BS EN 15213-1:2013

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Intelligent transport systems — After-theft systems for the recovery of stolen vehicles

Part 1: Reference architecture and terminology

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National foreword

This British Standard is the UK implementation of EN 15213-1:2013. It supersedes DD CEN/TS 15213-1:2005 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee EPL/278, Intelligent transport systems.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Intelligent transport systems - After-theft systems for the recovery of stolen vehicles - Part 1: Reference architecture and terminology

Systèmes de transport intelligents - Systèmes intervenant après un vol pour la récupération des véhicules - Partie 1 : Architecture de référence et terminologie

Intelligente Transportsysteme - Systeme für das Wiederfinden gestohlener Fahrzeuge - Teil 1: Referenzarchitektur und Begriffe

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Foreword

This document (EN 15213-1:2013) has been prepared by Technical Committee CEN/TC 278 “Road transport and traffic telematics”, the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2013, and conflicting national standards shall be withdrawn at the latest by December 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes CEN/TS 15213-1:2005.

It is derived from a suite of CEN Technical Specifications CEN/TS 15213-1 to -6 inclusive dealing with the tracking and recovery of stolen vehicles. Parts 1 to 5 inclusive have been upgraded to EN status without change. CEN/TS 15213-6:2011 remains a valid Technical Specification as of the date of this publication and will be considered for EN status in due course. All these documents remain related and should be read in conjunction according to the type of technology, product or service being considered.

EN 15213 consists of the following parts:

— EN 15213-1, *Intelligent transport systems — After-theft systems for the recovery of stolen vehicles — Part 1: Reference architecture and terminology* (the present document);

— EN 15213-2, *Intelligent transport systems — After-theft systems for the recovery of stolen vehicles — Part 2: Common status message elements*;

— EN 15213-3, *Intelligent transport systems — After-theft systems for the recovery of stolen vehicles — Part 3: Interface and system requirements in terms of short range communication system*;

— EN 15213-4, *Intelligent transport systems — After-theft systems for the recovery of stolen vehicles — Part 4: Interface and system requirements in terms of long range communication system*;

— EN 15213-5, *Intelligent transport systems — After-theft systems for the recovery of stolen vehicles — Part 5: Messaging interface*;

— CEN/TS 15213-6, *Road transport and traffic telematics — After-theft services for the recovery of stolen vehicles — Part 6: Test procedures*[1)].

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1) Part 6 awaits final evaluation and ratification as EN and until such time remains a valid part of this EN as CEN/TS 15213-6:2011.

Introduction

This European Standard was developed by CEN/TC 278 “Road transport and traffic telematics”, Working Group 14 (WG 14) on the subject of After Theft Systems for Vehicle Recovery (ATSVR).

WG 14 comprised representatives and experts from police, insurance associations (CEA), car manufacturers, transport associations, vehicle rental associations and ATSVR system and product providers. The work was also in cooperation with Europol and the European Police Cooperation Working Group (EPCWG).

This European Standard was developed to define an architecture within guidelines from CEN/TC 278 through which a level of interoperability can be achieved between Systems Operating Centres (SOC) and Law Enforcement Agencies (LEA), both nationally and internationally.

This will provide minimum standards of information and assurance to users as to the functionality of systems, thereby enabling the recovery of vehicles, detection of offenders and a reduction in crime.

This European Standard refers to the potential development of systems to enable law enforcement agencies to remotely slow and/or stop the engines of stolen vehicles. This situation remains and further information is available in 2012 CEN publication N2643 Feasibility Report on Remote Slow and Stop Technology, available from CEN/TC 278.

The other parts of EN 15213 should be read in conjunction with this document that distils the architecture and terminology profile generated by the internal technical reports of CEN/TC 278.

1 Scope

For many years, consumers, law enforcement agencies and insurers have been confronted with an ever-increasing number of vehicle thefts, both genuine thefts and insurance frauds, as well as the growing problem of increasing violence and threats against vehicle drivers.

Manufacturers have and will continue to introduce after-theft systems that will enable the police to recover stolen vehicles. Different techniques are being used for that purpose. This document refers to them by the generic name of After Theft Systems for Vehicle Recovery (ATSVR).

Standards for Automatic Vehicle Identification (AVI) and Automatic Equipment Identification (AEI) are being developed by CEN/TC 278/WG 12 in parallel with EN ISO 14814. This ATSVR standard does not prejudice that work and does not seek to establish parameters for future AVI/AEI standards. DSRC and AVI standards are seen as basic technology blocks for types of short-range ATSVR systems.

Certain specialised terms and definitions have been used in writing the ATSVR standards. This preliminary document aims to provide the preliminary framework of ATSVR concepts and definitions for the purpose of following ones. It will therefore:

— define the concepts and global architecture models for ATSVR and the appropriate terminology;

— identify the various elements that may comprise an ATSVR.

The events and associated information that are relevant to the situation prior to the registration of the theft are relevant to the total process, but may be subject to the laws of individual countries. Such events and associated information may be described in the standards to give clarity to the technical processes identified, which obviously does not presume on the prevailing legal conditions.

2 Normative references

Not applicable.

3 Terms and definitions

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

3.1 General definitions

3.1.1
ATSVR
After Theft System for Vehicle Recovery
system that comprises various technical elements that communicate and interact through various interfaces in accordance with standard procedures and transmission protocols in order to facilitate the recovery of a Registered Stolen Vehicle

Note 1 to entry: An ATSVR necessarily includes various human elements. For clarity, this document will identify interactions and interfaces that exist amongst the equipment and human elements operating within the system.

3.1.2
ATSVR user
individual, group or organisation that directly uses or interacts with an ATSVR

Note 1 to entry: The main users could be: Law Enforcement Agencies, Insurers, Car Manufacturers, System Service Providers and Vehicle Service Providers.

3.1.3
ATSVR detection equipment user
personnel who operate the *ATSVR Detection Equipment*

3.1.4
ATSVR information user
personnel who use the ATSVR data and information

3.1.5
ATSVR service provider
organisation that provides ATSVR Services for ATSVR Users

Note 1 to entry: An ATSVR Service Provider can operate all or part of the functions of an ATSVR. It will usually be distinct from a Law Enforcement Agency. It may also be known as a Private Security Company or ATSVR operator.

3.1.6
ATSVR equipment
equipment that either, individually or in combination with other equipment, performs one or more functions of an ATSVR or facilitates interfaces between the various elements of an ATSVR

3.1.7
ATSVR on-board equipment
OBE
equipment which is installed in or on the vehicle whose primary purpose is to allow that vehicle to be recovered in the event of theft and which may also indicate theft and record activity relevant to that detection

3.1.8
ATSVR detection equipment
DE
equipment which is used to perform various functions of an ATSVR and which may be stationary, portable or mobile

3.1.9
ATSVR system operating centre
SOC
System Operating Centre which functions as a control and management centre for an ATSVR

Note 1 to entry: It may, for example, be a commercial bureau, a government facility or law enforcement agency office. An SOC is distinct from the communications infrastructure, detection equipment and On-Board Equipment.

3.1.10
law enforcement agency
LEA
Agency or Organisation approved or appointed to have jurisdiction in a territory over the recovery of stolen vehicles

Note 1 to entry: It will usually refer to an official authority such as the Police Force or Customs Service.

3.1.11
ATSVR human interactions
human interactions are required to link different stages of the process, these human interactions obviously being outside the scope of standards

Note 1 to entry: Recovery process cannot be fully automatic. See Figure 3 — Human interactions for the ATSVR model.

3.1.12
ATSVR “human machine interface”
interaction mechanism between the user and the equipment, including the set of inputs, outputs and dialogue procedures (that concern all display, sound signals and command user)

Note 1 to entry: As technical supports of the Human Interface, the HMIs are subject to standardisation.

3.1.13
vehicle operators
individuals legally operating or driving a vehicle, not necessarily the vehicle's legal owner or registered keeper

3.1.14
unauthorised vehicle operators
individuals operating or driving a vehicle who have NOT been authorised by the registered owner or authorised agent of the vehicle to operate or drive the vehicle

Note 1 to entry: Individuals whose legal authority to use the vehicle has been withdrawn.

3.1.15
vehicles
wheeled or tracked conveyances including cars, motorcycles, trucks, trolley-buses, trailers, heavy construction vehicles and agricultural plant

3.1.16
target vehicle
registered stolen vehicle fitted with ATSVR OBE that is being sought

3.1.17
registered stolen vehicle
vehicle fitted with ATSVR OBE that has been reported as stolen or being used by an Unauthorised Vehicle Operator to a Law Enforcement Agency by the Vehicle Owner, by an Authorised Vehicle Operator, or by an ATSVR Service and that report having been accepted by the LEA caused the LEA to register the vehicle as stolen or as being used by an Unauthorised Vehicle Operator

Note 1 to entry: This is the official theft registration.

3.1.18
detected vehicle
Registered Stolen Vehicle fitted with an ATSVR OBE that has been detected by an item of DE

3.1.19
telecom operator
provider of telecommunications services not dedicated exclusively for an ATSVR System, but used in many application areas (e.g. Network Operator of a GSM, RDS, communication satellite, optical cable, PSTN network)

3.2 Basic ATSVR Functions

There are three basic ATSVR functions of **detection**, **location** and **identification** of a Registered Stolen Vehicle.

3.2.1
detection function
function to detect automatically or semi-automatically the location of a Registered Stolen Vehicle

Note 1 to Entry: This may be done by Signaling or by Consulting.

Note 2 to Entry: Detection by Signalling is where the OBE has been activated by a signal from an external source. This activation may come from a mobile or stationary source, which may be local to the vehicle (Short-Range) or at a distance from the vehicle (Long-Range). Once activated the OBE will transmit a signal that is capable of being picked up by ATSVR Detection Equipment located locally to the vehicle or at a distance from the vehicle. The transmitted signal may contain other relevant information.

Note 3 to Entry: Detection by Consulting is where an external item of Detection Equipment interrogates the OBE and the OBE responds by transmitting data to the DE. The DE then compares the received data with a database of Registered Stolen Vehicles, a data match confirms that a Registered Stolen Vehicle is present and further action can take place.

3.2.2
location function
function thanks to which, once the Registered Stolen Vehicle has been detected, its location can be established by one of the following functions:

— **Location by direct or indirect geographic co-ordinates** which is the process that establishes the general or precise location of the vehicle at a given point in time, which allows entitled persons to carry out their defined tasks of recovering;

— **Homing** (also known as Tracing or Relative Positioning) which is the process that periodically updates the range and direction of the detected vehicle from an intercepting vehicle over a period of time, thus allowing entitled personnel to approach or intercept the detected vehicle without the necessary use of landmarks or absolute geographic references;

— **Tracking** which is the process that periodically updates location and other information on the detected vehicle over a period of time and allows entitled personnel to monitor location of the detected vehicle, approach or intercept it

3.2.3
identification function
function which allows the unequivocal identification of a vehicle as being the Registered Stolen Vehicle

Note 1 to entry: This may be by means of a secure process that allows the unique vehicle data to be read, e.g. VIN, registration number, and other data, e.g. theft status, model, colour and, if relevant, position.

Note 2 to entry: **Discrimination** is the process that enables entitled personnel unambiguously to differentiate the detected vehicle from other surrounding vehicles.

Note 3 to entry: **Recognition** is the process that enables entitled personnel correctly to select the detected vehicle through visual observation based on knowledge of the vehicle particulars such as make, model, colour and other specific observable features.

Note 4 to entry: **Indirect Identification** results from data coming from a central or remote data bank, whilst **Direct Identification** is that resulting from data coming from the OBE itself.

3.3 Optional ATSVR Functions

3.3.1
remote degradation function
function of remotely degrading vehicle performance

Note 1 to entry: This is dealt with in Parts 3 and 5 of this European Standard.

3.3.2
theft indication function
transmission of a warning or alert from the OBE to an SOC or item of DE that the transmitting vehicle may have been stolen

Note 1 to entry: Figure 1 shows how these functions chain together in the course of operations.

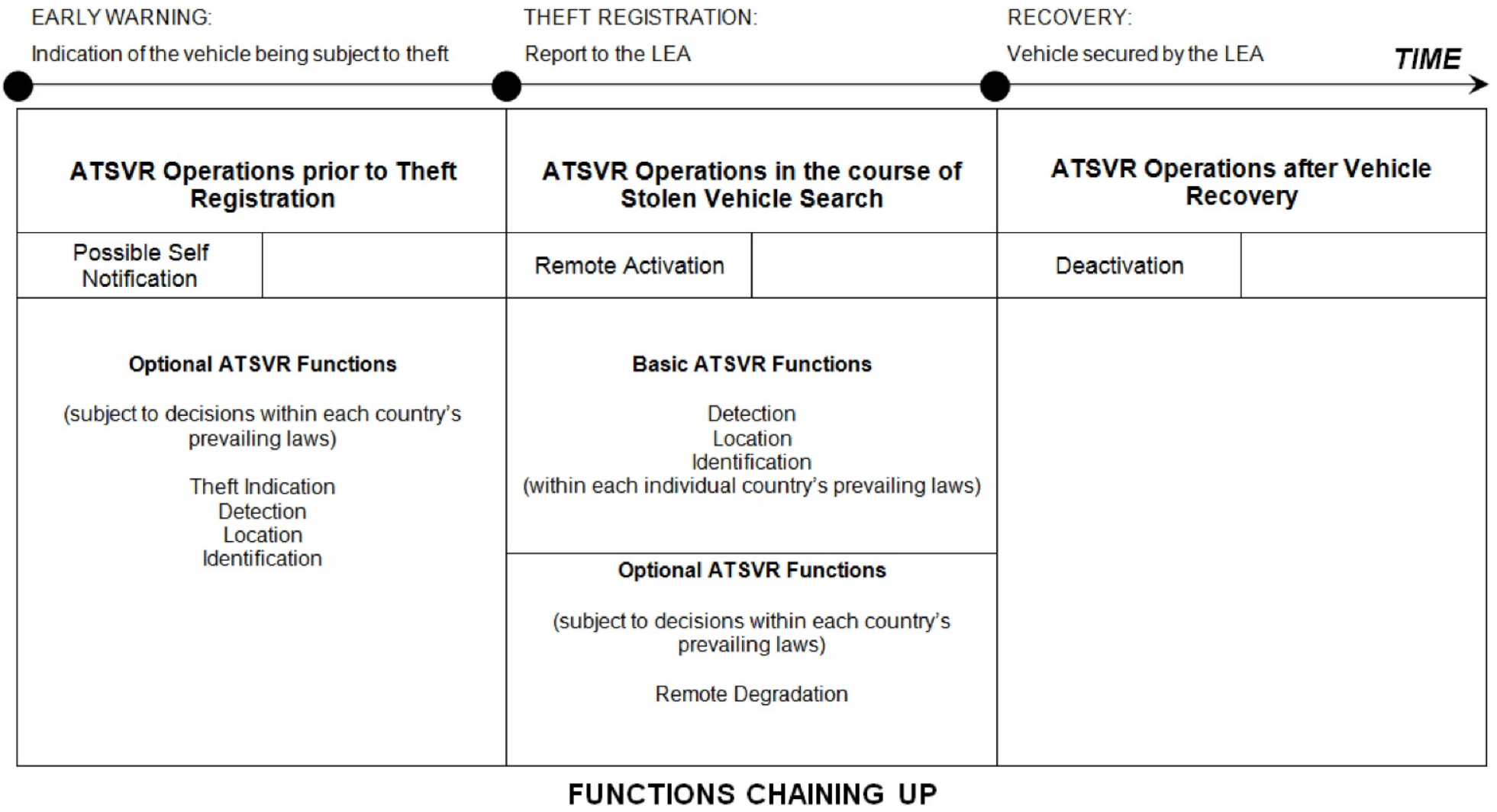

Figure 1 — ATSVR functions chaining up

3.4 ATSVR Services

3.4.1
ATSVR commercial services
supply of discrete services such as product delivery, product installation, setting up of ATSVR components and ATSVR service assistance

3.4.2
ATSVR monitoring services
supply of continuous services required in running an ATSVR service

3.5 ATSVR Communications

3.5.1
ATSVR interface
connections between all the ATSVR elements enabling them to interact, which include, but are not exclusively, fixed or radio interfaces, physical and display interfaces

3.5.2
OBE air interface
interface that facilitates the passing of information to and from the OBE, either to an item of Detection Equipment or to an infrastructure network, and that allows the ATSVR to interface with an OBE

3.5.3
long-range interface
interface between the OBE and other ATSVR equipment over extended distances, typically more than 100 m

3.5.4
short-range interface
interface between the OBE and other ATSVR equipment over short distances, typically less than 100 m

3.5.5
infrastructure network
one or more communications systems or networks that may be ground based or space based that facilitate the transmission of information

3.5.6
communications network
totality of communications between the OBE and other items of the ATSVR, which includes the Infrastructure Network and all the interfaces defined above

3.5.7
ATSVR interactions
communications, data exchanges and actions that take place between elements of the ATSVR through ATSVR Interfaces

3.6 ATSVR Status

3.6.1
OBE theft status
OBE internal status of "Stolen/Not Stolen" which is used by the OBE to modify its response to Detection Equipment and may be included in other information being transmitted to and from the OBE

3.6.2
OBE performance degradation status - option
status invoked by the Remote Degradation Function, which will have at least two states of Degradation ON and Degradation OFF, but may have more states to define the degree of degradation or functions to degrade, and which can be altered directly or remotely via an air interface

3.6.3
OBE theft warning or alert status - option
internal state which is invoked when the OBE detects that it may be stolen and which can be used to modify the transmitted information or undertake other functions

3.6.4
OBE activation status
status ON is invoked via an external signal into the OBE, causing it to perform as a Stolen Vehicle. It can also be set to OFF, causing the OBE to perform as vehicle that has not been stolen

Note 1 to entry: This status can be altered directly or remotely via an air interface.

3.7 Interoperability and Compatibility

3.7.1
interoperability
ability of systems to provide services to and accept services from other systems and to use the services so exchanged to enable them to operate effectively together

Note 1 to entry: The word "services" used in the definition is taken to mean the "functions", identified in this document, which combine to recover a vehicle. This concerns ATSVRs in regard to their processes and in regard to the information that passes between the defined elements of an ATSVR.

Specifically, two sorts of interfaces and hence two sorts of questions will be considered:

— HMI (Human-Machine Interface). At the HMI, a number of ATSVR functions are available for the User to interpret. Those pieces of information that are common to the different functions require a common method of communication or display;

— MMI (Machine-Machine Interface). The techniques implemented to meet the specific requirements of every function inevitably means that different types of MMIs will continue to coexist. Thus Interoperability is considered at the scale of a given type.

3.7.2
compatibility for ATSVR applications
ability of any (sub)-system to interact with another (sub)-system according to a set of predefined rules in the form of interface specification and protocol definition

Note 1 to entry: Quite obviously, the ATSVR constituents are compliant with the environment standards. In this regard, the different systems are mutually compatible; i.e. are not interfere with one another.

Note 2 to entry: Regarding communication ability, a given piece of equipment will be said to be compatible with different MMIs when able to communicate with the range of objects (networks, DE, Position Reference Sources) sharing these MMIs. Compatibility comprises working within the set of rules applying to a given type of MMI.

Note 3 to entry: Two pieces of equipment are said to be interchangeable, from the viewpoint of an interface, when they are both compatible with this interface.

4 Symbols and abbreviations

ATSVR After Theft Systems for Vehicle Recovery

LEA Law Enforcement Agency

SOC System Operating Centre

OBE On Board Equipment

DE Detection Equipment

LR Long-Range (Communications Interface)

SR Short-Range (Communications Interface)

5 ATSVR Conceptual Architecture Model

5.1 General

The ATSVR Conceptual Architecture Model provides an overview of the concepts and main interfaces of each function of a generic ATSVR. The model architecture is descriptive rather than prescriptive, and is independent of the various technologies, configurations and organisations that might be implemented in each country. Figure 2 — Conceptual architecture model for ATSVR functions provides a conceptual representation of a generic ATSVR.

The architecture concept consists of three main components:

a) the Vehicle, with On-Board Equipment, sensors and actuators as appropriate;

b) the Communications Network, with Positioning Reference, infrastructure network and Detection Equipment as appropriate;

c) the System Operating Centres for the LEA and Service Provider.

The main interfaces between these components are detailed below.

The process necessarily begins with the theft of the vehicle. Following theft or suspected theft, the first possible function is to **indicate** that a theft of a vehicle has occurred. Following this, the status of the target vehicle, i.e., whether the target vehicle has been stolen or not, shall be confirmed by the user or by other appropriate personnel and this status shall then be **acknowledged** by a Law Enforcement Agency. This then becomes a Registered Stolen Vehicle.

The vehicle should then be **located** by the ATSVR, and if moving, **tracked** or homed onto by the system in order to facilitate LEA or ATSVR service personnel to close range with the target vehicle. By closing range with the target vehicle, they will more easily be able to **recognise** the vehicle. Once recognised, the target vehicle shall be accurately **discriminated as the target vehicle** from other surrounding vehicles.

This process facilitates the selection of the target vehicle for closer examination by LEA or ATSVR personnel in order to confirm the **identity** of the target vehicle as the stolen vehicle. The process of establishing **identity** may require an additional query and response through ATSVR databases.

This process can under controlled circumstances, be assisted by the degradation of the performance capabilities of the target vehicle. This excludes safety critical functions.

5.2 Functions within the process

Following Theft Registration and, as appropriate to the ATSVR system and function operated, the SOC may activate or re-activate the OBE and / or the DE via an Infrastructure Network at Long-Range or at Short-Range.

Using the ATSVR DE or OBE, the system can detect, discriminate and recognise the Registered Stolen Vehicles at Short or Long-Range from Vehicles.

During this detection phase and according to the ATSVR Function operated, some ATSVR Interactions are processed between the OBE and the Communications Network and between the Communication Network and the SOC.

Concerning the optional Degradation Function, the OBE Activation/Deactivation signal interfaces with electronic actuators in the specific Registered Stolen Vehicle.

The ATSVR Identification Function usually operates only between the OBE and the DE, thus allowing an unequivocal identification of the Detected Vehicle.

The optional Theft Indication function will alert the SOC of the vehicle theft status.

5.3 Short- and Long-Range Concepts

5.3.1 ATSVR Operations with Short-Range Concept

The SR Concept uses an interface, which allows the Detection Equipment to operate some ATSVR Functions in vicinity of vehicles (i.e. in direct line of sight). The SR Concept allows LEAs, where it is necessary for them, to restrict their actions to ATSVR Operations located in their immediate vicinity.

5.3.2 ATSVR Operations with Long-Range Concept

The LR Concept uses an interface, which allows the Detection Equipment to operate some ATSVR Functions at distances normally greater than direct line of sight. This LR Concept is generally operated with ATSVR Location Functions.

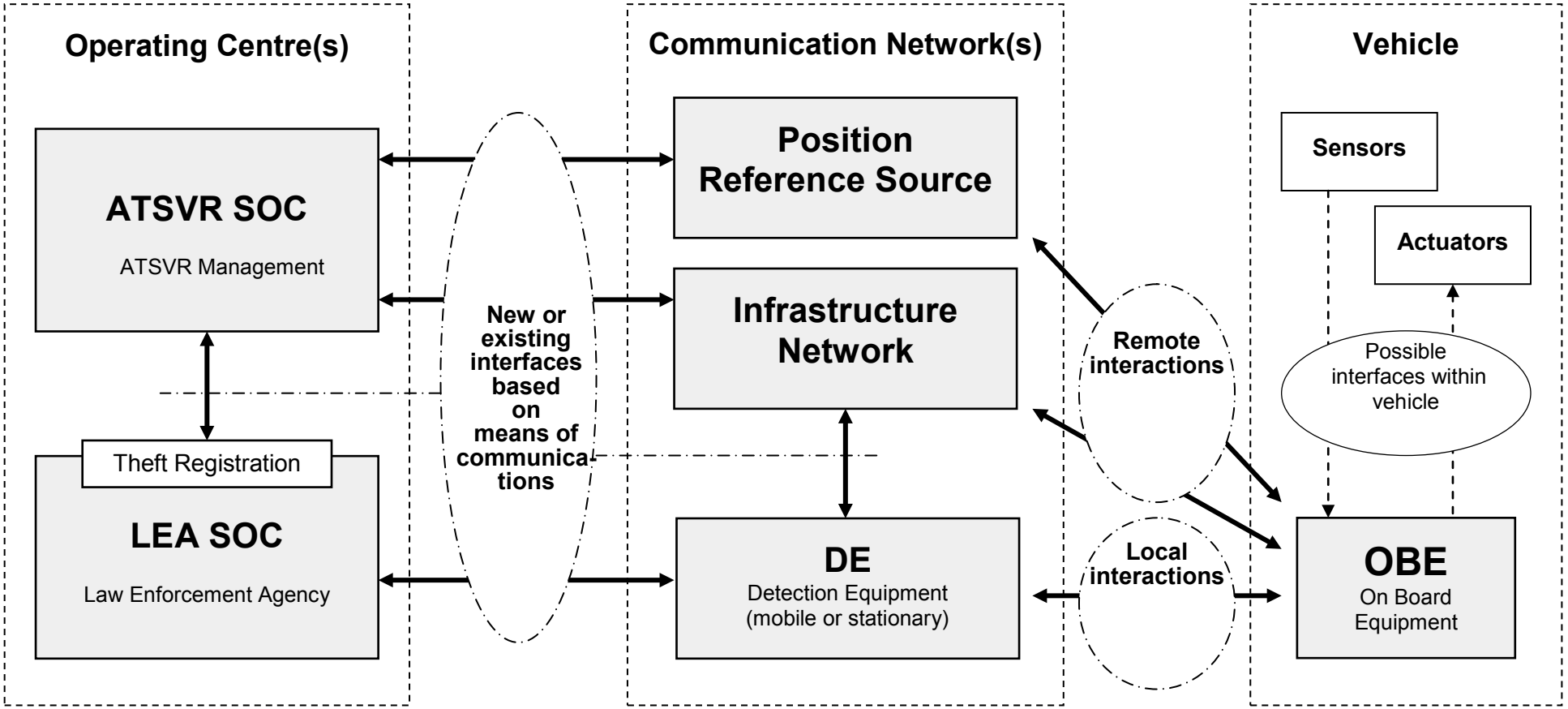

Figure 2 — Conceptual architecture model for ATSVR functions

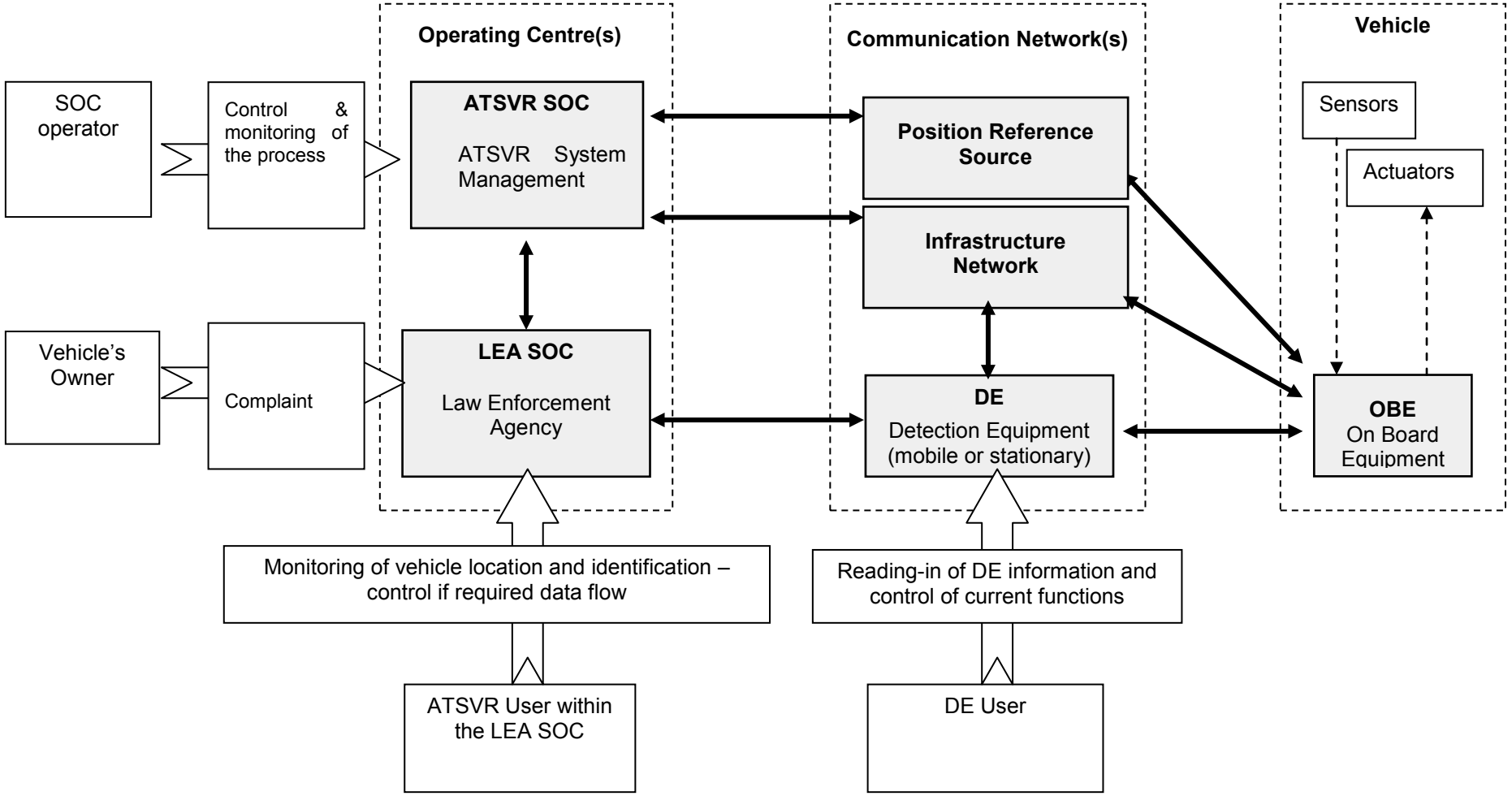

Figure 3 — Human interactions for the ATSVR model

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[1] EN 15213-3, *Intelligent transport systems — After-theft systems for the recovery of stolen vehicles — Part 3: Interface and system requirements in terms of short range communication system*

[2] EN 15213-4, *Intelligent transport systems — After-theft systems for the recovery of stolen vehicles — Part 4: Interface and system requirements in terms of long range communication system*

[3] EN 15213-5, *Intelligent transport systems — After-theft systems for the recovery of stolen vehicles — Part 5: Messaging interface*

[4] EN ISO 14814, *Road transport and traffic telematics — Automatic vehicle and equipment identification — Reference architecture and terminology (ISO 14814)*

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