Training Plan

Dallas Integrated Corridor Management (ICM) Demonstration Project

www.its.dot.gov/index.htm
Final Report — January 11, 2013
FHWA-JPO-13-057

U.S. Department of Transportation

Produced by Dallas Integrated Corridor Management Demonstration Project
U.S. Department of Transportation
ITS Joint Program Office, Research and Innovative Technology Administration
Federal Highway Administration
Federal Transit Administration

Notice

Technical Report Documentation Page

1. Report No. FHWA-JPO-13-057	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Training Plan, Dallas Integrated Corridor Management (ICM) Demonstration Project		5. Report Date January 11, 2013 6. Performing Organization Code
7. Author(s) Miller, Kevin; Bouattoura, Fairel; Seymour, Ed; Poe, Chris; Roberts, Ed; Olyai, Koorosh		8. Performing Organization Report No.
9. Performing Organization Name And Address Dallas Area Rapid Transit 1401 Pacific Avenue Dallas, TX 75202		10. Work Unit No. (TRAIS) 11. Contract or Grant No. DTFH61-06-H-00040
12. Sponsoring Agency Name and Address U.S. Department of Transportation ITS Joint Program Office-HOIT 1200 New Jersey Avenue, SE Washington, DC 20590		13. Type of Report and Period Covered Final Training Plan 14. Sponsoring Agency Code
15. Supplementary Notes Source for all figures and tables in this report is Dallas Area Rapid Transit and dated January 11, 2013.		
16. Abstract The Dallas Area Rapid Transit (DART) is leading the US 75 Integrated Corridor Management (ICM) Demonstration Project for the Dallas region. Coordinated corridor operations and management is predicated on being able to share transportation information on highways, arterials, transit, weather, and incidents. The ICM system will utilize the existing TxDOT Center-to-Center standards based communication infrastructure, and will provide direct connections to agencies not on the Center-to-Center network, via a web-based interface known as SmartNET. The ICM system uses SmartNET as the main graphical user interfaces for the ICM Stakeholders to create, edit, and view events in the corridor and region, view current conditions of field devices and congestion on the roadway network, and coordinate responses to incidents within the corridor. This Training Plan covers the policy, process, and technology training requested by the users and maintainers of the system for the Dallas ICM project.		
17. Key Words Integrated Corridor Management, ICM, Training	18. Distribution Statement	

19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 16	22. Price N/A

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

TABLE OF CONTENTS

List of Figures

List of Tables

1 Purpose

The purpose of the Training Plan is to provide an overview of the curriculum needed by the stakeholders to operate and maintain the Dallas Integrated Corridor Management (ICM) System.

2 General Information

2.1 Scope

This document contains the Training Plan for the US-75 Integrated Corridor Management Demonstration Project. The Integrated Corridor Management System (ICMS) is a component based system which supports corridor management by sharing internal and external incident, construction, special event, transit, and traffic flow data, and utilizes this data to provide operational planning and evaluation through decision support.

2.2 System Overview

The ICMS consists of the following subsystems:

- SmartNET – Information Exchange Network User Interface
- SmartFusion – Information Exchange Network Data Layer
- Decision Support System (DSS)

Supporting ICM systems that are a part of this plan:

- Arterial Street Monitoring System (ASMS) – provides arterial street travel time information
- 511 System – traveler information for web, phone, and mobile devices.

The stakeholders for the Project include:

- Dallas Area Rapid Transit
- City of Dallas
- City of Richardson
- City of Plano
- Town of Highland Park
- City of University Park
- North Central Texas Council of Governments

-

- North Texas Tollway Authority
- Texas Department of Transportation – Dallas District

2.3 Purpose

This document provides a plan to meet the training needs and requirements of the ICM demonstration project and on-going operations and maintenance of the ICMS once the system is in operation.

2.4 System Concept

The US-75 Corridor will be an integrated transportation system – managed and operated collectively – to maximize its efficiency to corridor travelers. All corridor assets will be attuned to obtain the goals and objectives of the corridor, as well as the goals of each individual traveler as their preferences prescribe. The corridor users will recognize the US-75 Corridor as a multimodal, integrated, efficient, and safe transportation system that provides them with multiple viable alternatives that they can select based on their specific travel circumstances and needs.

The system will utilize an existing Center-to-Center standards based communication infrastructure. It will also have direct connections to agencies not on the Center-to-Center network, via a web-based interface. The existing systems of each member agency will share ITS data with the corridor, and the Decision Support Subsystem will recommend responses for all affected agencies.

The SmartNET subsystem will provide the main graphical user interfaces for the ICM Stakeholders to create, edit, and view events in the corridor and region, view current conditions of field devices and congestion on the roadway network, and coordinate responses to incidents within the corridor. The Decision Support Subsystem and SmartFusion Subsystem will also have some graphical user interfaces for administrative functions of the Rules Engine, Model, and Database, for example.

The SmartFusion subsystem will provide the data integration and fusion needed for the operation of the ICM corridor. The SmartFusion subsystem will collect data from several sources, such as the regional center-to- center system, transit data from DART which may also be received from the regional center-to- center, weather and traffic information from 3rd parties, and fuse the data to provide the ICM Stakeholders with a view of the network via the SmartNET subsystem. The SmartFusion subsystem will also provide fused data to other external systems to include the regional 511 systems, media, and 3rd parties. The specific types of data being provided are described in this detailed design document in the later sections, and in the data dictionary. In addition, as part of the Operations of the 511 ICMS, the stakeholders will develop messages for their Dynamic Message Signs, Light Rail Transit message boards, and other enroute traveler information strategies.

-

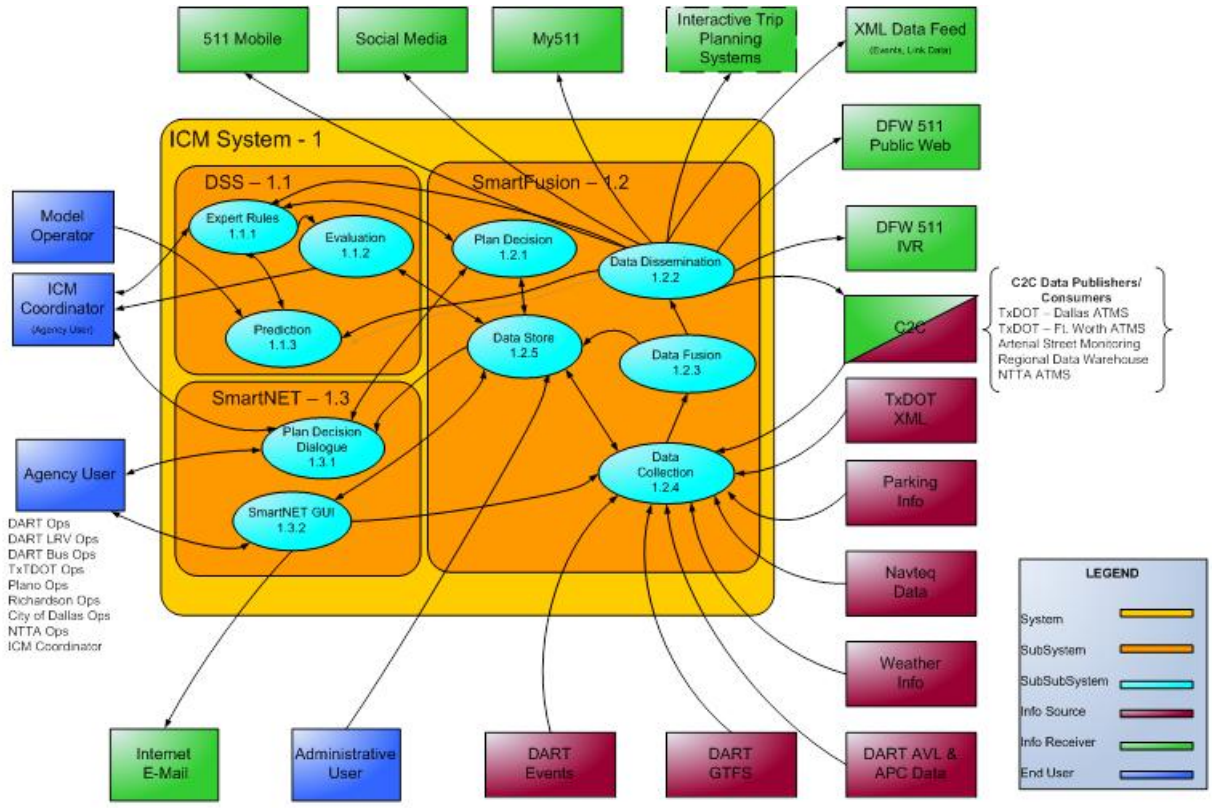

Figure 1: High-Level ICMS Conceptual Diagram

The Decision Support Subsystem recommends a response plan to the ICM Coordinator based on conditions provided by the SmartFusion subsystem. After approval from the ICM Coordinator, the SmartNET subsystem will send response plan requests via the SmartNET interface to communicate to the various agency operators. The DSS will receive the information from the SmartFusion subsystem and will use specific criteria (location, time of day, network conditions) to query its database, and select pre-approved response plans. The DSS sends the recommended plan to the ICM Coordinator who then sends a recommendation to the agencies. If the agencies are able to implement the recommendation, the ICM Coordinator then sends a "go live" request to the agencies. The DSS always has an ICM Coordinator in the loop that assesses the DSS recommendation and the agency readiness before issuing an implementation request.

When an ICM user receives a request to implement a response plan, they will have the capability to accept, reject, or request a modification of the recommended response plan. As the conditions of the incident change, and the SmartFusion system is updated, the DSS is updated and could provide a new recommended response plan to the ICM Coordinator.

-

2.5 Project References

- Concept of Operations, Dallas ICM , January 2010
- Draft Operations & Maintenance Plan, Dallas ICM Team, February 2012
- Draft Detailed Design Document, Dallas ICM Team November 2011
- Kirkpatrick, D. L. (1959) Evaluating Training Programs, 2nd ed., Berrett Koehler, San Francisco.

2.6 Glossary

- ADDIE - Analysis, Design, Development, Implementation, and Evaluation
- ATIS – Advanced Traveler Information System
- ATMS – Advanced Transportation Management System
- AVL – Automatic Vehicle Location
- C2C – Center-to-Center
- CAD – Computer Aided Dispatch
- CCTV – Closed Circuit Television
- Con Ops – Concept of Operations
- DalTrans – Dallas Transportation Management Center
- DART – Dallas Area Rapid Transit
- DMS – Dynamic Message Sign
- DSS – Decision Support Subsystem
- FHWA – Federal Highway Administration
- FTA – Federal Transit Administration
- HOV – High Occupancy Vehicle
- ICM – Integrated Corridor Management
- ICMS – Integrated Corridor Management System
- IEEE – Institute of Electrical and Electronics Engineers
- INCOSE – INternational Council On System Engineering
- ITS – Intelligent Transportation System
- KSA – Knowledge, Skills, and Abilities
- LRT – Light Rail Transit
- LRV – Light Rail Vehicle
- NCTCOG – North Central Texas Council of Government
- NTTA – North Texas Tollway Authority
- RITA – Research and Innovative Technology Administration
- SRS – System Requirement Specification
- TMDD – Traffic Management Data Dictionary
- TRE – Trinity Railway Express
- TxDOT – Texas Department of Transportation
- USDOT – United States Department of Transportation

-

2.7 Points of Contact

This subsection of the Training Plan provides and key points of contact for system development.

Table 1: Training Points of Contact

Role	Name	Contact
Program Manager	Koorosh Olyai	olyai@dart.org
Project Manager	Ahmad Sadegh	Ahmad.sadegh@telvent.com
Deployment Lead	Fariel Bouattoura	Fariel.bouattoura@telvent.com
DSS Lead	Ed Seymour	eseymour@tamu.edu

2.8 General Training Prerequisites

Since all ICM subsystems requiring user interaction are computer-based, all operations personnel should have the following knowledge, skills, and abilities:

1. Computer Skills – ability to use a computer with basic skills such as typing, using a web browser, and fill out web-based forms
2. Incident Management – each operator should have a basic understanding of incident management and the coordination required to respond to a transportation-related incident within the corridor
3. Traffic Operations – each operator should have a basic understanding of the traffic operations for the systems they are responsible for operating

-

3 Training Approach

Our approach to training is to utilize industry standard adult learning principles and processes to design, develop, and provide training to the stakeholder personnel for the Dallas ICM demonstration project.

3.1 Training Development Approach

This subsection of the Training Plan discusses the approach used to develop the course curriculum and to ensure quality-training products. Our approach to training development is to use a five-phase instructional design model consisting of Analysis, Design, Development, Implementation, and Evaluation (ADDIE). Each step has an outcome that feeds into the next step in the sequence.

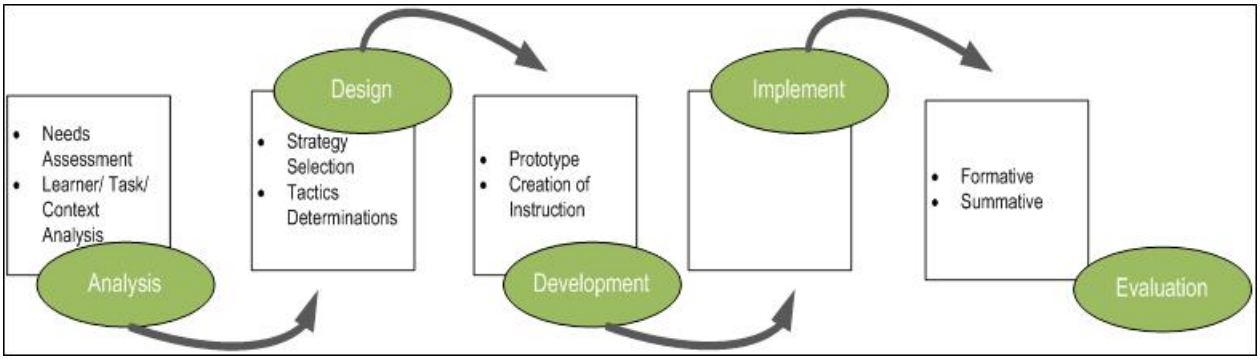

Figure 2: ADDIE Model

The five phases are as follows:

3.1.1 Analysis

During analysis, the designer identifies the learning problem, the goals and objectives, the audience's needs, existing knowledge, and any other relevant characteristics. Analysis also considers the learning environment, any constraints, the delivery options, and the timeline for the project.

3.1.2 Design

The design phase is a systematic process of specifying learning objectives. Detailed storyboards and prototypes are often made, and the look and feel, graphic design, user-interface and content are determined here.

3.1.3 Development

During the development phase, the actual creation (production) of the content and learning materials based on the Design phase are created.

3.1.4 Implementation

During implementation, the plan is put into action and a procedure for training the learner and teacher is developed. Materials are delivered or distributed to the student group. After delivery, the effectiveness of the training materials is evaluated.

3.1.5 Evaluation

This phase consists of (1) formative and (2) summative evaluation. Formative evaluation is present in each stage of the ADDIE process. Summative evaluation consists of tests designed for criterion-related referenced items and providing opportunities for feedback from the users. Revisions are made as necessary.

3.2 Curriculum

The following curriculum represents the modules that will cover the purpose, operation, and maintenance of the ICM system. The full curriculum represents a three ½-day program. It will be appropriate for some agency representatives to take the entire curriculum while other agency representatives may be targeted for only specific modules.

Table 2: Course Intended Audience

Course Title	Audience
SmartNET Overview	Agency Stakeholders
SmartNET Event Management	Agency Stakeholders
DSS Response Plans	Agency Operators
Response Plan Process	Agency Operators
511 Overview	ICM Coordinator, and Stakeholder Leads
DSS Maintenance	Stakeholder Leads
511 Operations	Agency Operators, Stakeholder Leads
511 Maintenance	Stakeholder Leads
SmartNET Maintenance	Stakeholder Leads
ASMS Management and Maintenance	Stakeholder Maintenance Staff

3.2.1 SmartNET Overview

Description: This course provides an introduction to the SmartNET software interface, to include the management of a User's profile, basic Graphical User Interface interaction, and menu structure of the SmartNET software. Users will be provided hands-on training and interact with the SmartNET software to view the different components of the software, how to manage their agency's profiles, and their own user profile. The system manager/administrator manages elements such as password control, agency profile and user privileges. Agency profile controls items such as what facilities an agency can enter events on, what event data is seen by the agency and what conditions are that generate agency alerts.

Length: 4 hours

Expected Class Size: 20 maximum

Type: Classroom

Prerequisites: Basic Computer skills

KSAs: Login/ Log-off functionality of SmartNET, Menu Structure of SmartNET, overview of SmartNET Graphical User interfaces.

Resources: Computer for each student with internet access, and a web browser. Ability to modify web browser settings, as required by the SmartNET software.

3.2.2 SmartNET Event Management

Description: This course provides an introduction to Event Management using the SmartNET software interface, to include the viewing, editing, and creation of Incidents, Construction, and Special Events. The User will be provided hands-on training to create test events, verify events created by other users, and update events. Daily operator training needs to address items such as how to view, enter, modify, filter and close events, how to generate and react to alarms, how to send events/alarms via email and how to generate reports.

Length: 4 hours

Expected Class Size: 20 maximum

Type: Classroom

Prerequisites: Basic Computer skills, SmartNET Overview

KSAs: Creation, Verification, Editing, and Closing of Events

Resources: Computer for each student with internet access, and a web browser. Ability to modify web browser settings, as required by the SmartNET software.

3.2.3 DSS Response Plans

Description: ICM operations involve the integrated daily operations under the ICM umbrella. It is important for the attendees to understand the operation of the individual corridor agencies as well as the purpose of the integrated corridor proposed operation. This training will largely be focused on drills vs. classroom training and could be based on a phased level on complexity such as:

- Initial drills will be scheduled with agency knowledge of time and scope and largely confirm that systems perform their correct functions when manipulated to do so.
- A second level of drills could be scheduled with agency knowledge of time and scope and set up to test/demonstrate that systems perform their correct functions and agencies understand how to use the systems and respond appropriately.
- A third level of drills could be scheduled with agency knowledge of rough time (e.g. day but not hour) and rough scope. The drill will require agencies to react in a timely and proper manner without having advance knowledge of all drill parameters. As an added test, the drill

could include a significant change in conditions during the course of the event, requiring agencies to adapt to the new conditions.

Length: 4 hours

Expected Class Size: 10 maximum

Type: Hands-on classroom

Prerequisites: Basic Computer skills, SmartNET Overview, SmartNET Event Management

KSAs: ITS operation, Signal operation, Response Plan decision making, Response Plan Process

Resources: Computer for each student with internet access, and a web browser.

3.2.4 Response Plan Process

Description: The DSS will be the primary mechanism for identifying conditions triggering an ICM response, selecting the appropriate response plans, initiating response plan alerts (to be delivered by SmartNET) and monitoring response plan effectiveness. Daily operators need to be trained to understand what response plans are, how and when response plan alerts are generated, what agency responsibilities are for acknowledging response plans alerts, implementing plan actions and/or advising the agency cannot participate in the plan response. Daily operators also need to understand the inputs and outputs to the DSS and when appropriate to use operator knowledge to adjust, supplement, or override a recommendation from the DSS. The role of the ICM Coordinator will be included in this training.

Length: 4 hours

Expected Class Size: 10 maximum

Type: Hands-on classroom

Prerequisites: Basic Computer skills, SmartNET Overview, SmartNET Event Management, DSS Response Plan

KSAs: DSS Response Plan decision making, Response Plan Process

Resources: Computer for each student with internet access, and a web browser, and Adobe Acrobat Reader.

3.2.5 511 Overview

Description: The 511 system will be critical to interfacing with the public to enable smarter travel and promote mode shift. It is extremely important that the system be as up-to-date and accurate as possible in order to maintain the public confidence. This will require agency members to have a

strong understanding of how the system works. This training will provide the stakeholders with an overview of the 511 system, the inter-relationships among SmartNET Events, Weather, Regional Events and how the 511 system uses information from the various systems to provide the travelers information.

Length: 2 hours

Expected Class Size: 10 maximum

Type: Classroom

Prerequisites: Basic Computer skills, Understanding of Public Information policies

KSAs: Understanding of the 511 system and its functions, Understanding the use of data within the 511 system.

Resources: Computer for each student with internet access, and a web browser.

3.2.6 DSS Maintenance

Description: One or more managers/experienced operations personnel from each agency should have high level training to understand the DSS functions and how they are performed. Topics will include:

- Quality assurance/quality control procedures in their agency to check system operations and veracity, especially in the early stages of the system implementation
- Data monitoring and update procedures to ensure data such as roadway network information, location of traffic cameras and points of interest are accurate and up-to-date and coordinated within all ICM subsystems.
- Response plan postmortem evaluation to ensure that goals are met, plan accuracy, and how changes will be implemented during the quarterly updates with the agencies

Length: 2 hours

Expected Class Size: 10 maximum

Type: Classroom

Prerequisites: Understanding of Public Information policies, Understanding of local transportation network and deployed equipment

KSAs: DSS Response Plan decision making, Response Plan Process

Resources: Computer for each student with internet access, and a web browser.511 Operations

3.2.7 511 Operations

Description: The 511 system will be critical to interfacing with the public to enable smarter travel and promote mode shift. It is extremely important that the system be as up-to-date and accurate as possible in order to maintain the public confidence, to include data quality control and data quality assurance. This will require agency members to have a strong understanding of how the system works. This training will provide the stakeholders with an overview of the 511 operational processes, to include what items can be updated in the 511 system by the operators, and the use of floodgate messages.

Length: 2 hours

Expected Class Size: 10 maximum

Type: Classroom

Prerequisites: Basic Computer skills, Understanding of Public Information policies, data quality control and assurance

KSAs: 511 Updates, 511 Floodgate Message creations

Resources: Computer for each student with internet access, and a web browser.511 Maintenance

3.2.8 511 Maintenance

Description: The 511 system will be critical to interfacing with the public to enable smarter travel and promote mode shift. It is extremely important that the system be as up-to-date and accurate as possible in order to maintain the public confidence. This training will provide the stakeholders with an overview of the 511 maintenance process, how changes will be implemented, and the timeline necessary for changes for quarterly updates.

Length: 2 hours

Expected Class Size: 10 maximum

Type: Classroom

Prerequisites: Basic Computer skills, Understanding of Public Information policies, data quality control and assurance .

KSAs: 511 Updates, 511 Floodgate Message creations

Resources: Computer for each student with internet access, and a web browser.SmartNET Maintenance

3.2.9 SmartNET Maintenance

Description: This course provides an overview and detailed information on updating and maintaining the SmartNET system. This will include an overview of the maintenance process, and change management process. The course will provide hands-on activities to use the Object Editor functionality of SmartNET to add new devices and links to the system for use by the stakeholders.

Length: 4 hours

Expected Class Size: 10 maximum

Type: Classroom

Prerequisites: Basic Computer skills, SmartNET Overview

KSAs: Creation, Editing, and Removing of Links and Devices, Maintenance Process, data quality control and assurance .

Resources: Computer for each student with internet access, and a web browser. Ability to modify web browser settings, as required by the SmartNET software.

3.2.10 ASMS Management and Maintenance

Description: This course provides an overview and detailed information on maintaining the Bluetooth ASMS system. This will include an overview of the monitoring, management, and change management process. The course will provide hands-on activities to add new devices and links to the system for use by the stakeholders.

Length: 2 hours

Expected Class Size: 5 maximum

Type: Classroom

Prerequisites: Traffic signal cabinet wiring, electrical wiring, basic understanding of cellular modems, basic understanding of traffic flow

KSAs: Setup, Repair, and Installation of Bluetooth reader

Resources: Basic tools for installation and repair of readers

3.3 New Personnel Training

Once the classroom training courses are complete, training for new personnel will be provided as needed. This will include providing the course materials to new personnel, and trained stakeholders providing hands-on training to new personnel in their organization.

3.4 Updated Training

Since the response plans may change over time – an updated classroom based training session to review and educate the stakeholder operators may be needed. This need will be determined by the Operations Committee. During the Operations Committee's reviews of response plan implementation, it may find that re-training is required and will request an updated training course.

3.5 Schedule

In order to prepare for the System Acceptance Testing and for the Operation of the ICMS, the majority of the training courses need to be completed prior to the go-live currently planned for April 2013. The following course schedule is planned:

Table 3: Training Schedule

Course Title	Status	Schedule	Audience
SmartNET Overview	Training started	On-going as needed	Agency Stakeholders
SmartNET Event Management	Training started	On-going as needed	Agency Stakeholders
DSS Response Plans	In-development	Prior to go-live	Agency Operators
Response Plan Process	In-development	Prior to go-live	Agency Operators
511 Management and Operations	In-development	Prior to 511 go-live	ICM Coordinator, and Stakeholder Leads
DSS Maintenance	In-development	After Go-live	Stakeholder Leads
511 Operations	In-development	Prior to 511 go-live	Agency Operators and Stakeholder Leads
511 Maintenance	In-development	After Go-Live	Stakeholder Leads
SmartNET Management and Maintenance	In-development	After Go-Live	Stakeholder Leads
ASMS Management and Maintenance	In-development	After Go-Live	Stakeholder Maintenance Staff

4 Evaluation

Training outcomes will be more effective with standards that apply program wide to classroom, hands-on and self-instruction efforts. Everyone creating learning experiences will use the same standards to assure that design and delivery fit the needs of the program and the learner.

Measuring the effectiveness of training programs consumes valuable time and resources. The most well-known and used model for measuring the effectiveness of training programs was developed by Donald Kirkpatrick in the late 1950s. The basic structure of Kirkpatrick's four-level model is shown here.

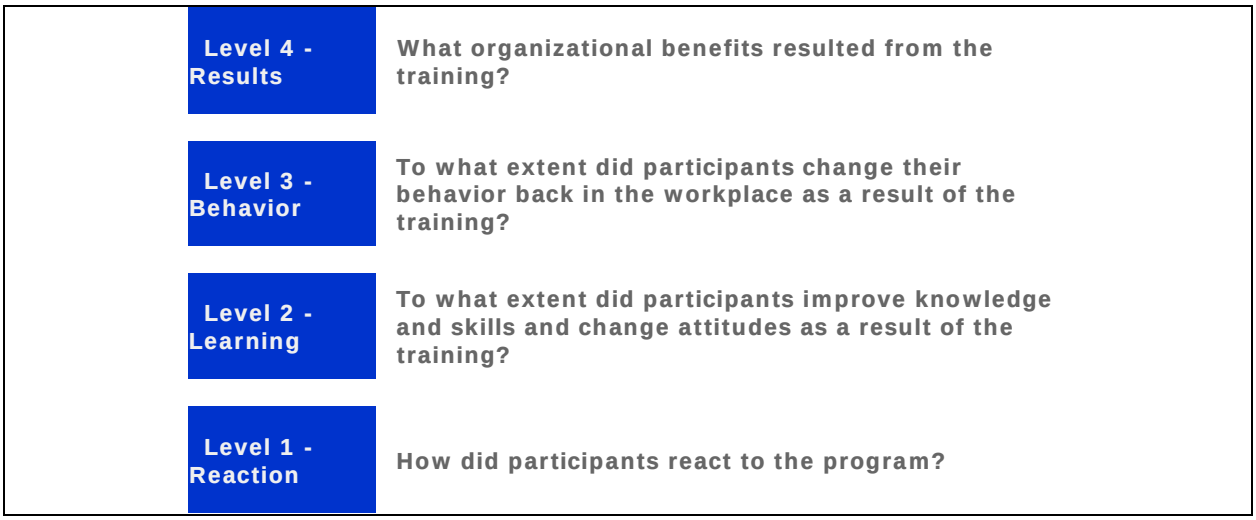

Figure 3: Kirkpatrick Model for Evaluating Effectiveness of Training Programs

An evaluation at each level answers whether a fundamental requirement of the training program was met. It's not that conducting an evaluation at one level is more important than another. All levels of evaluation are important. In fact, the Kirkpatrick model explains the usefulness of performing training evaluations at each level. Each level provides a diagnostic checkpoint for problems at the succeeding level. Therefore, if participants did not learn (Level 2), participant reactions gathered at Level 1 (Reaction) will reveal the barriers to learning. Now moving up to the next level, if participants did not use the skills once back in the workplace (Level 3), perhaps they did not learn the required skills in the first place (Level 2).

The difficulty and cost of conducting an evaluation increases as you move up the levels. So, you will need to consider carefully what levels of evaluation you will conduct for which programs. You may decide to conduct Level 1 evaluations (Reaction) for all programs, Level 2 evaluations (Learning) for

"hard-skills" programs only, Level 3 evaluations (Behavior) for strategic programs only and Level 4 evaluations (Results) for programs costing over $50,000. Above all else, before starting an evaluation, be crystal clear about your purpose in conducting the evaluation.

4.1 Metrics

The metrics that should be tracked include:

- Total staff
- Duration (estimated versus actual)
- Number of attendees (estimated versus actual)
- Percent of total attended
- Percent of estimated attended

4.2 Strategy

Utilizing the Kirkpatrick Model, each training course will include a written evaluation by the course participants to measure the course effectiveness and suggestions for improvements for the training course. In addition, once training is completed, the stakeholder agencies will also be requested to provide feedback on the benefit of the training to their operations.

U.S. Department of Transportation
ITS Joint Program Office-HOIT
1200 New Jersey Avenue, SE
Washington, DC 20590

Toll-Free “Help Line” 866-367-7487
www.its.dot.gov

FHWA-JPO-13-057

U.S. Department of Transportation