

December 2, 2003

CONFIGURATION MANAGEMENT RECOMMENDED INITIATIVES WHITE PAPER

INTRODUCTION

Recent activities at the national level have resulted in significant improvements in the availability of supporting materials for incorporating configuration management (CM) in transportation operations. With the publication of the *Configuration Management for Transportation Management Systems* handbook and the development of the 1-day NHI course “CM for Traffic Management Systems” (Number 137042A), transportation professionals now have available sound CM guidance resources developed with a transportation orientation. The most pressing need at this point is awareness – to ensure that professionals know of the benefits of CM and take the steps towards incorporating it within their project development process and systems engineering processes. Once this first step is taken, the recently developed handbook and course should adequately support CM practice.

The purpose of this white paper is to document recommended future initiatives in CM for transportation management systems. Given the need for awareness, one will note that the majority of the recommended initiatives are designed with this in mind. Beyond the recommended initiatives presented in this report, the key activity at the national level should be to aggressively follow the communications plan established for the Configuration Management for Transportation Management Systems project. The recommendations are presented below in sections entitled training, technology transfer, outreach and awareness, and research.

TECHNOLOGY TRANSFER

Excellent technology transfer tools and plans are now in place given the completion of the *Configuration Management for Transportation Management Systems* handbook and the NHI course. The technology transfer recommendation presented in this section targets individualized assistance through a peer-to-peer program.

CM Peer-to-Peer Exchange

While the handbook and NHI course provide sound CM guidance, they require individuals to synthesize the information and then apply it to their system. In some cases, particularly when one is new to CM, this will prove difficult. An excellent way to address this need is to actively use the ITS Peer-to-Peer program of FHWA to allow the limited group of transportation professionals with CM experience to work directly with professionals new to CM on a one-to-one basis.

- *Need* – Individuals attempting to apply CM for the first time often find it difficult to synthesize guidance in handbooks or courses to use in their own situations.
- *Purpose* – To provide short-term, hands-on guidance to accelerate the transfer of CM knowledge to individuals new to CM.
- *Intended Audience* – Transportation professionals new to the application of CM to support the design, development, and maintenance of transportation management systems.
- *Product* – Peer visit from individuals experienced with transportation CM.
- *Proposed Approach* – The existing peer-to-peer program would be utilized to match peers and administer the program. It is expected that 1-3 day peer visits would be sufficient in most cases.
- *Cost/Schedule* – Consistent with current peer-to-peer program
- *Potential Sponsors* – FHWA ITS Peer-to-Peer Program

OUTREACH & AWARENESS

As stated earlier, a key challenge will be to make transportation professionals aware of the benefits of CM, and the resources now available to support a CM program. It is doubtful, however, that professionals will be interested in attending events specifically dealing only with CM. For this reason, it is suggested that CM be incorporated in related targeted workshops/conferences.

Specialty National Workshops/Conferences

A series of specialty national workshops/conferences should be held on ITS system development and operation themes. Conference topics recommended include ITS Maintenance, ITS & Systems Engineering, and ITS & Software Engineering. In both of these events, CM should play a major role on the agenda. Given the importance of these areas, it is expected these broader topics will generate respectable attendance and thus support outreach and awareness of CM.

- *Need* – To accelerate the use of CM in transportation management systems.
- *Purpose* – To increase awareness of CM benefits and resources available to support CM programs.
- *Intended Audience* – Transportation professionals new to the application of CM to support the design, development, and maintenance of transportation management systems.
- *Product* – Workshops/conferences with ½ day devoted to CM.
- *Proposed Approach* – Specialty conferences/workshops covering a range of issues related to the topic (i.e. in ITS Software Engineering, the workshop might cover cost estimation, software testing, and configuration management)
- *Cost/Schedule* – \$10,000 per event
- *Potential Sponsors* – FHWA

TRAINING

The NHI CM course will fulfill the key need in the training area. However, given the lack of experience with CM in ITS, some existing ITS training courses do not adequately address CM. This proposed initiative addresses this limitation.

Upgrade CM Content in Existing ITS PCB Courses

In order to improve awareness of CM, and help professionals see the need for the CM training course, it is recommended that existing ITS Professional Capacity Building (PCB) courses be reviewed for the adequacy of their CM content. When possible, the CM content should be updated and/or expanded based on the information in the new handbook.

- *Need* – To incorporate CM in ITS training at all applicable levels.
- *Purpose* – To increase awareness of CM of those taking ITS PCB courses.
- *Intended Audience* – Transportation professionals new to the application of CM to support the design, development, and maintenance of transportation management systems.
- *Product* – First, the product will be an action plan for updating PCB courses. Second, the product will be updated courses.
- *Proposed Approach* – First, each PCB course will be reviewed to determine adequacy of CM content and opportunities to improve CM awareness. Then, high priority courses will be updated based on information in the CM Handbook. Based on a preliminary review of ITS PCB courses, the following are identified as likely to warrant investigation:

- Deploying ITS--Metropolitan
- Introduction to Systems Engineering
- ITS Procurement
- ITS Software Acquisition
- Managing High Technology Projects for Transportation
- Applied Systems Engineering for Advanced Transportation Projects
- Recommended Practices for Management and Operations of ITS
- Freeway Traffic Operations
- Computerized Traffic Signal System
- Traffic Control Software and Signalization

- *Cost/Schedule* – \$5,000 & 1-month for review of courses, cost and schedule will then be variable based on the updates needed on a per course basis.
- *Potential Sponsors* – NHI

RESEARCH

Given that CM is applied in numerous complex, information technology-based systems, research into detailed elements of CM is not advisable purely in the transportation sector. There are two research projects identified in this section that are intended to improve the practice of CM in transportation operations. Note that these recommendations go well beyond the primary goal of increasing awareness, and, thus, are of a relatively lower priority.

Configuration Item Registry

A fundamental step in CM is to define configuration items for the system in order to clearly document the system and manage subsequent change. A challenge to transportation professionals practicing CM is to identify configuration items at an appropriate level to allow for effective change management, while not getting to such a detailed level that the number of items becomes unwieldy. Given that transportation management systems generally perform largely the same functions, configuration items across systems should be relatively consistent. This project would establish a set of generic configuration items for transportation management systems that could be used by professionals as they establish a CM program.

- *Need* – Establishing appropriate configuration items is one of the most difficult, yet important aspects of CM.
- *Purpose* – To document a set of common configuration items in transportation management systems.
- *Intended Audience* – Transportation professionals responsible for the design, development, and maintenance of transportation management systems.
- *Product* – A registry of common configuration items in transportation management systems (this should be established in a way that could grow in time).
- *Proposed Approach* – A researcher would review existing CM plans and interview professionals to develop the initial registry. The registry would then move to a standards organization to sustain.
- *Cost/Schedule* – 6 months, \$40,000
- *Potential Sponsors* – FHWA, Standards organizations

Configuration Management at the Regional, Multi-system Level

While the current handbook, and limited experience, in transportation CM is at the single system level, it is expected that as ITS progresses, and regional operations incorporate multiple systems, CM will need to be applied at this level as well. While the principles of CM will remain the same, it is expected that CM at the regional, multi-system level will be quite difficult given the multiple sets of agencies/companies involved, and the varying levels of technical sophistication. This project would consider CM at this level in-depth and attempt to define suggested approaches that can be used as regional integration becomes more prevalent.

- *Need* – Regional integration of transportation management systems will become more commonplace, but there is little guidance for CM at this level.
- *Purpose* – To define recommended approaches and practices for CM at the regional/multi-system level.
- *Intended Audience* – Transportation professionals responsible for the design, development, and maintenance of transportation management systems (both individual systems and regional systems).
- *Product* – Written report.
- *Proposed Approach* – A researcher would propose recommended approaches and then assess their quality through interviews and consultation with CM experts and transportation management personnel.
- *Cost/Schedule* – 12 months, \$60,000
- *Potential Sponsors* – FHWA, TMC PFS