A Joint Standard of AASHTO, ITE, and NEMA

NTCIP 1202 v03

National Transportation Communications for ITS Protocol

Object Definitions for Actuated Signal Controllers (ASC) Interface

Published in February 2019

Published by

American Association of State Highway and Transportation Officials (AASHTO)
444 North Capitol Street, N.W., Suite 249
Washington, D.C. 20001

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Acknowledgements

NTCIP 1202 v03 was prepared by the NTCIP Actuated Signal Controller Working Group (ASC WG), which is a subdivision of the Joint Committee on the NTCIP. The NTCIP Joint Committee is organized under a Memorandum of Understanding among the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), and the National Electrical Manufacturers Association (NEMA). The NTCIP Joint Committee consists of six representatives from each of the standards organizations, and provides guidance for NTCIP development.

When NTCIP 1202 v03 was prepared, the following individuals were voting (indicated by an asterisk) or alternate voting members of the NTCIP ASC WG:

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- Southwest Research Institute, Cameron Mott
- The University of Arizona, Larry Head
- Trafficware Engineered by Naztec, Clyde Neel
- Trevilon Corp., Kenneth Vaughn
- WSP, Christopher Toth, Thomas Timcho, Erica Toussant, Nora Wisor

Additional stakeholders who provided input or monitored development include:

- Arcadis U.S., Inc., David Ritchie
- Battelle, Jeffrey Arch, Greg Zink
- CA DOT (CalTrans), Herasmo Iniguez, Brian Simi, Ted Lombardi, Antonio Sarmiento, Stan Slavin
- Diablo Controls, Inc., Allen Jacobs
- Global Traffic Technologies, LLC, Christian Kulus
- Gridaptive, Jim Frazer
- SCSC, David Kelley
- Jacobs, Diederick VanDillen
- Mid-America Regional Council, Ray Webb
- Miovision, Jan Bergstrom, Dave Hillis
- Mixon Hill, Lee Mixon
- Minnesota DOT, Peter Skweres, Ray Starr
- New Jersey DOT, Jeevanjot Singh
- New York City DOT, Rami Khashashina, Mohammad Talas
- Oregon DOT, K. Groves, Roger Boettcher
- Overland Park, KS, Shawn Gotfredson
- Oz Engineering, Tom Guerra
- Parsons, Jon Wyatt
- PR Olson Associates, Paul Olson
- Reno A&E, Matt Zinn
- SAE International, Keith Wilson
- Sandag, Peter Thompson

- Siemens Industry, Inc., Glenn Massarano, Dave Miller, Daniel Nelson, Andrew Valdez
- Utah DOT, Shane Johnson

In addition to the many volunteer efforts, recognition is also given to those organizations that supported the effort by providing funding:

- U.S. Department of Transportation

Foreword

NTCIP 1202 v03, an NTCIP standards publication, identifies and defines how a management station may wish to interface with a field device to control and monitor traffic signal controllers and associated detectors in an NTCIP-conformant fashion. NTCIP 1202 v03 uses only metric units.

NTCIP 1202 v03 is titled Actuated Signal Controllers (ASC) Interface Protocol to express the multiple sections and annexes that are included in NTCIP 1202 v03. This NTCIP 1200-series standards publication has grown beyond the “object definitions” that were reflected in the title for its predecessors, NTCIP 1202 versions v01 and v02 (2005).

NTCIP 1202 v03 defines data elements for use with Actuated Signal Controller Units. The data is defined using the Simple Network Management Protocol (SNMP) object-type format as defined in RFC 1212 and the defined NTCIP format defined in NTCIP 8004. This data would typically be exchanged using one of the NTCIP 1103 recognized Application Layers (e.g., SNMP).

NTCIP 1202 v03 follows an established systems engineering approach to support procurement processes. The PRL is designed to allow an agency to indicate what user needs are applicable to a procurement, and to select which requirements are to be implemented in a project specific implementation. Proper completion of the PRL by the agency results in a specification that is more likely to satisfy the agency’s project needs and that is conformant to NTCIP 1202 v03. The RTM defines the interface specifications for those requirements selected, and can be used to develop the test plans and test procedures.

The following keywords apply to this document: AASHTO, ITE, NEMA, NTCIP, ASC, data, data dictionary, object, MIB, PRL and RTM.

NTCIP 1202 v03 includes a number of normative and four informative annexes.

NTCIP 1202 v03 is also an NTCIP Data Dictionary standard. Data Dictionary standards provide definitions of data concepts (messages, data frames, and data elements) for use within NTCIP systems; and are approved by AASHTO, ITE, and NEMA through a ballot process, after a recommendation by the NTCIP Joint Committee. For more information about NTCIP standards, or to acquire the related NTCIP 1202 v03 MIB, visit www.ntcip.org.

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User Comments are generally referred to the committee responsible for developing and/or maintaining NTCIP 1202 v03. The committee chairperson, or their designee, may contact the submitter for clarification of the User Comment. When the committee chairperson or designee reports the committee’s consensus opinion related to the User Comment, that opinion is forwarded to the submitter. The committee chairperson may report that action on the User Comment may be deferred to a future committee meeting and/or a future revision of the standards publication. Previous User Comments and their disposition may be available for reference and information at www.ntcip.org.

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Section, Paragraph, or Clause:
Comment:
Editorial or Substantive?:
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Approvals

NTCIP 1202 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 1202 v03 as the following standard type, as of the date:

AASHTO—Standard Specification; December, 2018
ITE—Software Standard; January, 2019
NEMA—Standard; December, 2018

History

In 1992, the NEMA 3TS Transportation Management Systems and Associated Control Devices Section began the effort to develop NTCIP. 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 ITS network.

In September 1996, an agreement was executed among AASHTO, ITE, and NEMA to jointly develop, approve, and maintain the NTCIP standards. In late 1998, the Actuated Signal Controller Working Group was tasked with the effort to update the Actuated Traffic Signal Controller Object Definitions document. The first meeting of this working group was held in October 1999. From 1996 to 1999, this document was referenced as NEMA TS 3.5-1996. However, to provide an organized numbering scheme for the NTCIP documents, this document is now referenced as NTCIP 1202. As included in the following development history, NTCIP 1202 has experienced revisions over time:

NEMA TS 3.5-1996. 1996 – Approved by NEMA. 1996 – Accepted as a Recommended Standard by the Joint Committee on the NTCIP. 1997 – Approved by AASHTO and ITE.
v01.07a printed with NEMA cover.

NTCIP 1202 v01. v01.07b printed with joint cover. v01.07c printed to PDF in November 2002. v01.07d printed to PDF for no-cost distribution January 2005.

NTCIP 1202 Amendment 1. November 1999 – Accepted as a User Comment Draft Amendment by the Joint Committee on the NTCIP. April 2000 – NTCIP Standards Bulletin B0049 sent NTCIP

1202 Amendment 1 v01.06b for user comment. NTCIP 1202 Amendment 1, a User Comment Draft, was incorporated into 1202v02, and was not advanced further.

NTCIP 1202 v02.10. June 2001 – Accepted as a User Comment Draft by the Joint Committee on the NTCIP. February 2002 – NTCIP Standards Bulletin B0068 referred v02.13 for user review and comment.

NTCIP 1202 v02.16. October 2002 – Accepted as a Recommended Standard by the Joint Committee on the NTCIP. April 2004 – NTCIP Standards Bulletin B0091 referred v02.18 for balloting. Approved by AASHTO in November 2004, approved by ITE in March 2005, and approved by NEMA in November 2004.

NTCIP 1202:2005 v02.19. November 2005 – Edited document for publication. By the terms of MOU on CTPA article 1.2, the ownership of version 02 was assigned to AASHTO, ITE, and NEMA because the preexisting work was revised by more than 50%.

NTCIP 1202 v03 was developed to reflect lessons learned, to update the document to the new documentation formats, and to add new features such as support for a connected vehicle interface. NTCIP 1202 v03 also follows an established systems engineering approach. Several new sections were added to relate user needs identified in a concept of operations, functional requirements, interface specifications and a requirements traceability matrix to the existing sections.

Compatibility of Versions

To distinguish NTCIP 1202 v03 (as published) from previous drafts, NTCIP 1202 v03 also includes NTCIP 1202 v03.27 on each page header. All NTCIP Standards 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.

The MIB associated with NTCIP 1202 v03 (as published) is 1202v0327.MIB. In addition, the 1217v0127.MIB is available through SAE.

NTCIP 1202 v03 is designated, and should be cited as, NTCIP 1202 v03. Anyone using NTCIP 1202 v03 should seek information about the version number that is of interest to them in any given circumstance. The PRL, RTM and the MIB should all reference the version number of the standards publication that was the source of the excerpted material.

Compliant systems based on later, or higher, version numbers MAY NOT be compatible with compliant systems based on earlier, or lower, version numbers. Anyone using NTCIP 1202 v03 should also consult NTCIP 8004 v02 for specific guidelines on compatibility.

CONTENTS

Note: The following Contents listing includes seven heading levels (for annexes) to permit TPG evaluation.

FIGURES

TABLES

Section 1
General [Informative]

1.1 Scope

NTCIP 1202 v03 specifies the logical interface between an Actuated Signal Controller (ASC) and the host systems that control them. NTCIP 1202 v03 describes the supported ASC functionality in terms of user needs and requirements; however, the nature of the interface is determined in part by the operational nature of the devices being controlled, and therefore NTCIP 1202 v03 touches on such operational issues on occasion.

Prior to the development of NTCIP 1202, there were no standards defining how ASCs communicate with host systems. As a result, each manufacturer has developed its own protocol to meet its own particular needs. This approach has resulted in systems that are not interchangeable or interoperable. If an agency wishes to use either a central management system or additional ASC from a different vendor, the agency encounters significant systems integration challenges, requiring additional resources to address. These additional resource requirements inhibit information sharing within and between various potential users of the data and prevent vendor independence. Without manufacturer independence, resource requirements further increase because of a lack of a competitive market.

These problems have not been limited to traffic signal controllers. Many other devices also need to exchange information. In surface transportation, examples include dynamic message signs, bus priority sensors, weather, and environmental monitoring, etc.

To address these problems, NTCIP is developing a family of open standards for communications between field devices and central management systems. NTCIP 1202 v03 is part of that larger family and is designed to define an interoperable and interchangeable interface between a transportation management system and an ASC, while still allowing for extensions beyond NTCIP 1202 v03 to allow for new functions as needed. This approach is expected to support the deployment of ASC from one or more vendors in a consistent and resource-efficient way.

NTCIP 1202 v03 standardizes the communications interface by identifying the various operational needs of the users (Section 2) and subsequently identifying the necessary requirements (Section 3) that support each need. NTCIP 1202 v03 then defines the NTCIP standardized communications interface used to fulfill these requirements by identifying the dialogs (Section 4) and related data concepts (Section 5) that support each requirement. Traceability among the various sections is defined by the Protocol Requirements List (Section 3.3) and the Requirements Traceability Matrix (Annex A). Conformance requirements for NTCIP 1202 v03 are provided in Section 3.3. NTCIP 1202 v03 only addresses a subset of the requirements needed for procurement. It does not address requirements related to the performance of the traffic detectors (e.g., accuracy, the supported detection range, the time it takes to detect conditions, etc.), hardware components, mounting details, etc.

Previous versions of NTCIP 1202 addressed only Actuated Traffic Signal Controllers (ASC) that employ vehicle or pedestrian detectors to activate a particular phase – the scope did not include pre-timed, or fixed-time signal controllers that cycle through phases regardless of the number of vehicles or pedestrians present. ASCs included both fully actuated traffic signals, where all phases are actuated, and phases are skipped if no vehicles or pedestrians are detected, as well as semi-actuated traffic signals, where at least one phase is guaranteed to be served regardless of whether pedestrians or vehicles are detected. For the NTCIP 1202 v03 purposes, controllers that allow different phases to be active (or skipped) at any point in time phase are known as phase-based controllers.