using 2G or 3G	Communication session successfully opened
11.1.3.5	6	IVS sends file named <VPF110316 070603KV76WRR> <START> <D0o3M45S,44,LUTON^M1^J9;,AaaSs0,0,xxxx:xxxx:xxxx:xx	File sent and arrives correctly at destination

		xx:xxxx:xxxx:xxxx:xxxx,128..16511,1G1JF27W8GJ178227,000000,1297339499,0x0A5D3770, 0x027E2938,0000,Sat8,0,123,Ign 1,000,000,010326 UKPeter Jones,01,02,03a,h1,120325,010326 124538 Peter Jones 01,02,h1,120325, 201205011840,201205020700, 9,localdata, WILLI402137RK9MA85,440,6,bkg001,16,mybookingdetails, s0123110316 x0A5D3770 0x027E2938 >0123, 7,key0123,30, s0123110316 x0A5D3770 0x027E2938 >0123, 3,N27,D0o3M45S > <END>	
11.1.3.6	7	Destination address sends ACK <VPX>	
11.1.3.7	8	IVS receives ACK <VPX>	File received and ACK <VPX> sent
11.1.3.8	9	IVS closes communication session	Communication session closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

.

TEST RESULT: CTP 11.1.3	PASS / FAIL	Date: 29th June 2102
Signature/initials 	PASS	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

CTP 11.2.1 Instigated Vehicle Parking Facilities using 3G

SUT Reference	Instigated send of Vehicle Parking Facilities using 3G
CTP/11.2.1	
SUT Test Objective	The IVS of a vehicle establishes a new communication using one of (and must be tested for each of) several wireless media defined below. The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address The vehicle sends the datafile to the predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS closes the communication on receipt of acknowledgement
CTP Origin	CSI
Reference requirement	ISO 15638-19
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated. The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
11.2.1.1	1	IVS instigates a communication session using selected media (3G) to predetermined destination IP address	Session established
11.2.1.2	2	IVS sends file named <VPF110316 070603KV76WRR> <START> <D0o3M45S,44,LUTON^M1^J9;,AaaSs0,0,xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx,128..16511,1G1JF27W8GJ178227,000000,1297339499,0x0A5D3770, 0x027E2938,0000,Sat8,0,123,Ign 1,000,000,010326 UKPeter Jones,01,02,03a,h1,120325,010326 124538 Peter Jones 01,02,h1,120325, 201205011840,201205020700, 9,localdata, WILLI402137RK9MA85,440,6,bkg001,16,mybookingdetails, s0123110316 x0A5D3770 0x027E2938 >0123, 7,key0123,30, s0123110316 x0A5D3770 0x027E2938 >0123, 3,N27,D0o3M45S > <END>	File sent and arrives correctly at destination
11.2.1.3	3	Destination address sends ACK <VPX>	
11.2.1.4	4	IVS receives ACK <VPX>	File received and ACK

			<VPX> sent
11.2.1.5	5	IVS closes communication session	Communication session closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

.

TEST RESULT: CTP 11.2.1	PASS / FAIL	Date: 29th June 2102
Signature/initials 	PASS	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

CTP 11.2.2 Interrogated at 5.9 GHz and send of Vehicle Parking Facilities using 3G

SUT Reference	5.9 GHz Interrogated and send of Vehicle Parking Facilities using 3G
CTP/11.2.2	
SUT Test Objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data. The IVS of a vehicle is switched on but is not connected to an active wireless communication session The IVS of a vehicle receives a wireless interrogation requesting a packet of data. On receipt it acknowledges the request (ACK) It closes the communication Opens a new communication session using one of (and must be tested for each of) several wireless media defined below. Sends the datafile to a predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS Closes the communication on receipt of acknowledgement
CTP Origin	CEN
Reference requirement	ISO 15638-19
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
11.2.2.1	1	session connected (incoming call) using 5.9 Ghz (IEEE 802.11p)	Call in progress
11.2.2.2	2	Caller sends data request command GET VPF	Data request sent
11.2.2.3	3	IVS acknowledges request by returning ACKnowledgement <P>	ACK<P> received
11.2.2.4	4	IVS closes communication session	Communication session closed
11.2.2.5	5	IVS instigates a communication session using selected media (2G or 3G) to predetermined destination IP address	Communication session successfully opened
11.2.2.5	6	IVS sends file named <VPF110316 070603KV76WRR> <START> <D0o3M45S,44,LUTON^M1^J9;,AaaSs0,0,xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx,128..16511,1G1JF27W8GJ178227,000000,129	File sent and arrives correctly at destination

		7339499,0x0A5D3770, 0x027E2938,0000,Sat8,0,123,Ign 1,000,000,010326 UKPeter Jones,01,02,03a,h1,120325,010326 124538 Peter Jones 01,02,h1,120325, 201205011840,201205020700, 9,localdata, WILLI402137RK9MA85,440,6,bkg001,16,mybookingdetails, s0123110316 x0A5D3770 0x027E2938 >0123, 7,key0123,30, s0123110316 x0A5D3770 0x027E2938 >0123, 3,N27,D0o3M45S ><END>	
11.2.2.6	7	Destination address sends ACK <VPX>	
11.2.2.7	8	IVS receives ACK <VPX>	File received and ACK <VPX> sent
11.2.2.8	9	IVS closes communication session	Communication session closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

.

TEST RESULT: CTP 11.2.2	PASS / FAIL	Date: 29th June 2102
Signature/initials 	PASS	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

CTP 11.3.1 Instigated Vehicle Parking Facilities using 802.11p (WAVE) 5.9 GHz

SUT Reference	Instigated Vehicle Parking Facilities using 802.11p (WAVE) 5.9 GHz
CTP/11.3.1	
SUT Test Objective	The IVS of a vehicle establishes a new communication using one of (and must be tested for each of) several wireless media defined below. The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address The vehicle sends the datafile to the predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS closes the communication on receipt of acknowledgement
CTP Origin	CSI
Reference requirement	ISO 15638-19
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
11.3.1.1	1	IVS instigates a communication session using selected media (5.9G) to predetermined destination IP address	Session established
11.3.1.2	2	IVS sends file named <VPF110316 070603KV76WRR> <START> <D0o3M45S,44,LUTON^M1^J9;,AaaSs0,0,xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx,128..16511,1G1JF27W8GJ178227,000000,1297339499,0x0A5D3770, 0x027E2938,0000,Sat8,0,123,Ign 1,000,000,010326 UKPeter Jones,01,02,03a,h1,120325,010326 124538 Peter Jones 01,02,h1,120325, 201205011840,201205020700, 9,localdata, WILLI402137RK9MA85,440,6,bkg001,16,mybookingdetails, s0123110316 x0A5D3770 0x027E2938 >0123, 7,key0123,30, s0123110316 x0A5D3770 0x027E2938 >0123, 3,N27,D0o3M45S > <END>	File sent and arrives correctly at destination
11.3.1.3	3	Destination address sends ACK <VPX>	
11.3.1.4	4	IVS receives ACK <VPX>	File received and ACK <VPX> sent
11.3.1.5	5	IVS closes communication session	Communication session

			closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

.

TEST RESULT: CTP 11.3.1	PASS / FAIL	Date: 29th June 2102
Signature/initials 	PASS	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

CTP 11.3.2 Interrogated Vehicle Parking Facilities using 802.11p (WAVE) 5.9 GHz

SUT Reference	Interrogated send of Vehicle Parking Facilities using 802.11p (WAVE) 5.9 GHz
CTP/11.3.2	
SUT Test Objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data. The IVS of a vehicle is switched on but is not connected to an active wireless communication session The IVS of a vehicle receives a wireless interrogation requesting a packet of data. On receipt it acknowledges the request (ACK) It closes the communication Opens a new communication session using one of (and must be tested for each of) several wireless media defined below. Sends the datafile to a predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS Closes the communication on receipt of acknowledgement
CTP Origin	CEN
Reference requirement	ISO 15638-19
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
11.3.2.1	1	session connected (incoming call) using 5.9 Ghz (IEEE 802.11p)	Call in progress
11.3.2.2	2	Caller sends data request command GET VPF	Data request sent
11.3.2.3	3	IVS acknowledges request by returning ACKnowledgement <P>	ACK<P> received
11.3.2.4	4	IVS closes communication session	Communication session closed
11.3.2.5	5	IVS instigates a communication session using 5.9GHz selected media to predetermined destination IP address	Communication session successfully opened
11.3.2.5	6	IVS sends file named <VPF110316 070603KV76WRR> <START> <D0o3M45S,44,LUTON^M1^J9;,AaaSs0,0,xxxx:xxxx:xxxx:xxxx:	File sent and arrives correctly at destination

		xxxx:xxxx:xxxx:xxxx,128..16511,1G1JF27W8GJ178227,000000, 1297339499,0x0A5D3770, 0x027E2938,0000,Sat8,0,123,Ign 1,000,000,010326 UKPeter Jones,01,02,03a,h1,120325,010326 124538 Peter Jones 01,02,h1,120325, 201205011840,201205020700, 9,localdata, WILLI402137RK9MA85,440,6,bkg001,16,mybookingdetails, s0123110316 x0A5D3770 0x027E2938 >0123, 7,key0123,30, s0123110316 x0A5D3770 0x027E2938 >0123, 3,N27,D0o3M45S > <END>	
11.3.2.6	7	Destination address sends ACK <VPX>	
11.3.2.7	8	IVS receives ACK <VPX>	File received and ACK <VPX> sent
11.3.2.8	9	IVS closes communication session	Communication session closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

.

TEST RESULT: CTP 11.3.2	PASS / FAIL	Date: 29th June 2102
Signature/initials 	PASS	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

CTP 11.4.1 Instigated Vehicle Parking Facilities using Mesh WiFi

SUT Reference	Instigated send of Vehicle Parking Facilities using Mesh WiFi
CTP/11.4.1	
SUT Test Objective	The IVS of a vehicle establishes a new communication using one of (and must be tested for each of) several wireless media defined below. The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address The vehicle sends the datafile to the predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS closes the communication on receipt of acknowledgement
CTP Origin	CSI
Reference requirement	ISO 15638-19
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated. The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
11.4.1.1	1	IVS instigates a communication session using selected media (Mesh WiFi) to predetermined destination IP address	Session established
11.4.1.2	2	IVS sends file named <VPF110316 070603KV76WRR> <START> <D0o3M45S,44,LUTON^M1^J9;,AaaSs0,0,xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx,128..16511,1G1JF27W8GJ178227,000000,1297339499,0x0A5D3770, 0x027E2938,0000,Sat8,0,123,Ign 1,000,000,010326 UKPeter Jones,01,02,03a,h1,120325,010326 124538 Peter Jones 01,02,h1,120325, 201205011840,201205020700, 9,localdata, WILLI402137RK9MA85,440,6,bkg001,16,mybookingdetails, s0123110316 x0A5D3770 0x027E2938 >0123, 7,key0123,30, s0123110316 x0A5D3770 0x027E2938 >0123, 3,N27,D0o3M45S > <END>	File sent and arrives correctly at destination
11.4.1.3	3	Destination address sends ACK <VPX>	

11.4.1.4	4	IVS receives ACK <VPX>	File received and ACK <VPX> sent
11.4.1.5	5	IVS closes communication session	Communication session closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

.

TEST RESULT: CTP 11.4.1	PASS / FAIL	Date: 29th June 2102
Signature/initials 	PASS	innoVITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

CTP 11.4.2 Interrogated Vehicle Parking Facilities using Mesh WiFi

SUT Reference	5.9 GHz Interrogated and send of Vehicle Parking Facilities using Mesh WiFi
CTP/11.4.2	
SUT Test Objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data. The IVS of a vehicle is switched on but is not connected to an active wireless communication session The IVS of a vehicle receives a wireless interrogation requesting a packet of data. On receipt it acknowledges the request (ACK) It closes the communication Opens a new communication session using one of (and must be tested for each of) several wireless media defined below. Sends the datafile to a predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS Closes the communication on receipt of acknowledgement
CTP Origin	CEN
Reference requirement	ISO 15638-19
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
11.4.2.1	1	session connected (incoming call) using 5.9 Ghz (IEEE 802.11p)	Call in progress
11.4.2.2	2	Caller sends data request command (GPRS, EDGE etc) GET VPF	Data request sent
11.4.2.3	3	IVS acknowledges request by returning ACKnowledgement <P>	ACK<P> received
11.4.2.4	4	IVS closes communication session	Communication session closed
11.4.2.5	5	IVS instigates a communication session using mesh WiFi selected media to predetermined destination IP address	Communication session successfully opened
11.4.2.5	6	IVS sends file named <VPF110316 070603KV76WRR>	File sent and arrives correctly at destination

		<START> <D0o3M45S,44,LUTON^M1^J9;,AaaSs0,0,xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx,128..16511,1G1JF27W8GJ178227,000000,1297339499,0x0A5D3770, 0x027E2938,0000,Sat8,0,123,Ign 1,000,000,010326 UKPeter Jones,01,02,03a,h1,120325,010326 124538 Peter Jones 01,02,h1,120325, 201205011840,201205020700, 9,localdata, WILLI402137RK9MA85,440,6,bkg001,16,mybookingdetails, s0123110316 x0A5D3770 0x027E2938 >0123, 7,key0123,30, s0123110316 x0A5D3770 0x027E2938 >0123, 3,N27,D0o3M45S > <END>	
11.4.2.6	7	Destination address sends ACK <VPX>	
11.4.2.7	8	IVS receives ACK <VPX>	File received and ACK <VPX> sent
11.4.2.8	9	IVS closes communication session	Communication session closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

.

TEST RESULT: CTP 11.4.2	PASS / FAIL	Date: 29th June 2102
Signature/initials 	PASS	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

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