A Project Document for the
Infrastructure Standards Security Assessment

Project Management Plan (PMP) for the Infrastructure Standards Security Assessment

October 25, 2019

PMP in support of: USDOT Contract # DTFH61-16-D-00055, TOPR # HOIT180152PR

For approval by: Steve Sill, ITS Architecture & Standards Program Manager
USDOT ITS Joint Program Office

For use by: Siva Narla, Senior Director, Transportation Technology
Institute of Transportation Engineers

Consulting Team for the Security Evolution for NTCIP Project

Prepared by: Ralph W. Boaz
Pillar Consulting, Inc.

Reviewed by: Jean Johnson
NEMA
### CHANGE HISTORY

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<th>DATE</th>
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<tr>
<td>11/8/19</td>
<td>Added comments from USDOT and SDO from Ramp-up meeting 10/29/19</td>
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<tr>
<td>10/25/19</td>
<td>Task name change, incorporated comments from Kickoff meeting 10/8/19</td>
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<tr>
<td>10/4/19</td>
<td>Revisions provide by NEMA</td>
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<tr>
<td>10/1/19</td>
<td>Minor edits and additional contacts</td>
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<tr>
<td>09/23/19</td>
<td>Initial Draft for this Project Management Plan (PMP) v01.00.</td>
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<pre><code>                            | Security Road map                                                      |
</code></pre>
## CONTENTS

1. **INTRODUCTION**
   - 1.1 Purpose of the Project Management Plan 4
   - 1.2 Background of Project 4

2. **SCOPE MANAGEMENT PLAN**
   - 2.1 Purpose of the Scope Management Plan 5
   - 2.2 Scope Statement 5
     - 2.2.1 Project Scope Description 5
     - 2.2.2 Project Acceptance Criteria 9
     - 2.2.3 Project Exclusions 10
     - 2.2.4 Project Constraints 10
     - 2.2.5 Project Assumptions 10
   - 2.3 Scope Verification 10
   - 2.4 Scope Control 10

3. **COMMUNICATIONS PLAN**
   - 3.1 Purpose of the Communications Plan 10
   - 3.2 Stakeholder Points of Contact 10
   - 3.3 Project Team and Working Group Communications 12
   - 3.4 Communications with ITS JPO 12

4. **DELIVERABLES AND MILESTONES**
   - 4.1 Monthly Progress Reports 12
   - 4.2 Deliverable Summary 12
   - 4.3 Project Schedule 13

5. **QUALITY MANAGEMENT PLAN**
   - 5.1 Purpose of the Quality Management Plan 16
   - 5.2 Quality Planning 16
   - 5.3 Quality Control 16
   - 5.4 Quality Assurance 16

6. **HUMAN RESOURCES MANAGEMENT PLAN**
   - 6.1 Purpose of the Human Resources Management Plan 17
   - 6.2 Roles, Responsibilities and Reporting 18

7. **RISK MANAGEMENT PLAN**

APPENDIX A – REFERENCES 23

APPENDIX B – GLOSSARY, ACRONYMS AND ABBREVIATIONS 24
1 INTRODUCTION

1.1 Purpose of the Project Management Plan

This document a Project Management Plan (PMP) for the Security Evolution for NTCIP (ISSA) Project under the United States Department of Transportation (USDOT) Contract Number DTFH61-16-D-00055, Task Order Proposal Request (TOPR) # HOIT180152PR. This PMP identifies the activities for the ISSA and establishes a common understanding for the management of the project for:

a) The USDOT Intelligent Transportation Systems (ITS) Joint Program Office (JPO) who is sponsoring the work and

b) The consulting team contracted to perform the work.

This PMP includes plans for scope management; communications; deliverables and milestones; quality management; human resource management; and risk management. Portions of this PMP may be updated during the course of the project if the management team or the USDOT determines that modification would significantly facilitate the project management functions. The PMP is not intended to be a progress tracking tool or to be modified for minor changes in schedule once the project has started.

1.2 Background of Project

The National Transportation Communications for ITS Protocol (NTCIP) standards have been developed to provide for interoperability ITS systems and devices. NTCIP standards define common data definitions and open protocols (“open” meaning available to everyone to use) that create a system environment that can be expanded and adapted with multiple types of field equipment from multiple manufacturers. The first NTCIP standards were published in the 1990s.

NTCIP standards define two types of communications: Center-to-Field (C2F) and Center-to-Center (C2C). A center may be a workstation, a laptop, or anything other device used to manage the operation of field devices. Field devices include traffic controllers, cameras, detection equipment, dynamic messages signs, ramp meters, environmental sensors, street lighting, connected vehicle roadside equipment, and others. C2C communication uses a peer-to-peer communication model. It was designed to share information between centers whose main functions may be diverse such as traffic systems and traveler information systems or emergency management systems and toll collection. C2F communication uses a manager-agent communication model (similar to a client-server model) where the center is the manager and the field devices are agents. It is designed so that a center may configure, control, monitor, and retrieve historical reports from numerous transportation field devices regardless of who manufactured the device.

NTCIP C2F communications is based on Simple Network Management Protocol (SNMP) Version 1 (SNMPv1). SNMPv1 was developed in the 1980s to address the communications needs of managed networked devices. The simplicity of the information exchange in SNMPv1 made it a widely accepted protocol. A shortcoming of the protocol is its lack of security. With the growing concerns associated with cybersecurity attacks and the increased connection of our transportation infrastructure, it is evident that the current NTCIP standards do not adequately address security.

The purpose of this project is to analyze the existing NTCIP standards and deployments and to provide guidance on the best way to implement security for NTCIP C2F communications, and NTCIP C2C communications. The intent is to incorporate a lockdown concept into a security protocol for both C2C and C3F Device Standards covered by NTCIP. This project deliverable is not a new standard. SNMP Version 3 (SNMPv3) has been identified as part of a solution. SNMPv3 was developed specifically to address the security concerns of the previous versions of SNMP. Other resources and mechanisms for securing NTCIP
communications will also be investigated. This includes the Government reporting organizations United States Computer Emergency Readiness Team (US-CERT) and Industrial Control Systems Computer Emergency Response Team (ICS-CERT), implemented by various commercial off the shelf software (COTS). The final deliverable of the ISSA Project will be a migration plan for using SNMPv3 in the NTCIP standards along with the other mechanisms identified.

2 SCOPE MANAGEMENT PLAN

2.1 Purpose of the Scope Management Plan

This Scope Management Plan establishes the scope management approach and processes as they pertain to scope description, verification and control measures. It establishes the processes which ensure that the ISSA Project includes all tasks required to complete the work identified while excluding all work that is unnecessary. Each of the major project tasks are listed below with the objectives, approach and deliverables identified. Tasks specifically identified in the TOPR are identified in brackets with the TOPR task number (i.e. [TOPR Task #]). Specific deliverables identified in the TOPR are identified in brackets with the TOPR deliverable number (i.e. [TOPR Deliverable #]).

2.2 Scope Statement

2.2.1 Project Scope Description

The subsections below describe the project activities listed in the Gantt Charts in Section 4.3 Project Schedule. The development of the deliverable documents is carried out using a cyclical draft-review-update process with a working group (WG) of qualified reviewers that is not a part of the development team.

2.2.1.1 Task 1 Project Management [TOPR Task 1]

The purpose of this task is to establish the management processes for the ISSA Project and to hold a “kick-off” meeting for the project including ITE and its contactors and the USDOT and its representatives. The purpose of the kick-off meeting is to ensure that all parties have a clear understanding of the requirements of this PMP and the USDOT’s expectations. The kick-off meeting is to take place within 45 working days of the Authorization to Proceed (ATP) unless otherwise agreed to by the Government. As a technical quality measure, the NTCIP BSP2 (Base Standards and Protocols 2) working group (WG) will be reconstituted and made current to act as the stakeholder boy to validate the analysis and deliverables as appropriate. Since this is not a standards effort, the normal standards development process and NTCIP Joint Committee is not involved in this effort.

2.2.1.1.1 Task 1.1 Monthly Progress Reporting [TOPR Task 1.1]

Objectives

- Establish and execute the process of monthly project reviews.

Approach

- Prepare and deliver monthly progress reports for the ISSA Project as defined in the PMP

Deliverables


2.2.1.2 Task 1.2 Project Management Plan (PMP) [TOPR Task 1.2]
Objectives
- Develop a PMP that describes the overall approach to managing the ISSA Project and coordinating
  the work performed by any and all subcontractors.

Approach
- The PMP based on a PMP template Attachment A of the TOPR.
- The PMP will contain a Communications Plan that describes how ITE will coordinate their efforts
  with the USDOT, particularly the Contracting Officer’s Representative (COR) and the Contracting
  Officer (CO).
- The PMP will include a Human Resources Management Plan that describes the overall structure
  of the development team including how to leverage key experience and capabilities, explain the
  roles and responsibilities of all key individuals, and describe the reporting relationships among
  the team. The Human Resources Management Plan will contain team resumes, representing domain
  experts and a qualified technical editor. The Human Resources Management Plan, including team
  members, is subject to USDOT approval as part of the overall approval of the PMP.
- The PMP will include a Quality Management Plan to ensure that the documents submitted as
  deliverables will:
  - contain suitable material for the target audience;
  - be organized in presentation;
  - contain proper word use and English diction;
  - contain detailed illustrations;
  - be comprehensive, complete and correct; and
  - be edited for grammatical and editorial errors.
  The Quality Management section is subject to USDOT approval as part of the overall approval of
  the PMP.
- The PMP includes Risk Management Plan that identifies risks that might affect the project and the
  characteristics of the risk. Types of risks considered include risks potentially impacting: technical,
  project schedule, scope, and costs. A Risk Management Log will be maintained on an on-going
  basis during the entire period of performance to track risks, mitigation plans and status. Each risk
  will have a unique number, probability of occurrence and impact of occurrence rating.
- The PMP includes a detailed project schedule in Microsoft Project 2010 format that contains all of
  the planned tasks and milestones for the project. The project schedule addresses all project
  management activities. The project schedule will reflect a work breakdown structure (WBS)
  comprised of at least three levels. An updated project schedule reflecting actual work performed
  for the previous month will be included with every monthly report (see Section 2.2.1.1.1). The
  monthly updated project schedule will reflect both the baselined task start and end dates and the
  actual start and end dates for each task. The project schedule will be provided in both Microsoft
  Project 2010 and Adobe Acrobat formats.
- The PMP will be delivered 30 days after ATP.
- The approved version of the PMP and baseline schedule may only be revised with pre-approval
  from the COR. Any modified version of the schedule will be delivered to the COR within 10 working
  days after receiving COR approval.
- Once the draft PMP and schedule are ready for review, ITE will schedule a meeting with the USDOT
  and its representatives, and AASHTO and NEMA to review each document and ensure that all
  parties are in agreement on the overall approach to project execution.
ITE will put the revised version of each contract deliverable (including the project schedule) under document configuration control, with version numbers assigned to each document. All documents submitted to, and approved by, USDOT will be assigned a unique version number.

Authorization to proceed (ATP) to Task 2 is pursuant to USDOT’s approval of the revised PMP and schedule.

**Deliverables**

- Project Management Plan (PMP) and Schedule.

### 2.2.1.2 Task 2 Current NTCIP Standards Analysis [TOPR Task 2]

The purpose of this task is to understand the scope of potential changes to the NTCIP standards.

#### 2.2.1.2.1 Task 2.1 Identify SNMPv1 Coverage within NTCIP Standards [TOPR Task 2.1]

**Objectives**

- Identify the existing NTCIP standards that could be affected by a moving from SNMPv1 to SNMPv3.

**Approach**

- ITE and the Project Team will analyze all NTCIP standards that are published or are currently in ballot to determine how many NTCIP standards would be affected by migrating from SNMPv1 to SNMPv3 and the magnitude of those changes.
- ITE and the Project Team will include subject matter experts as qualified professionals with at least 8 years of experience with SNMP.
- SNMPv3 is a transport layer improvement and not necessarily a full solution to address security. If any other security deficiencies in a given NTCIP standard are known and unresolved even after upgrade to SNMPv3, then they should be noted in the Coverage Analysis Report.
- The result break down of the security analysis in the SNMPv1 Coverage Analysis Report should include any applicable testing to refine the results.
- The Coverage Analysis report shall have a detailed analysis of each NTCIP standard that is identified to be upgraded to SNMPv3. Every effort shall be made to flag objects as either deprecated, retained or modified where possible. If it is not possible or there is a need for further work on actually performing the SNMPv3 upgrade, then it shall be noted as such.
- The general analysis at a MIB level of candidate NTCIP standard will be done as part of the Coverage Analysis Report. An object level analysis will be done where feasible and necessary.

**Deliverables**

- NTCIP SNMPv1 Coverage Analysis Report.

#### 2.2.1.2.2 Task 2.2 SNMPv3 Migration Analysis [TOPR Task 2.2]

**Objectives**

- Develop an NTCIP SNMPv3 Migration Analysis Report that assesses the impact of migration from SNMPv1 to SNMPv3.

**Approach**

- After acceptance of the NTCIP SNMPv1 Coverage Analysis Report, ITE will conduct a detailed analysis of the impact of migration from SNMPv1 to SNMPv3 for each applicable NTCIP standard. This analysis will include the following information for each NTCIP standard that implements SNMPv1:
  - What changes would be required (if any) to each SNMP protocol to migrate from SNMPv1 to SNMPv3;
– What changes would be required (if any) to the SNMPv1 objects to migrate from SNMPv1 to SNMPv3;
– What such changes may have on backward compatibility to existing devices and software using the updated NTCIP standards. This should include but not limited to assessing severity of impact, level of effort to overcome negative impact, and impact of timing of transition from SNMPv1 to SNMPv3; and
– Based on NTCIP rules governing the development and maintenance of NTCIP standards, whether the changes required to migrate from SNMPv1 to SNMPv3 would require a full update to the standard or could be conducted as standards maintenance.

• ITE will capture the results of this analysis in an NTCIP SNMPv3 Migration Analysis Report.
• Authorization to proceed (ATP) to Task 3 is pursuant to USDOT’s approval of the Task 2 deliverables.

Deliverables
• NTCIP SNMPv3 Migration Analysis Report.

2.2.1.3 Task 3 Develop NTCIP SNMPv3 Guidance [TOPR Task 3]

ITE and the Project Team will identify the areas of SNMPv3 that can be implemented by reference in the NTCIP standards and those areas of SNMPv3 that may need additional guidance provided in NTCIP standards. This guidance will include ways to address known vulnerabilities in SNMPv3 as identified by ICS-CERT and US-CERT. The final objective is to propose a way ahead for implementing this guidance within the NTCIP standards as well as the updates identified in Task 2.2 (see Section 2.2.1.2.2). ITE and the selected Project team will include qualified professionals with at least 8 years of experience with SNMP.

2.2.1.3.1 Task 3.1 Identify SNMPv3 Standards References [TOPR Task 3.1]

Objectives
• Develop an SNMPv3 Standards Reference Report that identifies capabilities of SNMPv3 that can be included by reference in NTCIP standards.

Approach
• ITE will investigate the applicable capabilities within SNMPv3 that can be implemented by reference in existing NTCIP standards.
• These SNMPv3 capabilities, the appropriate SNMPv3 standards reference, and the NTCIP standards that should include those references will be documented in a SNMPv3 Standards Reference Report.

Deliverables
• SNMPv3 Standards Reference Report.

2.2.1.3.2 Task 3.2 Identify SNMPv3 NTCIP Guidance [TOPR Task 3.2]

Objectives
• Develop an SNMPv3 NTCIP Guidance Report that identifies capabilities of SNMPv3 that require specific additional guidance within NTCIP standards.

Approach
• ITE will investigate the capabilities within SNMPv3 that require specific additional guidance within the NTCIP standards family
• This guidance will not contradict the Internet Engineering Task Force (IETF) SNMP RFC guidance and will also include addressing known vulnerabilities in SNMPv3 as identified by ICS-CERT and US-CERT
• ITE will document this guidance and identify which NTCIP: standards the guidance applies to in an SNMPv3 NTCIP Guidance Report.

**Deliverables**

• SNMPv3 NTCIP Guidance Report.

2.2.1.3.3 Task 3.3 Identify NTCIP Standard Security Implementation Way Ahead [TOPR Task 3.3]

**Objectives**

• Develop an NTCIP Standard Security Implementation Way Ahead Report which contains a plan for updating the NTCIP family of standards.

**Approach**

• Utilizing the analysis conducted in Tasks 2.2, 3.1 and 3.2 (Sections 2.2.1.2.2, 2.2.1.3.1 and 2.2.1.3.2 respectively), ITE will develop a proposed plan for updating the NTCIP standards with SNMPv3 and/or any other applicable protocols or security mechanisms that may be relevant.
• This plan will include at a minimum, a list of all of the NTCIP standards that must be updated, whether those updates could be handled as a maintenance update or would need to go through the full consensus based development process, and a prioritization of the affected NTCIP standard updates
• This plan will be documented in an NTCIP Standard Security Implementation Way Ahead Report.

**Deliverables**


2.2.2 Project Acceptance Criteria

Overall project acceptance is based on acceptance of the deliverables. Table 1 identifies the acceptance criteria and the accepting entity for each type of deliverable identified in the Section 2.2.1 Project Scope Description.

**Table 1. Deliverable Acceptance Criteria and Accepting Entity**

<table>
<thead>
<tr>
<th>Deliverable Type</th>
<th>Acceptance Criteria</th>
<th>Acceptance By</th>
</tr>
</thead>
</table>
| Monthly Progress Reports  | • Adherence to Section 4.1.  
• Meets quality control criteria as described in Section 5.3.                   | COR                    |
| Project Management Plan   | • Adherence to Section 2.2.1.2.1.  
• Meets quality control criteria as described in Section 5.3.                   | USDOT                  |
| Comment Disposition Reports | • Criteria to be established by the Project Manager.  
• Meets quality control criteria as described in Section 5.3.                   | Project Team, USDOT, WG |
| Final Reports             | • Meets the objectives of the applicable project task (see Sections 2.2.1.2.1, 2.2.1.2.2, 2.2.1.3.1, 2.2.1.3.2 and 2.2.1.3.3).  
• Meets quality control criteria as described in Section 5.3.                   | USDOT                  |
2.2.3 Project Exclusions

No exclusions have been identified.

2.2.4 Project Constraints

The following constraints have been established for the ISSA Project:
   a) The project schedule may not extend beyond August 28, 2021.
   b) No capital expenditures are available on the project.
   c) Project travel must be preapproved by ITE.

2.2.5 Project Assumptions

The following assumptions are being made for the ISSA Project:
   a) Additional web conferences will be used as needed to meet the project goals.
   b) Time has been built in to many of the tasks due to the WG reviews and process.
   c) Throughout the project, there may be various versions of the project schedule produced to take advantage of economies discovered or to account for anomalies unforeseen. As long as there is no change in scope, this PMP does not need to be modified.

2.3 Scope Verification

It is the responsibility of the Project Manager to verify interim project deliverables against the original scope as defined in the scope description (see Section 2.2.1). If there is a proposed change of scope (see Section 2.4), ITS JPO must formally accept the change prior to its incorporation into the project.

2.4 Scope Control

The Project Manager and the Project Team will work together to control the scope of the project. The Project Team will leverage the project scope description (see Section 2.2.1) and the project schedule (see Section 4.3) as a statement of work for each task. The Project Team will ensure that they perform only the work described in the project scope description and generate the deliverables identified. The Project Manager will oversee the Project Team and the progression of the project to ensure that this scope control process is followed.

A change in scope is defined by a change in the overall budget, a change that extends the overall schedule, or a change in the work to be performed. Any member of the Project Management Team, the Project Team, the WG, or the ITS JPO may propose a change in scope. The proposed change is assessed by the Project Management Team. If the Project Management Team determine that a change in scope is warranted, formal approval from ITS JPO is required. This PMP is to be updated in the case of an approved change in scope.

3 COMMUNICATIONS PLAN

3.1 Purpose of the Communications Plan

This Communications Management Plan sets the communications framework for the administration of the ATC Standards Maintenance Projects. It identifies the key stakeholders project, their roles, and contact information.

3.2 Stakeholder Points of Contact
ITS JPO Contracting Officer's Representative (COR)

Steve Sill, ITS Architecture & Standards Program Manager
ITS Joint Program Office
United States Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590
Phone: 202-366-1603
Email: steve.sill@dot.gov

ITS JPO Task Order Contracting Officer's Representative (TOCOR)

Edward Fok, P.E.
Transportation Technology Specialist
Operations TST
201 Mission St., Suite 2100
San Francisco CA 94105
Phone: (415) 744-4848
Email: edward.fok@dot.gov

Project Administrator/Coordinator

(Primary)
Siva R. K. Narla, Senior Director, Transportation Technology
Institute of Transportation Engineers
1627 I (“Eye”) Street, NW, Suite 600
Washington, DC 20006
Phone: 202-464-6219
Email: snarla@ite.org

(Deputy)
Nicola Tavares, Technical Projects Specialist
Institute of Transportation Engineers
1627 I (“Eye”) Street, NW, Suite 600
Washington, DC 20006
Phone: 202-464-6208
Email: ntavares@ite.org

Project Manager

Jean Johnson, Technical Program Manager / NTCIP Project Manager
National Electrical Manufacturers Association (NEMA)
1300 North 17th Street, Suite 900
Rosslyn, VA 22209
Phone: 703-841-3226
Email: jeannjohnson@nema.org

Venkat Nallamothu
Program Manager, Operations
American Association of State Highway and Transportation Officials (AASHTO)
444 N. Capitol St., NW, Suite 249
Washington, DC 20001
3.3 Project Team and Working Group Communications

Communications within the Project Team is on an ad hoc basis. Meetings of the WG will typically use web conferencing. Throughout the project, the WG will provide technical guidance and document reviews/validation. The Project Manager will work to ensure that WG meetings and web conferences are carried out according to the project needs.

3.4 Communications with ITS JPO

Communications between the project team and ITS JPO Contract Officer’s Representative will formally take place once monthly and as deliverables occur as described in Section 4. It is anticipated that ITS JPO Contract Officer’s Representative will have one or more technical staff participating in the WG meetings and web conferences where they will have extemporaneous and informal communication with the project team. Official communications between ITS JPO and the project team should be made through the Project Administrator/Coordinator and the COR (see Section 3.2).

4 DELIVERABLES AND MILESTONES

4.1 Monthly Progress Reports

ITE will provide monthly progress reports as follows:

a) Monthly Status Reports – ITE will submit monthly progress reports no later than 30 days after the end of the month being reported on in the format specified by the COR. The progress report will describe work completed during the period, anticipated work, problems encountered and anticipated as well as financial status including at least hours expended and other costs.

b) Project Schedule – ITE will submit, to the Government, an initial project schedule in Microsoft Project 2010 format within sixty (60) days after the effective date of the contract and updates showing the percent complete of major deliverables every thirty (30) days thereafter. The schedule will include at a minimum, the major deliverables and milestones and adhere to the Microsoft Project template structure provided by the COR. Any changes to due dates after the initial project schedule baseline must be approved by the COR. ITE and the project team will support the identification of schedule dependencies related to the project and in accordance with the Government defined process.

c) Risk Register – ITE will document risks that might affect the project and the characteristics of the risk defined by the ITS JPO. The COR will provide a Microsoft Excel-based Risk Register template for ITE to populate and update as necessary. Each risk will have a unique number, probability of occurrence and impact of occurrence rating. The risk log will be updated monthly and submitted with monthly progress reports.

The Project Manager will provide a monthly summary of the Project Team progress reports to the Project Administrator/Coordinator and an updated project schedule per the requirements for the Project Administrator/Coordinator’s monthly reporting.

4.2 Deliverable Summary
Documents and software deliverables are to be sent electronically to the COR. Table 2 identifies the deliverables based on the project tasks. The delivery dates have not been established due to adjustments in the project schedules as stated in Section 4.3.

### Table 2. Deliverables by Project and Task

<table>
<thead>
<tr>
<th>Proj Task</th>
<th>Deliverable Item</th>
<th>Delivery Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Monthly Progress Report</td>
<td>30 days after the end of the month</td>
</tr>
<tr>
<td>1.2</td>
<td>Project Management Plan</td>
<td>30 days after Authorization to Proceed (ATP)</td>
</tr>
<tr>
<td>2.1</td>
<td>NTCIP SNMPv1 Coverage Analysis Report</td>
<td>Per Schedule</td>
</tr>
<tr>
<td>2.2</td>
<td>NTCIP SNMPv3 Migration Analysis Report</td>
<td>Per Schedule</td>
</tr>
<tr>
<td>3.1</td>
<td>SNMPv3 Standards Reference Report</td>
<td>Per Schedule</td>
</tr>
<tr>
<td>3.2</td>
<td>SNMPv3 NTCIP Guidance Report</td>
<td>Per Schedule</td>
</tr>
<tr>
<td>3.3</td>
<td>NTCIP Standard Security Implementation Way Ahead Report</td>
<td>Per Schedule</td>
</tr>
</tbody>
</table>

### 4.3 Project Schedule

The Gantt Charts in Figures 1-2 provide the schedules for the ISSA Project. Deliverables are identified by a diamond shape (◆). Web conferences are identified by a diamond shape within a circle (❖). Face-to-face meetings are identified by solid circle (⚫).
Figure 1. Infrastructure Standards Security Assessment Project Schedule.
Figure 2. Infrastructure Standards Security Schedule Project Schedule.
5 QUALITY MANAGEMENT PLAN

5.1 Purpose of the Quality Management Plan

This Quality Management Plan describes how quality will be managed throughout the life of the project. It includes processes and practices for ensuring quality planning, quality control and quality assurance.

5.2 Quality Planning

To be successful, this PMP integrates a quality system into the project tasks, project schedule, project deliverables and project team. The ISSA project relies heavily on the SMEs to provide quality technical content and the WG to validate it. The WG are made up of subject matter experts including those from public agencies, manufacturers, software providers, and consulting firms. The WG include operational users which provide quality input from the user’s perspective. The WG will also include one or more technical staff from ITS JPO. This allows the ITS JPO to have quality input early in the development of project deliverables. It is the responsibility of the WG Chairs and the Project Manager to ensure that the WG are made up of individuals appropriate for the quality aspects of the project. The Project Manager and Project Team have been selected for their experience with the NTCIP program, SNMP and cybersecurity.

There are two types of “quality” addressed by this plan: “product quality” and “process quality.” Product quality focuses on the project deliverables. Product quality will be insured by the WG as described in the previous paragraph. Process quality focuses on how the project deliverables will be produced. In addition, the SMEs and Project Manager provide overall quality review prior to the deliverable submission.

5.3 Quality Control

This section describes the process for monitoring and recording the results of executing the quality activities. It applies to the project’s products as opposed to its processes.

The WG review of all project deliverables will be performed according to the project schedule. Additional reviews may be required to meet project objectives. Reviewers will verify that deliverable documents:

a) contain suitable material for the target audience;
b) are organized in presentation;
c) contain proper word use and English diction;
d) contain detailed illustrations;
e) are comprehensive, complete and technically correct; and
f) are edited for grammatical and editorial errors.

Project deliverables will be judged on a “suitable for purpose” basis. A WG may identify more items or make suggestions for changes to a document than are needed to meet the project goals. In some cases, gaining consensus on technical matters within a WG can be time consuming. If any undertaking by a WG may jeopardize the project schedule, the Project Manager or Project Coordinator/Administrator may make decisions and recommendations to move the project forward.

5.4 Quality Assurance

A final Quality Checklist will be established and maintained by the Project Manager to assist in identifying specific items to be reviewed by the WG. A Project Issue Log will be established and maintained by the Project Manager to capture any issue regarding the project that should be addressed by the project management team including items that pertain to quality. Items for the Quality Checklist and Project Issue Log may be proposed by any member of the project team. It is up to the project management team to determine if these items should be included on these lists and if any action should be taken. The Project Management Team will discuss any quality items on a bi-weekly basis.
will be established and maintained by the Project Manager to capture written inputs during the review process and their disposition.

6  HUMAN RESOURCES MANAGEMENT PLAN

6.1 Purpose of the Human Resources Management Plan

This Human Resources Management Plan is a tool which aids in the management of the human resources throughout the ATC Standards Maintenance Projects. It contains the roles, responsibilities and reporting on the project.
6.2 Roles, Responsibilities and Reporting

Table 3 identifies the members of the ISSA Project Team, their roles within the project, their project responsibilities and their reporting responsibilities.

### Table 3. ISSA Project Team and Reporting

<table>
<thead>
<tr>
<th>Name</th>
<th>Project Role</th>
<th>Responsibilities</th>
<th>Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narla, Siva</td>
<td>Project Administrator/Coordinator</td>
<td>• Part of the Project Management Team.</td>
<td>• Provides monthly progress reports to the COR per Section 4.1 including an updated Microsoft Project Schedule.</td>
</tr>
<tr>
<td>ITE</td>
<td>(202) 464-6219</td>
<td>• Official administration and coordination of the project from a contracts perspective.</td>
<td></td>
</tr>
<tr>
<td><a href="mailto:snarla@ite.org">snarla@ite.org</a></td>
<td></td>
<td>• Monitors project expenditures in labor, travel expenses and capital expenses.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Official project communications channel to the COR.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Plays a quality management function on deliverables.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Provides leadership for the rest of the consulting team.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Provides monthly progress reports to the COR per Section 4.1 including an updated Microsoft Project Schedule.</td>
<td></td>
</tr>
<tr>
<td>Tavares, Nicola</td>
<td>Deputy Project Administrator/Coordinator</td>
<td>• Part of the Project Management Team.</td>
<td>• Provides monthly progress reports to the COR per Section 4.1 including an updated Microsoft Project Schedule.</td>
</tr>
<tr>
<td>ITE</td>
<td>(202) 464-6208</td>
<td>• Official administration and coordination of the project from a contracts perspective.</td>
<td></td>
</tr>
<tr>
<td><a href="mailto:ntavares@ite.org">ntavares@ite.org</a></td>
<td></td>
<td>• Monitors project expenditures in labor, travel expenses and capital expenses.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Official project communications channel to the COR.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Organizes meetings and keeps records between ITE and USDOT, as well as between SDO’s as needed.</td>
<td></td>
</tr>
<tr>
<td>Tatiana Richey</td>
<td>Contracts Manager</td>
<td>• Part of the Project Management Team.</td>
<td>• Provides monthly progress reports to the COR per Section 4.1 including an updated Microsoft Project Schedule.</td>
</tr>
<tr>
<td>ITE</td>
<td>(202) 785-0060</td>
<td>• Official administration and coordination of the project from a contracts perspective.</td>
<td></td>
</tr>
<tr>
<td><a href="mailto:ntavares@ite.org">ntavares@ite.org</a></td>
<td></td>
<td>• Prepares project policies and procedures to fulfil contract requirements.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Provides monthly progress reports to the COR per Section 4.1 including an updated Microsoft Project Schedule.</td>
<td></td>
</tr>
<tr>
<td>Johnson, Jean</td>
<td>Project Manager</td>
<td>• Part of the Project Management Team.</td>
<td>• Provides monthly progress reports to the Project Administrator/Coordinator per Section 4.1 including an updated Microsoft Project Schedule.</td>
</tr>
<tr>
<td>NEMA</td>
<td>(703-841-3226)</td>
<td>• Works with the ITE program manager to maintain project reporting required by the USDOT.</td>
<td></td>
</tr>
<tr>
<td><a href="mailto:jean.johnson@nema.org">jean.johnson@nema.org</a></td>
<td></td>
<td>• Maintains the PMP and MS Project schedule.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Serves as quality reviewer.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Actively manages project and resources to conform to schedule.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Coordinates with the ISSA Project WG.</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Project Role</td>
<td>Responsibilities</td>
<td>Reporting</td>
</tr>
<tr>
<td>---------------------------</td>
<td>--------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------</td>
</tr>
</tbody>
</table>
| Boaz, Ralph               | Subcontractor| • Part of the Project Team.  
• Subject matter expert within the NTCIP Standards Program.  
• Cyber Security  
• Investigator for the ISSA Project. | • Provides monthly progress reports to the Project Manager. |
| Pillar Consulting         | Subcontractor| • Part of the Project Team.  
• Subject matter expert within the NTCIP Standards Program.  
• NTCIP MIB Steward  
• Investigator for the ISSA Project. | • Provides monthly progress reports to the Project Manager. |
| 858-352-6281              | Subcontractor| • Part of the Project Team.  
• Subject matter expert within the NTCIP Standards Program.  
• NTCIP MIB Steward  
• Investigator for the ISSA Project. | • Provides monthly progress reports to the Project Manager. |
| rboaz@pillarinc.com       |              |                                                                                  |                                                     |
7 RISK MANAGEMENT PLAN

This section identifies potential problems in the project before they occur, plans for their occurrence, and monitors the system development so that early actions can be taken. A Risk Log has been established as shown in Table 4. Using this log risks can be identified, analyzed, prioritized, and mitigated. Note: The Risk Log will be initiated with risk items once funding levels and priorities are established for the ATC Standards Maintenance Projects.

Risk monitoring will be performed by the project manager on a bi-weekly basis. Each risk area addressed in this PMP will be reviewed along with any new risk area that is identified during the execution of the project. At any time during the project any member of the WG or interested parties may alert the management team of the occurrence of a risk item or identify new risk areas. New risk areas identified will be added to a Risk Log Table maintained by the project manager.
### Table 4. Risk log

<table>
<thead>
<tr>
<th>ID#</th>
<th>Project Work Stream</th>
<th>Status</th>
<th>Risk Category</th>
<th>Description</th>
<th>Impacts</th>
<th>Owner</th>
<th>Mitigation (update where applicable)</th>
<th>(P)</th>
<th>(I)</th>
<th>P*I</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>02</td>
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<td>03</td>
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<tr>
<td>04</td>
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</tr>
</tbody>
</table>

**LEGEND:**
- ID# – Unique identifier for each identified risk item.
- Project Work Stream – Specific contract/task order activity and/or deliverable to which the risk item applies.
- Status – N: New
  - R: Retired
  - IDPMP: Identified in PMP or SEMP
- Risk Category –
  a) Schedule – Risks that cause schedule slippage of the project;
  b) Cost – Risks that cause cost to exceed budget of the project; and
  c) Technical – Risks affecting the completeness or correctness of the product.
- Description – Concise description of the risk item.
- Impacts – Impacts on the task or program if the identified risk occurs.
- Owner – Individual or entity with authority to resolve risk.
- Risk Response Plan – Description of the planned response should an identified risk occur. This column can be a reference to a specific plan document.
- Date Assessed – Most recent date the risk and/or risk response plan was updated.
- (P) – See Table 5 below.
- (I) – See Table 5 below.
- P*I – Risk probability (P) multiplied by impact of risk (I).
- Priority - Identifies priority based on the P*I.

### Table 5. Values Assigned for Probability of Risk and Impact of Risk

<table>
<thead>
<tr>
<th>Probability of Occurrence (P)</th>
<th>Impact of Risk (I)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 = High</td>
<td>3 = High</td>
</tr>
<tr>
<td>Certain or very likely to occur</td>
<td>Major impact on cost, schedule, or scope</td>
</tr>
<tr>
<td>2 = Medium</td>
<td>2 = Medium</td>
</tr>
<tr>
<td>50/50 chance of occurring</td>
<td>Significant impact on cost, schedule or scope</td>
</tr>
<tr>
<td>1 = Low</td>
<td>1 = Low</td>
</tr>
<tr>
<td>Possible, but unlikely to occur</td>
<td>Insignificant impact on cost, schedule, or scope</td>
</tr>
<tr>
<td>Risk Item Details</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td>01) TBD</td>
<td></td>
</tr>
<tr>
<td>02) TBD</td>
<td></td>
</tr>
<tr>
<td>03) TBD</td>
<td></td>
</tr>
<tr>
<td>04) TBD</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX A – REFERENCES


National Transportation Communications for ITS Protocol (NTCIP) Website
https://www.ntcip.org
## APPENDIX B – GLOSSARY, ACRONYMS AND ABBREVIATIONS

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATP</td>
<td>Authorization to Proceed</td>
</tr>
<tr>
<td>C2C</td>
<td>Center-to-Center</td>
</tr>
<tr>
<td>C2F</td>
<td>Center-to-Field</td>
</tr>
<tr>
<td>CO</td>
<td>Contracting Officer</td>
</tr>
<tr>
<td>COR</td>
<td>Contract Officer’s Representative</td>
</tr>
<tr>
<td>FHWA</td>
<td>Federal Highway Administration</td>
</tr>
<tr>
<td>ICS-CERT</td>
<td>Industrial Control Systems Computer Emergency Response Team</td>
</tr>
<tr>
<td>IEEE</td>
<td>Institute of Electrical and Electronics Engineers</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
</tr>
<tr>
<td>ITE</td>
<td>Institute of Transportation Engineers</td>
</tr>
<tr>
<td>ITS</td>
<td>Intelligent Transportation Systems</td>
</tr>
<tr>
<td>IETF</td>
<td>Internet Engineering Task Force</td>
</tr>
<tr>
<td>JPO</td>
<td>Joint Program Office</td>
</tr>
<tr>
<td>N/A</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>NEMA</td>
<td>National Electrical Manufacturers Association</td>
</tr>
<tr>
<td>NTCIP</td>
<td>National Transportation Communications for ITS Protocol</td>
</tr>
<tr>
<td>NTP</td>
<td>Notice to Proceed</td>
</tr>
<tr>
<td>PMP</td>
<td>Project Management Plan</td>
</tr>
<tr>
<td>POP</td>
<td>Period of Performance</td>
</tr>
<tr>
<td>PWS</td>
<td>Performance Work Statement</td>
</tr>
<tr>
<td>SDO</td>
<td>Standards Development Organization</td>
</tr>
<tr>
<td>ISSA</td>
<td>Security Evolution for NTCIP</td>
</tr>
<tr>
<td>SNMP</td>
<td>Simple Network Management Protocol</td>
</tr>
<tr>
<td>SOW</td>
<td>Statement of Work</td>
</tr>
<tr>
<td>TOPR</td>
<td>Task Order Proposal Request</td>
</tr>
<tr>
<td>TBD</td>
<td>To Be Determined</td>
</tr>
<tr>
<td>US</td>
<td>United States</td>
</tr>
<tr>
<td>US-CERT</td>
<td>United States Computer Emergency Readiness Team</td>
</tr>
<tr>
<td>USDOT</td>
<td>United States Department of Transportation</td>
</tr>
<tr>
<td>WBS</td>
<td>Work Breakdown Structure</td>
</tr>
<tr>
<td>WG</td>
<td>Working Group</td>
</tr>
</tbody>
</table>