

Special GRRF Session on

Automatic Emergency Braking and Lane Departure Warning Systems

Brainstorming Meeting
Dec 9, 2008
Geneva, Switzerland

John Hancock
US Expert Delegate to ISO/TC204/WG14



Technical Committee 204

- **Intelligent Transport Systems**
 - Standardization of information, communication and control systems in the field of urban and rural surface transportation, including intermodal and multimodal aspects thereof, traveler information, traffic management, public transport, commercial transport, emergency services and commercial services in the intelligent transport systems (ITS) field.



TC204 / Working Group 14

- **Vehicle/Roadway Warning & Control Systems**
 - The purpose of this area is to reduce driver workload, improve convenience, and arouse awareness of dangers, as well as to avoid accidents and decrease damage by the use of advanced technologies. Examples of systems already on the market include adaptive cruise control (ACC) and forward vehicle collision warning. WG14's work covers wide-ranging areas from vehicle control, sensing of and communications with external information and interface with drivers. WG14 is chaired by Japan and is widely recognized as one of the most active groups in ISO/TC204.



TC204 / WG14

- Working Group 14 is comprised of 29 International Experts Representing...
 - 9 Countries
 - 9 Vehicle Manufacturers
 - 9 Automotive Suppliers
 - 5 Government Agencies
 - 2 Academic Research Institutions



TC204 / WG14

- Working Group 14
 - Meets twice per year
 - Meeting location rotates between Europe, Asia and North America
 - Most recent meeting was held in Ottawa, Canada November 10-12, 2008
 - This was the 30th meeting of WG14



Convener's Report

For the 30th meeting of WG14 in Ottawa, Canada

WG 14

ITS: Vehicle/Roadway Warning and Control Systems

Yoshimi Furukawa, Convener

Shibaura Institute of Technology, Dept. Of Machinery and Control Systems

Eliko Kosaka, Rapporteur

International Language and Culture Center



Ottawa Meeting objectives

- (1) Continue to refine FVCMS, ISIVWS, CSWS, LKAS work item standardisation drafts.***
- (2) Discuss CD 22840 ERBA and propose to DIS.***
- (3) Discuss revision of FVCWS***
- (4) Discuss new work item proposals.***
- (5) Future schedule of each of the work items.***

FVCMS: Forward Vehicle Collision Mitigation Systems

ERBA: Extended Range Backing Aid Systems

ISIVWS: Intersection Signal Information and Violation Warning Systems

LSF: Low Speed Following Systems

FSRA: Full Speed Range ACC

CSWS: Curve Speed Warning Systems

LKAS: Lane Keeping Assist Systems

Revised ACC: Revised Adaptive Cruise Control Systems

Revised MALSO: Revised Maneuvering Aid for Low Speed Operation

Revised FVCWS: Forward Vehicle Collision Warning Systems

WG14 Convener's Report

WG14 Activity Status(1/4)

Work item	Status	Participating Countries	Note
ACC	ISO 15622	Germany(Leader), Canada, France, Japan, Korea, UK, US, Netherlands	Published
FVCWS	ISO 15623	Japan(Leader), Canada, France, Germany, Korea, UK, US, Netherlands	Published
MALSO	ISO 17386	Germany(Leader), Canada, France, Japan, Korea, UK, US, Netherlands	Published
LDWS	ISO 17361	Japan(Leader), Canada, France, Germany, Korea, UK, US, Netherlands	Published
LCDAS	ISO 17387	US(Leader), Canada, Germany, Japan, Korea, UK, Netherlands	Published

ACC: Adaptive Cruise Control Systems FVCWS: Forward Vehicle Collision Warning System
MALSO: Maneuvering Aid for Low Speed Operation
LDWS: Lane Departure Warning Systems LCDAS: Lane Change Decision Aids Systems

WG14 Convener's Report

WG14 Activity Status(2/4)

Work item	Status	Participating Countries	Note
LSF	IS 22178	Japan (Leader), Canada, Germany, Korea, UK, US	IS: Processing to be published
FSRA	IS 22179	Germany (Leader), Japan, Korea, UK, US	IS: Processing to be published
Revised ACC	DIS 15622	Germany (Leader), Canada, Japan Korea, UK, US	DIS Ballot ends 12/1/08 FDIS: Spring, 2009
Revised MALSO	DIS 17386	Germany (Leader), Canada, Japan Korea, UK, US	DIS Ballot ends 12/1/08 FDIS: Spring, 2009
ERBA	CD 22840	US (Leader), Canada, Germany, Japan, Korea, UK	DIS: Autumn, 2008

FVCM: Forward Vehicle Collision Mitigation Systems

ERBA: Extended Range Backing Aid Systems

LSF: Low Speed Following Systems FSRA: Full Speed Range ACC

ISIVWS: Intersection Signal Information and Violation Warning Systems

WG14 Convener's Report

WG14 Activity Status(3/4)

Work Item	Status	Participating Countries	Note
<i>FVCMS</i>	<i>PWI 22839</i>	<i>US (Leader), Canada, Germany, Japan, Korea, UK,</i>	<i>NP: Spring, 2009</i>
<i>ISIVWS</i>	<i>PWI 26684</i>	<i>Korea (Leader), Japan, US</i>	<i>NP: Spring, 2009</i>
<i>CSWS</i>	<i>PWI 11067</i>	<i>Korea (Leader), Canada, Germany, Japan, UK, US</i>	<i>NP: Spring, 2009</i>
<i>LKAS</i>	<i>PWI 11270</i>	<i>Germany (Leader), Canada, Japan, Korea, UK</i>	<i>NP: Spring 2009</i>

CSWS: Curve Speed Warning Systems

LKAS: Lane Keeping Assist Systems

Revised ACC: Adaptive Cruise Control Systems

Revised MALSO: Maneuvering Aid for Low Speed Operation

WG14 Convener's Report

WG14 Activity Status(4/4)

Work Item	Status	Participating Countries	Note
<i>Revised FVCWS</i>	<i>CD 15623</i>	<i>US (Leader), Canada, Germany, Japan, Korea, UK,</i>	<i>DIS: Spring 2010</i>



IS 17361 ***Lane Departure Warning Systems***

- Published January 2007
- Introduction
 - Lane Departure Warning Systems (LDWS) are based on fundamental traffic rules. The main focus of LDWS is to help the driver keep the vehicle in the lane on highways and highway-like roads. Accordingly, a warning is issued to alert the driver in case of lane departure caused by, for example, inattention. LDWS are not intended to issue warnings with respect to collisions with other vehicles or control vehicle motions.



IS 17361

Lane Departure Warning Systems

- **Scope**

- This standardisation working draft specifies the definition of the system, classification, functions, human machine interface (HMI) and test methods for lane departure warning systems. These are in-vehicle systems that can warn the driver of a lane departure on highways and highway-like roads. The subject system, which may utilise optical, electromagnetic, GPS, or other sensor technologies, shall issue a warning consistent with the visible lane markings. The issuance of warnings at roadway sections having temporary or irregular lane markings such as road work zones is not within the scope. The standard shall apply to passenger cars, commercial vehicles and buses. The system will not take any automatic action to prevent possible lane departures. Responsibility for the safe operation of the vehicle remains with the driver.



IS 17361

Lane Departure Warning Systems

Key

- 1 Lane Boundary
- 2 Warning Threshold Placement Zone
- 3 Earliest Warning Line
- 4 Latest Warning Line
- 5 No Warning Zone
- 6 Warning Threshold (reference only)

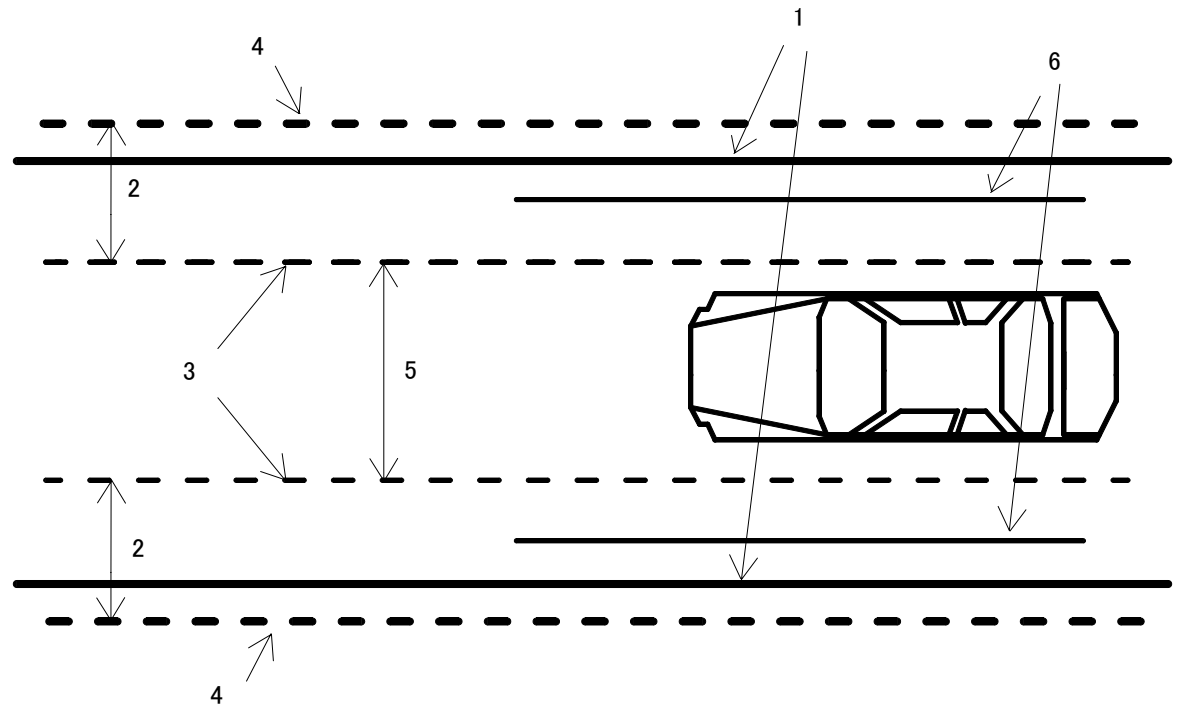


Figure 1 – Concept of warning thresholds and warning threshold placement zones



IS 17361

Lane Departure Warning Systems

Key

- 1 Lane Boundary
- 2 Lane Departure
- 3 Warning Threshold (reference only)
- 4 Earliest Warning Line
- 5 Latest Warning Line

Note When warning condition is fulfilled at the point 6 and there is no suppression request, then lane departure warning is issued.

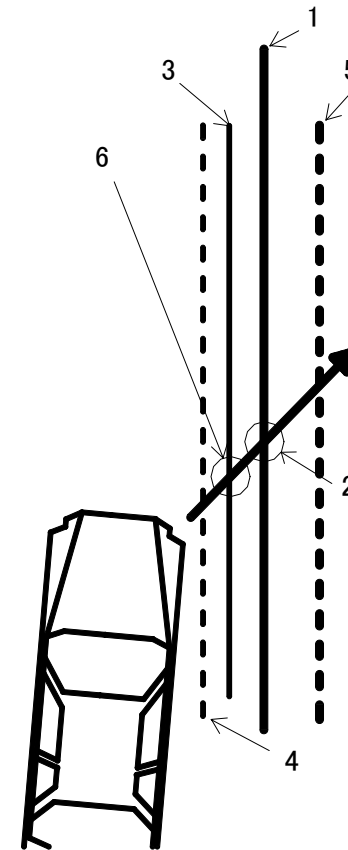


Figure 2 – Illustration of warning issue definitions



PWI 22839
Forward Vehicle Collision Mitigation Systems

- Currently a Working Draft
- Introduction
 - Forward Vehicle Collision Mitigation Systems (FVCMS) reduce the severity of collisions with forward vehicles that cannot be avoided, and may reduce the likelihood of colliding with forward vehicles. FVCMS require information about range to forward vehicles, motion of forward vehicles, motion of the subject vehicle, driver commands and driver actions. FVCMS detect vehicles ahead, determine if detected vehicles represent a hazardous condition, and warn the driver if a hazard exists. They estimate if the driver has an adequate opportunity to respond to the hazard. If there is inadequate time available for the driver to respond, and if appropriate criteria are met, FVCMS assess that a collision is imminent. Based upon this assessment, the FVCMS activate vehicle brakes to mitigate collision severity.



PWI 22839

Forward Vehicle Collision Mitigation Systems

- **Scope**

- This International Standard specifies the concept of operation, minimum functionality, system requirements, system interfaces, and test methods for Forward Vehicle Collision Mitigation Systems (FVCMS). It specifies the behaviors that are required for FVCMS, and the system test criteria necessary to verify that a given implementation meets the requirements of this International Standard. Implementation choices are left to system designers, wherever possible.
- FVCMS mitigate rear-end collisions. By reducing the collision energy, FVCMS reduce the degree of property damage, personal injury, or the likelihood of fatality. They supplement crashworthiness systems such as airbags, seatbelts and other energy-absorbing systems by reducing the impact energy that must be isolated from the occupants.. By automatically activating collision mitigation braking after a collision warning occurs, FVCMS assist in slowing the vehicle when a collision is likely. While not required, this Standard permits collision avoidance to be attempted by a system that conforms to FVCMS.
- With the exceptions of single-track vehicles, and trucks with dual or triple trailers, the FVCMS are for use on road vehicles intended for public and non-public roadways. The systems are not intended for off-road use.