First edition
2020-07

# Road vehicles — Extended Vehicle (ExVe) time critical applications — General requirements, definitions and classification methodology of time-constrained situations related to Road and ExVe Safety (RExVeS)

*Véhicules routiers — Applications temps critiques du véhicule étendu (ExVe) — Exigences générales, définitions et méthodologie de classification des situations sous contrainte de temps liées à la sécurité routière et à la sûreté du véhicule étendu (RExVeS)*

Reference number
ISO 23132:2020(E)



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Published in Switzerland

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# Foreword

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This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 31, *Data communication*.

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.

# Introduction

Preventing death and serious injury in road traffic crashes is a global priority. With the advent of vehicular data communications, road vehicles become connected vehicles, and safety is one of the key issues in the development of such road vehicles. ISO 26262-1 defines the vehicle safety as the absence of unreasonable risks that arise from malfunctions of the E/E system. The absence of unreasonable risk due to these potentially hazardous behaviours related to specific limitations (identified in ISO/PAS 21448[7]) is defined as the safety of the intended functionality (SOTIF). Functional safety (addressed by the ISO 26262 series) and SOTIF are distinct and complementary aspects of safety.

This document defines a complementary methodology for the prioritization of safety-related external communication use-cases to help to design extended vehicle time-critical interfaces described in the ISO 20077-1.

NOTE 1 ISO 20077-1 defines the concepts and terms related to the extended vehicle (ExVe), whereas ISO 20077-2 specifies general rules and basic principles that the manufacturer of the ExVe considers when elaborating its own design method.

NOTE 2 ISO 20077-1 defines an "extended vehicle" (ExVe) as an "entity, still in accordance with the specifications of the vehicle manufacturer, that extends beyond the physical boundaries of the road vehicle and consists of the road vehicle, off-board systems, external interfaces, and the data communication between the road vehicle and the off-board systems". Road vehicles without off-board systems and road vehicles equipped with telematics units are extended vehicles.

Recent developments in the field of connected vehicles, in various parts of the world, bring hope of being able to improve road safety, e.g. by reducing the number of road fatalities through collision avoidance cooperation. Connected vehicles taking into account ISO 20077-1 and ISO 20077-2 take their part in this global effort.

Due to the limited per design embedded resources, a priority management is necessary to apply these resources to the function and request with the highest criticality.

For these connected vehicles, the use of the “ExVe time critical interfaces" is firstly associated with safety-critical functions (e.g. emergency braking, steering) that are functions for which the priorities are based on a criticality concept.

It is important that all the functions using the “ExVe time critical interfaces” take into account the capabilities of the vehicles in which they are installed.

During the design phase, the connected vehicle behaviour regarding all safety-critical situations and its interactions with the external environment should be defined. Its implementation can be based on the methodology proposed in this document.