

Collision detection and avoidance

The international ISO standardization body develops a J1939-based profile for collision detection and avoidance. It is in work draft status.



Collision situations should be detected and avoided, especially when machinery moves automated (Source: Stock Adobe)

The ISO 21815-2 technical specification under development specifies the J1939-based communication interface for collision detection and avoidance systems. The increasing use of hazard detection systems and avoidance technology has been supporting operators to safely operate machines in the field of mining and construction. At the same time, there are demands to set standards for machines and systems capable of detecting hazards, signaling their presence and mitigating the risks they present.

There are currently two existing standards in the field: the ISO 16001 standard (earth-moving machinery – object detection systems and visibility aids – performance requirements and tests), and the ISO 17757 standard (earth-moving machinery – autonomous machinery system safety). These standards provide guidance for visual aids and for autonomous and semi-autonomous machines. However, there is currently no specification that describes hazard awareness and detection in relation to human response.

The ISO 21815-2 specification describes the J1939-based interface between a connected device and mobile machines. This interface is intended for use by a collision avoidance system (CAS) device integrated independently from original machine providing intervention signals to slow down, to stop, or to prevent motion of the machine. The protocol may also be used to provide input information for a collision warning system (CWS). This technical specification is not intended for plug-and-play implementation of CAS or CWS on the earth-moving machine. The CAS or CWS manufacturers and the OEM (original equipment manufacturer) need to negotiate details not fully described. The joint working group 28 of sub-committee 2 in the ISO technical committee 127 is responsible for the development of ISO 21815-2.

There are already other public specifications related to collision detection systems. In the ISO 11992-3 a communication link between truck and trailer is standardized, which provides J1939 messages to indicate vehicles driving behind or in the blind-spot areas of the trailer. It is intended for automated lane departure.

The CiA 462 profile for item detection devices specifies the CANopen interface for devices that identify existence, dimension, orientation, or movement of items in their environment (e.g. optical camera (2D or 3D), laser device). Often those devices are called vision sensors or object detection devices. The camera by ifm implements this profile. The profile can also be mapped to the J1939-21 application layer and related parameter groups.

[hz](#)