The following Standard Development Report (SDR) is made in accordance with the Institute of Transportation Engineers (ITE) procedures for the Advanced Transportation Controller standards.
1 LATEST VERSION OF THE DRAFT PROPOSED STANDARD

Appendix I contains Recommended Standard (RS) ATC 5201 Advanced Transportation Controller Standard Version 06A.36 (ATC 5201 v06A.36). It is an update version to the current Jointly Approved ATC 5201 v06.25. Jointly Approved means that the standard had been formally balloted and approved separately by the three cooperating standard development organizations (SDOs): the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), and the National Electrical Manufacturers Association (NEMA).

2 SUMMARY STATUS

ATC 5201 v06A.36 has been accepted as a Recommended Standard of the ATC Joint Committee (JC). The standard contains the detailed design and requirements for ATC 5201 conforming transportation controller devices. It is being distributed to the members of the Institute of Transportation Engineers (ITE), the American Association of State Highway and Transportation Officials (AASHTO), and the National Electrical Manufacturers Association (NEMA) for formal balloting and approval.

3 STATUS REPORT

ATC 5201 v06.25 was published as a Jointly Approved standard of the ATC JC on January 12, 2018. It was completed approximately a year prior but was delayed due to an appeal that was later rescinded. During the process of the appeal, a maintenance effort was started that would become ATC 5201 v06A.36. Comments were solicited from the Controller Working Group (WG), a technical subcommittee of the ATC JC. Its membership is made up of members from state and local transportation agencies, manufacturers, software developers and consultants. There were 57 comments submitted. Of those 57, 54 comments were adjudicated and closed. There were 3 comments that remained open on the list that could not be closed due to the scope of the effort at the time. Later during the development, User Comment Draft (UCD) ATC 5201 Advanced Transportation Controller Standard Version 06.32 (ATC 5201 v06.32) was produced and distributed to the SDOs. Based on this UCD, 29 comments were submitted (included the three previously unresolved comments) and adjudicated by the Controller WG. Both sets of comments provided valuable feedback in identifying areas of ATC Standard 5201 v06.25 that needed correction, further definition or enhancement.

Appendix I contains ATC 5201 v06A.36. The comment reports that are described in the previous paragraph are found in Appendix II and Appendix III. Appendix IV contains the list of milestones in the development of the standard.

The improvements to the standard are mainly corrections and additions focused on removing ambiguities and barriers to software portability and hardware compatibility. There are also increases to memory sizes and to the minimum Linux kernel version to be more contemporary. ATC 5201 v06A.36 represents an improved and clarified document over ATC 5201 v06.25.

The Controller WG submitted ATC 5201 v06A.34 to the ATC JC for review as a Proposed Recommended Standard (pRS). The ATC JC accepted the document as a Recommended Standard during their teleconference on June 20, 2019 with a vote of 8 yeas, 0 nays, and 0 abstentions. The minor revision number was advanced to ATC 5201 v06A.36 for administrative and editorial reasons.
4 COMMENTS LISTING

The adjudicated comments used in the creation of ATC Standard v06A.36 are found in Appendix II and Appendix III.

5 COMMITTEE OBJECTIVES

This standard has been developed under the oversight of the ATC Joint Committee which is made up of representatives from the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), and the National Electrical Manufacturers Association (NEMA). The work in developing this standard was performed by the Controller Working Group, a technical subcommittee of the ATC JC. The goals of the ATC program are to create a general purpose field computing platform for transportation applications that is:
   a) Open architecture;
   b) Modular;
   c) Multi-process / Multi-application; and
   d) Can grow with advances in technology.

The objective of the Controller WG is to create a transportation controller architecture that, when combined with Application Programming Interface (API) software as defined by the ATC 5401 Standard, meets the goals of the ATC program.

6 COMMITTEE MEMBERS

Controller Working Group

Ralph Boaz, Pillar Consulting
George Chen, Los Angeles DOT
Mike Gallagher, Intelight
Robin Harrison, Peek Traffic
Herasmo Iniguez, California DOT
Dave Miller, Siemens
Clyde Neel, Naztec
Bob Rausch, TransCore
Jim Rose, Econolite
Faisal Saleem, Maricopa County, AZ
Mohamed Talas, New York City DOT
John Thai, City of Anaheim

ATC Joint Committee

Doug Crawford, Intelight
Alan Davis, Georgia DOT
Kleinjan Deetlefs, Applied Information
Gary Duncan, Econolite
Daniel Farley, Pennsylvania DOT
Matt Luker, Utah DOT
Andrew Mao, Texas DOT
Dave Miller, Siemens
Robert Rausch, TransCore
7 OTHER MATERIAL OF INTEREST

The documents listed below are consistent with those listed within ATC 5201 v06A.36. Newer versions with minor revisions may be available.


IEEE 802.3 Ethernet Specifications. Available from the Institute of Electrical and Electronics Engineers.


8 DECLARATION REGARDING OTHER KNOWN NATIONAL AND INTERNATIONAL STANDARDS

This statement confirms that other known national and international standards have been examined with regard to harmonization and duplication of content, and no significant conflicts with other known standards have been identified.

9 ABSTRACT OF THE STANDARD

Purpose

The Advanced Transportation Controller (ATC) standards are intended to provide an open architecture hardware and software platform that can support a wide variety of Intelligent Transportation Systems (ITS) applications including traffic management, safety, security and other applications. The ATC standards are being developed and maintained under the direction of the ATC Joint Committee (JC) which is made up of representatives from the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE) and the National Electrical Manufacturers Association (NEMA).

This standard defines a transportation field device known as an Advanced Transportation Controller. It has been prepared by the Controller Working Group (WG), a technical subcommittee of the ATC JC. It establishes a common understanding of the specifications for an ATC for:

a) Local, state and federal transportation agencies who specify and use ATC equipment;

b) Manufacturers who produce ATC equipment;

c) Software developers who develop application programs for ATC equipment; and

d) The public who benefit from the application programs that run on ATC equipment and who directly or indirectly pays for these products.

Overview

ATC 5201 v06A.36 uses a transportation controller architecture where the computational components of the controller reside on a single small printed circuit board (PCB), called the “Engine Board,” with standardized connectors and pinout. It is made up of a central processing unit (CPU), Linux operating system (O/S), memory, external and internal interfaces, and other associated hardware necessary to create an embedded transportation computing platform (see Figure 1). The Engine Board plugs into a “Host Module” which supplies power and physical connection to the input/output (I/O) facilities of the controller. While the interface to the Engine Board is completely specified, the Host Module may be of various shapes and sizes to accommodate innumerable transportation controller designs and cabinet architectures. Figure 2 illustrates how the engine board and host board can be used in different types of transportation controllers. Figure 3 shows how a controller compliant with two different existing cabinet standards can utilize the ATC Standard.
Figure 2-1. Block diagram of the ATC Engine Board.

Figure 2-2. ATC Engine Board used in Host Modules for different types of transportation controllers.
In order to meet all the goals of the ATC program, ATC units require Application Programming Interface (API) software as defined by the ATC 5401 Standard. ATC units with operational API software can run multiple application programs concurrently that share the resources of the controller and the field cabinet system. This includes applications from different software vendors.

**Document Organization**

*ATC 5201 v06A.36* is made up of ten sections and three appendices. Section 1, “Introduction,” provides an overview of the entire document. Section 2, “Overall Description,” provides the background information and context necessary for the requirements. Section 3, “Functional Requirements” identifies the requirements of an ATC based on the “Representative Usage” described in Section 2. Sections 4-10, contain the detailed requirements and specifications for ATC units. Appendices A-C contain the Linux operating system specifications, device driver interface specifications, and a short historical background on transportation controllers, respectively.
Appendix I

Recommended Standard ATC 5201 v06A.36

(See Attachment)
Appendix II

Adjudicated Controller Working Group Comments on ATC 5201 v06.25

(See Attachment)
Appendix III

Adjudicated User Comments on
User Comment Draft ATC 5201 v06.32

(See Attachment)
## Appendix IV

### Development Milestones

<table>
<thead>
<tr>
<th>ITE Standards Development Milestone</th>
<th>Date, Description of Action Taken and Other Background Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Decision Made and Effort Announced</td>
<td>This work is part of the maintenance of the standard under the oversight of the Advanced Transportation Controller (ATC) Joint Committee (JC). The decision was made to perform this effort in July 2017 while then ATC 5201 v06.24 was under appeal (changed to ATC 5201 v06.25 when the appeal was dropped).</td>
</tr>
<tr>
<td>2. Committee Formed</td>
<td>The Controller Working Group (WG) was formed in 1997 to develop and maintain the controller standards of the ATC program.</td>
</tr>
<tr>
<td>3. Committee Develops Draft Proposed Standard</td>
<td>The Controller WG started this effort in August 2017. It continued through May 17, 2018 to produce Proposed User Comment Draft (pUCD) ATC 5201 v06.31.</td>
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<tr>
<td>7. Proposed Standard Published to Solicit Comments</td>
<td>UCD ATC 5201 v06.32 was published and circulated for user comment for the period of August 8 – September 9, 2018.</td>
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<tr>
<td>8. Comments Considered by Committee</td>
<td>The Controller WG adjudicated the comments received and the standard was modified to produce Proposed Recommended Standard (pRS) ATC 5201 v06A.</td>
</tr>
<tr>
<td>11. Revised Standard Approved</td>
<td>The ATC JC voted to accept Recommended Standard (RS) ATC 5201 v06A on June 20, 2019.</td>
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<tr>
<td>12. Intent to Adopt Announced</td>
<td>In process.</td>
</tr>
<tr>
<td>13. ITE Standard Adopted by the ITE Board</td>
<td>In process.</td>
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<tr>
<td>14. Maintenance of Standard</td>
<td>SDOs maintain the Standard on a five-year review cycle.</td>
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