U.S. Department of Transportation

# Intelligent Transportation Systems Standards Fact Sheet

July 2001

# SAE J2374 Location Referencing Message Specification (LRMS) Information Report

## Overview

The Location Referencing Message Specification (LRMS) Information Report describes a set of standard interfaces for the transmission of location references among different components of Intelligent Transportation Systems (ITS). The LRMS facilitates the movement of ITS data containing the attribute of location– typically, but not always, on a transportation network. LRMS interfaces define standard meanings (semantics) for the content of location reference messages, and standard, public domain formats (syntax) for the presentation of location references to application software. Location references must be communicated in an unambiguous and mutually understandable way. LRMS interfaces, when incorporated into relevant standards, will provide a common language for the expression of location among the different components of an integrated transportation system.

To obtain a copy of this standard, please contact:

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The LRMS Information Report defines a family of interfaces, each termed a "profile." The necessity for more than one interface is driven by the diversity of location references within operational, integrated ITS systems. For example, as defined by the National ITS Architecture, the location of a traffic accident could be communicated directly or indirectly from a police vehicle or private cell-phone to a central information service provider (ISP) site. The ISP could determine the impact of the accident on traffic patterns then communicate it to emergency vehicles, traffic management functions, or even to a private vehicle's navigation system. During this process, the location of the accident and its impacts could be expressed in a variety of ways, since what is appropriate for a police vehicle may not be appropriate for a central site or for a private automobile. Also, historical, modeling, or other data may be obtained from other databases within an ISP, and combined with data from other sources. Thus, location referencing can occur between both internal and external system components and interface standards are required for successful and efficient deployment.

## What is this standard for?

This Information Report, **SAE J2374, Location Referencing Message Specification Information Report**, describes seven LRMS profiles. Profiles are defined for commonly cited location referencing methods and for particular application communities that have unique requirements. Some of these communities have urgent requirements, whereas others are years away from formulating location-referencing requirements. Therefore, some profiles within the LRMS are more speculative than others and will be developed further as applications evolve and needs arise.

Each profile contains one or more individual "format records" that specifies syntax for profile options. A global definition section for foundation terms is provided as is a global set of "named objects" (data elements) found in the format records. System developers may use the Information Report to help in the selection of profiles for use in ITS implementations of either internal or external interfaces. The seven profiles described are:

*The Geometry Profile* - This profile contains referencing formats for locations based on fundamental spatial objects, such as points, nodes, links, and polygons;
*The Geographic Coordinate Profile* - contains record formats for the geographic coordinates of latitude, longitude, and altitude, expressed with reference to an established geodetic datum;
*The Grid Profile* - intended for use in bandwidth-limited applications such as FM sub-carrier and other wireless transmissions;
*The Linear Referencing Profile* - intended for linear references, which identify a location on a network by an offset along network links from known locations on the network;

*The Cross-Streets Profile* - uses intersecting (crossing) street names and coordinates of intersections to identify nodes, rather than explicit node or link identifiers;
*The Address Profile* - uses an address that is a value unambiguously associated with a known location, such as a house or structure number; and
*The MDI Profile* - supports link and offset referencing and coordinate-based referencing using global coordinates and local offsets from reference nodes of various types. Also supports short references with respect to a locally defined grid.

### Who uses it?

This standard is intended for use by ITS system developers, ISP designers, geographic information system vendors, vehicle navigation map database providers, or any person or organization wishing to use standard interfaces for location referencing.

### How is it used?

This Information Report is used as an overview of common location referencing methods, formats, and definitions. System developers may use it to help in the selection of profiles for use in ITS applications of either internal or external interfaces. Individual profiles may then be used directly when appropriate for an application. It may also be used for the selection of profiles to be proposed for standardization, in original or modified form, by appropriate standards development organizations.

### Scope

This Information Report is intended to provide a practical approach to standardization for location referencing within a mixed data set environment, i.e., where more than one kind of spatial data set exists and where spatial references between these data sets must be made. Although some ITS applications in local areas may be satisfied by having one common data set for which location references may be implemented in any number of ways, many ITS applications will have broad interoperability requirements within the nation or a region. For example, a vehicle driven from California to Florida should be able to receive and understand spatial references for traffic information or routing instructions throughout the trip. Similarly, information sent from a vehicle to a central ISP site should be understood in any city, state, or region regardless of the kinds of data sets in use, whether they are public or private, or how locations are referenced internally to particular data sets. The LRMS can be applied to ITS systems involving vehicles on roads, rails, and waterways. It can also be applied to location references between central sites and non-mobile sites such as kiosks, other central sites, or pedestrians, as well a within centers and ISPs. The broadest scope of the LRMS is, therefore, intermodal spatial data set interoperability at the national level and across all ITS applications.

### Related documents

This Information Report is based on the Location Reference Message Specification (LRMS) Revision B (MDI), dated 22 May 1997, with additional inputs received from both private and public sector parties. Other related standards include:

SAE J1746 – ISP-Vehicle Location Referencing Standard

SAE J2369 – Standards for ATIS Message Sets Delivered Over High Speed FM Subcarriers



For more information on ITS standards, contact the Federal Highway Administration, ITS Joint Program Office, Room 3401, HOIT, 400 7th Street, SW, Washington, DC 20590, phone: 202-366-2180, fax: 202-366-3302, Web site: www.its-standards.net

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