



SURFACE VEHICLE RECOMMENDED PRACTICE

J2364

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Navigation and Route Guidance Function Accessibility While Driving

RATIONALE

Stabilize and preserve existing J2364 Recommended Practice in existing form and with existing content. Document can serve as a historical reference. It has been superseded by subsequent Standards and Guidelines. It would not be feasible to update it, nor to try and harmonize it with the subsequent documents.

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Introduction

Navigation and Route Guidance Systems have some functions that can take significantly more time to use than conventional controls and displays such as the headlights, windshield wipers, the speedometer, the fuel gauge, or the radio (Kurokawa, 1990; Green, 1998, Tijerina, Parmer and Goodman, 1998). Consequently, there are concerns that interacting with navigation and route guidance systems could unduly distract drivers from the primary task of driving. Automated route planning provided by such systems is a convenience for drivers and reduces their pre-trip workload. Driving with route guidance may offer some safety benefit, but special care should be taken in the design of these systems to limit the distraction due to the visual demands placed on the driver while the vehicle is in motion.

1. Scope

This document applies to both Original Equipment Manufacturer and aftermarket route-guidance and navigation system functions for passenger vehicles. It establishes two alternative procedures, a static method and an interrupted vision method, for determining which navigation and route guidance functions should be accessible to the driver while the vehicle is in motion. These methods apply only to the presentation of visual information and the use of manual control inputs to accomplish a navigation or route guidance task.

The document does not apply to visual monitoring tasks which do not require a manual control input, such as route following. Voice-activated controls or passenger operation of controls are also excluded.

There are currently no compelling data that would support the extension of this document to in-vehicle systems other than navigation systems.

2. Normative References

2.1 Applicable Publications

The following Standards and Recommended Practices contain provisions that are referenced in this text and therefore are provisions of SAE J2364. At the time of publication, the editions listed were current. All document are subject to revision, and parties to agreements based on this section of J2364 are encouraged to investigate the possibility of applying the most recent editions of the standards listed in this section. SAE maintains a list of currently valid standards.

2.1.1 SAE PUBLICATIONS

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J287—Driver Hand Controls Reach, Volume 3

SAE J1050—Describing and Measuring the Driver's Field of View, Volume 3

SAE J2396—Definitions and Experimental Measures Related to the Specification of Driver Visual Behavior Using Video Based Techniques

SAE J2365—Calculation of the Time to Complete In-Vehicle Navigation and Route Guidance Tasks

3. Definitions

For the purposes of this Document, the following definitions apply.

3.1 Accessible by the Driver

Feature is accessible by a driver when:

1. the controls to complete the task are within reach of the unconstrained driver as defined by SAE J287; **and**
2. the display is visible with head movement as defined by SAE J1050; **and**
3. the system is operable by the driver.

3.2 Computationally-Interrupted Task

Task where the driver must wait 1.5 seconds or more for the driver interface to respond to a driver input in order to complete a task such as when an off-board computer is queried. (See Section 5 for measurement procedure.)

3.3 Control

Device used to enter information into a vehicle system.

3.4 Display

Device that presents information to a driver, typically by visual or auditory means.

3.5 Driver Interface

Means by which a driver interacts with a vehicle or vehicle subsystem.

NOTE—The driver interface typically includes one or more controls and/or displays, as well as the system's operating logic.

3.6 Glance Duration

Time from the moment at which the direction of gaze moves towards a target (e.g., the interior mirror) to the moment it moves away from it.

NOTE—This includes transition time to that target per SAE J2396.

3.7 Goal

System end state sought by a driver.

Examples of goals include: obtaining guidance to a particular destination; providing greater magnification of a map display; determining the location of a point of interest; and canceling route guidance.

Example of what is not a goal: Entering part of a destination address without having the route calculated for that does not achieve the system end state of being provided with route guidance.

3.8 Navigation System

System that identifies the current position of a vehicle on the earth's surface and may provide guidance to a destination.

NOTE—Information that may be provided includes the road being driven, the location of crossroads, the heading or compass directions, the distance to a destination, and other items.

3.9 Occlusion Interval

Time a driver display or interface is not visible.

NOTE—This can be the shutter closed time using occlusion goggles, or the time the display is not available if display blanking is used.

3.10 Occlusion Total Shutter Closed Time

Total time that the view of the display is occluded.

NOTE—Occlusion can be either by physical means or display blanking, during a trial.

NOTE—This is the sum of the total shutter closed times during a trial

3.11 Occlusion Total Shutter Open Time

Sum of the total shutter open times during a trial.

3.12 Occlusion Total Task Time

Total time required to complete a given task using the Interrupted Vision method.

3.13 Route Guidance System

System that automatically selects a path to a user-specified destination and usually also provides directions to a destination by indicating the streets and roadways comprising the path using graphics, text, voice, or other means. Route guidance may be a feature of a navigation system.

3.14 Shutter Closed Time

Time interval during which the subject cannot see the visual display when using an occlusion technique.

3.15 Shutter Open Time

Time interval during which the subject can see the visual display when using an occlusion technique.

3.16 Static Total Task Time

Total task time measured in a stationary vehicle, buck, or mock-up in which a subject is only performing the task of interest without interruption.

3.17 Task

Specific sequence of control operations leading to a goal at which the driver will normally persist until the goal is reached.

EXAMPLE—Obtaining guidance by entering a street address using the scrolling list method until route guidance is initiated.

3.18 Task Partitionability

Subdivision of a task into small time segments

3.19 Total Task Time

Total time to complete a task. (See Section 5 for the measurement procedure.)

3.20 Vehicle In Motion

Vehicle speed exceeds the minimum nonzero speed that can be reliably detected by the vehicle speed sensors.