A102
Introduction to User Needs Identification

STANDARDS ITS TRAINING

STUDENT SUPPLEMENT

RITA Intelligent Transportation Systems
Joint Program Office

A102: Introduction to User Needs Identification

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Systems Engineering Process

Systems engineering grew from the need to develop large-scale (predominantly defense) systems in a structured manner that progresses from concept to production to operation. There are numerous courses, seminars and training sessions offered by private and public entities (including NASA) that introduce and certify users in the practice of SEP.

Promoted by the United States Department of Transportation (US DOT) as an effective way to successfully develop and deploy Intelligent Transportation Systems (ITS), numerous guides and support mechanisms specific to the ITS industry have been developed, including:

- Systems Engineering Guidebook for ITS v3.0, US DOT, November 2009.

- International Council on Systems Engineering. Systems Engineering Handbook Version 3.2. January 2010.

- Systems Engineering for ITS: An Introduction for Transportation Professionals, US DOT, January 2007.

- The National ITS Architecture which provides a common framework for planning, defining, and integrating intelligent transportation systems. A website hosting the National ITS Architecture has been developed and includes training courses and workshops such as:

    o Deploying the National Intelligent Transportation System (ITS) Architecture

    o Turbo Architecture Software Training

    o ITS Architecture Use and Maintenance Workshop

    o ITS Architecture Process Workshop

    o Systems Engineering for ITS Workshop

- Building Quality Intelligent Transportation Systems through Systems Engineering.

- Developing Functional Requirements for ITS Projects.

- Understanding Software Development: A Primer for ITS Public Sector Managers.

- A Guide to Configuration Management for Intelligent Transportation Systems.

- Technical Assistance

    o US DOT Peer-to-Peer Program

    o ITS Standards Field Support Team

- Training

    o ITS Dynamic Message Sign Standards Procurement Workshop

    o US DOT Professional Capacity Building Program for ITS

    o National Highway Institute ITS Training

    o University of Maryland's Consortium for ITS Training and Education (CITE)

Summary of Relevant Standards

Various organizations are involved in the development of ITS standards. A brief summary of the pertinent standards that may be referenced within this module include:

1. ASTM family of standards. Published on the ASTM International (originally known as the American Society for Testing and Materials) site, standard specifications for Archiving ITS-Generated Traffic Monitoring Data provides definitions of the data elements to be archived from ITS traffic management systems, their interrelationships, and the procedures and methodologies for collection and calculation of traffic statistics.

2. ATIS and ITIS. Society of Automotive Engineers (SAE) message set for Advanced Traveler Information Systems (ATIS) and International Traveler Information Systems (ITIS) phrase lists provide the messages and data elements that are exchanged among traveler information providers (data providers) and travelers (data consumers).

3. IEEE 1512© family of standards. Published by the Institute of Electrical and Electronics Engineers deal with information exchanges between public safety centers and traffic management centers.

4. LRMS series of standards. SAE Location Referencing Message Specification (LRMS) provides for the definition of the location references of ITS.

5. NTCIP family of standards. National Transportation Communications for ITS Protocol (NTCIP) communications standards (jointly developed by AASHTO, ITE, and NEMA) ensure interoperability of traffic control and ITS devices. Contains object definitions for numerous ITS devices including Actuated Traffic Signal Controllers, Dynamic Message Signs, Environmental Sensor Stations, Ramp Meter Control, Closed Circuit Television, etc.

6. TCIP family of standards. Transit Communications Interface Profiles (TCIP) family of standards published by the American Public Transportation Association provide a library of information exchange building blocks to allow transit agencies and transit suppliers to create standardized tailored interfaces.

7. TMDD and MS/ETMCC. Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC) standards were developed to support center-to-center communications. Published by ITE, owned jointly with the American Association of State Highway and Transportation Officials (AASHTO).

Acronyms

The following acronyms are used throughout the Training Module and Student Supplement:

Acronym	Description
AASHTO	American Association of State Highway and Transportation Officials
ASC	Actuated Traffic Signal Controller
APTA	American Public Transportation Association
ATC	Advanced Transportation Controller
ATIS	Advanced Traveler Information Systems
ASTM	American Society for Testing and Materials
C2C	Center to Center
C2F	Center to Field
CCTV	Closed Circuit Television
CITE	Consortium for ITS Training and Education
DMS	Dynamic Message Sign
DSRC	Dedicated Short-Range Communications
ELMS	Electrical and Lighting Management Systems
ESS	Environmental Sensor Systems
FHWA	Federal Highway Administration
FMS	Field Master Stations
IEEE	Institute of Electrical and Electronics Engineers
ITE	Institute of Transportation Engineers
ITIS	International Traveler Information Systems
ITS	Intelligent Transportation System
LCS	Lane Control Signals
LRMS	Location Referencing Message Specification
MIB	Management Information Base
MS/ETMCC	Message Sets for External Traffic Management Center Communications
MULTI	Mark-Up Language for Transportation Information
NDDOT	North Dakota Department of Transportation
NEMA	National Electrical Manufacturers Association
NHI	National Highway Institute
NRTM	Needs to Requirements Traceability Matrix (same as PRL)

Acronym	Description
NTCIP	National Transportation Communications for ITS Protocol
PRL	Protocol Requirements List (same as NRTM)
RTM	Requirements Traceability Matrix
SAE	Society of Automotive Engineers
SCP	Signal Control and Prioritization
SDO	Standards Development Organization
SEP	Systems Engineering Process
SSM	Signal System Locals
SMU	Signal Monitor Unit
TCIP	Transit Communications Interface Profiles
TMC	Traffic Management / Monitoring Center
TMDD	Traffic Management Data Dictionary
TSS	Transportation Sensor Systems
US DOT	United States Department of Transportation
VDOT	Virginia Department of Transportation
VTTI	Virginia Tech Transportation Institute
XML	eXtensible Markup Language

Traffic Management Data Dictionary (TMDD)

TMDD Website

Figure 1 - TMDD Website: http://www.ite.org/standards/tmdd

Guide to

Traffic Management Data Dictionary (TMDD)

Standard v3.0 for

Traffic Management Center-to-Center Communications

DRAFT 6.4.1

May 17, 2010

Figure 2 - Guide to TMDD Standard v3.0

Guide to TMDD Standard v3.0 (Table of Contents)

Figure 3 - Guide to TMDD Standard v3.0 - Table of Contents (page iv)

An Balloted Standard of the TMDD Steering Committee

By AASHTO and ITE

Document Number ___

TMDD Standard for Traffic Management Center-to-Center Communications

Volume 1: Concept of Operations and Requirements

Figure 4 - TMDD Volume 1: Concept of Operations and Requirements

TMDD Volume 1: Concept of Operations and Requirements (Table of Contents)

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Figure 6 - TMDD Volume 1 - Table of Contents (page vii)

Figure 7 - TMDD Volume 1 - Table of Contents (page viii)

Figure 8 - TMDD Volume 1 - Table of Contents (page ix)

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Figure 10 - TMDD Volume 1 - Table of Contents (page xi)

Figure 11 - TMDD Volume 1 - Table of Contents (page xii)

Figure 12 - TMDD Volume 1 - Table of Contents (page xiii)

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