ISO-/DTS 23374-2:####(X:2023(E)

ISO TC 204/WG 18

Date: 2022-11-232023-05

Secretariat: ANSI

Intelligent transport systems — Automated valet parking systems (AVPS) — Part 2: Security integration for type 3 AVP

DTSWD/CD/DIS/FDIS stage

Warning for WDs and CDs

This document is not an ISO International Standard. It is distributed for review and comment. It is subject to change without notice and may not be referred to as an International Standard.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Style Definition
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted

ISO copyright office

CP 401 • Ch. de Blandonnet 8

CH-1214 Vernier, Geneva

Phone: +41 22 749 01 11

Email: copyright@iso.org

Website: ~~www.iso.org~~www.iso.org

Published in Switzerland

Formatted: Font: 11 pt, Font color: Blue

Formatted: Border: Box: (Single solid line, Blue, 0.5 pt Line width)

Formatted: Font: 11 pt, Font color: Blue, English (United Kingdom)

Formatted: Font: 11 pt, Font color: Blue

Formatted: Font: 11 pt, Font color: Blue

Contents

Formatted: Space Before: 48 pt, Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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~~document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see ~~www.iso.org/directives~~www.iso.org/directives).

~~Attention is drawn~~ISO draws attention to the possibility that ~~some of~~ the ~~elements~~implementation of this document may ~~be~~involve the ~~subject~~use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights. in respect thereof. As of the date of publication of this document, ISO *[had/had not]* received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights. ~~Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).~~

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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

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

A list of all parts in the ISO 23374 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers

Formatted: Font color: Auto

Formatted: English (United States)

Formatted: Font: Not Italic

Formatted: std_publisher

Formatted: std_docNumber

Formatted: std_docPartNumber

Formatted: English (United States)

Formatted: English (United States)

Introduction

The "Automated Valet Parking System"An automated valet parking system (AVPS) automatically operates unoccupied vehicles from the drop off area where the driver and passengers leave the vehicle, and returns the vehicle to a pickup area upon the user's request to retrieve the vehicle.

Beside enhanced user experiences, the AVPS is expected to contribute to accident:

— enhanced user experience,

— a reduction, in accidents,

— the lowering of energy consumption and CO_2 emission of emissions whilst vehicles searchingsearch for available parking spaces, and effectively utilize

— the effective use of land bythrough parking of vehicles in dense spaces.

AVPS, asAs for any kind of automated traffic, AVPS is susceptible to attacks and malfunctioning, which maycan affect the safety of human life and other properties. Thus, security is an essential prerequisite for deployment of AVPS. Further on,Furthermore, it is essential to avoid the proliferation of security means must be avoidedin order to keepensure that the overall C-ITS / /CCAM (cooperative, connected and automated mobility) security systems remain manageable, and to ensure interoperability.

The aim of this document is to contribute to the realization of secure level 4 driverless operation of vehicles within parking facilities, and to support a fast and smooth market introduction by achieving interoperability among vehicles provided by different manufactures and within different parking facilities.

Clause 6 of this document addresses specifications of basic security requirements for AVPS related to identified operation interfaces and management interfaces. This is complemented by the informativeinformation in Clause 5 and three informative Annexes.

Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers

Formatted: List Continue 1

Formatted: Body Text, Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers

Formatted: cite_sec

Formatted: cite_sec

Formatted: cite_sec

Formatted: cite_sec

annexes.

Formatted: Font: 11 pt

Formatted: Space After: 12 pt, Line spacing: Exactly 11 pt

Intelligent transport systems — Automated valet parking systems (AVPS) — Part 2: Security integration for type 3 AVP

1 Scope

This document specifies security means and procedures for AVPS Type 3 as specified in ISO 23374-1 ~~and~~. It focuses on ~~the~~ operation interfaces and management interfaces as defined in ISO 23374-1.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 23374-~~-~~1~~:~~—,[1] *Intelligent transport systems — Automated valet parking systems (AVPS) — Part 1: System framework, requirements for automated driving, and communication interface*

ISO/SAE 21434, *Road vehicles — Cybersecurity engineering*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 23374-1 and the following apply.

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

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

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

3.1
subject vehicle
SV
light vehicle which is equipped with the vehicle operation sub-~~-~~system of an automated valet parking system (AVPS~~, and subject to this document~~)

[SOURCE: ISO~~/DIS~~ 23374-1~~:~~—,[2] 3.~~1~~] 4]

3.2
parking facility

[1] Under preparation. Stage at the time of publication: ISO/FDIS 23374-1:2023.

[2] Under preparation. Stage at the time of publication: ISO/FDIS 23374-1:2023.

Formatted: Font color: Blue
Formatted: Different first page header
Formatted: Space Before: 20 pt, Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted ...
Formatted: std_publisher
Formatted: std_docNumber
Formatted: std_docPartNumber
Formatted: std_publisher
Formatted: std_docNumber
Formatted: std_docPartNumber
Formatted: std_publisher
Formatted: std_docNumber
Formatted: std_docPartNumber
Formatted: std_docTitle, Font: Not Italic
Formatted ...
Formatted: std_publisher
Formatted: std_docNumber
Formatted: std_docTitle
Formatted: std_docTitle, Font: Not Italic
Formatted ...
Formatted: std_publisher
Formatted: std_docNumber
Formatted: std_docPartNumber
Formatted: English (United States)
Formatted: English (United States)
Formatted ...
Formatted: English (United States)
Formatted: List Continue 1, No bullets or numbering
Formatted: Font: English (United States)
Formatted ...
Formatted ...
Formatted ...
Formatted: std_publisher
Formatted: std_docNumber
Formatted: std_docPartNumber
Formatted: std_section

public or private car park ~~capable of~~ in which an automated valet parking system (AVPS ~~and subject to this document~~) is available

Note 1 to entry: ~~The entire facility~~ An AVPS does not necessarily have to be ~~capable of AVPS in being compliant~~available in the entire favility in order to achieve conformance to this document. For example, it is possible for only a certain floor within a multi-story parking facility ~~may~~to be dedicated ~~for~~to an AVPS.

[SOURCE: ISO~~/ DIS~~ 23374-1~~:~~—, 3.5, modified — Note 2~~]~~ to entry removed.]

3.3
operation zone
single or multiple geographical ~~boundaries of the~~ area(s) within a parking facility where ~~parking automation~~automated driving can be performed by an automated valet parking system (AVPS)

[SOURCE: ISO~~/ DIS~~ 23374-1~~:~~—, 3.3~~]~~6, modified — Notes 1 and 2 to entry removed.]

3.4
drop-off area
location within the operation zone where the ~~driver~~user leaves the subject vehicle (SV) and ~~AVPS receives the dispatching~~hands over authority to the service provider

[SOURCE: ISO~~/ DIS~~ 23374-1~~:~~—, 3.4~~]~~7, modified — Notes 1 and 2 to entry removed.]

3.5
pick-up area
location ~~in~~within the operation zone where ~~AVPS places~~ the ~~SV for~~ service provider sends the ~~user~~subject vehicle (SV) to ~~board~~ the ~~vehicle~~user for boarding and ~~retains~~hands over authority

[SOURCE: ISO~~/ DIS~~ 23374-1~~:~~—, 3.5~~]~~8, modified — Notes 1 and 2 to entry removed.]

3.6
destination
location within the operation zone to ~~transfer a~~ which the subject vehicle (SV ~~to, determined by AVPS.~~) is transferred

Note 1 to entry: For example, parking slots delineated by line markers, service bays (e.g. location beside an electric vehicle charging stations), or a pick-up area can be a destination.

[SOURCE: ISO~~/ DIS~~ 23374-1~~:~~—, 3.6~~]~~11, modified — Original Note 1 to entry removed. New Note 1 to entry added.]

3.7
parking area
area within the operation zone consisting of multiple parking ~~locations~~spots

[SOURCE: ISO~~/ DIS~~ 23374-1~~:~~—, 3.7~~]~~10, modified — Note 1 to entry removed.]

3.8
parking facility equipment
PFE

Formatted: Font: 12 pt
Formatted: Left, Space After: 36 pt, Line spacing: Exactly 12 pt
Formatted ...
Formatted: std_publisher
Formatted: std_docNumber
Formatted: std_docPartNumber
Formatted: std_section
Formatted ...
Formatted: Font: Bold
Formatted: std_publisher
Formatted: std_docNumber
Formatted: std_docPartNumber
Formatted: std_section
Formatted ...
Formatted: std_publisher
Formatted: std_docNumber
Formatted: std_docPartNumber
Formatted: std_section
Formatted: Font: Bold
Formatted: std_publisher
Formatted: std_docNumber
Formatted: std_docPartNumber
Formatted: std_section
Formatted: Font: Bold
Formatted ...
Formatted: std_publisher
Formatted: std_docNumber
Formatted: std_docPartNumber
Formatted: std_section
Formatted ...
Formatted: std_publisher
Formatted: std_docNumber
Formatted: std_docPartNumber
Formatted: std_section
Formatted: Font: Bold

physical equipment installed in the parking facility for ~~providing~~ supporting an automated valet parking system (AVPS)

~~Note 1 to entry: For example, communication~~EXAMPLE Communication devices and detection sensors ~~are PFEs.~~

[SOURCE: ISO~~/ DIS~~ 23374-1~~:~~—, 3.~~9~~15, modified — Preferred term changed from "automated valet parking facility equipment" to "parking facility equipment".]

3.9
designed speed
physical speed of a subject vehicle (SV) which changes dynamically under the given circumstances ~~that~~ under which an automated valet parking system (AVPS) intends to operate ~~at~~ while performing automated driving

Note 1 to entry: For example, the AVPS will adjust the SV's operating speed when ~~travelling~~travelling towards a corner with limited visibility due to occlusion by a wall. This speed depends on the system design~~, thus,~~ For this reason, most of the test procedures in this document do not specify a specific value and only refer to the "designed speed.".

~~[SOURCE: ISO/DIS 23374-1, 3.10]~~

3.10
designed distance
physical distance from the subject vehicle (SV) to an object that an automated valet parking system (AVPS) intends to ~~keep~~maintain under the given circumstances while performing automated driving

~~[SOURCE: ISO/DIS 23374-1, 3.11]~~

[SOURCE: ISO 23374-1:—, 3.19, modified — "Situation-specific" removed from the beginning of the definition; "other facility users, objects or structures" replaced by "an object"; Note 1 to entry removed.]

3.11
sub-system
component of an automated valet parking system (AVPS) at a logical ~~composition of AVPS~~level which ~~carries~~includes one or more functions

[SOURCE: ISO~~/DIS~~ 23374-1~~:~~—, 3.~~12~~21, modified — Note 1 to entry removed.]

3.12
function
smallest composition of an automated valet parking system (AVPS) described in this document which contributes to the system outputs

~~**[SOURCE: ISO/DIS 23374-1, 3.13]**~~
~~**3.13**~~
~~**(system)**~~ **state**
<system> mutually exclusive condition that each vehicle managed by an automated valet parking system (AVPS) is in

~~[SOURCE: ISO/DIS 23374-1, 3.14]~~

Formatted: Font: 12 pt
Formatted: Right, Space After: 36 pt, Line spacing: Exactly 12 pt
Formatted: std_publisher
Formatted: std_docNumber
Formatted: std_docPartNumber
Formatted: std_section
Formatted: Source
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: Font: Bold
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers, Tab stops: 0.7 cm, Left + 1.4 cm, Left + 2.1 cm, Left + 2.8 cm, Left + 3.5 cm, Left + 4.2 cm, Left + 4.9 cm, Left + 5.6 cm, Left + 6.3 cm, Left + 7 cm, Left
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: std_publisher
Formatted: std_docNumber
Formatted: std_docPartNumber
Formatted: std_section
Formatted: Font: Bold
Formatted: Font: Bold
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: Font: 11 pt
Formatted: Space After: 12 pt, Line spacing: Exactly 11 pt

3.14
reservation ID
unique identifier for an established agreement between a user and a service provider to ~~handover~~hand over the ~~SV's~~subject vehicle (SV)'s authority to an automated valet parking system (AVPS) within a specific parking facility

Note 1 to entry: A single reservation ID could be used over a period of time, or could be destroyed each time it is used.

~~[SOURCE: ISO/DIS 23374-1, 3.15]~~

3.15
session ID
unique identifier given each time an authority handover occurs, and destroyed when authority handback occurs

~~[SOURCE: ISO/DIS 23374-1, 3.???]~~

3.16
mission ID
unique identifier given each time ~~when an~~ a subject vehicle (SV) is given a new destination

~~[SOURCE: ISO/DIS 23374-1, 3.17]~~

4 Abbreviated terms

For the purposes of this document, the abbreviated terms given in ISO 23374-1 and the following apply.

AVP	automated valet parking
AVPS	~~AVP~~automated valet parking system
CCAM	cooperative, connected and automated mobility
DoS	denial of service
~~DTSL~~DTLS	datagram transport layer security
ESP	encapsulating security payload
HoL	head-of-line
IKE	~~Internet~~internet key exchange
OB	operator backend
OEDR	object and event detection and response
OEM	original equipment manufacturer
~~OEM_ID~~PFE	parking facility equipment
PKI	public key infrastructure
~~QUIC~~RSU	~~name of a protocol specified in RFC 9000 - this is not an abbreviated term.~~roadside unit

Formatted: Font: 12 pt
Formatted: Left, Space After: 36 pt, Line spacing: Exactly 12 pt
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers, Tab stops: 0.7 cm, Left + 1.4 cm, Left + 2.1 cm, Left + 2.8 cm, Left + 3.5 cm, Left + 4.2 cm, Left + 4.9 cm, Left + 5.6 cm, Left + 6.3 cm, Left + 7 cm, Left
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: std_publisher
Formatted: std_docNumber
Formatted: std_docPartNumber
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted ...
Formatted ...
Formatted ...
Formatted ...
Formatted ...
Formatted ...

SA	security association
SV ~~ID~~	subject vehicle
TCP	Transport Control Protocol
TLS	transport layer security
UB	user backend
UDP	User Datagram Protocol
VB	vehicle backend
VIN	vehicle identification number
VMC	vehicle motion control
WAVE	wireless access in vehicular environments
WMI	world manufacturer identifier

5 General

5.1 Basic operation model of AVPS

5.1.1 Basic functionalities

The basic functionalities of AVPS can be described as the operation functions of an automated vehicle and the management functions of system participants. ~~Table 1~~Table 1 describes these basic functionalities of AVPS.

- — Performance requirements associated with the operation functions are specified in ISO 23374-1:—, Clause 6 ~~of ISO 23374-1~~.
- — General requirements associated with the management functions are specified in ISO 23374-1:—, Clause 7 ~~of ISO 23374-1~~.

Table ~~1 —~~ 1 — Basic functionalities of AVPS and their description

Basic functionalities	Description
Operation functions of an automated vehicle	- — Determine a destination and route - — Perform level 4 automated driving - — Respond to commands of the system management functionalities
Management functions of system participants	- — Manage environmental conditions - — Check the compatibility between vehicles and facilities

Formatted: Font: 12 pt
Formatted: Right, Space After: 36 pt, Line spacing: Exactly 12 pt
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers, Tab stops: 0.71 cm, Left
Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers, Tab stops: 0.71 cm, Left + 0.99 cm, Left + 1.27 cm, Left
Formatted ...
Formatted ...
Formatted: std_section
Formatted: std_section
Formatted: std_section
Formatted: English (United Kingdom)
Formatted: English (United Kingdom)
Formatted ...
Formatted: Font: Bold
Formatted ...
Formatted ...
Formatted ...
Formatted Table
Formatted ...
Formatted ...
Formatted: Font: 11 pt
Formatted ...