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National Transportation Communications for ITS Protocol

Object Definitions for Electrical and Lighting Management Systems (ELMS)

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FOREWORD

NTCIP 1213 v03 defines the generic reference model and conformance requirements for traffic management centers (TMCs) that wish to provide interfaces to external centers. NTCIP 1213 v03 defines requirements that are applicable to all NTCIP TMCs, and contains optional and conditional sections that are applicable to specific environments for which they are intended.

NTCIP 1213 v03 defines the Electrical and Lighting Management System (ELMS) data element objects that are supported by the NTCIP. An ELMS is defined as any system capable of monitoring, controlling, and communicating certain electrical and lighting system parameters using NTCIP.

The effort to develop an NTCIP ELMS standard began with the International Technology Exchange Program's European Road Lighting Technologies scan tour in April of 2001 (Report FHWA-PL-01-034 dated September 2001). This technology and implementation plan was further developed by the AASHTO Task Force for Highway Lighting and is being implemented as the Master Lighting Plan in the AASHTO publication entitled *Roadway Lighting Design Guide*. The Task Force's original desire was to define the features, functionality, and point of interoperability for ELMS equipment.

NTCIP 1213 v03 defines data elements in ASN.1 using the SNMP Object Type Macro for field devices that monitor and control electrical and lighting systems.

NTCIP 1213 v03 is an NTCIP Device Data Dictionary Standard. Device Data Dictionary Standards define management information in terms of objects (data elements, data frames, and messages) for use within NTCIP systems.

The following keywords apply to NTCIP 1213 v03: AASHTO, ITE, NEMA, NTCIP, ELMS, data logger, electrical service, branch circuit, luminaire, data elements.

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Approvals

NTCIP 1213 v03 was separately balloted and approved by AASHTO, ITE, and NEMA after recommendation by the Joint Committee on the NTCIP. Each organization has approved NTCIP 1213 v03 as the following standard type, as of the date:

AASHTO—Standard Specification; June 2022
ITE—Software Standard; July 2022
NEMA—Standard; July 2022

History

In 1992, the NEMA Transportation Management Systems and Associated Control Devices Section (3TS) began development of the NTCIP. The Transportation Section's purpose was in response to user needs to include standardized systems communication in the NEMA TS 2 standard, *Traffic Controller Assemblies*. Under the guidance of the Federal Highway Administration's NTCIP Steering Group, the NEMA effort was expanded to include the development of communications standards for all transportation field devices that could be used in an Intelligent Transportation Systems (ITS) network.

In September 1996, an agreement was executed among AASHTO, ITE, and NEMA to jointly develop, approve, and maintain the NTCIP standards. In 2002, the Joint Committee on the NTCIP accepted the invitation from Karl Burkett (Texas DOT) to transfer the initial work of an ad hoc committee of the Illuminating Engineering Society of North America (IESNA), and formed the NTCIP ELMS Working Group to further develop the control objects based on NTCIP. The NTCIP ELMS Working Group's first meeting was in April 2003.

NTCIP 1213 v02 development started in 2002 under funding provided by the FHWA, and was published in June 2010.

NTCIP 1213 v03 development initiated in 2014, to reflect lessons learned and to support new identified user needs and other new systems engineering elements.

Compatibility of Versions

To distinguish NTCIP 1213 v03 (as published) from previous drafts, NTCIP 1213 v03 also includes NTCIP 1213 v03.XX on each page header. All NTCIP technical publications have a major and minor version number for configuration management. The version number syntax is "v00.00a," with the major version number before the period, and the minor version number and edition letter (if any) after the period.

NTCIP 1213 v03 is designated, and should be cited as, NTCIP 1213 v03. Anyone using NTCIP 1213 v03 should seek information about the version number that is of interest to them in any given circumstance.

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Section 1
General [Informative]

1.1 Scope

Communication between an ITS Management Center or portable computer and an Electrical and Lighting Management System (ELMS) is accomplished by using the NTCIP Application Layer services to convey requests to access or modify values of ELMS data elements resident in the device via an NTCIP network. An NTCIP message consists of a specific Application Layer service and a set of data elements. An NTCIP message may be conveyed using any NTCIP defined class of service that has been specified to be compatible with the Simple Transportation Management Framework (STMF).

The scope of NTCIP 1213 v03 is limited to the functionality related to ELMS within a transportation environment.

The remainder of NTCIP 1213 v03 includes the following sections, and each section builds on the previous section(s):

a) Concept of Operations (Section 2)—providing a description of user needs (needs for features and needs related to the operational environment) applicable to ELMS devices
b) Requirements (Section 3)—defining the functional requirements that address the user needs identified in the Concept of Operations, and including a Protocol Requirements List (PRL) that defines conformance requirements, thereby allowing users to select the desired options for a particular project
c) Dialog Specifications (Section 4)—describing how each functional requirement is fulfilled (the dialogs define the standardized procedure for a Traffic Management Center to exchange data with an ELMS device)
d) ELMS Object Definitions (Section 5)—defining the data exchanged during communications; some of the definitions are included via reference to another standard
e) Requirements Traceability Matrix (Annex A)—providing a table that associates each requirement to a dialog, and its associated list of data
f) Object Tree (Annex B)—provides a graphical representation of the branch and tree structure for objects and the organization of the data defined in NTCIP 1213 v03
g) Astronomical Clock Support (Annex C)—including object definition modifications needed to support astronomical clock

> Note: Test procedures needed for each functional requirement are not included in NTCIP 1213 v03, although they may be added in a future version.

Section 2 and Section 3 are presented at a high level and are of interest to most readers; Section 3 and Section 5 address more detailed design issues that are of interest to implementers, integrators, and testers.

1.2 References

Normative references contain provisions that, through reference in this text, constitute provisions of NTCIP 1213 v03. Other references in NTCIP 1213 v03 might provide a complete understanding of the entire protocol and the relations between all parts of the protocol. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standard listed.

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