

Comments Regarding Proposed Advanced Transportation Controller Standard v. 5.0 dated October 28, 2003

Section	Page(s)	Comment	Acceptable Resolution
General	n/a	<p>Proposed standard is strongly centered around the 170/2070 Users, yet approximately 70% of intersections are currently controlled by NEMA controllers. Approval of this standard therefore endorses the 170/2070 world over the NEMA (majority) world. This will send a bad message to the NEMA users.</p>	<p>Retract proposed standard and rework it to be more in-line with current accepted NEMA standard. For example, do not define the internal connections and inter-module protocols, etc but rather define the external interfaces and required functionality.</p>
General	n/a	<p>Proposed standard attempts to target the most sophisticated and demanding users, while ignoring the fact that 90% or more of the users would easily use less than 50% of the requirements in the products life-time.</p> <p>The standard should allow for a completely “integrated” version of the ATC provided it can accept (be upgraded to) a standard engine board. Installation of a standard engine board should transfer control to the engine board.</p>	<p>Specifically identify within the standard two versions: a “full” and a “lite”. The “lite” should specify one Ethernet port (and no hub), four serial ports total (includes communications), SPI (host EEPROM ... to allow a full engine board to identify what capabilities the host unit has) but Datakey optional, the communications slot being optional, and allow either the use of an integrated “engine board” (on the “host” board) or a non-integrated standard engine board. Additionally, a “lite” version of the engine board should be included, but the unit should accept and correctly function with a “full” engine board installed. To support recognition of an engine board, an “engine board present” pin needs to be allocated to one of the engine board connectors (suggest selecting of of pin 34-38 on connector P1). The “lite” should only require (specify) the engine board as an interchangeable module, with all other interfaces defined strictly as physical external connections and their required functionality. Lastly, a “lite” ATC shall</p>

			allow for integrated I/O and User interfaces provided the manufacturers provide software interfaces that are transparent to the application program (Note: cannot reference the API since it does not “exist”).
General	n/a	Lack of software portability. Users are expecting that they will be able to move/install the same software across various manufacturers’ products. Without more specific hardware definitions this will not be possible, even if the API were available.	This is a big dilemma ... does one specify the hardware completely to achieve the desired portability (similar to the 2070 approach) or does one accept that software will be expensive to port across products. The Users need to specify their requirements and not the manufacturers. Resolution deferred to the Users (both NEMA and 170/2070).
General	n/a	The ATC JC approved the document (with required minor changes) for balloting purposes by the three SDOs. It appears that ITE is not balloting the proposed standard (I have seen no call for votes), but rather is only offering a call for appeals and then will unilaterally sanction the standard. The ATC JC was promised that comments received during balloting would be disposed of by the ATC Controller Working Group.	The proposed standard should be submitted for a vote by ITE members, and any comments received during the process should be disposed of by the Working Group and not the Contractor.
1	1-1 (lines 31-34)	Observation of the “process” followed by the contractor team does not appear to be consistent with the ITE’s Recommended Practice for Standards Development at the time of contract award. It appears that the process has been altered as the contract has progressed. For example, the ATC Controller Working Group did not dispose of the comments received during the User Comment period; the Contractor unilaterally handled all	Request copies of the ITE contract with Siemens and project management plan along with a detailed analysis documenting concurrence and deviations from the ITE’s Recommended Practice for Standards Development. If the analysis does not proof consistency, then the proposed standard should be retracted and the official process followed.

		comment dispositions and did not make all of their answers available within the necessary (defined) period prior to ATC JC voting.	
2.1	2-1 (lines 26-27)	Functional Requirements identified in Section 4 is not a complete list of USER requirements. Do not develop the technical requirements first.	First develop a complete list of USER requirements, and then develop the technical requirements based on them. For example, the USER requirement for an interchangeable power supply (as stated at the Traffic Signal Workshop in Seattle, WA in July 2003) and graphical display capabilities have been missed.
2.1	2-1 (lines 27-29)	“Plug-in compatibility” is misleading as it does not include functional compatibility. For example, one may have two Spread Spectrum Radio communication cards from different manufacturers both of which operate in the 900 MHz band using frequency hopping technology; there is no guarantee (in fact it is highly unlikely) that the two will be able to communicate to each other.	Change wording to clarify that although modules may be interchangeable between manufacturers, that it is highly probable that they will not provide equivalent functionality. This applies to both communication modules and the engine board (i.e. one cannot move application software from one manufacturer’s engine board to another as is currently possible in the 2070).
2.2.1	2-3 (lines 22-23)	Comment on ITS Cabinet Standard	Remove “(standard concurrently in design)”
2.2.2	2-3 (line 38)	There are no designated minimum requirements on the “Operating System Software” anywhere in the document	Remove line 38 on page 2-3 completely.
2.2.3	2-4 (lines 11-12)	This requirement hampers the utilization of future technological advances that WILL occur during the lifespan of this standard	Remove the sentence “In this standard user interfaces not specified here as minimum or optional are considered non-compliant”. Place the requirement that alternative user interfaces may be included provided that the minimum or an optional interface is provided also. Update page 7-1 similarly.
7.1.1	7-1 (lines 33-34)		
2.2.5	2-4 (lines 27-37)	As discussed (and agreed upon) at the ATC JC meeting, references to the API need to be	Either 1) remove section 2.2.5 completely, or 2) delay approval of this standard until AFTER the API is

		removed since it is not at the same point in its development as this standard. This section is extremely misleading to users, etc as there is NO requirement for the ATC to currently support the API (now or in the future).	balloted and approved (in this case this proposed standard will need to be reviewed to ensure that it can support the API requirements).  Also request that it be resubmitted for User Comment since this will be a substantial change from the Users point of view.
2.3.1	2-5 (lines 4-8)	API is not at the same development stage as this proposed standard and hence cannot be referenced normatively, nor can any form of support for the API be mentioned or inferred.	Either 1) remove all references to the API draft standard completely, or 2) delay approval of this standard until AFTER the API is balloted and approved (in this case this proposed standard will need to be reviewed to ensure that it can support the API requirements).  Also request that it be resubmitted for User Comment since this will be a substantial change from the Users point of view.
2.3.1	2-5 (lines 13-14)	NEMA TS2-2002 is approved.	Remove text “(pending NEMA approval)”
2.3.2	2-6 (lines 3-4)	This standard does not truly support the identification of communication modules properly.	Either 1) change statement to reflect communication module support capabilities (either does not offer support or support is limited to information entered into ATC by User), or 2) (preferred) add SPI signals to the communication slot(s) to facilitate automatic reading of communication module details and require that all communication modules support this feature.
3	3-1 (line 26)	... yet must be designed in a cost-effective manner.	The standard has many costly requirements without any analysis of the minimum hardware requirements of the majority of intersections in this country. A standard that only addresses the high end of the requirements cannot be considered cost-effective for

			the majority of users.
3.3	3-5 (lines 1-7)	...is particularly interested in addressing the longevity concerns surrounding the ATC 2070...	The standard largely ignores the needs of the majority of users (NEMA-based) if favor of a 2070-based design with some NEMA add-ons.
3.3	3-5 (line 24)	An additional need for the ATC is improved network communication interface support.	Has any actual study been done of the number of stand-alone intersections vs. interconnected intersections in this country?
3.3	3-6 (lines 4-12)	Cost-effective design is also a goal...	Requiring a separate engine board reduces reliability (100 pins adds 100 failure points) and increases costs for all possible hardware designs. For the example given (Personal Computers), separate motherboard and CPU boards do not exist in the general market place, and where they are used the relative cost is 3 to 4 times higher.
3.3	3-6 (lines 14-21)	Need exists for CPU upgrade and interchangeability between manufacturers.	The majority of intersections have been running
4.1.1	4-1 (line 32)	Reference made to non-existent API	Change "API" to "operating system"
4.1.2	4-2 (line 9)	Reference made to non-existent API	Change "APIs" to "operating system"
4.1.3	4-2 (line 25)	Reference made to non-existent API	Change "API" to "operating system"
4.1.4	4-3 (lines 13-14)	Reference made to non-existent API	Remove lines 13 and 14 completely.
4.1.5	4-3 (lines 30-31)	Reference made to non-existent API	Remove lines 30 and 31 completely.
4.1.6	4-4 (lines 7-8)	Reference made to non-existent API	Remove lines 7 and 8 completely.
4.1.7	4-4 (lines 22-23)	Reference made to non-existent API	Remove lines 22 and 23 completely.
4.1.8	4-4 (line 33)	Reference made to non-existent API	Change "API" to "operating system"
4.3.1	Page 4-5	Without a finished API standard, one cannot	Remove this section completely.

	line 28 to Page 4-6 line 4 inclusively	ensure or claim that this standard supports it completely. As agreed at the ATC JC, such references to the API need to be removed.	
4.3.2.1	4-6 (lines 23-25)	The ITS cabinet is complete. Also, both the ITS and 332 cabinets require rack-mounted controllers.	Change text to read “If used in standard NEMA TS1 or TS2 cabinet, the controller unit shall be shelf mounted.”
4.3.2.2	4-6 (line 40)	Section 5 does NOT designate minimum Engine Board requirements on “operating system software”	Remove line 40 completely.
4.3.2.2	4-6 (line 28) – 4-7 (line 4)	Engine Board Contents	Engine board interoperability is dubious – any additional interfaces added by a manufacturer, such as an interface to drive a graphic LCD, will preclude the use of any other manufacturer’s engine board.
5.1.1	5-1 (lines 14-15)	Software is NOT compatible and portable as Users have been lead to believe.	The terms “compatible” and “portable” need to be explicitly defined so that Users are aware that and software will (most likely) require recompilation, and porting efforts to be performed. These efforts may include procurement of different Operating System development tools, cross-compilers, etc.  Also request that it be resubmitted for User Comment since this will be a substantial change from the Users point of view.
5.1.1	5-1 (line 40)	The ATC-2070 specifies 2070-1A and 2070-1B CPU modules only. The engine board does not appear to be “built” upon these CPU platforms as specified.	Remove line 40 completely.
5.1.2	5-2 (lines 9-10)	One cannot reference the “upcoming ATC API” standard since it is not at a suitable stage in its development yet.	Remove lines 9 & 10 completely.

5.2.1	5-2 (line 24)  5-3 (lines 1-2)	The standard should not specify the “nominal thickness” of the PCB material. This should be left up to the engineers and be based on their requirements.	<p>Change the line to either read 1) “The minimum nominal thickness of the PCB material shall be 0.062”. Thicker materials may be used as required provided that the resulting engine board envelope remains within the overall dimensions specified in this standard.” or 2) (preferred) “The thickness of the PCB material shall be such that the rigidity and strength of the PCB are at a minimum equivalent to that of 0.062” thick FR4 material. The resulting engine board envelope shall remain within the overall dimensions specified in this standard.”</p> <p>Also affected are lines 1-2 on page 5-3. These lines should be changed to read “... and shall not exceed 0.742” on the top including the Engine Board PCB material thickness.”</p>
5.2.1	5-2 (lines 34-37)	There is no technical or User requirement that the height between the engine board and the host must be as specified. The REAL requirement is that the engine board overall envelope cannot be exceeded and that the host module/device can accommodate such an engine board. The standard as it exists prevents manufacturers from providing more or less space between the engine board and host board as may be required for such reasons as thermal heat dissipation, mechanical fit, etc. For example, one may need/desire 0.500” of clearance between the Host Module components and the Engine Board envelope.	Change lines 34-37 to read “The assembled distance between the Engine board and the Host Module shall provide a minimum of 0.100” of clearance between the Engine Board envelope and any components on the Host Module (including the actual Host Module PCB).

5.3.1	5-6 (line 18)	Minimum MIPS should be in the 50-60 MIPS range. As agreed at the July 2003 ATC Controller Working Group meeting in San Diego, the contractor was to review available (suitable) processors and select a minimum MIPS rating between 50 to 60 MIPS. 80 MIPS is outside of this range and eliminates both existing traffic products (from other manufacturers) and potential, cost-effective processors from being considered. The standard is forcing a luxury ATC device to be designed.	Change the MIPS rating to be a minimum of 60 MIPS (i.e. the highest minimum value agreed to by the working group).
5.3.3	5-6 (line 14)	A lite version of the ATC does not require this much FLASH for application program storage.	Add a new requirement of 2MB of FLASH application program storage for a "lite" version. (Aside: most programs use less than 1MB, some less than 512KB).
5.3.4	5-6 (line 25)	Applications do not require this much DRAM now or in the foreseeable future. The 2070ATC standard only requires 4MB, but this is being increased to 8MB. A manufacturer could install more at their option if required.	Change minimum DRAM for a full engine board to 8MB and add a new requirement of only 4MB for a "lite" ATC.
5.3.4	5-6 (line 32)	Applications do not require this much SRAM now or in the foreseeable future. Both the latest Caltrans 2070 spec (including the October 28, 2003 errata) and the 2070ATC standard only require 512KB. As Caltrans increased all other memory requirements in the October 28, 2003 errata except SRAM, this further indicates that not more than 512KB of SRAM is required. A manufacturer	Change minimum SRAM to 512KB (for both the full Engine Board and the "lite" ATC).

		could install more at their option if required.	
5.3.3	5-7 (line 36)	SRAM on an ATC-lite using an integrated engine board needs to have a standby power source.	Add the following to the end of line 36 “The SRAM on an ATC-lite shall be maintained by an appropriate standby power source.”
5.3.5	5-8 (lines 8-14)	This standard cannot require compliance with a standard that is still under development and not at the same level of completion. I.e. this standard cannot require that “ ... be capable of providing the required functionality in its entirety as defined by the ATC API”.	Remove section 5.3.5 completely. No reference or requirement can be made that devices compliant to this standard shall support the API.
5.4.3	5-14 (lines 23-24)	One of the SPI select signals should be reserved for manufacturer specific purposes.	Allocate SPI-SEL-4 as a manufacturer specific signal.
5.4.3	5-15 (lines 16-20)	The requirement for two Ethernet is complete overkill for over 95% of the installations. Reduce the requirement to one Ethernet, especially for a “lite” version.	Add the specification for a “lite” version to require a minimum of one Ethernet on the Engine Board, and further allow the Host Module the option of supporting no (i.e. zero) Ethernet ports.
6.1	6-1 (line 11)  also affects line 26	Not all Modulation and Demodulation are completely specified in Chapter 6 as this line leads the User to believe (e.g. Spread Spectrum Radio).	Possible solutions: <ol style="list-style-type: none"> <li>1) Remove line 11 completely,</li> <li>2) Move line 11 to line 19, or</li> <li>3) Remove modulation/demodulation techniques not adequately specified (preferred)</li> </ol>
6.1	6-2 (Figure 6.1)	Radio connector should be chosen based on field requirements, and not be dictated by this standard.	Remove “License Free Radio” from the “Specified Connectors For” list.
6.1	6-2 (Figure 6.1)	Modulation method for Spread Spectrum Radio connector should be chosen based on field requirements, and not be dictated by this standard.	Remove “Spread Spectrum” from the “Choice of Modulation” list as the standard incompletely specifies the method. (Note: One cannot specify a single method since both DSS and Hopping are extensively used within the industry. Also, the different frequency ranges are widely deployed).

6.1	6-2 (Figure 6.1)	Optical Amplitude Modulation for fiber communications is/has been replaced by digital techniques within the industry. For example, GDI (the creator of the 2070-6D) has moved away analog communications and moved to digital techniques. The digital versions of 2070-6D will not communicate with the analog version. Since no official standard of the 2070-6D exists, they were free to make this improvement. Also, most Users demand digital techniques to assist with troubleshooting, redundancy, etc. Analog is unacceptable.	Remove “Optical Amplitude Modulation” from the “Choice of Modulation” list as the standard specifies an “obsolete” method. (Yes, Siemens makes a compliant version, but most customers want digital). Note: Once digital is chosen, there are numerous modulation techniques available and widely deployed. One will not be able to specify interchangeability easily. Suggest removing ALL specifications surrounding the 2070-6D completely.
6.1.1	6-2 (line 14)	The requirement for at least one communications interface slot should be removed, especially in an ATC-Lite. Users are not really receiving the functionality they are expecting, especially if multiple slots are provided.	Modify line 14 appropriately.
6.2.2	6-4 (lines 4-36, 45-46) and 6-5 (lines 1-2)	There are significant problems if multiple communications slots are identical. This includes who responds to a RTS signal on a port? This issue of sharing signals between multiple devices is further complicated when integrated communication ports are considered.	Change standard so that first slot has pin out as presented, but if a second slot exists then it resembles the A1 slot pin out of the ATC2070. Third, etc slots would have the same pin out as A2.  Need to re-evaluate how multiple ports will share key signals.
6.2.2	6-5 (lines 1-2)	Existing 2070-6x and 2070-7x modules do NOT meet this requirement (for disabling their drivers after 10 bit periods). Under the impression that it was a User requirement to reuse the existing 2070-6x/7x modules.	Either 1) remove requirement to support existing 2070-6x/7x modules, or 2) remove requirement for disabling line drivers are 10 bit periods of inactivity.

6.2.2	6-4 (lines 35-36)	+12VDC (isolated) and DCGND2 should not be used by any communication module per ATC2070, Caltrans TEES, and section 7.2.6.	Remove these signals from the Communications Interface (i.e. designate as NA or No Connection).
6.2.3	6-5	NEMA TS2-2002 requires a 25 pin D-subminiature connector for port 2. This standard does not support or allow such a connector (25 pin).	Add a new subsection under 6.2.3 that specifies a EIA-232 interface/connector that is compliant with NEMA TS2 section 3.3.2. This also needs to include the “latch” mechanism. This should be listed as optional.
6.2.3.7	6-8	Coaxial connector type should be driven by actual field requirements and not this standard.	Change requirement to read “...shall be via a coaxial connector.”
6.3.1.3	6-9 (line 30)	DCGND2 should not be used by any communication module per ATC2070, Caltrans TEES, and section 7.2.6.	Remove these signals from the Communications Interface (i.e. designate as NA or No Connection) and line 30 from this document..
6.3.1.4	6-9 (lines 33-36)	DCGND2 and +12VDC ISO should not be used by any communication module per ATC2070, Caltrans TEES, and section 7.2.6.	Remove these signals from the Communications Interface (i.e. designate as NA or No Connection) and lines 33-36 completely from this document..
6.3.2.1	6-10	2070-7A is hot-swappable ... need to add this requirement to the standard.	Add text as per 2070-7A module i.e “The Comm modules shall be “Hot” swappable without damage to circuitry or operations”.
6.3.2.2	6-10	2070-7B is hot-swappable ... need to add this requirement to the standard.	Add text as per 2070-7B module i.e “The Comm modules shall be “Hot” swappable without damage to circuitry or operations”.
6.3.2.2	6-11 (line 6)	RS-485 Full-duplex operation also has to be supported.	Change line to read “... be simplex, full duplex, or half duplex.”
6.3.2.5	6-15	Need to support other modulation techniques that are currently being deployed in fiber communication infrastructures within traffic systems. Amplitude modulation is probably the least deployed technique (used on original	Either remove all references to modulation of fiber signals, or specify the specifics of each type of modulation (e.g. Manchester, etc).

		2070-6D but not the newer versions of the 2070-6D).	
6.3.2.6	6-15	Need to support other modulation techniques that are currently being deployed in fiber communication infrastructures within traffic systems. Amplitude modulation is probably the least deployed technique (used on original 2070-6D but not the newer versions of the 2070-6D).	Either remove all references to modulation of fiber signals, or specify the specifics of each type of modulation (e.g. Manchester, etc).
6.3.2.7	6-16	Need to support all modulation techniques that are currently being deployed in spread spectrum radio systems as well as different frequency ranges.	Remove all references to modulation of spread spectrum radio signals and frequency ranges.
6.4	Page 6-18 line 41 to Page 6-22 line 42 inclusively	There are several variations of the 2070-6D in existence and the one specified here is outdated. Also, only an analog version is included. This specification should be removed.	Remove the referenced text completely.
7.1	7-1 (Line 13)	The requirement of preserving compatibility with existing NEMA interface software is missing ... this is the largest target audience. Need to support graphics on the display.	Add the ability to control and manipulate bit-mapped graphical displays. This is needed for such things as intersection displays, DMS message viewing/editing, etc. This device was not to only be developed to meet 2070 traffic software functionality.
7.1	7-1 (line 15)	Cannot force adherence to a standard/specification that does not exist at the time of this document	Remove line 15 completely.
7.1.4.1	7-3	There is no support for graphics on the LCD. This is needed to maintain existing functionality of transportation system devices (signal controllers and DMS controllers).	Add support for graphics to the LCD section. That could include extending the LCD protocol to provide bit-map capabilities.

7.3.1.4	7-15	There is no need to restrict the maximum size of a NEMA controller to the height specified. NEMA controllers sit beside a monitor that has a height restriction of 10.5”	The height of a NEMA version of the ATC should be limited to 10.5” maximum.
8.1.1	8-1 (line 16)	Incomplete description	Change to “NEMA/AASHTO/ITE ITS”
8.4.3	8-26 (line 6 and Figure 8-4)	SP7 does not exist (and hence is not part of the communications interface).	Change SP7 to SP4 on line 6 and in Figure 8-4