A Project Document of the
Advanced Transportation Controller Joint Committee

ITS Cabinet V2 PMP v01.04

Project Management Plan (PMP) for the
Intelligent Transportation System (ITS) Cabinet
Version 2 Project – USDOT Work Order 14-0701, Tasks 7-12

September 18, 2008

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# CHANGE HISTORY

<table>
<thead>
<tr>
<th>DATE</th>
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<tr>
<td>06/22/08</td>
<td>Initial Draft Project Management Plan (PMP) v01.00.</td>
</tr>
<tr>
<td>07/09/08</td>
<td>Revisions based on ITS Cabinet Working Group comments. PMPv01.01-v01.02.</td>
</tr>
<tr>
<td>09/16/08</td>
<td>Revisions based on comments from USDOT/Noblis PMPv01.03-v01.04.</td>
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</table>
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1 PURPOSE OF DOCUMENT

This document defines a Project Management Plan (PMP) for the Intelligent Transportation System (ITS) Cabinet Version 2 (V2) project under the United States Department of Transportation (USDOT) Work Order 14-0701, Tasks 7-12. It conforms to the Project Plan Template of the "Systems Engineering Guidebook for ITS" (see Section 6 Referenced Documents). This PMP establishes a common understanding of the project scope, objectives, tasks, schedule, deliverables, and referenced documents for:

a) The USDOT Joint Program Office (JPO) who is sponsoring the work;

b) The Standard Development Organizations (SDOs) overseeing the development; and

c) The consultants, manufacturers, and public transportation professionals from both the public and the private sectors who participate in the committees and working groups which will develop the work products specified in this PMP.

2 PROJECT SCOPE

The ITS Cabinet V2 Project is sponsored by the USDOT JPO as part of an ITS Standards Development Program. The project is to be performed under the direction of the Advanced Transportation Controller (ATC) Joint Committee (JC). The ATC JC is made up of representatives from three SDOs: the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE) and the National Electrical Manufacturers Association (NEMA). The development effort will be carried out by the ITS Cabinet Working Group (WG), a technical subcommittee of the ATC JC, and a paid consultant team including a Project Manager, Systems Engineer, and Technical Expert to support the WG.

The Advanced Transportation Controller (ATC) family of standards are intended to provide open architecture hardware and software platforms that can support a wide variety of ITS applications including traffic management, safety, security and other applications. There are currently four ATC Standards: the ATC/2070 Standard, the ITS Cabinet Standard, the ATC Controller Standard, and the ATC Application Programming Interface (API) Standard. These standards are used by agencies who specify and purchase ATC equipment, manufacturers who build ATC equipment, software developers who write application software for ATC equipment, and consultants who integrate ATC equipment into systems. The ATC Standards are equipment standards and are a part of the National ITS Architecture promoted by the USDOT under the Roadway Subsystem of the Field Class of subsystems as shown in Figure 1. Any work products of this PMP should be considerate of existing ATC Standards and other
standards in this subsystem such as the NEMA TS 2 Standard and the National Transportation Communications for ITS Protocol (NTCIP) standards (see Section 6 Referenced Documents).

Figure 1. ATC Standards are part of the Roadway Subsystem of the National ITS Architecture

ATC Standards are developed using a consensus process taken from the NTCIP "Joint Standards Committee Standards Development Process" (see Section 6 Referenced Documents) as illustrated in Figure 2. Special provisions must be made in this PMP to accommodate this process and use it to achieve the goals of the project. The consensus process requires iterations in the project schedule to allow Working Group and Joint Committee members to review interim work product, provide input and build support. It also presents a risk as the WG is made up of members with diverse backgrounds and points of view. At critical points in the schedule, the inability to achieve consensus could result in delays that would jeopardize the project schedule. It is imperative that the ITS Cabinet WG Chairs and the consultant team monitor developing issues within the WG and strive to resolve matters quickly. Another risk is the number and frequency of teleconferences and meetings required to produce a standard in a timely manner. This will require extensive planning, advanced notice and solicitation of support by the Project Manager, SDO ITS Standards Manager, and the ATC JC/WG Chairs.

The key objectives of the ITS Cabinet V2 Project are:
1) Develop an ITS Cabinet V2 Standard assessing issues and integrating lessons learned from current deployments of the ITS Cabinet Standard into a Concept of Operation (ConOps), requirements and design. User needs to be considered, but are not limited to: low-power features, items referred to as "B-List" items by the ITS Cabinet WG, and mercury relay replacement. These items along with all others solicited will be introduced into the Systems Engineering Process (see objective #2) to examine their relevancy.

2) Use a Systems Engineering Process (SEP) to ensure the completeness and correctness of ITS Cabinet V2 Standard and associated documents. The standard must be traceable and logically consistent.

3) Develop a detailed conformance statement that addresses backwards compatibility and provides clear and unambiguous instruction on how to extend the standard.

To accomplish these objectives, development will consist of two primary activities:

1) Identify and formalize advanced cabinet needs (user needs) and requirements from a broad perspective; and

2) Produce the ITS Cabinet V2 Standard.

The project activities and schedule are described in Section 3. The project schedule is detailed showing cycles of review and revision required by the consensus process. Generally, the WG is empowered by the JC to perform the technical work and detailed technical reviews. The JC reviews are at a summary level and are used to gain acceptance and/or approval to move the project to the next stage of development.
Figure 2. Consensus process used by the ATC Joint Committee.
3 PROJECT TASKS

The subsections below describe the project activities listed in the Gantt Chart of Section 4 Project Schedule. The project follows a systems engineering process and explicitly incorporates layers of review and modification of the deliverable documents corresponding to the ATC Standards consensus process described in Section 2. Additional teleconferences will be added as needed to meet the project goals.

3.1 Task 3 Cross Cutting Activities

**Inputs**

The input to this activity is Task 2 ITE Notice to Proceed (NTP) from the ITE ITS Standards Manager.

**Approach**

This activity is defined by tasks 3 through 22 in the Gantt chart. These tasks provide the documents that support the planning and management aspects of the project. Key components are capable personnel, detailed planning and effective oversight. An SEP will be followed to provide the most opportunity of success.

Tasks 4-5 provide the consultant team necessary to carry out the project. This includes a Project Manager, Systems Engineer and Technical Expert. Tasks 6-12 produce draft project-wide plans including a Project Management Plan (PMP, this document) and a Systems Engineering Management Plan (SEMP). The SEMP contains additional plans including a Configuration Management Plan (CMP), a Verification and Validation Plan (V&VP) and a Risk Management Plan (RMP). The PMP is to be prepared by the Project Manager. The SEMP is to be prepared by the Systems Engineer. It is expected that the entire consultant team will work together to ensure quality in drafting the project-wide plans. Tasks 13-16 provide for the ITS Cabinet WG review and modification to the draft plans. Tasks 17-21 provide for SDO and USDOT review and modification to the plans.

**Outputs**

The outputs of this activity are USDOT accepted project-wide plans (PMP and SEMP) and 1) completion of Task 22 Authorization to Perform WO 14-0701, from the USDOT JPO.
3.2 Task 23 Identify and Formalize Advanced Cabinet Needs and Requirements

This activity develops a Concept of Operations and Standards Requirements Specification for an advanced transportation cabinet.

3.2.1 Task 24 Develop Advanced Cabinet Concept of Operations (ConOps)

*Inputs*

The input to this activity is completion of Task 22 Authorization to Perform WO 14-0701, Task 8 which will come from the USDOT JPO.

*Approach*

The intent of this activity is to solicit, derive, and formally capture user needs to be included in an Advanced Cabinet ConOps. In order to make sure that this cabinet standard effort is complete and correct, no predispositions towards the current ITS Cabinet Standard will be assumed. Tasks 25-27 gather user needs from across the industry including a workshop. Tasks 28-30 produce a draft ConOps. This includes an Advanced Cabinet Needs Analysis Workshop for agencies, manufacturers, system developers and integrators to provide both breadth and depth of input. At the workshop, the consultant team will gather user needs (and system requirements as identified) from the stakeholders. Depending on the extent and complexity of the user needs and anticipated system requirements, a systems engineering tool may be purchase for use in the project. Tasks 31-34 provide for the ITS Cabinet WG review and modification to the draft ConOps. Tasks 35-38 provide for the ATC JC review and modification to the ConOps. The primary author for the ConOps is the Technical Expert with contributions from the ITS Cabinet WG and the rest of the consultant team.

*Outputs*

The output of this activity is an ATC JC accepted ConOps.

3.2.2 Task 39 Develop Advanced Cabinet Standards Requirements Specification (SRS)

*Inputs*

The input to this activity is an ATC JC accepted ConOps.
Approach

This activity expands upon the user needs of the Advanced Cabinet ConOps (and any system requirements identified at the Needs Analysis Workshop) expanding into the necessary detail to produce an Advanced Cabinet SRS that formally captures requirements. Tasks 40-41 produce a draft SRS. Tasks 42-45 provide for the ITS Cabinet WG review and modification to the draft SRS. This includes a 2 ½ day face-to-face meeting with the ITS Cabinet WG. Tasks 46-49 provide for the ATC JC review and modification to the SRS. The primary author for the SRS is the Technical Expert with contributions from the ITS Cabinet WG and the rest of the consultant team.

Outputs

The output of this activity is an ATC JC accepted SRS.

3.3 Task 50 Develop ITS Cabinet V2 Standard

This activity develops the design content and produces the ITS Cabinet V2 Standard that includes the ConOps, requirements and design content.

3.3.1 Task 51 Develop Design Content

Inputs

The inputs of this activity are an ATC JC accepted SRS.

Approach

This activity manifests the requirements defined in the SRS through specific cabinet and component designs. The design content will be iteratively produced, reviewed and revised. Tasks 52-53 produce the draft design content. Although not shown, it is anticipated that iterations of design and review may take place with members of the ITS Cabinet WG to produce the initial set of draft designs. Tasks 54-57 provide for the ITS Cabinet WG review and modification of the draft design content. Tasks 58-61 provide for the ATC JC review and modification to the SRS. The primary author for the design content is the Technical Expert with contributions from the ITS Cabinet WG and the rest of the consultant team.

Outputs

The output of this activity is design content acceptable to the ATC JC.
3.3.2 Task 62 Develop ITS Cabinet V2 UCD Standard

*Inputs*

The input to this activity is ATC JC approved SRS and cabinet design content.

*Approach*

The ConOps, requirements and the design content are joined into a draft of the ITS Cabinet V2 Standard suitable for review and comment by the members of the SDOs. The standard will include a detailed conformance statement that addresses backwards compatibility and provides clear and unambiguous instruction on how to extend the standard.

Task 63-64 prepare the initial User Comment Draft (UCD) ITS Cabinet V2 Standard. Tasks 65-67 provide for the ITS Cabinet WG review and modification of the UCD. Tasks 68-69 provide for the ATC JC review, modification and approval of the UCD. Tasks 70-71 distributes the UCD through the membership of the SDOs for review for a 30-day period. Tasks 72-75 gather and formally address comments sent from the SDOs to the ITS Cabinet WG. The primary author for the UCD ITS Cabinet V2 Standard is the Technical Expert with contributions from the ITS Cabinet WG and the rest of the consultant team.

*Outputs*

UCD ITS Cabinet V2 Standard and completed comment database.

3.3.3 Task 76 Develop ITS Cabinet V2 Recommended Standard

*Inputs*

UCD ITS Cabinet V2 Standard and completed comment database.

*Approach*

This activity produces the ITS Cabinet V2 Recommended Standard and gains the ballot approval of the SDOs. Modifications to the UCD will be made based on the adjudication of comments in the comment database. Task 77 produces a draft ITS Cabinet V2 Standard. Tasks 78-80 provide for the ITS Cabinet WG review and modification of the draft Recommended Standard. Tasks 81-82 provide for the ATC JC review, modification and approval of the UCD. Tasks 83-88 achieve official approval via SDO ballot for the ITS Cabinet V2 Recommended
Standard. The primary author for the ITS Cabinet V2 Recommended Standard is the Technical Expert with contributions from the ITS Cabinet WG and the rest of the consultant team.

**Outputs**

Approved ITS Cabinet V2 Standard.

### 3.4 Task 89 Publish ITS Cabinet V2 Standard

**Inputs**

Approved ITS Cabinet V2 Standard.

**Approach**

This activity publishes the ITS Cabinet V2 Standard in a fashion that is publically available and at no cost to the user. This may be done through the use of a website, email or other forms. Task 90 provides for the editorial modifications and formatting necessary for publication. Tasks 91-92 provide the no-cost distribution of the standard. This task will be performed by the SDOs with support from the consulting team.

**Outputs**

No cost distribution of the Approved ITS Cabinet V2 Distribution.
4 SCHEDULE

The Gantt Chart in Figure 3 provides the ITS Cabinet V2 Project Schedule. Project tasks that correspond to an explicit task of WO 14-0701 are identified. Milestones and teleconferences are identified by a diamond shape (♦). Face-to-face meetings are identified by a diamond shape within a circle (◇).

![Figure 3. The ITS Cabinet V2 Project Schedule (part 1 of 3).](image-url)
Figure 3. The ITS Cabinet V2 Project Schedule (part 2 of 3).
Figure 3. The ITS Cabinet V2 Project Schedule (part 3 of 3).
5 DELIVERABLES

Table 1 identifies the deliverable items and their due dates from the ITS Cabinet V2 Project Schedule in Section 4.

Table 1. Deliverable items of the ITS Cabinet V2 Project Schedule.

<table>
<thead>
<tr>
<th>Task#</th>
<th>Deliverable Item</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Deliver Draft PMP, SEMP, CMP, V&amp;VP, RMP to WG</td>
<td>06/23/08</td>
</tr>
<tr>
<td>16</td>
<td>Deliver Draft PMP, SEMP, CMP, V&amp;VP, RMP to ITE</td>
<td>07/11/08</td>
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<tr>
<td>21</td>
<td>Deliver PMP, SEMP, CMP, V&amp;VP, RMP [WO 14-0701, Task 7.3]</td>
<td>09/23/08</td>
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<td>26</td>
<td>Distribute User Needs Solicitation and Workshop Invitation</td>
<td>09/16/08</td>
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<td>30</td>
<td>Deliver Draft Advanced Cabinet ConOps to WG</td>
<td>12/24/08</td>
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<td>38</td>
<td>Deliver Advanced Cabinet Concept of Operations [WO 14-0701, Task 8.1.6]</td>
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<td>42</td>
<td>Deliver Draft Advanced Cabinet SRS to WG</td>
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<td>45</td>
<td>Deliver Second Draft Advanced Cabinet SRS [WO 14-0701, Task 8.2.3]</td>
<td>04/09/09</td>
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<td>49</td>
<td>Deliver Advanced Cabinet Standards Requirements Specification [WO 14-0701, Task 8.2.5]</td>
<td>05/04/09</td>
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<td>53</td>
<td>Deliver Draft Design Content to WG</td>
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<td>57</td>
<td>Deliver Second Draft Design Content [WO 14-0701, Task 8.3.3]</td>
<td>07/22/09</td>
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<td>61</td>
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<td>08/14/09</td>
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<td>64</td>
<td>Deliver UCD of ITS Cabinet V2 Standard to WG</td>
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<td>68</td>
<td>Present UCD of ITS Cabinet V2 Standard to ATC JC</td>
<td>10/01/09</td>
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<td>70</td>
<td>Circulate UCD ITS Cabinet V2 Standard</td>
<td>10/09/09</td>
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<td>81</td>
<td>Present Draft ITS Cabinet V2 Recommended Standard to ATC JC for Approval</td>
<td>02/18/10</td>
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<td>Circulate Draft ITS Cabinet V2 Recommended Standard [WO 14-0701, Task 10.2] / Final Ballot</td>
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6 REFERENCED DOCUMENTS

The documents referenced by this document are listed below.

"ATC API Standard v02.06a, Application Programming Interface (API) Standard for the Advanced Transportation Controller (ATC)," ATC JC, 31 May 2007. Available from the Institute of Transportation Engineers.

“ATC Controller Standard Revision v5.2b," ATC JC, 26 June 2006. Available from the Institute of Transportation Engineers.

“ATC Standard for the Type 2070 Controller v01.05," ATC JC, 29 March 2001. Available from the Institute of Transportation Engineers.


