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(Revision of
IEEE Std 1512.3-2002)

IEEE Standard for Hazardous Material Incident Management Message Sets for Use by Emergency Management Centers

Sponsor

Intelligent Transportation Systems Committee
of the
IEEE Vehicular Technology Society

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IEEE-SA Standards Board

Abstract: This standard addresses the exchange of vital data about public safety issues involved in transportation-related events, through common incident management message sets. The message sets specified are consistent with the National Intelligent Transportation Systems Architecture and are described using Abstract Syntax Notation One ("ASN.1" or "ASN") syntax. This standard comprises one companion volume of the family of incident management standards centered around a base standard: IEEE Std 1512®-2006. Other members of that family include other companion volumes, specifying incident management message sets for transportation-management-related data exchange and hazardous-material and public safety data exchange. Collectively, that family of standards shall be referred to as the "IEEE 1512 Family of Standards." The goal of that family of standards is to support efficient communication for the real-time, interagency management of transportation-related events. Those events include incidents, emergencies, accidents, planned roadway closures, special events, and disasters caused by humans or natural events. Those events include any such event that impacts transportation systems or that causes a report to be received by an emergency management system, whether or not the event actually affects a transportation system and whether or not a response is required.

Keywords: 911, ASN.1, ATMS, CAD, Center-to-Center, Commercial Vehicles, Dangerous Goods, Data Exchange, EMC, Emergency Response, Emergency Services, EMS, Fire, Hazardous Materials, Hazmat, Incidents, Incident Response, Incident Management, Incident Command, Incident Management System, Intelligent Transportation Systems, Law Enforcement, Message Sets, Police, Public Safety, Traffic Incidents, Traffic Incident Management, Traffic Management, TMC, Transportation System Management

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Introduction

This introduction is not part of IEEE Std 1512.3, IEEE Standard For Hazardous Material Incident Management Message Sets for Use by Emergency Management Centers.

The Incident Management Working Group was formed from a cross section of ITS (Intelligent Transportation System) and incident management practitioners in 1997 to address the problems and concerns of dispatching traffic management centers interacting with each other in the resolution of (primarily) roadway services disruptions (and certain other events on the highway), generically referred to as incidents. Advancing the greater coordination of these centers and their cross servicing over various jurisdictional boundaries is the primary objective of this Working Group.

This standard is one of several related standards in this area and deals primarily with the communication of vital data of a public safety and/or emergency management nature involved in transportation-related events. It is a companion volume to a Base Standard: IEEE Std 1512-2006. Other categories of communication, having to do with transportation management, hazardous material, and other cargo are addressed in other companion volumes generated by the Working Group. The Base Standard, this volume, and other companion volumes together comprise what shall be known as the IEEE 1512 Family of Standards.

The Base Standard includes more general introductory material for the family of standards, including the other companion volumes and the relationship between the family of standards and other ITS standards and the National ITS Architecture. That material will not be repeated here. Rather, the remainder of this section will present a statement of the problem this companion volume is to address and its goal.

Problem statement

In the course of a transportation-related event where multiple public safety agencies are involved, there is a critical need to coordinate the management of the event among those agencies. Involved public safety agencies may include law enforcement, fire and rescue, emergency medical services (EMS), hazardous material management, traffic management, towing and recovery, and others. Each agency has a separate set of tasks, resources, and communication gear; yet the agencies need to coordinate their separate actions.

The challenge to be met by the IEEE 1512 Family of Standards is to specify message sets to support communication to coordinate those separate actions. That coordination extends to five categories of information, as follows:

a) Situation awareness: A common-format rendition of the situation, i.e., the spatial layout, general aspects such as smoke and fire, what each agency is doing, and tracking several variables in a summary way: injured, response personnel, response equipment, witnesses, perpetrators, involved vehicles, and cargo. And as a special subject area of this volume, detailed information relating to the cargo and any hazardous aspects that it may contain and of which others need to be aware.

b) Each agency's plan of action: A flexible format for agencies to disseminate their plans, so that each agency can take all other agencies' plans into account in its own planning and management. That exchange can support the specification of a single incident-wide action plan, or simply each agency specifying its own plan, to be followed separately but accounting for the plans of the other agencies.

c) Asset management: An effective way for the agencies to share information about availability of assets for inter-agency management, and then to facilitate the inter-agency use of those assets, i.e., where Agency A requests that an asset of Agency B be dispatched to the incident. This approach extends to informing other agencies of the need for services such as law enforcement, evacuation, medical treatment, rescue, fire suppression, and hazardous material management.

d) Warning information: Emergency evacuation, responder distress, cautions for responders, and "be on lookout for" information.

e) Messaging overhead: Message priority, drill/not-a-drill, acknowledgment, ability to address by function as opposed to by agency name, and determining whether a center is functioning.

That presents us with the basis for stating the goal.

Goal of this companion volume

The goal of this companion volume is to specify message sets to support the exchange of the five types of information just listed. More precisely, it is to specify the message sets that support that exchange, in combination with the message sets specified in the rest of the IEEE 1512 Family of Standards. As of this writing, that IEEE 1512 Family of Standards includes

— Base Standard: IEEE Std 1512-2006, Standard for Common Incident Management Message Sets for Use by Emergency Management Centers

— Companion Volume: IEEE Std 1512.1TM-2006, Standard for Traffic Incident Management Message Sets for Use by Emergency Management Centers

— Companion Volume: IEEE Std 1512.2TM-2005, Standard for Public Safety Incident Management Message Sets for Use by Emergency Management Centers

As part of its support of that exchange, this companion volume will support existing conventions and nomenclature for established practices in public safety incident management, in particular the National Incident Management System (NIMS)[1] and existing formats for incident action plans. At the same time, the message sets will not require that the local implementation use NIMS or any particular format for an incident action plan. Although in some local implementations any multiagency incident is coordinated with a single plan, in other local implementations, conventions are oriented around each agency having its own plan without any single, explicitly integrated plan. Both of those cases are supported by this standard. References to ICS and UCS in this volume shall be taken to also refer to the NIMS.

Companion volumes

This standard provides information on additional messages, data frames, and data elements beyond those appearing in the Base Standard (IEEE Std 1512-2006) and the companion volumes listed above. To make full use of this information, the Base Standard, companion volumes, and other references to ITS and industry standards may also need to be employed. That is particularly true in the area of message set reuse where the contents of various elements have been taken from well-established practices, both within and outside that of the ITS and the public safety industries.

The standard and use with data registries

The standard was developed in conjunction with entries designed to be made into a data registry. The following information may be useful to persons wishing to track the data structures described in this standard with those entries or in other similar registries.

In each of the data structures found in Clause 5 through Clause 7 of this standard, the following meta data fields are used and are equivalent to the named fields in a data registry. The mapping between these fields is as follows. The specific clause numbering and name of an entry is also the DESCRIPTIVE NAME of that entry in the registry (the part that follows after the ":" is the name used). The one or more paragraphs that then follow, headed "Use," forms the DESCRIPTION entry. The final one or more paragraphs, headed "Remarks," forms the REMARKS entry. The section headed "Used by," contains linkages to other data

[1]U.S. Department of Homeland Security, www.dhs.gov, March 1, 2004. As of this writing, exact URL: http://www.dhs.gov/interweb/assetlibrary/NIMS-90-web.pdf.

then follow, headed "Use," forms the DESCRIPTION entry. The final one or more paragraphs, headed "Remarks," forms the REMARKS entry. The section headed "Used by," contains linkages to other data structures that in turn refer to this one. In a data registry, the fields RELATED DATA CONCEPT and RELATIONSHIP TYPE may be used to convey this information, along with other relationships. The section headed by "ASN.1 Representation," contains all ASN.1 defining code. In a data registry, this information is broken up among the fields: ASN.1 NAME, DATA TYPE, VALID VALUE RULE, and BODY. The ASN.1 NAME contains the formal ASN.1 Type Definition name of the object. The DATA TYPE contains the base type from which it is defined. The VALID VALUE RULE, or the BODY, then contains the various constraints, declared constants, enumerations values, and comments of the rest of the definition. In the case of data element entries, this information is found in the VALID VALUE RULE, whereas in the case of data frames and messages, this information is placed into the BODY field.

Other fields used in a data registry (such as UNITS or FORMULA) are, typically, not provided with content from this standard or are self evident and constant in nature. The SOURCE field is an example of this, and its value for all entries from this standard is IEEE Std 1512.3-2006.

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The Working Group wishes to acknowledge the assistance of Bancroft Scott and Paul Thorpe of Open Systems Solutions, Inc. (OSS) in providing the use of their ASN.1 tool suite compiler. The ASN.1 syntax appearing in this standard was validated using that tool suite compiler.

The IEEE 1512 Family of Standards is dedicated to the memory of those who lost their lives responding to the tragic events of September 11, 2001. The Working Group honors the men and women who continue to maintain vigilance in protecting freedom and security. It is our hope and expectation that these standards will enhance multijurisdictional communications.

When the IEEE-SA Standards Board approved this standard on 8 June 2006, it had the following membership:

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Contents

IEEE Standard for Hazardous Material Incident Management Message Sets for Use by Emergency Management Centers

1. Overview

This standard contains a framework for the exchange of data in messages sets for use by emergency management centers (EMCs) for hazardous material incidents.

This standard supplements IEEE Std 1512®-2006,[1] henceforth called the "Base Standard" for the family of incident management message sets. The overview, scope, and purpose of IEEE Std 1512-2006 will not be repeated in this standard.

In the course of managing many transportation-related events, there is a need for sorting out and managing the often complex and partial information about the cargo and contents of involved vehicles and, in some cases, the contents of involved buildings. Often there are large gaps between the available information and what the incident commander needs to best manage the incident with regard to cargo and contents. In the ITS world, those gaps will often be spanned by off-site databases. The particular complexities of collecting the on-site data, then querying multiple off-site databases to gather all relevant information, is a task for local implementers. The task for this standard is to provide the framework for communication among the site and those databases to provide a flexible basis for that complex decision support process.

In supporting that decision process, this standard supports communication concerning vehicle cargo, contents, and building contents. Often a material that must be taken into account in incident management is not an involved vehicle's cargo, but its fuel, as in a fuel spill. Thus, this standard extends to both vehicle cargo and other contents. In addition, the IEEE 1512 Family of Standards has within its scope all transportation-related events, which include, for example, building fires and building structural failures as they impact the transportation system. For example, a structural fire can involve significant road closure. Often buildings have contents, in particular, hazardous material, that must be taken into account in managing a transportation-related incident. Thus, this standard addresses not only vehicle cargo and contents, but also building contents.

Often information about cargo and/or contents is important for incident management whether the cargo and/or contents is labeled as hazardous material or hazardous waste. There are several examples: Many common solvents and cleaning compounds require no shipping papers, labels, or placards when shipped as new, yet become U.S. Environmental Protection Agency (EPA) regulated as hazardous waste, requiring shipping papers, markings, and placards, when they are used and dirty, indicating that they should be

[1] Information on references can be found in Clause 2.