

BSI Standards Publication

Road vehicles — Safety of the intended functionality



National foreword

This Published Document is the UK implementation of ISO/PAS 21448:2019.

The UK participation in its preparation was entrusted to Technical Committee AUE/32, Electrical and electronic components and general system aspects (Road vehicles).

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2019 Published by BSI Standards Limited 2019

ISBN 978 0 580 94502 1

ICS 43.040.10

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 January 2019.

Amendments/corrigenda issued since publication

Date Text affected

PD ISO/PAS 21448:2019

PUBLICLY AVAILABLE SPECIFICATION

ISO/PAS 21448

First edition 2019-01

Road vehicles — Safety of the intended functionality

Véhicules routiers - Sécurité de la fonction attendue



Reference number ISO/PAS 21448:2019(E)

PD ISO/PAS 21448:2019 **ISO/PAS 21448:2019(E)**



COPYRIGHT PROTECTED DOCUMENT

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office CP 401 • Ch. de Blandonnet 8 CH-1214 Vernier, Geneva Phone: +41 22 749 01 11 Fax: +41 22 749 09 47 Email: copyright@iso.org Website: www.iso.org

Published in Switzerland

Cont	tents	Page
Forew	ord	v
Introd	uction	vi
1	Scope	1
2	Normative references	1
3	Terms and definitions	1
4	Overview of this document's activities in the development process	6
5	Functional and system specification (intended functionality content)	
J	5.1 Objectives	11
	5.2 Functional description	
	5.3 Consideration on system design and architecture	
6	Identification and Evaluation of hazards caused by the intended functionality 6.1 Objectives	13
	6.1 Objectives	
	6.3 Hazard analysis	
	6.4 Risk evaluation of the intended function	
	6.5 Specification of a validation target	
7	Identification and Evaluation of triggering events	
	7.1 Objectives	
	7.2.1 Triggering events related to algorithms	
	7.2.2 Triggering events related to sensors and actuators	
	7.3 Acceptability of the triggering events	
8	Functional modifications to reduce SOTIF related risks	
	8.1 Objectives	
	8.3 Measures to improve the SOTIF	
	8.4 Updating the system specification	22
9	Definition of the verification and validation strategy	22
	9.1 Objectives	
	9.2 Planning and specification of integration and testing	
10	Verification of the SOTIF (Area 2) 10.1 Objectives	
	10.2 Sensor verification	
	10.3 Decision algorithm verification	24
	10.4 Actuation verification	
	10.5 Integrated system verification	
11	Validation of the SOTIF (Area 3)	
	11.2 Evaluation of residual risk	
	11.3 Validation test parameters	
12	Methodology and criteria for SOTIF release	
	12.1 Objectives	27
	12.2 Methodology for evaluating SOTIF for release12.3 Criteria for SOTIF release	
A		
	A (informative) Examples of the application of SOTIF activities	30
Annex	B (informative) Example for definition and validation of an acceptable false alarm rate in AEB systems	22
Annos	C (informative) Validation of SOTIF applicable systems	
AMMILLA	. • (111101111ative) vanuation di 30 i il ' applicable 3y3tem3	TL

PD ISO/PAS 21448:2019 ISO/PAS 21448:2019(E)

Annex D (informative) Automotive perception systems verification and validation	43
Annex E (informative) Method for deriving SOTIF misuse scenarios	46
Annex F (informative) Example construction of scenario for SOTIF safety analysis method	49
Annex G (informative) Implications for off-line training	52
Bibliography	54

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 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. 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 22, *Road vehicles*, Subcommittee SC 32, *Electrical and electronic components and general system aspects*.

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.