



U.S. Department  
of Transportation

**Intelligent Transportation Systems  
Professional Capacity Building Program:**

***Framework and Overview for  
Establishing A Professional Capacity Building Program  
for Transportation Management and Traveler  
Information Services in Support of ITS Deployment***

**FY 1997 Edition**

September 30, 1997

**U.S. Department of Transportation  
ITS Joint Program Office  
Federal Highway Administration's Office of Safety and Systems Applications  
Federal Transit Administration's Office of Research, Demonstration and Innovation**

**Professional Capacity Building Program  
Washington, DC**

## FOREWORD

This document has been prepared to describe how the U.S. Department of Transportation's (US DOT) *Five- Year Strategic Plan for Professional Capacity Building for ITS Transportation Management and Traveler Information Services* is being implemented, as of September 30, 1997. It provides a brief status report as of that date, and it describes the framework for proceeding in FY 1998 and beyond. It is limited in this edition to Metropolitan transportation management and traveler information infrastructure deployment and services because those efforts were the first to be developed by U.S. DOT. It does not, at this time, incorporate the other three ITS program areas--Rural, Commercial Vehicle, or the Intelligent Vehicle Initiative. However, subsequent versions will expand the scope of the program to incorporate those other three areas as they advance toward implementation.

This document was first drafted in Spring 1997, when the Professional Capacity Building (PCB) Program was still in its early stages of development. Its purpose was to begin to establish some form and direction to the program. The first draft was circulated internally within U.S. DOT, and then reviewed by the PCB National Steering Committee. Comments from those reviews were incorporated into a second draft, dated August 1997, and that draft was then given wider circulation within U.S. DOT headquarters; to the Regional offices of the Federal Highway and Federal Transit Administrations; and to professional associations. We gratefully acknowledge the time and effort and excellent comments received from these reviewers. We have attempted to incorporate as many of those comments as possible, but we could not incorporate all at this time. That is because some comments dealt with the need to expand the scope of the program. As noted above, the next edition will do so appropriately, as the ITS program advances toward full implementation.

We expect this to be a living document, with updates occurring annually. Thus, we expect the next version to be distributed in Fall 1998.

The PCB Program will also expand in FY 1998 to include the development of the PCB program roadmap and specific programmatic objectives that will guide the process of identifying the core competencies, knowledge, skills, and abilities critical to planning, deploying, operating and managing ITS. An overall program roadmap will provide a critical step toward formulating training, education, and outreach, and for targeting audiences in order to develop distinct curricula. To ensure that the program roadmap and the program delivery is reflective of audience needs, the program will continue to be guided internally by the U.S. DOT as well as by a National Steering Committee made up of prominent transportation professionals from government agencies, academic institutions, and the private sector.

Although the program has been underway for little more than a year, it has made considerable progress. It has identified those transportation professionals who need immediate training and education, and matched them with relevant training offered by DOT sources. The program has initiated the development and delivery of ITS awareness and technical seminars and has established partnerships with leading transportation professional and educational organizations. Between March 1997 and September 1997, over 100 seminars, short courses, and workshops have been presented to approximately 2500 people around the country.

In conclusion, we wish to express our sincere appreciation to the many individuals within US DOT; the members of the PCB National Steering Committee; and the contractors who have provided staff support necessary to help develop and deliver PCB seminars, short courses and workshops during FY 1997. Grateful acknowledgement is also extended to the staff support provided by US DOT's Volpe National Transportation Systems Center in Cambridge, MA. Their contribution in helping to prepare this document and in developing and delivering the PCB offerings has been invaluable. These individuals who have been prominent in doing so include Suzanne M. Sloan, John O'Donnell, Gary Ritter, Cheryl Little, Sylvia Harris, Olive Lesueur, Maureen Luna-Long, and Joseph LoVecchio of the US DOT; David Jackson, Margaret Zamora, and Anne Tallon of EG&G Dynatrend; and Bemardine Hayes of Unisys.

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## EXECUTIVE SUMMARY

Research and operational field tests, conducted since 1991, have determined that advanced electronic sensor, navigation, communication and information technologies can enhance the safety and-productivity of surface transportation. Based on favorable research findings, the U.S. Department of Transportation (DOT) set forth a series of national goals for widespread deployment of public sector Intelligent Transportation Systems (ITS) infrastructure to be achieved by the year 2005. Attaining these goals depends upon having public sector decision makers who are fully aware of ITS options; informed transportation system users; and a cadre of transportation professionals who are capable of planning, financing, designing, procuring, implementing, operating, and maintaining such systems. In March 1996, the DOT adopted a *Five-year Strategic Plan for Professional Capacity Building for ITS Transportation Management and Traveler Information Services* (hereafter referred to as the Strategic Plan). Its purpose was to conceptualize the framework for building the requisite professional capacity to enable widespread ITS deployment.

**The purpose of this document, the *PCB Framework and Overview*, is to describe how the Five-Year Strategic Plan is being implemented in FY 1997 and 1998 and to present the framework for building professional ITS capacity for FY 1998-2002.**

The ITS Professional Capacity Building (PCB) program was established to ensure that public transit, highway agency, and motor vehicle regulatory professionals have the core competencies, and the knowledge, skills and abilities (KSAs) to meet the challenges of deploying ITS as part of the 21st century transportation system. The PCB program is guided internally by the U.S. DOT as well as by a national steering committee made up of prominent transportation professionals from government agencies, academic institutions, and the private sector. The National Steering Committee was organized by ITS America as an advisory group to the U.S. DOT. Although the program has been underway for little more than a year, it has made considerable progress. It has identified those transportation professionals who need immediate training and education and matched them with existing, relevant training offered by DOT sources. The program has initiated the development and delivery of ITS awareness and technical seminars as well as established partnerships with leading transportation professional and educational organizations.

This *Framework and Overview* document describes the major PCB activities in fiscal year (FY) 1997 and identifies the associated resource requirements needed from FY 1997 to FY 2002 in order to achieve the PCB program goals and objectives. During FY 1996, the PCB program was launched through a series of actions. They included organizing the program and beginning the development and then delivery of several seminars, short courses, and workshops. By September 30, 1996, those activities were well underway.

The following is a list of the specific milestones of the PCB Program in FY 1996 through the end of September 1997. These milestones reflect accomplishments in response to the various needs of the ITS and transportation professionals for course development and delivery, academic participation, public outreach, and the structuring of a PCB program.

**Milestones of the PCB Program for FY 1996 and 1997 (9/30/97)**

**-- In response to the revealed need for training:**

- Presented a one-day ITS Awareness Seminar in twelve U.S. DOT regional locations -- in nine regions for joint Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) audiences and in three FTA regions that are not co-located with the FHWA. Presentations have also occurred in FHWA division locations. Over 1500 individuals have participated in these seminars to through September 30, 1997.
- Prepared a three day short-course titled “Deploying Integrated Intelligent Transportation Systems.” The pilot for the course was presented for the first time in Washington, DC on June 16- 19, 1997. In total, nine seminars were presented to over 320 professionals at Federal, State, regional and local levels in FY 1997.
- Developed and delivered a series of one-day technical seminars designed to provide technical guidance for Federal, state and local ITS professionals on the following topics:
 

	<b># <u>Presented</u> and # <u>Attending</u>:</b>
• <i>Using the National ITS Architecture for Deployment</i>	3 times to over 35 participants
• <i>ITS and the Transportation Planning Process</i>	5 times to over 140 participants
• <i>ITS Telecommunications Seminar</i>	6 times to over 160 participants
• <i>ITS Public/Private Partnerships</i>	6 times to over 170 participants
- Presented two separate seminars on telecommunications-shared resources and telecommunications analysis-which are available now for scheduling upon request. They have already been presented in 30 locations to federal, state and local professionals.
- Coordinated with the National Transit Institute (NTI) on the development of ITS technology training for the transit industry.

**— In response to the need to develop future transportation professionals**

- Initiated programs with universities to establish new initiatives in ITS curriculum and degree programs, and ITS needs assessment activities from a university perspective.
- Established a university subcommittee as part of the PCB Steering Committee to provide direct university input to the national PCB program.

**— In response to the need for public outreach**

- Initiated formal coordination with the National Associations Working Group. Two meetings in 1996 and 1997 were conducted specifically on this topic.
- Developed and delivered Executive Scanning Reviews.

- Presented speeches to professional organizations describing the PCB program.

**-- In response to the need for programmatic structure**

- Wrote a Strategic Plan for Professional Capacity Building that was approved by the DOT in March 1996 and is the foundation of this *Framework and Overview*.
- Initiated formal interaction with FH WA and FTA field staff and within Headquarters (HQ) through conference calls (which are continuing) and participation in seminars and workshops.
- Initiated planning for the PCB National Steering Committee, which was established, and met for the first time on December 13, 1996, and then subsequently both on May 13, 1997 and on September 29-30, 1997 to set future directions.
- Initiated needs assessment activities that confirmed that initial series of courses covered the appropriate topics. The report, *PCB Needs Assessment Baseline: A Review and Synthesis of 13 Prior Studies, Field Interviews, and Summary Assessment of ITS Needs*, concludes that more advanced courses must be developed; that the needs of some transportation modes are underrepresented; that implementing agencies are not well prepared to pursue widespread ITS deployment; and that new media options for delivery must be explored to overcome obstacles such as travel restrictions, lack of travel funding, and lack of staff time for training.
- Launched the development of six white papers to address the training and education needs of professional associations and universities.
- Extensive coordination between the PCB program and various DOT organizations, professional associations, and universities.

It is at this critical juncture that the opportunity exists to establish a more well designed and systematic program that responds proactively to the needs of the ITS professional workforce. This *Framework and Overview* proposes the PCB task activities that will establish a structured program for the future. The activities are recognized as being required in the near-term, mid-term or far-term. The activities are also divided into four general categories that will be referred to throughout this plan:

- **Identification of Core Competencies and KSAs:** Development and implementation of a systematic process for defining the required core competencies, knowledge, skills, and abilities needed for the deployment and operation of ITS
- **Development of Curricula, Courses and Programs:** Activities required to support the transformation of core competencies and KSAs into training, education and outreach initiatives
- **Delivery of Courses and Programs with Educationally Effective Media:** Activities that support the delivery of training, education and outreach with the most educationally effective delivery mechanisms
- **Program Management:** Development of a programmatic roadmap and definition of activities that provide a structure to the program's management.

Each category includes major milestones for proposed FY 1998:

- **Identification of Core Competencies and KSAs:**
  - + Develop a more complete understanding of the full range of ITS core competencies, knowledge, skills, abilities, and training needs.
  - + Identify gaps between critical competencies, knowledge, skills, and abilities and current training, so appropriate new courses can be initiated.
  - + Establish a process to develop new offerings and refresh and update existing courses.
  - + Explore new media options that can increase PCB delivery cost-effectiveness and accessibility.
  
- **Development of Curricula, Courses and Programs:**
  - + Based on the identification of needs, develop new courses in response to the gap between the “state-of-the-art” and the “state-of-the-practice” knowledge base in ITS deploying organizations. Course development in FY 1998 and beyond will be grounded in the core competency/KSA identification exercise.
  - + Present a second round of short (half- to one-and-a-half day) modularized seminars on cross-cutting issues. These courses will be designed to provide critical “need to know” information to ITS professionals and decision makers to facilitate deployment of intelligent transportation systems.
  - + Develop tutorial materials on subjects being considered as cost effective alternatives to formal courses where there is a pressing need to provide technical training but a limited target audience.
  - + Focus transit specific activities on the development and presentation of tutorials to update and add to ITS knowledge and capabilities of the transit industry.
  - + Develop and deliver seminars on standards. The first standards seminar will address the National Transportation Communications ITS Protocol (NTCIP) standard and will be available in 1998. Following, a series of seminars will be developed to address an additional 40 standards that allow for interoperability and integration of ITS systems and technologies. Development of these seminars will begin in 1998.
  - + Develop new courses and curriculum with universities to facilitate the training of the professionals of the future.
  
- **Delivery of Courses and Programs with Educationally Effective Media:**
  - + Continue delivery of the ITS awareness seminar, technical seminars and short courses developed in FY 1996 and 1997 to state and local officials and transportation professionals.
  - + Present distance learning and computer-based training courses to provide advanced training to professionals and technicians who are not able to travel to training sites. These advanced training techniques will also be used in conjunction with technical certification programs to improve the technical capabilities of ITS system operators and maintainers.

- + Showcase of ITS systems and technologies through Executive Scanning Reviews at Model Deployment sites and elsewhere, and development and presentation of technical information sessions to Federal, state and local officials, ITS Working Group members, and other professional and civic organizations.
- + Coordinate distance learning activities with FHWA's Central Training team which is identifying the various media options and presenting a cost/benefit analysis.

• **Program Management:**

- + Develop programmatic roadmaps in line with the ITS Program roadmaps
- + Develop a means to publicize PCB on the World Wide Web
- + Perform continuing needs assessment
- + Perform continuing coordination with DOT and partners
- + Develop the scope for university-based programs
- + Begin textbook development.

The programs for FY 1999 are preliminary at this time and are not included in this plan. Upon completion of the actual needs assessment and core competency definition (identified as Task B in Section III), and the inventory of currently available and planned programs (Task D), more specific FY 1999 tasks and priorities will be established.

The budgets and funding status for the program to date are:

FY 1996	\$ 2.4 Million	actual
FY 1997	\$ 4.0 Million	actual
FY 1998	\$ 5.260 Million	actual (see p. 123 for details)
FY 1999-2002		currently under development

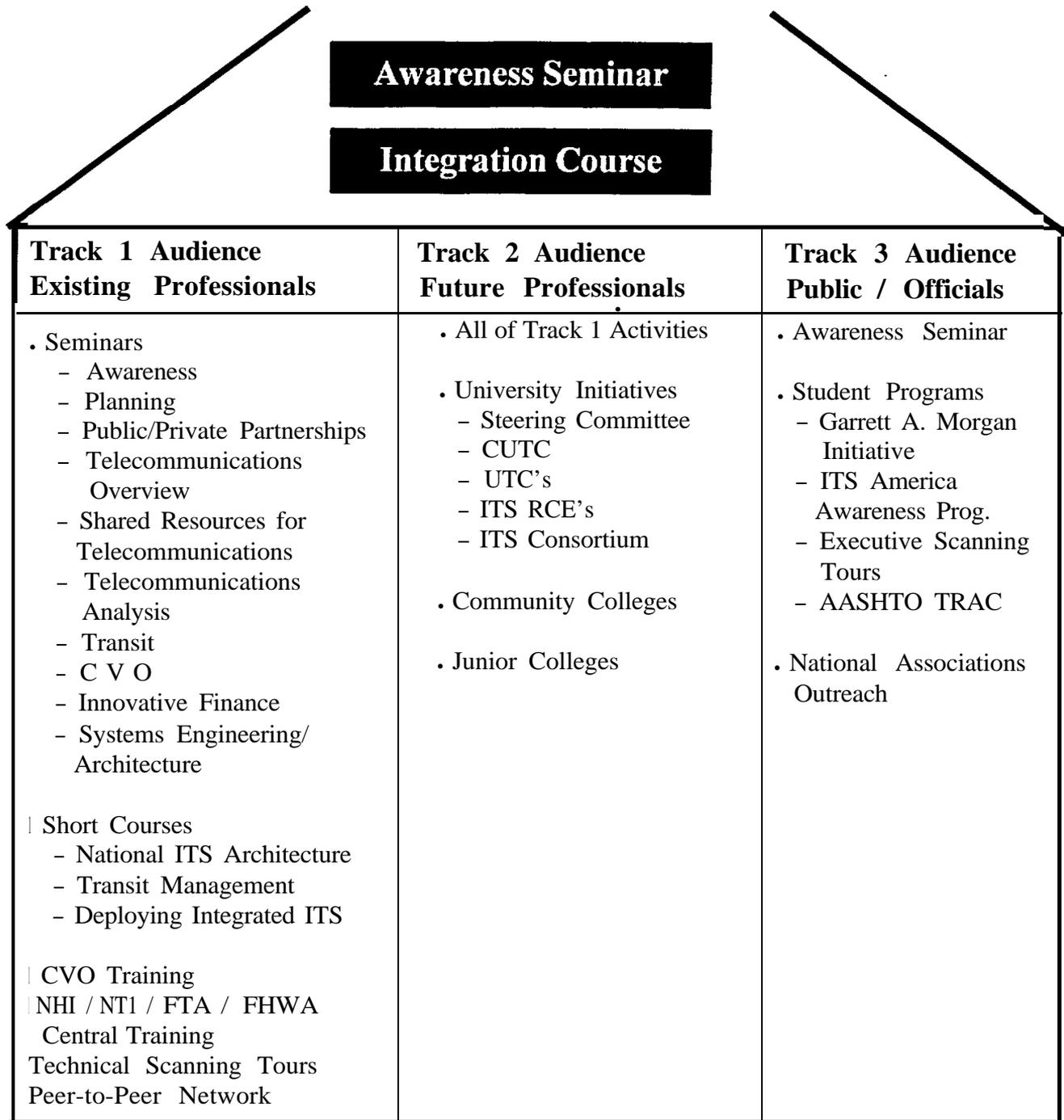
In summary, an ambitious training and education program to meet current identified needs **has** been launched. In order to meet future demands, this program will maintain ongoing activities that include:

- Continuous needs assessment to define core competencies, and to identify and better target audience needs
- Development and delivery of training and education programs to meet current and future demands for training existing professionals, developing future leaders and informing the public
- A process that will mainstream ITS training into existing public agencies, the public sector, academia, and private sector programs.

The following illustration summarizes the PCB program to date with a listing of courses and initiatives developed to meet the needs of the three audience tracks of the PCB program:

# Figure 1

## ITS PCB Umbrella of Training



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# I INTRODUCTION

## National Vision for ITS Deployment

In 1991, when Congress passed the Intermodal Surface Transportation Efficiency Act (ISTEA), it launched a new era of transportation. ISTEA established the DOT's Intelligent Transportation Systems (ITS) program, which emphasizes more efficient and safe use of *existing* highway and transit infrastructure and advances intermodalism -- the seamless integration of multiple transportation modes. The proposal for the "National Economic Crossroads Transportation Efficiency Act (NEXTEA)," continues the ITS program's key role in shaping the transportation systems of the next century.

The DOT established a principal deployment goal for ITS in early 1996. That goal is to create an information and communications platform to ensure that ITS services are integrated, interoperable, and intermodal. To date, the DOT has defined three primary elements of the nationwide ITS infrastructure:

- Full implementation of a Metropolitan Intelligent Transportation Systems Infrastructure, which will include advanced traffic management, traveler information, and public transportation systems capabilities in the nation's largest metropolitan areas within 10 years. Specifically, metropolitan ITS infrastructure will unite the following nine ITS services: advanced traffic signal controls, freeway management, transit management, incident management, electronic fare payment, electronic toll collection, emergency management services, regional multimodal traveler information, and railroad grade crossings.
- The implementation of Commercial Vehicle Information Systems and Networks (CVISN) that integrates multiple ITS/Commercial Vehicle Operations (CVO) services to achieve safe and efficient shipping operations and enable electronic business transactions by the year 2005 in all states.
- The development of a Rural ITS Infrastructure that will improve safety and mobility in rural communities and small towns with an eye toward linking rural ITS services with ITS infrastructure in adjacent metropolitan areas.

ITS offers promising solutions to improve the efficiency, safety, and cost-effectiveness of surface transportation systems. However, these benefits cannot be realized without a workforce that has the essential knowledge, skills, and abilities to effectively plan, implement, operate, and maintain ITS services and their supporting communications and information infrastructure.

The DOT is committed to creating an environment in which transportation agencies have the capability to perform the public sector roles and responsibilities of planning, developing, financing, deploying, operating, and managing ITS infrastructure in the public domain. Building professional capacity is essential to fulfilling this commitment. A limited cadre of ITS professionals now exists largely as a result of experiences gained through ITS research, field tests, evaluation activities, and pioneering deployments.

The DOT has recognized the need to develop a cadre of trained professionals at the Federal level and with state and local partners who would be responsible for planning, designing, implementing, operating, and maintaining ITS technologies and systems. These trained professionals do not currently exist in sufficient numbers to effectively deliver the expected goals for widespread deployment of ITS. In response to this need, DOT developed the *Five-Year Strategic Plan for ITS Professional Capacity Building for Transportation Management and Traveler Information Services* (March 1996).

**The purpose of this document, the *PCB Framework and Overview* is to describe how the Five-Year Strategic Plan is being implemented in FY 1996 and 1997 and to present an approach to building professional ITS capacity for FY 1998-2002.**

### Professional Capacity and Professional Capacity Building

Within the context of ITS deployments, professional capacity is defined as the building of core competencies, knowledge, skills, and abilities (collectively referred to as KSAs) that enable successful deployment of ITS by:

- Federal generalist and specialist staff
- State and local transportation agency staff
- Existing and future transportation professionals within both the public and private sector.

Additionally, the success of ITS deployments will depend on raising the awareness of purchasers and users (both elected officials, the consumers of transportation, and industry) in the ways that ITS can meet individual transportation needs and deliver benefits. Brief definitions of knowledge, skills, and abilities are:

- **Knowledge:** includes increasing the awareness of elected officials about ITS, conducting outreach activities to public decision makers, and equipping current and future transportation professionals with the *comprehension* of fundamental principles and concepts through education. This comprehension goes beyond narrow proficiency in carrying out tasks to emphasize what can be called know-why-the understanding of how ITS technologies function, how they relate to each other and to other elements of a surface transportation system, and why their application produces the benefits of more effective and efficient transportation system performance.

- **Skills:** provides the know-how to execute specific tasks competently. The conventional wisdom indicates that training provides immediately usable skills, whereas education provides the knowledge of principles and concepts which underlie these skills.
- **Ability:** the coalescence of knowledge and skills that allow professionals to creatively act and make decisions, to improvise and trouble shoot problems, and to think about and provide solutions in new and innovative ways.
- **Core Competencies:** the bundling of the KSAs that are considered necessary to effectively perform specific functions.

Just as the Interstate Highway program required transportation agencies to acquire and develop the requisite roadbuilding and civil engineering skills, ITS infrastructure deployment now requires building competency in disciplines that are often unfamiliar to current surface transportation professionals. Those competencies and disciplines include information systems, systems integration, electronics, and communications technologies. Deployment encompasses multiple disciplines that expand beyond the borders of traditional sources of knowledge such as systems operations, performance measurement, or institutional issues. ITS also requires unprecedented cooperation within and between the public and private sectors. ITS, therefore, represents a fundamental technical and cultural shift in how surface transportation systems will be planned, designed, built, operated, and maintained.

As a result of these shifts, transportation professionals will be greatly challenged to fulfill the tasks and roles required to support ITS deployments. Transportation professionals must be familiar with many new areas. They will be required to incorporate ITS functions into current transportation systems in order to function as members of multi-disciplinary deployment teams.

A major goal of the PCB program is to provide the training, education, and outreach resources necessary to overcome staff KSA shortfalls in deploying ITS. A telling example of the current status of ITS-related KSA capability comes from a 1995 survey by the Institute of Transportation Engineers (ITE) and the Federal Highway Administration (FHWA). The survey revealed that 50 percent of state agencies rated their ability to operate advanced systems as only fair or poor, while 66 percent rated their ability to maintain such systems as fair or poor.

The PCB Program *Framework and Overview* proposes an approach to, and a methodology for, targeting and overcoming these impediments to public agency ITS infrastructure deployment.

## PCB Program History

In order to support the U.S. DOT's goal to advance the deployment of ITS in metropolitan areas, an interagency team led by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA), in cooperation with ITS America (ITSA), developed the *Five-Year Strategic Plan for Professional Capacity Building for Transportation Management and Traveler Information Services*. This plan was the result of findings from a number of workshops, conferences and reports developed by numerous partners, including ITS America (ITSA), during the first four years of the ITS program. The Strategic Plan, which was published in March 1996, provides a framework which outlines the mission, objectives, and activities of an effective PCB program aimed at FHWA and FTA staff, their state and local partners, transportation professionals, elected officials, and public decision makers.

## PCB Program Framework and Overview

*The PCB Program Framework and Overview* has been developed to produce the framework for and to describe the actions required to meet the goals and objectives for building professional capacity in concert with the DOT's deployment goals. Using the goals and activities described in the ITS Strategic Plan, the *Framework and Overview* will identify target audiences, responsibilities and the core competencies / KSAs needed to carry out the activities for metropolitan deployments, and expand them to embrace ITS/CVO and rural deployment needs. The *Framework and Overview* will also identify ways of leveraging training and educational activities produced by other organizations such as federal agencies, professional organizations or universities. In some instances, the PCB program will meet training needs through development and delivery of targeted courses; in others, the PCB program will agree to deliver already developed courses, find ways to encourage or facilitate course development through other organizations, or transfer course material developed through the PCB program to other organizations for delivery, for instance the National Highways Institute (NHI) or National Transit Institute (NTI).

Overall, it is a goal of the PCB program to proactively address ITS professional needs. PCB activities are expected to track closely with the deployment sequence of ITS, although some activities may precede ITS deployment in anticipation of fulfilling transportation needs. At this time, professional capacity building and deployment are occurring simultaneously.

It is important to note that at this time this *Framework and Overview* is limited to programs that encompass metropolitan transportation management and traveler information services. However, the intent of the program is to eventually incorporate CVISN and rural ITS infrastructure as well. Many of the programs already in place and planned are equally applicable to all three of the ITS primary elements -- the Metropolitan Intelligent Transportation Systems, CVISN and Rural Infrastructure.

It is also important to note that this document does not include two activities that are currently in the early stages of development. It is our intention that both will be eventually addressed as they develop. The first activity is the recently launched DOT Garrett A. Morgan education initiative that has as its objective to provide transportation-related educational opportunities within and outside of the transportation profession. This effort, led by the DOT's Research & Special Programs Administration (RSPA), constitutes delivering transportation and transportation-related education to the following four audiences: college and university students, continuing education for professionals within and outside of the transportation profession, community colleges and K-12 education. The PCB Program will provide ITS training materials to the Garrett A. Morgan program as well as leverage the outreach done through this program to ensure that a solid vision of ITS is incorporated into presentations. The second activity is the Standards Training program. The National ITS Architecture recognized a number of standards that are critical to the successful deployment and interoperability of ITS. Training, technical guidance documentation and instructional courses are currently being developed to ensure adequate understanding by the users when deploying standards based systems. Instructional courses will be developed in conjunction with the Standards Development Organizations (SDOs) developing the standards. These courses will then be folded into the umbrella of the PCB program for consideration of delivery.

### The Current Status of the PCB Program

In an ideal situation, the PCB *Strategic Plan* and this *Framework and Overview* would have been developed first, and the resulting priorities would have been implemented in a systematic way. However, it has proved impractical to follow such a linear approach, as so many training needs are urgently required. Thus, the PCB program initiated both the strategic planning for the program as well as the development of training initiatives. Section V details activities and accomplishments of the program in 1996 and 1997.

The period from mid-1996 to mid-1997 has been primarily focused on developing and delivering a series of awareness and overview seminars and short courses for professionals currently engaged in ITS deployment. The first delivery of an awareness seminar for FHWA and FTA field professionals occurred on March 3, 1997 in Chicago, IL (Region 5). Since then, this and other seminars have been delivered around the country to Federal, state and local professionals. In addition, professional organizations are planning to present these same seminars. The educational materials being developed by the DOT are being made available to all organizations that request them.

Appendix A provides the latest PCB delivery plan for FY 1997 that reflects our priority for delivering awareness seminars. Appendix B provides the latest delivery schedule for courses developed through the PCB program. Appendix C presents a catalog of existing training courses developed by DOT agencies (i.e., the PCB program, which includes the Federal Highway Administration and the Federal Transit Administration; FHWA's Central Training; the National Highway Institute; and the National Transit Institute) that address ITS deployment at various levels of intensity. -Appendix D presents a summary of the funding and budget allocations for FY 1996, FY 1997 and FY 1998. Appendix E is the Bibliography of previous needs assessment reports that was used to identify the gaps in PCB knowledge. Appendix F is a glossary of terms and acronyms listed throughout this document.

As the program continues to develop, a number of new initiatives will be launched in coordination with various DOT agencies, professional associations and their constituents, as well as universities throughout the *country*. *This Framework and Overview* will help establish the priorities and define the activities required for building professional capacity.

The next section of this document presents the mission, goals and rationale for the PCB program, its scope and management roles and responsibilities, and plans for the future delivery of professional capacity building.

## **II THE PROFESSIONAL CAPACITY BUILDING PROGRAM**

### **Mission and Goals for Building ITS Professional Capacity**

The mission of the Professional Capacity Building (PCB) Program is to develop the core competencies, knowledge, skills and abilities (KSAs) of transportation professionals, public officials and the public decision makers to ensure the success of ITS deployment now and in the future. The mission also includes the responsibility to ensure that requisite training, education and outreach assistance exists to provide the necessary resources for producing a new cadre of transportation professionals-those who can conceive of, design, plan, manage, operate and manage intelligent transportation systems now and in the future.

The primary goals of the program are to:

- Ensure that sufficient numbers of trained Federal, state and local ITS professionals will be in place and equipped with the core competencies / KSAs to implement successful, integrated, interoperable, and intermodal ITS deployments
- Develop processes and provide resources to facilitate the development of the next generation of transportation professionals as a means of ensuring that there are sufficient numbers entering the workforce to staff ITS deployments in the future
- Increase awareness about ITS benefits and deployment options among public sector decision makers and industry, particularly to encourage interjurisdictional arrangements and public-private partnerships for building essential ITS infrastructure
- Raise public awareness about the benefits of ITS services to encourage their widespread acceptance and use.

### **Objectives**

Attainment of the following objectives will assist in achieving the PCB program goals. These objectives reflect the vision described in the PCB Strategic Plan:

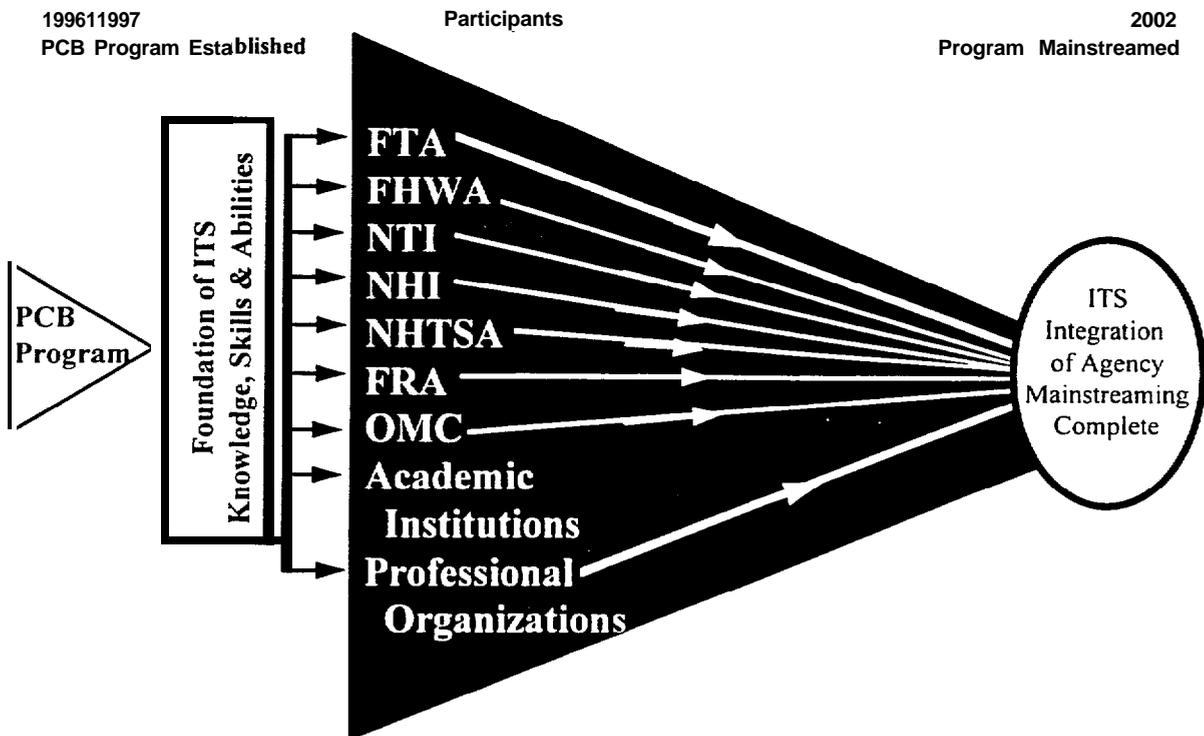
- Capacity building will be multidisciplinary
- Capacity building will be multi-level (entry level through training professionals of the future)
- Capacity building will reflect state-of-the-art and state-of-the-practice of ITS technology
- Capacity building will be cross-cutting and address all aspects of ITS programs and technology
- ITS specialist topics will be integrated in all areas of professional capacity building
- The PCB program will explore new delivery media for training, education and outreach by utilizing more advanced technological forms of media
- Capacity building will be focused on interagency coordination, within the DOT and between the DOT and state and local partners. Capacity building also includes the private sector that supports public agencies and academia.

## Evolution of the ITS PCB Strategic Plan

The existing Strategic Plan focuses on developing the core competencies needed to implement transportation management and traveler information services. It also provides an overall vision for professional capacity building, sets goals and objectives, identifies potential target groups, establishes “levels of expertise” and identifies corresponding “ITS technical responsibilities” to-be attained by the target groups, and identifies preliminary activities that support the PCB program.

Although not explicitly mentioned in the Strategic Plan, the DOT recognizes the necessity of integrating ITS training and education into existing programs such as those sponsored by its administrations and their agencies (such as the NHI and the NTI) as well as within the curricula of universities, professional associations, and independent private training organizations. The DOT expects that within five years, the integration of ITS into existing training, educational, and outreach efforts will eventually eliminate the need for a separately identified and funded PCB program. Therefore, it is essential that the PCB program establish and mainstream a core set of required ITS core competencies / KSAs. Figure 1 shows the expected evolution of the PCB program.

Figure 1: Illustration of PCB Program Evolution



## PCB Program Scope

The scope of the PCB program is extensive in terms of the audience that requires training, education and outreach in ITS. The program is designed to address the specific needs of all current and future transportation professionals in their effort to deploy, operate and maintain ITS systems and infrastructures. At the present time, the elements of the ITS program that can be readily deployed with existing technology revolve around three major initiatives. The first initiative is a full implementation of a metropolitan ITS infrastructure. The second initiative is the implementation of Commercial Vehicle Operations (CVO), which is being implemented under the Commercial Vehicle Information Systems and Networks (CVISN) program. The third initiative is the development of a rural transportation systems infrastructure.

The audience for these initiatives ranges from skilled technicians to the public decision makers. Table 1 shows the levels of expertise to be delivered to specific audience categories:

Table 1: Levels of Expertise for Training, Education & Outreach

Level	Expertise	Objective	Audience
1	<b>General Awareness</b>	To provide a basic and fundamental knowledge of ITS, prospective benefits, and national program elements.	Public decision makers, transportation professionals, and elected and appointed officials.
2	<b>Overview of ITS</b>	To provide a basic knowledge of specific ITS program elements (ATIS, ATMS, APTS, etc.), policies, decision points, institutional issues, and consumer awareness. An additional objective is to provide an understanding of how ITS is relevant to audiences' professional positions.	DOT Federal, state, regional and local personnel in positions directly and indirectly involved in ITS program development and delivery.
3	<b>Specialized KSAs</b>	To provide intermediate, in-depth knowledge of specific ITS program elements that support the basic functions of ITS deployment, i.e., procurement, cost-benefit training, ITS management, planning, etc.	DOT Federal, state, regional and local personnel, ITS managers, on-site decision makers including private-sector and academics.
4	<b>intensive KSA learning</b>	To provide intensive, hands-on technical knowledge, skills and abilities to professionals who, on a daily basis, are directly involved in and responsible for designing, developing, procuring, deploying, integrating, operating and maintaining the various advanced ITS applications, devices and services.	DOT Federal, state, regional and local personnel, and transportation professionals including private sector contractors and consultants, and academic programs.

The framework for the program is divided into three audience tracks to better target needs:

- **Track 1** - Existing transportation professionals and trained professionals from other fields who have the potential to bring required KSAs to the ITS field, including faculty and private sector deployment experts working with public agencies
- **Track 2** - Future transportation professionals and leaders, including students at universities, colleges, and technical/vocational schools
- **Track 3** - Elected and appointed officials who have influence over transportation policies, especially those of funding, land use, environmental, and quality of life, and the general traveling public who stand to benefit from ITS deployment.

Table 2 illustrates the Program's framework for the delivery of training and education within these three tracks:

**Table 2: Framework for Delivery of Training, Education & Outreach**

	<b>Track 1</b>	<b>Track 2</b>	<b>Track 3</b>
	<b>Current Professionals</b>	<b>Future Leaders</b>	<b>Deployment Decision Makers</b>
<b>Program</b>	Training and/or Retraining of Existing Professionals	Education of Future Transportation Professionals	Public outreach
<b>Objective</b>	Continuing education and expansion of the trained pool of ITS practitioners	Facilitate the development of next generation of ITS leaders	Informed decision making for transportation and ITS
<b>Substance</b>	Seminars; Workshops; Short Courses	Courses; Programs; Curricula	Public information
<b>Audience</b>	Federal; State; Regional Local	Undergraduates; Graduates; Faculty	Elected & Appointed Officials; Pre-College Students, including K-12; Public Decision Makers
<b>Media</b>	Classroom; Distance Learning; CD-ROM; Non-Traditional forms; w w w	Various new media; Traditional Classrooms	WWW; PBS/Television; Literature; Video
<b>Organizations for Delivery: present thru 2002</b>	DOT - HQ NHI, NTI, LTAP DOT Regions, Divisions Universities, Technical/Vocational Schools Private Sector Professional Associations	Universities Colleges	Professional Associations PTI ITSA
<b>Eventual Host for Training &amp; Education Activities once the PCB Program is mainstreamed</b>			
<b>Future Year 2002+</b>	NHI, NTI, LTAP Professional Associations Other DOT programs	Universities Community Colleges Technical Schools	Professional Associations PTI ITS A

## **PCB Program Management**

Since the PCB program was launched in 1996, significant progress has been made in developing a management structure and in preparing education and training materials. The PCB program represents a significant new collaborative initiative for the DOT. Consequently, it requires a new way of doing business. As such, a new management approach has evolved to effectively operate the program:

### ***PCB Steering Committee***

The implementation of the ITS Program requires that partnerships be established within and between public agencies, the private sector and academicians. To implement this concept for the PCB Program, the PCB Steering Committee has been established with ITSA. The chairman of the committee is Wayne Shackelford, Commissioner of the Georgia Department of Transportation. Committee members include representatives from the public sector, private sector, and the academic communities. The mission of the committee is to provide overall direction and external peer review for all DOT and ITSA PCB education and training.

### ***U.S. DOT Internal Headquarters Direction***

The in-house direction is provided by a three-person management team that includes the FHWA Associate Administrator for Safety & Systems Applications, the FTA Associate Administrator for Research, Demonstration and Innovation, and the Director of the ITS Joint Program Office. In addition, an interagency curriculum team has been formed to provide overall coordination, consistency, and advice on all ITS training and education activities.

### ***Coordination and Overall Management***

This program is being carried out as a coordinated effort between the DOT and ITSA. As such, a joint coordination and management function has been established. The ITSA Director of Operations and the DOT Coordinator for the program share that responsibility.

### ***Staff Support***

Both the FHWA and the FTA provide staff support for the program. The Office of Traffic Management and ITS Application's (HTV) Team Leader for Training manages the FHWA program at the headquarters (HQ) level and coordinates with FHWA regional and division offices, and with other FHWA units within headquarters.

The FTA staff support is provided by the Volpe National Transportation Systems Center (the Volpe Center), and manages HQ and regional office participation. That person also provides contact with the NTI.

ITSA provides the principal liaison with the private sector. In addition, some administrative support is also provided to the program.

### ***Peer Review of the Program***

A critical function of the program is to insure that the program itself, as well as the training and education materials, are technically superior and have the best possible educational value. Consequently, an external (both inside and outside the DOT) peer review process has been established to ensure that the highest quality standards are maintained in three areas: content, educational effectiveness, and relevancy to the audience.

### ***Tracking and Evaluation***

A tracking and evaluation process has been established to provide a mechanism for feedback and modifications to the PCB program on a continuing basis. It consists of several straight-forward activities for each training course presentation:

- . Collect an attendance list
- Gather information on each participant with a registration form
- Collect an evaluation form from each participant
- Request recommendations on the evaluation form regarding training needs for subsequent development.

### ***Measures of Success***

Both a short-term and a longer-term PCB program is now underway. The challenge is to be certain that these programs are providing the most appropriate education and training required to support the ITS program deployment goals.

The short-term PCB objectives focus on training and retraining professionals and attracting new professionals to work in these areas. Measures of success will be fairly straight forward for the first few years. They will include the following:

- Short Term Outputs: “Outputs” are specific measures that gauge the number of seminars, workshops, courses, and the number of people attending these activities within a certain time period. They provide a baseline for measuring success. These measures will be used for the first several years.
- Short Term Outcomes: “Outcomes” provide a more substantive measure of results achieved. Outcomes are much more difficult to measure, as they are longer-term in nature. Some measures may include:
  - + For universities: changes in curriculum, new degrees or certificates, new short courses, new faculty attracted to ITS, new research programs and more students attracted to ITS programs

- + For Federal Agencies: new outreach programs, closer cooperation with public and private agencies, new training and education initiatives at regional or local levels, an increase in the numbers of employees requesting ITS training, an increase in the number of employees voluntarily moving into ITS areas, and more agency priority given to ITS
- + For State and Local Agencies: increased demand for training, increased numbers of ITS projects being funded, more ITS success stories conveyed on-line, and an adequate pool of new professionals coming into the field
- + For the Private Sector: increased investments in ITS and an adequate pool of new professionals and technicians.

The proposed measures of success that will be assessed toward the end of each fiscal year are the following:

- In the Public Sector:
  - + Results of program evaluation forms to modify specific activities
  - + The demand from public agencies and the private sector for seminars, workshops, courses, etc.
  - + The degree to which ITS education and training programs become an integral part of on-going programs
  - + The availability of an adequate pool of trained professionals to fill an expanding number of new and modified positions.
- In the Universities:
  - + The number of faculty and new students attracted to ITS education programs
  - + The demand for employing students with an ITS focus within public and private organizations
  - + New courses, curricula, certification and degrees focusing on ITS.

### **PCB Program Roles and Responsibilities for Training, Education and Outreach**

Training, education and outreach to the ITS transportation field and consumers of public transportation is a large task. Since many of the ITS functions are found at all levels of public sector agencies, the public sector has the responsibility for training the majority of personnel involved in ITS. Although the PCB program is limited to providing those courses and assistance programs directly relevant to the ITS deployment program, the effort needed spans a wide range of core competencies, knowledge, skills and abilities.

As previously mentioned, the entire task of building professional ITS capacity does not rest solely with the PCB program. Other agencies and institutions will be involved in developing professional capacity. The following provides suggested boundaries for the roles different sectors of the ITS field can and will play in developing professional capacity:

### ***Federal Level Role***

#### **Agency Headquarters**

- Establish program vision, mission, goals and objectives
- Provide funding to start programs
- Provide initial set of educational materials
- Present first set of training activities
- Serve as facilitators, convenors, coordinators, and catalysts for action
- Leverage, expand, enhance existing programs
- Create new initiatives through existing training departments
- Evaluate and monitor programs

#### **Regional - FHWA and FTA**

- Provides or arranges to provide internal/external customer training at the National, Regional, and local level
- Help identify training needs of customers
- Provide feedback on the PCB program
- Promote the implementation of the PCB program
- Coordinate PCB program activities with other training organizations in the Region
- Develop training courses, presentation, etc., within the Region

#### **FHWA Divisions**

- Same as FHWA regional roles but on a day-to-day basis with local partners
- Critical input on Needs Assessment
- Coordinate at local level with universities, private sector, and professional organizations
- Participate in peer review process in order to better target training to audiences

### ***State Level Role***

- Identify training and education needs at state level
- Help develop materials
- Participate in courses
- Assist in preparing and presenting educational materials
- Interaction with all partners to plan, design, deploy, operate maintain programs
- Participate in peer review process

### ***MPOs, Transit Operators, and Local Agencies***

- Identify training and education needs at the local level

- Help develop local materials
- Participate in courses
- Assist in preparing and presenting educational materials
- Interaction with all partners to plan, design, deploy, operate and maintain programs

### ***Professional Associations***

- Assist in the development of training
- Assist in the identification of needs for professional membership
- Participate in courses
- Serve as a forum for public sector / private sector members to network and exchange information
- Develop and deliver training and education programs
- Make members aware of training opportunities

### ***Academic Institutions***

- Train transportation leaders of the future
- Create fundamental changes in transportation education:
  - Interdepartmental
  - Interdisciplinary
- Integrate research into undergraduate and graduate courses
- Transfer cutting-edge research to transportation professionals as well as community through continuing education credits
- Use the DOT developed materials to create new course materials
- Assist the DOT in creating new educational materials
- Develop new courses, certification criteria, new degree initiatives
- Integrate ITS into existing courses
- Participate in peer review process
- Work with public and private organizations to help identify education needs
- Continuing assessment of education needs and programs
- Act as site hosts for DOT seminars.

### **III RATIONALE FOR THE CURRENT PCB PROGRAM**

The literature discussing professional capacity building for ITS dates back to the inception of the ITS program, then known as IVHS. Both private and public sector transportation professionals have long recognized the need to establish certain preconditions for successful implementation of ITS -- public awareness, knowledgeable public officials and decision makers, and a skilled cadre of managers, planners, designers and technicians.

The training of transportation staffs is the most pressing nontechnical issue confronting ITS deployment. The lack of professionals with the requisite skills or capacity to build and then effectively use this new ITS infrastructure will hinder the full deployment of intelligent transportation systems. This document presents, for the first time, a comprehensive proposal for the full-scale development and delivery of a professional capacity building program.

This section addresses the basis for developing the PCB Program. It first presents the methodology used to set the strategic direction for the PCB Program. Second, it presents the initial results of an analysis of existing professional capacity building literature which revealed gaps in knowledge and skills that are critical to sound program foundation (a more detailed needs assessment is currently underway). These results support the rationale for the proposed structure of the PCB program and convey the required actions to build a solid program foundation. Third, it describes the strategic direction that is required to establish a solid program foundation.

#### **Methodology**

To navigate through the obstacles posed by both the technical and institutional complexity of ITS as well as the competing philosophies on learning, five key questions were posed:

- What core knowledge, skills, and abilities are required to implement and sustain ITS deployments successfully?
- Which groups (e.g., designers, operators, planners, managers, students, public officials, public decision makers, etc.) must possess these KSAs? To what degree?
- What are the training, education, and outreach efforts required to instill the appropriate levels of knowledge, skills, and abilities for each of the target groups?
- To what extent do existing training, education, and outreach activities carried out by Federal, state, and local agencies, universities, professional societies, and others address the professional capacity building needs of the ITS program?
- What are the best methods for delivering training, education, and outreach programs to targeted groups to build professional capacity for ITS now and in the future?

Three lines of investigation were pursued to answer these questions:

- Approximately 13 studies assessing various aspects of the PCB needs of ITS and approaches for building professional capacity were reviewed and analyzed. A bibliography is presented as Appendix E.
- Federal, state, and local/regional staff responsible for developing or delivering training and outreach programs for surface transportation systems in general, **and** ITS specifically, were informally interviewed.
- A repository of existing training, education, and outreach material from Federal agencies, professional societies, and universities to assess the quantity and quality of ITS content in their curricula was begun.

## Results

Analysis and review of the above information revealed several gaps in the existing foundation of knowledge about building professional ITS capacity. Specifically, gaps exist in the following areas:

- **Identification of Core Competencies / KSAs:** which KSAs are required for the deployment and operation of ITS?
- **Development of Curricula, Courses and Programs:** what information is needed to support the development of KSAs into training, education and outreach initiatives?
- **Delivery of Courses and Programs with Educationally Effective Mechanisms:** what other ITS training, education and outreach exists? What are the most effective mechanisms with which to deliver ITS course and programs?

The following provides insight and detail into exactly what knowledge is still deficient:

### *1) State of the Knowledge about KSAs*

- *A better understanding of which knowledge, skills, and abilities are required for successful ITS deployments is necessary.* While all of the reports were able to identify some training needs, most were developed from a limited perspective. Instead of comprehensively addressing ITS professionals' needs for KSAs, needs were identified as either a specific function of ITS (i.e., what training is needed for ATMS), a specific organization (i.e., what training is needed for MPOs), within a limited geographic area (i.e., what are the ITS needs of Southern California), or for staff at a narrow organizational level (i.e., what do traffic signal operators need to know).
- *Most of the studies acknowledge that lack of staffing and necessary skills could hinder ITS deployments.* During the evaluation of ITS operational tests, some participants stated that current staffs lacked the skills necessary for ITS projects. This assessment has been supported in studies conducted by ITE, FHWA, and the NHI.

---*More specificity is required on skills needed for various ITS functions and ITS positions.*  
As multiple skills are needed for each ITS function and position, these skills need to be discerned more clearly. For example, the communications infrastructure which supports ITS deployments could require several types of unique training. For instance a financing/ decision making course presenting cost-benefit analysis methodologies for deciding whether to lease or build ITS telecommunications capacity may be necessary, as may an intensive course on how to connect ITS devices- to wired networks, or a course addressing ITS telecommunications network specifications as they relate to the operations and maintenance of the ITS devices connected to the network (i.e., the impact of switching between CCTV cameras).

---*Knowledge, skills, and abilities must follow the sequence inherent within ITS deployments.*  
ITS professional capacity building must follow the specific stages of ITS deployment, independent of specific geography. Deployment stages and sequence have been previously defined by the DOT and Apogee Research in the establishment of a strategy for ITS deployment. At each stage of deployment it is necessary to ask:

- Who is involved at each stage (across government agencies and government levels)?
- Who has to do what at each stage (functional responsibilities in support of ITS deployment)?
- What needs to be known at each stage and by whom (KSAs)?
- What needs to change in order to accommodate and take full advantage of ITS installations?

Once ITS deployment sequences are defined, professional support requirements can then be:

- Identified and translated into core competencies / KSAs
- Categorized according to the most suitable form of learning, i.e., training, education or outreach
- Matched to existing courses and assistance programs
- Targeted for training, outreach development or educational consideration
- Delivered to the targeted audience in need
- Distributed to other interested parties
- Archived for future accessibility.

—*Non-technical issues must be addressed by PCB projects.* Although most of the documentation focuses on technical requirements needed for ITS deployments, they rarely acknowledge the interactions needed between ITS agencies. For example, regional planners may need a general understanding of traffic signal control modeling and operations in order to appropriately include signal control systems in the regional planning and budgeting process. Procurement officers need to be aware of new acquisition methods and the requirements for funding signal control system acquisition in an innovative manner.

## **2) State of Specificity for developing Curricula, Courses and Programs for ITS Training, Education, and Outreach**

- In general, existing information does not provide enough specificity to develop comprehensive courses and outreach material.* Although the available documentation provides a good point of departure, collectively it does not have the specificity required to develop training, education, and outreach courses. However, it does provide good *baseline* information regarding what ITS practitioners feel is needed in the training area.
- The PCB program must address the overlaps and linkages between ITS positions throughout various agencies.* Many ITS enabling technologies, such as communications, information, and location-referencing systems, standards, and systems architecture, are applicable to multiple modes of surface transportation (e.g., highway, transit, commercial vehicle operations) and multiple geographic areas (e.g., metropolitan, rural, interstate corridors). This allows for the possibility of developing courses that cover information related to many agencies and many ITS functions. It is important to recognize these linkages and overlaps in order to provide training that drives ITS deployment to be intermodal and integrated, as well as to most effectively employ the limited resources available for training.
- ITS training should to be prioritized* Although some reports address the specific needs of field practitioners, none of the reports attempt to systematically prioritize training needs.
- The content of ITS within existing training courses and educational programs should be examined more closely.* It is not clear that existing programs meet ITS needs. For example, the I-95 Corridor Report recognizes a need for training in Advanced Vehicle Identification (AVI)/Advanced Vehicle Location (AVL). A course by the Transportation Association of Canada provides such training. However, a closer examination of the Canadian course reveals that it is an overview of vehicle positioning and navigation for land, marine and air systems. In addition, the course does not address important AVYAVL highway and transit operations at the requisite level of depth for operators.

## **3) State of the Knowledge of ITS PCB Course Delivery and Delivery Mechanism**

- There are various and disparate ITS courses and training programs in existence around the nation.* Most of this material has been developed in response to an identified lack of required skills. For example, in response to its economic development initiative, one state conducted a skills assessment and recognized a need for training operators in advanced traffic signal control systems. This analysis resulted in development of a specific training course. In addition, Federal and professional societies have developed courses on various aspects of implementing ITS, and several universities have developed strong graduate transportation engineering programs that specialize in ITS.

- *Although ITS courses exist, ITS services are often treated as exotic afterthoughts rather than as integral parts of surface transportation systems.* Most ITS courses are being/have been developed within Federal agencies, state agencies, universities and colleges, and professional societies as autonomous technical courses and seminars. For example, a 1995 survey conducted by ITE on the education and training in traffic engineering found that nearly 75 percent of responding agencies have used short courses covering basic traffic engineering-in contrast to less-than-1 8 percent using a short course for ITS.
- *PCB programs must address practical obstacles to learning.* For example, a 1995 ITE report identified five major reasons why transportation staff do not receive adequate training:
  - heavy workload
  - unavailable funding
  - long duration of courses
  - inconvenient place of training, and
  - inconvenient time scheduling of training.
- *ITS PCB programs should be better publicized.* The majority of information regarding the most critical and pressing ITS needs comes from word-of-mouth from field practitioners. In the 1995 ITE survey, 40 percent of the respondents anticipated needing ITS-related courses, but only 33 percent were aware that such courses exist.
- Little is known about the effectiveness of various media for developing professional capacity for ITS.* Existing documentation does not evaluate the efficacy of various media such as computerized courses, short courses, or web sites as effective delivery mechanisms for instilling knowledge and skills.

### **Strategic Direction for the PCB Program**

The PCB program must grapple with the inherently complex nature of ITS deployments and must progress past the recognized deficiencies in information. The PCB program is greatly challenged to develop comprehensive activities that address the full spectrum of geographic areas, multiple modes, diverse objectives, and distinct users who will be impacted by ITS deployments.

The ITS Joint Program Office is currently developing a strategy and business plan for deploying ITS. To date, this strategy identifies a sequence of ITS deployment stages that will be used to conduct the PCB needs assessment. Although ITS is rarely deployed in a linear fashion, identification of a sequence allows for more targeted recognition of the types of core competencies, knowledge, skills and abilities needed at specific times by specific audiences. Using these stages also provides a systematic method for identifying technical and institutional impediments that occur at each stage and that may hinder deployment. In general, the stages are:

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<sup>1</sup> Source: Intelligent Transportation Infrastructure Deployment Strategy, Draft, May 9, 1997, prepared in conjunction with Apogee Research, Inc. for the ITS Joint Program Office.

- a **General Awareness** of ITS that establishes the foundation for understanding the need for ITS, the scope of ITS, the roles of the various agencies involved in ITS deployment;
- **Planning for ITS** which encompasses the notion of establishing a regional framework and develops an understanding of conformance to the National Architecture;
- **Designing ITS Systems** with an eye toward interoperability and intermodalism;
- **Procuring ITS Systems** including innovative financing methods;
- **Installing ITS Systems** which-includes the-role of contracting organizations; and
- **Operating and Managing ITS Systems** once deployed.

Using this model, the PCB needs assessment activity will identify for each separate deployment stage the various ITS jobs needed to support that stage of deployment:

- across all levels of public and private sector organizations that support ITS deployment (Federal, Regional, Division, State, MPO, Local, Private industry, Professional Associations, Universities)
- across all transportation agencies involved (Highways, Transit, Commercial Vehicles, R&D, and Planning)
- throughout all job levels of each agency (executive, management, practitioners [operators of specific devices, technologies, systems], and technicians).

Needs Assessment, however, is just one task in the whole of the PCB Program. In order to comprehensively and effectively build professional ITS capacity and build a solid program foundation, the following four overall program elements will be used to define the scope of the PCB program:

- **Identification of Core Competencies / KSAs:** Activities that identify the required core competencies, knowledge, skills, and abilities needed for the deployment and operation of ITS
- **Development of Curricula, Courses and Programs:** Activities required to support the development of KSAs into training, education and outreach initiatives
- **Delivery of Courses and Programs with Educationally Effective Media:** Activities that support the delivery of training, education and outreach with the most educationally effective delivery mechanisms
- **Program Management:** Development of programmatic roadmaps and activities that provide a structure to the program's management.

The next two sections of this *Framework and Overview* present a proposal for major activities that will advance the PCB Program's mission and objectives into realization. Section IV describes:

- A **program structure** through which professional ITS training, education and outreach can be provided, in close coordination with ITS deployment goals set by the DOT

- A series of fourteen **tasks** covering a 5 year period of 1998 - 2002, that will better target audiences and better focus the development of curriculum, seminars, workshops, and like activities toward one or more of the capacity building objectives
- An identification of the necessary **partnerships** among the Federal government, state departments of transportation, universities, the private sector, and professional and industry associations; thereby, reflecting the diversity of stakeholders involved in ITS deployment.

Section V presents a list of priorities for all activities that will be pursued in the remainder of FY 1997 and through FY 1998. Listing the activities allows the DOT to allocate resources most effectively while providing the PCB program with a clear understanding of some short-term goals. This overall strategic approach will be continued through FY 1998 to develop the FY 1999-2002 priorities.

## IV PCB FRAMEWORK AND OVERVIEW TASKS AND ACTIVITIES FOR FY 1998 - 2002

This section describes the activities and tasks that the PCB program proposes to pursue to accomplish its mission over the next five years. *The primary objectives of the program are to develop, to the fullest extent required, definitions of the core competencies, knowledge, skills, and abilities of transportation professionals, public officials, and the public decision makers to ensure the success of ITS deployments now and in the future.* The task activities in this section provide an overall framework for developing the program in more detail.

### Program Elements

Four overall program elements must be pursued to implement the DOT's PCB Program:

- **Identification of Core KSAs:** Activities that identify the required core competencies, knowledge, skills, and abilities needed for the deployment and operation of ITS
- **Development of Curricula, Courses and Programs:** Activities required to support the development of KSAs into training, education and outreach initiatives
- **Delivery of Courses and Programs with Educationally Effective Media:** Activities that support the delivery of training, education and outreach with the most educationally effective delivery mechanisms
- **Program Management:** Development of programmatic roadmaps and activities that provide a structure to the program's management.

### Tasks

Fifteen separate tasks have been established to provide a solid and ongoing program foundation. Each of the tasks fall under one of the above four general categories. Some tasks may be undertaken simultaneously while others will require a sequential approach. Table 3 on the following page lists the individual tasks and identifies them according to one of the above-listed general categories of activities and then by level of priority [near-term priority (FY 97 - FY 98), mid-term priority (FY 99 - 2000) or far-term priority (FY 2000 +)].

The colored pages directly following Table 3 provide a fuller description of each task including its purpose, approach, objective, priority level, schedule, and its deliverables and partner participants. The information in Table 3 in conjunction with the individual task descriptions provide a management structure for developing the PCB program in more detail.

**Table 3: Overall PCB Program Elements**

TASK	NAME OF TASK	PRIORITY LEVEL
<b><i>Program Element #1: Identify core competency /KSAs required for successful ITS deployments:</i></b>		
TASK A	Review & Synthesis of Existing PCB Needs Assessments	Near-term
TASK B	Assess PCB Needs: 1-5 Year Time Horizon	Near-term
TASK C	Assess PCB Needs: 5-20 Year Time Horizon	Far-term
TASK D	Evaluate Existing ITS Programs to identify gaps and plan for new programs	Near-term
<b><i>Program Element #2: Develop Curricula, Courses and Programs for Training, Education and Outreach:</i></b>		
TASK E	Develop Training Courses in support of the Track 1 Audience: Training and Retraining of Current Professionals	Near-term
TASK F	Develop University Courses and Curricula in support of the Track 2 Audience: Facilitating the Development of Future Professionals	Near-term
TASK G	Develop Public Outreach Programs in support of the Track 3 Audience: Awareness Building for the Public and for Transportation Decision Makers	Mid-term
<b><i>Program Element #3: Delivery of Courses and Programs with Educationally Effective Media</i></b>		
TASK H	Implement and Expand on Delivery Mechanisms	Near-term
TASK I	Deliver Training for Current Professionals	Near-term
TASK J	Facilitate the Development of Future Professionals	Near-term
TASK K	Deliver ITS Awareness to the Public and to Transportation Decision Makers	Mid-term
<b><i>Program Element #4: Program Management Tasks:</i></b>		
TASK L	Disseminate PCB Information	Near-term
TASK M	Coordinate & Integrate the PCB Program with existing Training Programs	Near-term
TASK N	Track PCB Progress	Near-term
TASK O	Develop Guidelines for Future PCB Training Activities	Mid-term

## Task A. Review & Synthesis of Existing PCB Needs Assessments

**Purpose:** Establish what information is already known about KSAs required to implement successful ITS deployments, the existence of training, education, and outreach programs to instill capabilities, and the development of delivery mechanisms to reach targeted audiences. This task will establish a foundation for the rest of the PCB program.

**Description:** Existing documentation must be reviewed to understand:

- what currently is known about the need for professional ITS KSAs;
- what further information is needed to be able to comprehensively provide the requisite training, education and/or outreach in support of ITS deployment, and
- where gaps exist in training, education and outreach.

This review will provide information to structure upcoming needs assessment activities in order to ensure that the needs assessment approach addresses the gaps.

**Approach:** Review current documentation for content, approaches used, and findings. Synthesize identified needs. Conduct selected interviews with ITS experts. Identify gaps in the findings. Identify limitations of needs assessments conducted to date.

**Objectives:** To provide a white paper that reviews and synthesizes the most current information. To use the synthesis to formulate a needs assessment methodology that will obtain missing PCB information in a comprehensive, detailed, and systematic manner.

**Priority:** Near-term. In-depth understanding will provide a foundation for building the PCB program.

**Schedule:** Contractors have been tasked with developing seven short white papers that explore the PCB needs and activities of professional organizations. This information from these white papers will be incorporated into the larger synthesis paper. Draft of this synthesis paper is expected by August 1997. An internal core group will then assess the results and relevance to the PCB program.

### ***Deliverables and Participants***

<b>Deliverables</b>	<b>Participants</b>
Seven short white papers on the PCB needs and activities within APTA, ITE, ITSA, AASHTO, CUTC, ITS RCEs, and UTCs.	The Volpe Center PCB Program Coordinator Contractors HTV/JPO/FTA for review
Report entitled, <i>PCB Needs Assessment Baseline: A Review and Synthesis of 13 Prior Studies, Field Interviews, and Summary Assessment of ITS Needs,</i>	The Volpe Center Universities

## **Task B. Assess PCB Needs: 1-5 Year Time Horizon**

**Purpose:** Identify core competencies, knowledge, skills, and abilities required to implement successful near-term ITS deployments.

**Description:** Based on the preliminary analysis and review of existing needs assessments, it is evident that information needs to be gathered- to address national ITS needs, particularly to achieve ITS infrastructure goals. The next step is to interview successful ITS program personnel to identify the core competencies, knowledge, skills and abilities required to conceive, design, develop, deploy, integrate, operate, and manage ITS. The detailed findings from these interviews will:

- Identify detailed core competencies / KSAs with enough clarity to develop training, education, or outreach materials that cut across all government levels and agencies involved in ITS
- Provide data to enable the DOT to forecast staffing requirements for ITS sites more precisely
- Develop a directory of known ITS experts.

It is expected that individual modal efforts may be conducted to supplement this report. For instance, FTA will be conducting a transit needs assessment for FY 1998, which will complement the PCB activity; FHWA is currently engaged in an agency wide skills assessment which, in an effort to leverage resources, will be used to inform the PCB program of the more general agency needs in ITS; and various state agencies have performed local needs assessments, such as CalSkills or LA Metro, that will be used to inform the PCB needs assessment activities.

**Approach:** Choose cutting-edge ITS deployment sites for needs identification. Develop site interview plan that includes all necessary levels of government (federal through local), involved transportation agencies, and ITS practitioners across agencies and government levels. Interview practitioners for insight into their job functions/positions and how it relates to ITS:

- The core competencies / KSAs needed to qualify for such a position
- Where each practitioner obtained his/her KSAs
- If any other KSAs are needed for the job but not provided
- A sense of which KSAs are most critical and immediate
- What changes need/ are needed to occur to make the position effective in supporting ITS deployment
- What future training might be anticipated.

Assess the staffing plans for the Model Deployment Initiative sites and other active ITS programs which are deploying metropolitan ITS infrastructure and CVISN.

Also, build on existing and emerging studies such as the JPO's Deployment Strategy, the FHWA Central Training Needs Assessment Study, and the Baseline report completed under Task A. These studies provide a broader perspective on needs throughout the transportation profession; the information gathered through these studies should complement and enhance the PCB needs assessment if the appropriate coordination is pursued with these other agencies.

**Objectives:** To understand the KSAs required to support the ITS deployment sequence chain; to utilize a methodology that will identify ITS KSAs in detail; to prioritize which are most critical and needed immediately, and those that are long-term; to categorize the KSA findings according to the most effective method of delivery-training, education or outreach.

**Priority:** Near-term. This is the first step in developing a PCB program that can respond proactively in fulfilling the ITS profession's needs.

**Schedule:** Appropriate preparation must be done to ensure that the fields interviews will cover the spectrum of ITS positions and levels at a given deployment site. Once the appropriate people have been identified and contacted, interviewing, data gathering, data input, and data assessment can commence.

***Deliverables and Participants:***

<b>Deliverables</b>	<b>Participants</b>
Methodology paper, including instruments to guide interviews	PCB Program
Site interview plans	Universities
Needs Assessment Report, August 1998	Professional Associations
	DOT Agencies

## **Task C. Assess PCB Needs: 5-20 Year Time Horizon**

**Purpose:** Identify core competencies, knowledge, skills, and abilities required to continue successful ITS deployments into the future, including the identification of KSAs that may yet not be defined.

**Description:** A future and continuing needs assessment activity must be structured to identify the likely future demand for ITS professional positions that may not yet exist. For example, in five years, many of the cutting-edge deployment sites will have moved from research and development to discrete deployments to regional integration and will be considering national integration. There will be a need for experts proficient in applications and systems that are currently under development, such as the cutting-edge research initiatives in collision avoidance systems or advanced sensors. The needs assessment activity must incorporate the capability to identify these, as yet undefined, positions. This activity will require a major input from the university participants in the program.

This Needs Assessment Strategy is an important element in the eventual mainstreaming of ITS research as well as the PCB program. When this Needs Assessment Report is complete, the information and the methodology can be transferred to other organizations that will sustain the objectives of the PCB program activities beyond the year 2002.

**Approach:** Structure a methodology for identifying future ITS core competencies / KSAs. Potential activities include:

- Asking a question on the training course evaluation sheets asking field practitioners for their input
- Analyzing detailed ITS information such as the National ITS Architecture or the Oak Ridge National Laboratory ITS Infrastructure Database to understand the future ITS deployment vision and speculate what jobs need to be developed
- Gathering a team of experts to envision the future world of ITS jobs
- Universities will conduct education needs assessment.

Coordinate with DOT agencies to gain information on their expected future core competency / KSA needs, including and especially the R&D activities of ITS as these activities will eventually be incorporated into deployments.

**Objective:** To establish ongoing, continuing assessment activities in order to ensure that the PCB program remain proactive in addressing ITS professional needs. To “forensically” identify future ITS needs for other organizations to take over the reigns of the ITS PCB program. To be able to define the critical KSA elements of future ITS jobs including costs per skilled position for training, hiring, and/or salaries.

**Priority:** Far-term. This activity can be completed in the later years of the PCB program, building upon the knowledge accumulated in the first few years.

**Schedule:** The 1-5 Year PCB Needs Assessment will need to be completed before the methodology for future needs assessment can be defined. Continuing contact with ITS practitioners at cutting-edge deployment sites will allow the PCB program staff to gauge how quickly deployment is happening, how well PCB activities are supporting deployment, and when future needs need to be anticipated.

***Deliverables and Participants***

<b>Deliverables</b>	<b>Participants</b>
Report on Future KSA Training Needs: Methodology and Findings.	PCB Program Coordinator Universities ITS practitioners DOT agencies

## **Task D. Evaluate Existing ITS Programs to identify gaps and plan for new programs**

**Purpose:** To take full advantage of existing training and education courses that may deliver the needed KSAs to the ITS profession without having to develop new courses for every identified ITS KSA need. To be able to immediately provide “matches,” or information on existing courses, to the professionals who are in need before development of new training courses occurs. In conjunction with the needs assessment tasks (A, B and C), to identify the gaps in existing courses and provide data concerning what needs to be developed. The results of this effort will then feed into tasks E, F and G-the development of new courses and materials.

**Description:** A number of training courses and ITS programs already exist to transfer ITS KSAs to transportation professionals. These programs vary between focusing specifically on ITS (for example, GPS instruction for Transit) or simply presenting general technical material that could be applied to ITS (e.g., GPS as applied to traffic of transportation management). In order to utilize successfully established resources, the PCB program will compile an inventory of these courses and programs and evaluate them for the depth and breadth of ITS content. Doing so will allow the PCB team to match identified ITS KSA needs from Task B to existing courses, alleviating the need to develop new training and outreach for every ITS KSA. Additionally, this inventory will begin the PCB Inventory task and will be published on the PCB Web Page for wider audience access (see Task L).

**Approach:** Access information on ITS courses from the DOT agencies and their training programs, universities, professional associations, and local area ITS sites. This information can be found through telephone interviews, requests for information, and web site searches. Information also exists in the form of inventories done by various organizations, for instance the ITE inventory of ITS courses. Seek out further information on content by requesting course syllabi and advertising information. Potentially talk to a cross-section of course instructors. Inventory existing ITS courses, education, and outreach needs. Evaluate the course or program for its ability to address specific professional ITS capacity needs. Match existing courseware with identified ITS KSAs to satisfy the need for immediate training. Use this inventory as the foundation of the larger PCB Inventory.

**Objectives:** *This* information will be ready to match against the identified KSA needs from the Needs Assessment activity (task B). Matching KSAs to existing courses alleviates the need to develop new training and outreach for every identified KSA. It also allows the PCB program to build on successfully established courses and programs and to meet field needs more immediately. The data from this task will also provide an understanding of what needs to be accomplished in tasks E, F, and G and will allow for the systematic development of new training and education materials.

**Priority:** Near-term. This task needs to occur simultaneous with Task B so that the ITS KSAs identified in the initial PCB Needs Assessment report (expected early 1998) can be immediately matched with existing courses and delivered to ITS practitioners in need.

**Schedule:** This task will begin in parallel with the Task B Needs Assessment. The compiled and evaluated information will be matched with the KSAs identified in Task B at the end of August 1998.

***Deliverables and Participants***

<b>Deliverables</b>	<b>Participants</b>
Inventory of Existing Courses PCB Coordinator	Professional Organizations Universities
Matching of Courses with identified need from the Needs Assessment task.	ITSA DOT Agencies and their Training Programs

## **Task E. Develop Training Courses in Support of the Track 1 Audience: Training and Retraining of Current Professionals**

**Purpose:** Develop training courses, based on the Needs Assessment task, to support the training and retraining of current professionals. Training goals will encompass professionals from the transportation field as well as professionals from other fields of expertise relevant to ITS, such as telecommunications.

**Description;** The PCB Training task is at the heart of the PCB program. Current transportation practitioners are in immediate need of focused ITS training to provide them with the KSAs required to support the deployment, operations, and management of ITS. Training can also be used to instill required transportation KSAs into practitioners from other fields who can be of great benefit to ITS, such as telecommunications experts brought on staff to design and build a network to support the ITS infrastructure. Courses will range in length from 1/2 day sessions to full semester-length instruction.

There are three approaches for developing training courses for ITS professionals. The first stems directly from the PCB needs assessment. These courses are developed and taught by the PCB (extended) staff, with assistance from subject matter experts within Federal and state transportation agencies. These training courses are subject to the criteria established by the PCB program for content, including coverage and depth of subject matter, effectiveness in delivery, peer review, scheduling, and marketing.

The second type of training is developed within the Federal and state agencies, outside of the PCB program structure, by ITS experts. These courses are not subject to the PCB program criteria, but PCB staff will seek out their details and place them on the master schedule. The third type of training emanates from outside of government by professional organizations, academia, consultants, and training organizations.

**Approach:** Develop training based on the comprehensive needs assessment which will provide hands-on, technical, in-depth information on needs related to designing, partnering, developing, procuring and contracting, deploying, operating, integrating, and managing ITS. Segment audiences into targeted groups, a division based on ITS functions and jobs in order to target training. Institute a peer review process to ensure appropriate content, educational effectiveness and relevant level of intensity. Utilize the most effective educational media to ITS professionals including classroom format, distance learning, CD-ROM, and WWW. Incorporate documents from successful ITS efforts such as specifications, bid packages, enabling legislation, or operations/maintenance plans. Develop materials that can be used by other training, educational or outreach programs. Ensure that the range of ITS core competencies / KSAs are addressed through training, and provide the requisite depth and intensity appropriate to the trainees' positions.

**Objectives:** To deliver core competencies / KSAs most critical to deploying ITS to current transportation professionals and retrained professionals from other technical disciplines. To support the deployment of the ITS infrastructure at every stage of the process at the appropriate depth of KSAs. To provide continuing education to current professionals. To expand the pool of trained ITS practitioners.

**Priority:** Near-term.

**Schedule:** The development of training has already begun. These courses are currently being delivered or under development and will occupy the training resources through the end of FY 1997 and into FY 1998. Feedback from the field and previous Needs Assessments have identified other, obvious critical ITS training needs, which are scheduled for FY 1998. In the future, training development will be based on the PCB Needs Assessment report, due August 1998, which will identify how, what, when and where ITS training is needed.

***Deliverables and Participants:***

<b>Deliverables</b>	<b>Participants</b>
Ongoing Delivery of Training Courses	PCB Program Coordinator U.S. DOT Transportation Agencies at the Federal, State, Regional and Division levels Professional Organizations NHI, NTI, LTAP Universities Technical/Vocational Schools Private Sector

## **Task F. Develop University Courses and Curricula in Support of Track 2 Audience: Facilitating the Development of Future Professionals**

**Purpose:** To facilitate the development of programs to educate future transportation professionals in ITS, To coordinate with universities, colleges, and vocational/technical schools to encourage the development of ITS courses, curricula and degree programs. To provide educational materials and funding support. To understand the relationship between the supply of graduates and their expertise and the demand for qualified ITS transportation professionals.

**Description:** The university programs play a key role in educating future transportation professionals, transferring research into the classroom and out into the community, and in carrying out objectives of the PCB program. It is primarily at the university level that a significant shift will occur in how future transportation professionals think about and operate the transportation systems. ITS courses and curricula will imbue transportation students with concepts for more efficient ways of using existing capacity while maintaining or improving on safety, environmental emissions reduction, intermodal opportunities, and mobility. ITS education will create more qualified graduates at the entry-level positions of the transportation workforce, thus building a foundation of ITS knowledge for the future.

**Approach:** Encourage universities to provide education to future transportation leaders by providing them with the PCB Needs Assessment report, which identifies the gaps in ITS education. Assist universities in developing courses and curricula and to meet certification standards by providing funding, exchange of information, and training materials and presentations with new media applications. Ask universities to perform ongoing needs assessment for educational ITS needs. Work with the universities to identify the demand-supply relationship between transportation graduates and the transportation field. Research methods for attracting students to the field. Leverage the resources of the UTC, RCE, CUTC, and ITS Consortium programs in delivering professional capacity building.

**Objectives:** The development of the next generation of ITS leaders is occurring at the undergraduate and graduate level now. Involving universities in the PCB programs facilitates the transference of ITS information and programs to upcoming professionals. It also provides more resources and information to leverage within the PCB program.

**Priority:** Near-term. A higher priority will be placed on these activities in order to facilitate the changes that are necessary within academic institutions. These changes will help create a shift in focus toward learning about the deployment and operations of an intelligent and integrated transportation systems, including those issues and policies that support and/or binder ITS effectiveness.

**Schedule:** Initial meetings with academic representatives regarding the role of academia in the PCB program are being held throughout 1997. Development and/or modification of education courses and academic curricula will be based on the PCB Needs Assessment report, due November 1997, which will identify how, what, when and where ITS education is needed. A curriculum committee will be established to develop model ITS curriculum and courses.

***Deliverables and Participants:***

<b>Deliverables</b>	<b>Participants</b>
University Needs Assessment study on ITS education  White Paper on the Supply-Demand Relationship between universities graduates and the job-market  New courses  Model core curriculum  Financial Incentives	PCB Program Coordinator University representatives including colleges, community colleges, vocational and technical schools UTCs RCEs CUTC

## **Task G. Develop Public Outreach Programs in Support of the Track 3 Audience: Awareness Building for the Public and for Transportation Decision Makers**

**Purpose:** Develop ITS outreach programs targeted toward public decision makers outside of the transportation field, such as elected and appointed officials industry representatives, university administrators, or transportation users (the traveling public). Outreach programs will be used to inform decision makers about the benefits and uses of ITS in order to favorable effect decisions that impact transportation. Outreach programs are also designed to attract younger students to the ITS field as a career choice.

**Description:** This activity primarily addresses the third audience track of the PCB program. Outreach Programs are developed to create an awareness of ITS and the benefits that result to the public from ITS deployment and operations. As such, it is important to educate, at a higher level, individuals involved in the decisions to fund ITS, such as elected and appointed officials, representatives of industry, and consumers of ITS (the traveling public).

Also, by developing outreach programs to younger students, the possibility exists to attract them as adults into the transportation field with a specialty in ITS. For this purpose, the PCB program will be coordinated with the DOT's Garrett A. Morgan educational initiative.

**Approach:** Develop outreach programs that describe the benefits of ITS to public decision makers. Continue the TRAC program, a highschool program designed to attract juniors and seniors to the transportation field and expand its scope to include younger students. Support the scanning tours of public and private sector executives visiting deployment sites for an intensive awareness session. Support peer-to-peer networks. Develop a methodology to gather information while doing the PCB Needs Assessment on where and what types of peer-to-peer facilitation is most needed. Coordinate with the DOT's Garrett A. Morgan program.

**Objectives:** Informed decision making for ITS.

**Priority:** Mid-term. Many transportation professionals are not yet aware of ITS, much less public decision makers. Thus, the outreach activity serves to educate the transportation field as well as public decision makers.

**Schedule:** The One-Day General Awareness Seminar, developed for high-level transportation executives, is being considered for video. FHWA and FTA are hosting scanning reviews. FHWA and FTA have also established the Peer-to-Peer Network for ITS practitioners to call when in need.

***Deliverables and Participants:***

<b>Deliverables</b>	<b>Participants</b>
One-Day General Awareness Seminar video Outreach programs to younger students Outreach programs to Elected and Appointed Officials and Legislatures Provision of materials to the AASHTO TMC program	PCB Program Coordinator ITSA DOT Agencies PTI, and other outreach associations

## **Task H. Implement and Expand on Delivery Mechanisms**

**Purpose:** Implement and expand on the different mechanisms available for the delivery of training, education and outreach programs. Utilize the most appropriate technologies, ones that can most effectively communicate the educational messages within the PCB programs.

**Description:** Training and education have traditionally been presented in lecture, classroom-type formats. Over the years, this format has evolved to a more interactive exchange, allowing students to participate more in the learning process and to shape it to meet their particular needs.. The advent of new technologies allows not only for more interactive exchange, but also for delivery to audiences who cannot travel or who need access to the learning materials at odd times. Thus, the PCB program is designed to explore new delivery media in order to reach the broadest possible audience in the most educationally effective manner. These new technologies include distance learning, CD-ROM computer-based learning, internet delivery, linking multiple sites simultaneously with CATV, and video.

**Approach:** Explore various delivery technologies for cost, accessibility, ease of use, and ease of delivery. Utilize previous studies on this subject as a benchmark of current use. Explore the educational effectiveness of each, including the level of interactive exchange. Test various technologies with expert audiences and analyze feedback. The following are the delivery mechanisms available for PCB program delivery:

- Traditional classroom format
- Distance learning
- CD-ROM / Computer-based interactive
- NHI
- NTI
- LTAP
- Office of Technology Assessment (OTA)
- WWW
- PBS / television.

**Objectives:** It is in the interest of both the PCB program and its audiences to deliver training and outreach in the most effective manner possible, including cost (total cost and cost per student trained) and educational effectiveness and delivery accessibility, and to deliver these programs to the greatest number of individuals. These approaches and technologies must allow for courses and materials to be used several times over for distribution to many audiences now and in the future, as opposed to a one-time experience that occurs between a trainer and audience.

**Priority:** Near-term. With the development of training courses and outreach programs, new media must be incorporated for educational effectiveness.

**Schedule:** The investigation of new delivery technologies has already begun by FHWA, FTA and others. Research includes cost and availability (i.e., how wide an audience can access the information using the newer technologies, such as internet-based courses?). Previous research on the subject is being integrated into the PCB program exploration. Educational effectiveness still needs to be researched once the exploration of new technologies is complete.

***Deliverables and Participants:***

<b>Deliverables</b>	<b>Participants</b>
A list of new technologies with cost and availability data.	PCB Coordinator Professional Trainers and Educators
An analysis of the educational effectiveness of each technology.	Professional Organizations Universities
New media trials with experts for feedback.	ITS A U.S. DOT Agencies

## **Task I. Deliver Training to Current Professionals**

**Purpose:** Expand the pool of trained ITS practitioners through the delivery of training to current professionals both within the transportation and from other professions with core competencies / KSAs relevant to ITS. Prioritize KSAs according to those that most critically support ITS deployments. Build requisite core competencies / KSAs in support of ITS deployment through the effective-delivery of training courses and programs. Provide continuing education opportunities to the professional field by transferring training course materials to local agencies, schools, and professional organizations.

**Description:** ITS core competency / KSA training is a critical prerequisite to the success of ITS deployments. The audience in need of training is primarily made up of Federal, state, regional and local transportation personnel, private sector contractors, consultants, and university and academic practitioners involved in ITS deployment. These audiences need to be contacted regarding the availability of training. Training will depend on the involvement of many organizations to provide resources such as instructors, subject matter experts, and sites for hosting training. These organizations include:

- US DOT - HQ
- US DOT - Regions and Divisions
- State and local agencies
- NHI, NTI, LTAP
- Universities, colleges
- Technical / vocational schools, community colleges
- On-site private sector contractors / consultants
- Professional Organizations
- Industry / vendors.

Eventually, tasks E and I -- the development and delivery of training -- will be mainstreamed into the training activities of the above listed organizations.

**Approach:** Take training out to the field in the form of seminars, workshops and short courses. Deliver through traditional forms of media, such as classrooms, lectures, on-site presentations, and through non-traditional forms such as distance learning, CD-ROMs, or the w w w .

**Objectives:** To provide as much training as possible to as wide an audience as possible through the leveraging of resources and materials of other organizations.

**Priority:** Near-term.

**Schedule:** Training has already begun. Other organizations are being involved through various forms of partnerships.

***Deliverables and Participants:***

<b>Deliverables</b>	<b>Participants</b>
Training Courses	DOT – HQ NHI, NTI, LTAP DOT Regions, Divisions State, Local agencies Universities, Colleges Technical/Vocational Schools Private Sector Consultants/ Contractors/ Industry Professional Organizations

## **Task J. Facilitate the Development of Future Professionals**

**Purpose:** Educate future transportation professionals in the fundamental principles underlying ITS as compared to traditional theories of transportation education. Encourage a shift in the understanding of transportation management-from expansion and building to more effective utilization of existing capacity. Leverage academic resources in subject matter expertise, technology transfer, effective education; instructor availability and site availability to deliver training and to develop new models of curricula, degree programs, and certifications. Link research programs to education programs and facilitate technology transfer.

**Description:** The next generation of ITS leaders will come from current and future groups of undergraduate, graduate students, and vocational and technical school students. The PCB program will commit resources to facilitate the ITS education and development of these students by working with academic representatives to model new curricula, design ITS courses and create new, multi-disciplinary degree programs. The PCB program intends to commit support for course and curricula design, encourage the creation of scholarships for ITS concentrations, and work with university and other academic institutions to shift the focus in transportation toward ITS.

**Approach:** Work with universities and academic representatives to discuss the issues involved with institutional change and the incorporation of ITS into courses, curricula and degree programs. Propose grants and contracts to course, curricula and degree design and redesign. Seek funds for scholarships for ITS transportation concentrations. Work with university representatives to bridge the gap between the needs of the transportation professional field and the reality of the actual educational experience given to pre-professionals.

**Objectives:** To facilitate the development of next generation of ITS leaders.

**Priority:** Near-term.

**Schedule:** A formal group of university representatives met in February 1997 to initiate the discussion of the role of the university in the PCB program. A subcommittee was formed from the PCB Steering Committee to explore what is currently available as courses, curricula, and degree programs for ITS. This subcommittee was tasked with developing a model curricula for ITS within this fiscal year. This will be a combined effort during the life of the PCB program.

*Deliverables and Participants:*

<b>Deliverables</b>	<b>Participants</b>
Model ITS Curricula	PCB Coordinator University Representatives
Model Courses	US DOT agencies ITS America Education Committee
Textbooks	ITE Education Council TRB Education Committee
Scholarships	APTA and AASHTO committees

## **Task K. Deliver ITS Awareness to the Public and to Transportation Decision Makers**

**Purpose:** To build public awareness of ITS in order to support informed decision making on the part of public officials, industry executives, and transportation users.

**Description:** Building awareness of ITS encourages informed decision making on the part of public officials, private sector executives and transportation users with regard to ITS and the shift in transportation toward more effective management. Outreach programs and materials will be designed for targeted audiences to explain why ITS is of relevance to them.

**Approach:** Deliver outreach through innovative, attention-getting media, such as video, brochures, showcase sites, the CVO technology truck, WWW, PBS/television, literature, etc. Modify materials and presentations from more in-depth training courses that have already been developed. Expand outreach to include younger students. Continue and support peer-to-peer networking and scanning tours.

**Objectives:** To encourage informed decision making on behalf of public officials and transportation users.

**Priority:** Mid-term.

**Schedule:** Outreach programs are underway with the Peer-to-Peer Network and the Executive Scanning Tours. Other programs will need to be designed.

**Deliverables and Participants:**

<b>Deliverables</b>	<b>Participants</b>
Targeted outreach programs and materials	PCB Coordinator Professional Associations PTI ITSA

## **Task L. Disseminate PCB Information**

**Purpose:** To compile and present information regarding PCB training, education and outreach to a broad public audience. To disseminate all information, including training courses, through various and appropriate media, including electronic and paper forms.

**Description:** Four smaller subtasks have been identified as means of providing and disseminating PCB information to the broader public. First, a PCB Web Page will be developed which will include a PCB Schedule of training courses developed through the PCB program, an Inventory (with frequent updates) of all known PCB-related training and education, publicity for newly available courses, and completed white papers. Eventually, the web page will provide an interactive format in order to receive feedback and information from field professionals.

The second subtask is a PCB Inventory, which will be compiled to organize information about the availability and accessibility of existing PCB training, education, and outreach programs. The inventory will help determine the gap between the current ITS KSAs that are being met with existing courses and projected needs that must be developed.

Third, the PCB Schedule will be developed, a master schedule of federal government agency courses that will be developed and delivered through the PCB Program. It is a subset of the PCB Inventory. The availability of the PCB Schedule on the web page will allow other agencies who are developing training to schedule their courses with the least amount of conflict with other courses.

Fourth, the PCB Program and individual courses need to be marketed and promoted. The task is to make the wider public aware that the program exists, that resources are available to professionally develop ITS capacity, and that courses -- training, educational, and outreach -- are available for delivery.

### **Approach:**

**PCB Web Page:** Investigate existing web sites for co-location of the PCB page, including ITSA, JPO, or FHWA. Work with developers to design the PCB web page. Co-locate the web page and establish a methodology for maintaining the information in an up-to-date fashion.

**PCB Inventory:** Research and gather information on all known ITS training, education and outreach programs. Develop databases for current ITS education and training; the type of available outreach, and key ITS professionals.

**PCB Schedule:** Gather information on existing training courses within the U.S. DOT agencies. Publish PCB Schedule on the Web page for better scheduling coordination between agencies.

- **PCB Publicity:** Provide information in a variety of formats: notices, brochures, pamphlets, calendars, e-mail, web site, internet, newsletters, training session notifications, and advertisements.

**Objectives:** To provide as much PCB information as possible to the widest possible audience.

**Priority:** Near-term. Information for -Web Page publishing is available now, particularly the promotional training course information. Additionally, the web page will encourage participation and feedback that is essential to understanding the needs of transportation professionals. Also, training information, including dates and training options, needs to be presented to the ITS audience and is available.

**Schedule:** Identification of the issues regarding developing and maintaining a web page are being researched along with which clearinghouse will host the PCB Web Page. Information for the inventory has been collected and needs to be organized into a database. The PCB Schedule exists on paper with frequent updates provided. PCB publicity has already begun with the promotion and marketing of the Four-Day course on Integration and the National Architecture. This task will continue with the advertisement of the program and each training course and outreach program developed by the PCB program.

**Deliverables and Participants:**

<b>Deliverables</b>	<b>Participants</b>
PCB Web Page PCB Inventory PCB Master Schedule Promotional and Marketing Materials as required for training courses, awareness events, or presentations.	PCB Program Coordinator Universities Web Page Developers ITSA U.S. DOT Agencies Professional Organizations

## **Task M. Coordinate and Integrate PCB Program with Existing Training Programs**

**Purpose:** To build from and leverage existing training programs presented by other organizations (which is based on the information from Task D). To integrate the objectives of the PCB program into the mission of other ITS training organizations. To integrate the materials of the PCB program into other organizations' curricula.

**Description:** By coordinating with other ITS training organizations, the PCB program is alleviated of the sole responsibility to develop ITS training, education and outreach. Coordination will allow the program to achieve leverage from other courses, as well as to advertise to the ITS community the immediate availability of courses that are essential. Over time, it is the goal of the PCB program to mainstream and integrate its objectives into the programs of other organizations such as NHI, NTI, Central Training, NHTSA, Turner-Fairbanks R&D, professional organizations and universities (see diagram on page 8). Close coordination with other organizations from the beginning will assist this evolutionary goal.

It is intended that with the publication of an inventory of courses and programs, the gap in meeting ITS professional needs will encourage other organizations to develop more training, education and outreach programs, eventually moving the PCB mission out to the field.

**Approach:** Establish a mechanism to ensure the full integration of training and education programs within the DOT as well as between the DOT and outside organizations.

**Objectives:** To encourage other organizations to develop ITS training, education and outreach; to build upon already successfully developed training and educational programs.

**Priority:** Mid-term. The PCB Needs Assessment report, due August 1998, will be instrumental in encouraging other organizations to develop training.

**Schedule:** Near-term.

### ***Deliverables and Participants:***

<b>Deliverables</b>	<b>Participants</b>
A fully integrated program by the mainstreaming of PCB activities within other organizations	PCB Program Coordinator Professional Organizations NHI, NTI, Central Training Universities <b>DOT Agencies and their training staff</b>

## **Task N. Track PCB Progress**

**Purpose:** To monitor the development of the PCB program. To monitor the effectiveness of PCB training, education and outreach. To analyze the trends in course participant feedback in order to modify the program to best meet audience needs.

**Description:** PCB Tracking Database is the internal mechanism to analyze and evaluate the progress and effectiveness of the PCB educational and training courses. PCB tracking will be done through the analysis of course registration and evaluation forms. The information from these forms will be used to understand the types of professionals who attend PCB courses, to benchmark the level of ITS understanding, to evaluate the effectiveness of each course and to recommend course revisions based on participant evaluation.

**Approach:** Track the PCB program's progress by collecting detailed course information from registration and evaluation forms. Develop standardized course registration forms and course evaluation forms. Distribute and collect the forms at each training session. Analyze the form information. Establish a database for information organization and analysis.

**Objectives:** The collection of detailed information on the PCB program will allow the staff to analyze whether the program is meeting its stated goals and objectives. The tracking information will also feed into the broader ITS program evaluation that occurs on an annual basis.

**Priority:** Near-term. Needs to coincide with development of training courses.

**Schedule:** Tracking of PCB training courses has already begun with the distribution and collection of registration and evaluation forms. Eventually, an analysis function will be added that assesses the evaluation form information with every collection. Registration form information will be compiled into the database and analyzed on a defined basis. All of the tracking information will be presented annually.

### ***Deliverables and Participants:***

<b>Deliverables</b>	<b>Participants</b>
Tracking Database	PCB Program Coordinator
Standardized Course Participant Forms	Divisional/Regional Field Staff assisting in the delivery of training courses

## **Task O. Develop Guidelines for Future PCB Training Activities**

**Purpose:** To compile information regarding the checklist of activities involved in delivering training. To ensure consistency across organizations presenting ITS professional capacity building, thus alleviating the PCB staff of the need to develop all of the requisite training.

**Description:** In order to ensure that ITS training is addressed with some uniformity in format, a Training Guide will be developed that provides a checklist for the following activities:

- Content Development
- Peer Review
- Educational Effectiveness Review
- Course Scheduling and Logistics.

This Guide will facilitate involvement from other agencies, organizations and people in the development of training without incurring a need for a large PCB training development staff.

**Approach:** Develop a standardized training plan that details the level of effort required to develop training courses including development (how to identify experts to develop content), delivery (how to identify media, sites, presentation materials), management (how to coordinate peer review, ensure educational effectiveness is added, identify educators to present the course), and logistics (ensure delivery). Coordinate with other agencies such as NHI and NTI to build on their training formats and guidelines. In addition, as initial training courses are developed and presented, and attendees are polled, information as to what works and what doesn't will help structure and direct the guidelines development.

**Objectives:** Establish the checklists for training course development to enable other organizations to develop training courses. The guidebook will help alleviate the need for the PCB staff to be intimately involved in training development.

**Priority:** Mid-term. Since the majority of new training initiatives will be met in the early years by the PCB staff, the guidebook activity can be scheduled within the next few years.

**Schedule:** This task has already been started through the various checklists and organizational notes needed for scheduling the current training courses. The compilation of these notes and lists into a set of Guidelines can occur at some time within the training process. It is preferable that it occur sooner as the training course development schedule is expected to grow to a large number of courses, necessitating additional staff to coordinate the logistics, management, etc. for these courses.

### ***Deliverables and Participants:***

<b>Deliverables</b>	<b>Participants</b>
ITS Training Development Guidebook	PCB Program Coordinator

## **V DETAILED ACTION PLANS**

### **Near-Term Priority Activities for FY 1997 and FY 1998**

The following tables list activities specific to the establishment and the ongoing success of the PCB program. The list begins with a summary of the activities and accomplishments for 1996. It continues with a listing of activities underway and planned for FY 1997 (through September 30, 1997). Also included is a preliminary list of FY 1998 activities that are considered priorities. However, a FY 1998 budget has not yet been authorized by Congress, as it is currently part of the discussion regarding the proposed "NEXTEA." The programs for FY 1999-2002 are currently under development. As the continuing assessment of needs occur, tasks will be expanded as required, until the program is eventually mainstreamed. The activities on the following lists are categorized according to the four overall program elements:

- Identify core competency / KSA needs required for successful ITS deployments
- Develop curricula, courses and programs for training, education, and outreach
- Delivery of courses and program with educationally effective media
- Program management.

## FY 1996: Activities & Accomplishments

Priority Activities	Accomplishments
Wrote a Five-Year Strategic Plan for Professional Capacity Building	Approved by the U.S. DOT in March 1996.
Established Support Resources	Staff resources put in place to implement the strategic plan, including the PCB coordinator, FHWA & FTA Training Team Leaders, and support contractors brought on board.
Initiated formal coordination with National Associations Working Group	Meetings took place in 1996 and 1997.
Initiated formal interaction with FHWA & FTA field staff and within Headquarters (HQ)	Set up a series of ongoing conference calls and participation in seminars and workshops.
Initiated planning for establishment of external Steering Committee	Steering Committee met with PCB Program Coordinator on December 13, 1996 to set future directions, and again on May 13, 1997 to review progress and first draft of <i>Framework and Overview</i> .
Initiated training activities	Developed a first cut at key PCB training needs based on inputs from ITS practitioners at all levels of government. Initial findings concluded that ITS awareness seminars were a top priority in order to ensure uniform understanding throughout the DOT. Thus, a One-Day Awareness Seminar was developed in cooperation with FHWA, FTA, and OMC to cover the breadth of ITS topics.
Developed and delivered Executive Scanning Tours and Reviews	Delivered by regional offices.
Speeches to professional organizations describing PCB	Delivered on demand throughout the country.
Wrote the <i>Framework and Overview</i> to describe the actions required to meet the goals and objectives for building professional capacity in concert with the DOT's deployment goals.	First draft presented to the steering committee May 1997. Comments were received and the text modified. Presentation of the final version to the Steering committee in September 1997 and then distribution to the Region and Division offices of FHWA and FTA.

## FY 1997: PCB Activities Underway and Planned

Priority Activities	Audience	Responsibility	Schedule	Underway or Planned
<b>Program Element #1: Identification of core competencies / KSAs</b>				
Review, Analysis and Synthesis of 13 Existing Needs Assessments plus field interviews and a summary assessment	US DOT agencies responsible for developing training, universities, professional organizations, independent training consultants	PCB Program	Final report	Available
PCB Roadmap for Knowledge, Skills, and Abilities	US DOT agencies responsible for developing training, universities, professional organizations, independent training consultants	<ul style="list-style-type: none"> <li>• PCB Program</li> <li>• Universities</li> <li>• Professional organizations</li> </ul>	Based on initial needs assessment report, work to define KSAs will begin in February 1998.	Underway
Inventory existing courses to evaluate and match them to identified needs	Transportation professionals interested in immediate ITS training	<ul style="list-style-type: none"> <li>• PCB Program</li> <li>• RCEs/UTCs/CUTC</li> </ul>	Must be performed simultaneous with the formal Needs Assessment	Underway
Identify and assess existing NHI / NTI/ Central Training and university-based ITS specialist short and long courses/ seminars	U.S. DOT personnel and organizations responsible for developing short and long courses/ seminars, as well as those responsible for overall tracking of the PCB program.	<ul style="list-style-type: none"> <li>• PCB Program</li> <li>• NHI</li> <li>• NTI</li> <li>• Central Training</li> <li>• Universities</li> </ul>	Summer 1997 - included in PCB catalog	Continuing
<b>Program Element #2: Develop Curricula, Courses and Programs:</b>				
Develop 3-Day Course on ITS Integration entitled, "Deploying Integrated Intelligent Transportation Systems"	Regional, local ITS practitioners who required a specialized understanding of ITS Integration (level 2)	<ul style="list-style-type: none"> <li>• PCB Program</li> <li>• Contractors</li> <li>• FHWA &amp; FTA ITS Specialists</li> </ul>	Finalizing development. Pilot test June 16-19, 1997. Plan to present course 10 times to about 400 professionals this fiscal year.	Delivery underway; course available for scheduling

Priority Activities		Audience		Responsibility		Schedule		Underway or Planned
<p>Complete development of One-Day Technical Seminars:</p> <ul style="list-style-type: none"> <li>• ITS in Transit</li> <li>• Commercial Vehicle Operations</li> <li>• Public/Private Partnerships</li> <li>• Innovative Procurement Strategies</li> <li>• Telecommunications</li> <li>• Systems Engineering / Architecture</li> </ul>	<p>Professionals currently engaged in or planning to be engaged in ITS deployment who are looking for overview courses (level 2)</p>	<ul style="list-style-type: none"> <li>• PCB Program</li> <li>• DOT agency experts to develop the courses</li> <li>• Professional associations</li> </ul>	<p>Course materials due mid-summer 1997. Some are scheduled for delivery as early as June 1997 (see Program Element #3 below for delivery information)</p>	Underway				
<p>Develop Systems Engineering / Architecture Training Course (2-3 days)</p>	<p>Specialists in ITS National Architecture (level 3 course)</p>	<ul style="list-style-type: none"> <li>• PCB Program</li> <li>• JPO / Architecture Coordinator (L. Simmons)</li> </ul>	<p>Pilot July 1997; delivery in August 1997</p>	Delivery underway				
<p>Develop new training courses on:</p> <ul style="list-style-type: none"> <li>• NTCIP/TCIP Standards</li> <li>• Communication Devices (with ITE)</li> </ul>	<p>ITS practitioners with a need for specialized standards training</p>	<ul style="list-style-type: none"> <li>• PCB Program</li> <li>• JPO</li> <li>• ITSA Standards Committee</li> <li>• Professional Organizations</li> </ul>	1998	Planned				
<p>Develop a Standards Training Program</p>	<p>ITS practitioners with a need for specialized standards training</p>	<ul style="list-style-type: none"> <li>• PCB Program</li> <li>• Professional Organizations</li> <li>• SDOs</li> </ul>	1998	Planned				
<p>Expand the 24-month HETP to include ITS specialization</p>	<p>Senior undergraduate students entering the HETP program with an interest in the ITS field</p>	<ul style="list-style-type: none"> <li>• PCB Program</li> <li>• Current Administrator of HETP program</li> </ul>		Underway				
<p>Form internal DOT curriculum team for PCB</p>	<p>To coordinate internal training for ITS</p>	<ul style="list-style-type: none"> <li>• PCB Program</li> <li>• FHWA/FTA/FRA/ NHTSA</li> </ul>	<p>First meeting July 1997</p>	Underway				
<p>Form university curriculum committee</p>	<p>Graduate and undergraduate for PCB transportation students</p>	<ul style="list-style-type: none"> <li>• PCB Program</li> <li>• RCEs / UTCs / ITS Consortium HBCUs</li> </ul>	<p>Established in May 1997 by Steering Committee</p>	Underway				

Priority Activities	Audience	Responsibility	Schedule	Underway or Planned
<b>Program Element #3: Delivery of Courses and Programs with Educationally Effective Media</b>				
Continue Delivery of One-Day General Awareness Seminar	An overview course for regional, local ITS practitioners throughout all levels of government, all agencies (Level 1 course).	<ul style="list-style-type: none"> <li>PCB Program</li> <li>FHWA &amp; FTA ITS Experts</li> </ul>	March 1997 through the end of fiscal year. Scheduled for delivery 63 times	Delivery underway; course available for scheduling
Deliver 3-Day Course on ITS Integration entitled, "Deploying Integrated Intelligent Transportation Systems"	Regional, local ITS practitioners who required a specialized understanding of ITS Integration (level 2 course)	<ul style="list-style-type: none"> <li>PCB Program</li> <li>JHK</li> <li>FHWA &amp; FTA ITS Specialists</li> </ul>	Began delivery in August 1997. First scheduled presentation was August 18-21, 1997.	Delivery underway; course available for scheduling
Delivery of One-Day Technical Seminars on: <ul style="list-style-type: none"> <li>Planning for ITS Deployment</li> <li>Public / Private Partnerships</li> <li>Telecommunications Overview</li> <li>Systems Engineering/ Architecture</li> <li>ITS Telecommunications Analysis</li> <li>Shared Resources</li> </ul>	Professionals currently engaged in or planning to be engaged in ITS deployment who are looking for overview courses (level 2 courses).	<ul style="list-style-type: none"> <li>PCB Program</li> <li>DOT agency experts to develop the courses</li> <li>Professional associations</li> </ul>	All courses scheduled by request. Delivery began as follows: <ul style="list-style-type: none"> <li>Planning: Underway</li> <li>P/P Partnerships: July 1997</li> <li>Telecommunications Overview: August 1997</li> <li>Syst. Eng/Arch: Fall 1997</li> <li>Telecomm Analysis &amp; Shared Resource: 1995</li> </ul>	Delivery underway; courses available for scheduling

Priority Activities		Audience		Responsibility		Schedule		Underway or Planned	
Continue 18-month HETP masters program and deliver expanded 24-month HETP to include ITS specialization	Senior undergraduate students entering the HETP program with an interest in the ITS field	PCB Program	Ongoing	Underway					
Continue delivery of Executive Scanning Tours	Industry and public sector executives and officials	PCB Program	Upon request	Underway					
Continue delivery of TRAC program	High school students	PCB Program	Upon request	Underway					
<b>Program Element #4: Program Management</b>									
Complete <i>Framework and Overview</i>		PCB Program	Final draft review August 1997. Finalized version for FY 1997 available.	Available from the JPO					
Work with professional associations to schedule training sessions		PCB Program	Ongoing	Underway					
Initiate NHI activities	Federal, State, and local transportation professionals, including transit, MPO, State DOT, and consultant personnel	PCB Program	Ongoing	Underway					
Initiate NTI activities	Federal, State, and local transportation professionals, including transit, MPO, State DOT, and consultant personnel	PCB Program	Ongoing	Underway					
Web Page Development	Transportation professionals interested in ITS training	PCB Program	Publication of PCB Page on host site by December 1997.	Underway					

Priority Activities	Audience	Responsibility	Schedule	Underway or Planned
Inventory of existing courses across U.S. DOT agencies and their training staff, universities, professional organizations and independent contractors	Transportation professionals, students, any organization involved or interested in ITS training	<ul style="list-style-type: none"> <li>• PCB Program</li> <li>• FHWA/FTA/FRA</li> <li>• Central Training</li> </ul>	Foundation will be established in Summer 1997 with the Evaluation & matching task. Inventory will be updated on an ongoing basis.	Underway
Publicity for Training courses under development	Transportation professionals interested in ITS training	<ul style="list-style-type: none"> <li>• PCB Staff</li> </ul>	Ongoing simultaneous with and in support of Training Development Fall 1997	Underway
Develop methodology for incorporating FRA and NHTSA ITS training into PCB		<ul style="list-style-type: none"> <li>• PCB Program</li> <li>• NHTSA</li> <li>• FRA</li> </ul>		Planned
PCB Training Course Schedule	U.S. DOT agencies, transportation professionals interested in ITS training	<ul style="list-style-type: none"> <li>• PCB Program in cooperation with Federal agencies</li> </ul>	Ongoing	Underway
Set up PCB Tracking Database	For use by the PCB Program for internal evaluation, for use by the ITS Program Assessment Team for program evaluation	<ul style="list-style-type: none"> <li>• PCB Program in cooperation with Division staff and other ITS training site hosts</li> </ul>	Ongoing, deliver results annually to ITS Program Assessment Team	Underway

## FY 1998 Activities

Priority Activities	Audience	Responsibility	Schedule	Continuation or Planned
<b>Program Element #1: Identification of core competencies / KSAs</b>				
Continue review and evaluation of needs assessment activities and data		• PCB Program	Ongoing from previous year - tasks A -D	Continuation
Develop ITS position descriptions based on FY 1998 Needs Assessment report	DOT, transportation agencies at all government levels, universities, future transportation professionals	• PCB Program	Begin task in calendar year 1998.	Planned
Conduct a needs study for transit staff professional development	FTA, state, regional and local transit managers and operators	• PCB Program • FTA • The Volpe Center		Planned
Begin Future Needs Assessment Agencies developing ITS training		• PCB Program • Universities • Professional Organizations • Field Experts	Begin task in calendar year 1998.	Ongoing
<b>Program Element #2: Development of Curricula, Courses and Programs</b>				
Consider developing tutorial materials on the following subjects: <ul style="list-style-type: none"> <li>• Traveler Information Systems Technologies</li> <li>• National ITS Architecture Guidelines</li> </ul>	Cost effective alternatives to formal courses where there is a pressing need but limited audience	• PCB Program • US DOT agencies • Professional Organizations		Planned

Priority Activities		Audience		Responsibility		Schedule		Underway or Planned	
<p>Consider developing new courses on the following subjects:</p> <ul style="list-style-type: none"> <li>Systems Management and Operational Considerations in the Transportation Planning Process</li> <li>ITS Procurement Issues</li> </ul>					<ul style="list-style-type: none"> <li>PCB Program</li> <li>US DOT agencies Professional Organizations</li> </ul>	<p>Technical guidance documents currently under development in support of training courses</p>		Planned	
Develop standards training program		ITS professionals with a need for specialized training in standards		<ul style="list-style-type: none"> <li>PCB Program</li> <li>Professional Organizations</li> <li>US DOT agencies</li> <li>SDOs</li> </ul>	<p>NTKIP standard seminar will be available in 1998. Development of seminars for 40 other standards will begin in 1998.</p>		Planned		
Develop and produce ITS Awareness videos		DOT, state and local personnel, managers and elected officials; and public decision makers		<ul style="list-style-type: none"> <li>PCB Program</li> </ul>	<p>Begin task in calendar year 1998</p>		Planned		
<p>Development of transit courses:</p> <ul style="list-style-type: none"> <li>APTS Benefits - Summary of State-of-the-Practice and -Art</li> <li>APTS Technologies - Summary of State-of-the-Art</li> <li>Integrated Highway / Transit ITS Systems</li> <li>Budgeting for APTS / ITS</li> </ul>		Federal, state and local transit personnel; Federal, state and local highway transportation professionals working toward intermodalism with transit agencies		<ul style="list-style-type: none"> <li>PCB Program</li> <li>FTA</li> <li>APTA</li> <li>NTI</li> </ul>			Planned		
Coordinate with the Garrett A. Morgan program to develop outreach students		Younger students		<ul style="list-style-type: none"> <li>PCB Program</li> </ul>	1998		Planned		
PCB session at 5th International Conference on Advanced Transportation Technology		Transportation professionals involved in advanced technology applications - overview course		<ul style="list-style-type: none"> <li>PCB Program</li> <li>Professional Organizations</li> </ul>	June 1998		Planned		

Priority Activities		Audience		Responsibility		Schedule		Underway or Planned	
Establish / Determine Job Market for graduates and to attract new professionals to the field	Students, Universities, transportation agencies	Universities	Begin task in calendar year 1998	Planned					
Coordinate using ITRCEs for development of curricula	Faculty and administration	<ul style="list-style-type: none"> <li>Universities</li> <li>PCB Program</li> </ul>	FY 1998	Planned					
Develop Model ITS curriculum for undergraduate courses	Students	Universities	FY 1998	Planned					
Develop Model ITS curriculum for graduate level courses	Students	Universities	FY 1998	Planned					
Develop and implement younger student Transportation and ITS awareness programs	Younger student population and their teachers; Garrett A. Morgan initiative	<ul style="list-style-type: none"> <li>PCB Program with assistance from U.S. Department of Education and ITSA</li> </ul>	Begin task in calendar year 1998	Planned					
<b>Program Element #3: Delivery of Courses and Programs with Educationally Effective Media</b>									
Continue Delivery of 4-Day Integration Course	Regional, local ITS practitioners	<ul style="list-style-type: none"> <li>PCB Program Staff; JHK; FHWA &amp; FTA ITS Specialists</li> </ul>	On-demand through FY 1998	Continuation					
Continue Delivery of I-Day Technical Seminars	Regional, local ITS practitioners; professional organizations	<ul style="list-style-type: none"> <li>PCB Program; FHWA &amp; FTA Experts</li> </ul>	On-demand through FY 1998	Continuation					
Deliver PCB training to regions/transit agencies including transit short courses, transit management courses, and awareness seminars and other technical modules not presented in FY 1997.	Federal, state and local transit personnel	<ul style="list-style-type: none"> <li>PCB Program</li> <li>FTA</li> <li>NTI</li> </ul>	10 regional offices, 25 other metropolitan areas, and other sites if possible	Planned					

Priority Activities		Audience		Responsibility		Schedule		Underway or Planned	
Continue Delivery of courses on: Standards (NTCIP/TCP) and Communication Devices (with ITE)	Transportation professionals interested in specialized Standards training	PCB Program ITSA Standards Committee JPO Professional Organizations	On-demand through FY 1998	Planned					
Explore various media in order to effectively present distance learning and computer-based training courses	Professionals and technicians unable to attend training due to time and budget constraints	PCB Program Professional Organizations US DOT agencies		Planned					
Support Delivery of TRAC program	High School students	PCB Program	Ongoing	Continuation					
Support Delivery of Executive Scanning Tours	Senior-level personnel from U.S. DOT, state and local transportation agencies, MPOs, and legislators involved in funding allocations	PCB Program ITSA FHWA/FTA Regional offices	Throughout FY 1998	Continuation					
Develop and support funding program to ITSA and ITE to support related programs	Transportation professionals	PCB Program ITSA ITE		Planned					
Develop and support a university scholarship program for new entrants in the transportation field	Graduate students at the nation's leading universities as well as faculty (funding resources permitting)	DOT	FY 1998	Planned					
<b>Program Element #4: Program Management</b>									
Analyze and format tracking information for ITS Program Assessment	ITS Program Assessment	PCB Program	Annually (end of fiscal year in September) delivered	Continuation					

Priority Activities		Audience		Responsibility		Schedule		Underway or Planned	
Continue Publicity of PCB Training Courses	Transportation professionals interested in ITS Training	• PCB Program	Ongoing	Continuation					
Continue Tracking PCB Training courses		• PCB Program	Ongoing	Continuation					
Develop Training Guidelines		• PCB Program	Begin task in calendar year 1998	Planned					
Publish PCB Master Schedule on a Web page		• PCB Program • Web-site Clearinghouse partner	Publish December 1997	Planned					
Publish PCB Inventory on Web Page	All transportation professionals	• PCB Program • Host Site • Web Page Developers	Publish Inventory on PCB Web Page December 1997; update on continuing basis	Planned					
Refine general ITS courses/seminars in order to incorporate components into other ITS training efforts, such as courses and seminars developed by FHWA, FTA, ITSA, and ITE	DOT agencies, transportation professionals interested in ITS transit training	• PCB Program • DOT • ITSA • ITE		Planned					
Develop program roadmaps	DOT agencies, transportation Professionals interested in ITS training	• PCB Program • NHI/NTI • DOT	Definition to begin in February 1998	Planned					

## **FY 1999 - 2002**

The priority activities for FY 1999 - 2002 are now being addressed. The completion of the various needs assessments will provide a more substantive basis for establishing the future program. It is clear that all of the primary implementation tasks of training, education and outreach will be ongoing, as well as any tasks that support the management of the primary tasks.

Additionally, the years FY 1999-2002 will be focused on how to more effectively mainstream the PCB program. It will be important to provide training agencies the future needs assessment report so that they can develop training focused on future ITS needs. The training guidelines will help these other organizations efficiently develop the training and, as such, will be provided to them for their use.

## **Conclusion**

*The PCB Program Framework and Overview* examines the existing state-of-the-knowledge for core competencies / KSAs; recognizes the deficiencies and omissions in information that need to be covered in order to establish a solid program foundation; proposes a program structure for establishing the requisite information; details the numerous tasks and activities that constitute a solid program foundation and direction; and establishes priority activities for the next fiscal year.

The following appendices provide detailed information in support of the current PCB program. Appendix A presents the PCB Delivery Plan priorities for FY 1997. Appendix B presents the schedule for delivery of the One-Day General Awareness Seminar. Appendix C presents an initial draft of a catalog of known ITS training courses developed through various DOT agencies including FHWA, FTA, the ITS Joint Program Office (JPO), the Office of Motor Carriers (OMC), FHWA's Office for Planning (HEP), FHWA's Central Training (CT), NHI and NTI. Appendix D presents a summary of the funding and budget allocations for FY 1996, FY 1997 and FY 1998. Appendix E is the Bibliography of previous needs assessment reports that were used to identify the gaps in PCB knowledge. Appendix F is a glossary of terms and acronyms listed throughout this document.

## Appendices

## Appendix A FY 1997 PCB Delivery Plan

### Overall Goals for Fiscal Year (FY 1997)

The major focus of activities for FY 1997 is the delivery-of General Awareness (skill level 1) and Overview (skill level 2) seminars, courses, and workshops to FHWA and FTA field personnel at the regional and division (FHWA) levels. Following closely in terms of priority are the presentation of these same programs to State, regional and local partners. A third, but still high priority is the delivery of more intense (level 3 and 4) programs to Federal, State and local partners. The purpose of these activities are two fold. The first is to help federal field personnel fully understand the importance of ITS deployment to the mission of USDOT and to their day-to-day duties. The second purpose is to begin the process of presenting more detailed and intense technical training for professionals who are now, or will soon be engaged in planning, delivering and deploying ITS programs.

### The Delivery Rationale

Four specific programs are currently being delivered or about to be delivered. They are summarized below in increasing order of skill levels.

	Title	Skill Level	Audience
1.	One Day General Awareness	Level 1 General Awareness	1. All federal field personnel, from Administrative staff to Regional and Divisional Administrators 2. Eventually, all partners
2.	Three- Day Integration Course, "Deploying Integrated Intelligent Transportation Systems"	Level 2 Overview	1. Mid-level Management and technical personnel in federal field offices, with state & local partners. 2. Eventually, predominantly all partners with federal field personnel
3.	Seven, 1/2 day to full day technical seminars and two workshops on telecommunications	Level 2 Overview	Technical level personnel employed in the specific topical areas covered, or those who need to learn more in those technical areas. For federal, State, regional and local professionals

4.	A Transit Management course	Levels 3 Specialized	Technical personnel at federal, State, regional and local levels.
5.	A systems engineering and architecture course entitled, <b>“Using the National ITS Architecture for Deployment”</b>	Levels 3 Specialized	Technical personnel at federal, State, regional and local levels, including contractors responsible for architectural conformance through design and installation.

**Priorities and Schedules**

The 1 -day Awareness Seminars are currently being presented throughout the country by FHWA and FTA personnel from Headquarters (Washington, DC) and be regional offices (with some contractor support). It is the goal of DOT that about 1500 federal employees attend these seminars this fiscal year. Several professional associations (ITSA, ITE, AASHTO and ITE) are currently planning to use this same material to present to their members during the summer and fall of 1997.

Assuming that individuals will have at least the knowledge provided by the Awareness Seminar, the next in the sequence of activities will be the delivery of the 3-day Integration Course. It’s purpose is to provide the information required by federal state, regional and local partners to understand the importance of the integration of ITS technologies and the essential institutional arrangements required to successfully deploy those systems. This course will provide the necessary context that is required to understand those deployment issues.

Also available now for presentation either prior to or after the delivery of the 3-day short course are seven one-half to 1 full day technical seminars on individual technical subjects. These seminars are for individuals either actively engaged or planning to become involved in those specific technical areas. The seminar will not create technical specialists, but will help people better understand how those various activities relate to ITS deployment. Those individual seminars will not provide the overall context, the institutional issues, or the importance of ITS systems integration as part of the deployment process. However, attendance at one or more of those seminars will help expand the pool of knowledgeable professionals.

The series of other short courses also have a single purpose, relating to specific technical areas. They will cover skill levels 3 and 4. They are designed for professionals who are already engaged in specific ITS deployment activities but require additional training. Other more intense level 3 and 4 short courses will be developed for delivery in Fiscal Year (FY 1998), to respond to demands that are now being analyzed. The following illustration depicts the current sequence of training courses presented within the context of the 1997 PCB Delivery Plan:

## **ITS PCB Training Delivery Plan for FY 1997/1998**

Seminar	<b>General Awareness</b> 1/2 to 1 day	1
Short Course	<b>Deploying Integrated Intelligent Transportation Systems</b> 3 days	2
Seminar	<b>Seven Technical Seminars</b> 1/2 to 1 day	2
Workshops	<b>Two workshops on Telecommunications</b> 1/2 to 2 days	3
Short Courses	<b>(1) Transit Management (Fall 1997)</b> <b>(2) National Architecture (Summer 1997)</b> 2 to 3 days	3 3
Many other short courses and seminars available now (see catalog of courses)		<b>3/4</b>
New courses and seminars will be developed to serve identified needs		<b>3/4</b>

The courses and seminars that constitute the 1997 Delivery Plan are described in the following brochure and are current as of the end of FY 1997:

## **Intelligent Transportation Systems (ITS) Professional Capacity Building (PCB) Seminar Descriptions**

### **Introduction**

A series of General Awareness, Overview Technical Seminars, and Telecommunications Workshops and the first in a series of short courses that have been developed and are now available for presentation to federal, state, regional, and local transportation professionals who are currently engaged in or planning to be engaged in ITS planning, design, deployment, operations and maintenance of various elements of the program. Participants will be provided with basic knowledge of specific ITS program elements, which will prepare the participant to take more advanced, in-depth training in specific areas. Each seminar is designed to provide approximately 4 to 6 contact hours of material. Consequently, a seminar can be scheduled for a one-half day presentation (e.g., 8:00 A. M. to 12 noon) or a seminar can be scheduled for a full day (e.g., 9:00 A. M. to 4:00 P. M.). Similarly, the two telecommunications workshops can be scheduled as an Executive Session or up to full day presentations. To arrange for presentations, please contact either the Regional FHWA or FTA ITS Specialist or the U. S. DOT/Volpe National Transportation Systems Center.

### **Awareness Seminar**

#### **Intelligent Transportation Systems Awareness Seminar**

**Description:** This one-day general awareness seminar provides a general understanding of ITS and ITS infrastructure. The seminar illustrates the nine ITS infrastructure components by showcasing those systems that are deployed around the country. Institutional and technical elements in deploying ITS infrastructure are presented, including planning, design, architecture, standards, procurement, installation and construction, operation and maintenance, and funding. The seminar also acquaints participants who are or will be involved in the implementation of ITS, with benefit cost issues related to ITS/ITS infrastructure implementation. Qualitative and quantitative benefits of ITS are presented through examples of systems deployed around the country. (Also given as FHWA course # 13380)

**Target Audience:** The seminar is for transportation professionals who are currently not generally involved in ITS, but expect to be involved in ITS planning, implementation, operations, or maintenance

**Availability:** Currently available.

## **Overview Technical Seminars**

### **ITS and the Transportation Planning Process**

**Description:** The successful implementation of ITS requires the close cooperation of many disciplines involved in transportation. This overview seminar provides individuals interested in advancing ITS strategies to implementation (both those with or without a planning background) with information on how ITS strategies, individually or as a component of other transportation improvements, can assist in meeting needs identified through the transportation planning process. It acquaints participants with information needed to advance ITS strategies to implementation within the context of typical transportation planning processes. The seminar identifies key success factors for implementing ITS over time and covers topics such as transportation plans and programs, system performance criteria, benefit cost analysis, financial planning, and working with the private sector. Case study information on the development of ITS in specific areas of the U.S. is included. (Also given as FHWA course #13383).

**Target Audience:** This seminar is for transportation staff who are planning to be involved in planning, systems engineering, project development, and finance.

**Availability:** Currently available.

### **ITS Telecommunications Overview**

**Description:** This overview seminar familiarizes participants with the current issues surrounding the deployment and use of telecommunications infrastructure. It introduces participants to the fundamentals of wireline and wireless telecommunications systems. The course concludes with a brief discussion of the telecommunication technology acquisition process. (Also given as FHWA course # 13386)

**Target Audience:** This seminar is for transportation managers and engineers involved in policy making, procurement, planning, program development, and legal aspects of ITS infrastructure deployment.

**Availability:** Currently available.

### **Shared Resources Seminar**

**Description:** This seminar targets issues and key decisions that senior transportation officials and project managers must address when considering shared resource arrangements. States wishing to pursue shared resource arrangements need to consider issues including applicability, compensation, and structure. The agency must answer questions such as the following:

Applicability - Do state and federal laws allow shared resource arrangements in its particular circumstance? Do they restrict the form of the arrangement?.

Compensation - What kind of compensation is best for the state? What kind of compensation may the state legally receive?

Structure - How many partners does the agency want? How should it choose a private partner? Who will direct the project?

(Also given as FHWA course #13392)

**Target Audience:** On-site Briefing: (1/2 to 1 hour) This briefing is for members of sponsoring organizations involved in senior management, program planning, finance, transportation and telecommunications project management.

Half-Day Seminar (general or tailored): The Executive briefing is for senior transportation officials. Full session is for transportation and telecommunications project managers, ROW managers, and transportation finance managers.

Full-Day Tailored Seminar: The Executive briefing is for senior transportation officials. The morning and afternoon sessions are for senior transportation officials, transportation and telecommunications project managers, ROW managers, and transportation finance managers. The afternoon session only is for private sector representatives.

**Availability:** Currently available.

### **ITS Telecommunications Analysis Seminar**

**Description:** The State of Maryland recently conducted an analysis of its telecommunications requirements, options, and cost for the Chesapeake Highway Advisories (for) Routing Traffic (CHART) ITS project. They made a number of startling discoveries:

- A hybrid network utilizing both owned fiber and leased commercial services saved \$23.6M when compared to a fully owned fiber optic network
- Compressed digital video produced pictures of sufficient quality for all the functions currently defined for the system
- The costs of telecommunications could not be projected based upon published tariffs because increasing competition and new technology are producing ever increasing savings.

These and other results of the analysis for Maryland's CHART project as well as a detailed description of the methodology employed in the study will be presented. (Also given as FHWA course #13393)

**Target Audience:** This seminar describes technologies, methods, and cost analysis tools intended for senior transportation officials, project managers, and engineers. At the seminar you will see how to use the tools to evaluate and cost alternative telecommunications technologies in support of ITS. Three options are available:

Executive Session (1 hour) is for senior transportation officials.

Technical Session (2 hours) is for project managers and engineers responsible for the planning, design, development, and costing of ITS systems.

Afternoon Session (4 hours) is based on session content requested by the State.

**Availability:** Currently available,

### **ITS Public/Private Partnerships**

**Description:** This overview seminar describes various types of cooperative public/private partnerships. It presents public/private partnership models for cost sharing, shared deployment, and franchising. It also identifies institutional impediments, discusses risk sharing in ITS partnering, and presents successful case studies. (Also given as FHWA course #13381)

**Target Audience:** This seminar is for transportation staff involved in planning, funding, program development, organizational, institutional, funding, and legal aspects of ITS infrastructure deployment.

**Availability:** Currently available.

### **ITS in Transit**

**Description:** This seminar addresses Advanced Public Transportation Systems (APTS) - the public transportation component of ITS. It serves to make the transit community aware of ITS/APTS, to make the highway community aware of the APTS role in ITS, and to describe the advantages of integrated Transit and highway operations. (Also given as FHWA course #13387)

**Target Audience:** This seminar is for transit transportation professionals (transit managers, transit and transportation planners, transit and transportation engineers), transportation workers and operators, public officials, and academia. It is also designed for highway transportation professionals who are involved in integrated ITS deployment.

**Availability:** Available Spring 1998.

## **ITS Systems Engineering/Architecture**

**Description:** The objective of this overview seminar is to explain what systems engineering is and how the National ITS Architecture is to be used for Intelligent Transportation Systems deployment. As a result of attending the seminar, participants should be able to understand the basic concepts and benefits of using systems engineering and the National ITS Architecture to guide implementation of ITS and ITS Infrastructure. (Also given as FHWA course #13384)

**Target Audience:** The seminar is for transportation staff who are involved in ITS implementation, planning, decision making, and systems engineering.

**Availability:** Available Spring 1998.

## **ITS/CVO Awareness Seminar**

**Description:** The ITS/CVO Awareness Seminar is designed to be given as part of the ITS/CVO “Technology Truck” Tour. This course will assist attendees in gaining a better understanding of the ITS/CVO Program while imparting information on existing technologies and benefits in an interactive environment. Participants will be able to attend briefings which examine ITS/CVO projects and explore technologies demonstrated in an interactive classroom environment, or by visiting the indoor demonstration areas such as a full-scale mock-up of a truck cab, outfitted with state-of-the-art technology. Briefings will be conducted for FHWA employees during the truck tour. Regions will be contacted -- as the “Technology Truck” moves from one event to another -- on a region-by-region basis to determine the interest of FHWA staff in attending such briefings. Contact will come from the “Technology Truck” scheduler as events are confirmed. For additional information on the “Technology Truck” and its schedule see the web-site at: [www.avalon-ais.com/itscvo/](http://www.avalon-ais.com/itscvo/) . (Also given as FHWA course # 13396)

**Target Audience:** This course is designed for audiences interested in gaining a better understanding of the ITS/CVO Program.

**Availability:** Currently available.

## **Innovative Procurement Strategies for Deploying ITS**

**Description:** This overview seminar is being developed to provide a basic understanding of ITS project delivery strategies including alternative design-build and private sector construction and operation. It will also provide a basic understanding of alternative ITS financing strategies, including federal-aid funding, state and local funding, and innovative financing. (Also given as FHWA course #13382)

**Target Audience:** This seminar is for transportation staff who are involved in policy making, procurement, planning, program development and legal aspects of ITS infrastructure.

**Availability:** Available Spring 1998.

### Short Courses

#### **Deploying Integrated Intelligent Transportation Systems**

**Description:** The objective of this three-day training course is to support integrated intelligent transportation system infrastructure deployment with clear consideration of the National ITS Architecture. The regional context in which the public components of ITS infrastructure will be implemented and integrated will be emphasized. The seminar will combine the technical and institutional components of integrated ITS infrastructure so that a clear understanding of the importance of each is understood and placed in context with the regional decisions that must be made by state and local agencies. In this manner, transportation program managers will obtain a sufficient understanding of the technical and institutional implications that accompany deploying integrated infrastructure within the framework of the National ITS Architecture. (Also given as FHWA course #13378)

**Target Audience:** Transportation program managers who are currently involved in ITS or expect to be involved in ITS planning, implementation, operations, or maintenance.

**Availability:** Currently available.

#### **Using the National ITS Architecture for Deployment**

**Description:** The objective of this three day, no cost, short course is to demonstrate how to apply tools and methodologies developed by the National Architecture Teams for the U. S. DOT. This course is presented by the ITS Joint Program Office. Some of the topics that will be covered are:

- An architecture as part of the systems engineering process
  - Logical and physical architectures
  - Theory of operations
  - Standards and the Architecture
  - How to use the Architecture for local and regional problems
  - Demonstration of the Architecture tools
  - Hands-on use of data bases and the INTERNET on PC Pentium computers
  - An optional two day case study follows
- (Also given as FHWA course #1 3394)

**Target Audience:** This course is for systems integrators and transportation professionals (public and private sector).

**Availability:** Currently available.

### **Transit Management Course (tentative title)**

**Description:** This course expands on the ITS in Transit Technical Seminar to present more details on the integration of highway and transit ITS, on how ITS can be applied to transit, the benefits to transit of applying ITS technologies, and other topics of high interest to the transit industry.

**Audience:** Headquarters and Regional FTA and FHWA staff, the transit industry, and state and local transportation officials.

**Availability:** Available Spring 1998.

*Scheduling an ITS seminar: Contact your regional FHWA/FTA ITS Specialist or Voipe Center*

**FHWA**

*Region 1: (includes Region 2, CT, MA, ME, NJ, NY, PR, RI, VT) Albany, NY  
Achille "Al" Alonzi, HPP-01  
(518) 431-4224 x 228 / FAX (518) 431-4208*

*Region 3: (DC, DE, MD, PA, VA, WV) Baltimore, MD  
Stephen Clinger  
(410) 962-3815/FAX (410) 962-4586*

*Region 4: (AL, FL, GA, KY, MS, NC, SC, TN) Atlanta, GA  
Brian Egan, T-26  
(404) 562-3685 / FAX (404) 562-3700*

*Region 5: (IL, IN, MI, MN, OH, WZ,) Olympia Fields, IL  
Bill Brownell, HES-05  
(708) 283-3549 / FAX (708) 283-350 I*

*Region 6: (AR, LA, NM, OK, TX,) Fort Worth, TX  
Jerry Jones, HEO-06  
(817) 978-4358 /FAX (817) 978-4144*

*Region 7: (IA, KS, MO, NE,) Kansas City, MO  
Bruce Baldwin, HTA-07  
(816) 276-2741 /FAX (816) 383-3347*

*Region 8: (CO, MT, ND, SD, UT, WY) Lakewood, CO  
Liyod Rue, HPP-08  
(303) 969-5772x 326 / FAX (303) 969-6727*

*Region 9: (AZ, CA, HI, NV) San Francisco, CA  
Alan Hansen, HPRID-AZ  
(602) 379-6856 / FAX (602) 379-3608*

*Region 10: (AK, ID, OR, WA) Portland, OR  
Ed Fischer, HEO-010  
(503) 326-2071/ FAX (503) 326-3928*

**U S DOT/VOLPE CENTER**

*Sylvia Harris, DTS-62, Cambridge, MA  
(617) 494-2552 / FAX (617) 494-2664  
e-mail: harriss@volpe2.dot.gov*

**FTA**

*Region 1: (CT, MA, ME, NH, RI, VT) Cambridge, MA  
Mary Beth Mello  
(617) 494-2444 /FAX (617) 494-2865*

*Region 2: (NJ, NY, VT) New York, NY  
Hans Point DuJour  
(212) 264-8162 /FAX (212) 264-8973*

*Region 3: (DC, DE, MD, PA, VA, WV) Philadelphia, PA  
Herman Shipman  
(215) 656-7100 / FAX (215)656-7260*

*Region 4: (AL, FL, GA, KY, MS, NC, PR, SC, TN) Atlanta, GA  
Brian Glen  
(404) 562-3500 /FAX (404) 562-3505*

*Region 5: (IL, IN, MI, MN, OH, WI) Chicago, IL  
Douglas Gerleman  
(312) 353-2865 / FAX (312) 886-0351*

*Region 6: (AR, LA, NM, OK, TX) Arlington , TX  
Gail Lyssy, Region 6 Office  
(817) 860-9663 /FAX (81 7) 860-9437*

*Region 7: (LA, KS, MO, NE) Kansas City, MO  
Joan Roeseler  
(816) 523-0204/FAX (816) 523-0927*

*Region 8: (CO, MT, ND, SD, UT, WY) Denver, CO  
David Beckhouse  
(303) 844-3242/FAX (303) 844-4217*

*Region 9: (AS, AZ, CA, GU, HI, NV) San Francisco, CA  
Paul Page  
(415) 744-3115/ FAX (415) 744-2726*

*Region 10: (AK, ID, OR, WA) Seattle, WA  
Nick Hockens  
(206) 220- 7954 / FAX (206)220- 7959*

**U. S. DOT/VOLPE CENTER**

*Joe Lo Vecchio, DTS-57, Cambridge, MA  
(617) 494-2131 /FAX (617) 494-2959  
e-mail: lovecchio@volpe1.dot.gov*

**Appendix B**  
**FHWA/FTA ITS AWARENESS SEMINAR PRESENTATIONS**

(Note: AS = Awareness Seminar; TTT = Train the Trainer)

<b>DATE OF PRESENTATION</b>	<b>LOCATION</b>	<b>TITLE OF PRESENTATION</b>	<b>TRAINER</b>
<b>03/03/97 (R-5)</b>	<b>Olympia Fields, IL</b>	<b>Awareness Seminar</b>	<b>Toni Wilbur Charlie Goodman Marty Monahan</b>
<b>03/04/97 (R-5)</b>	<b>Olympia Fields, IL</b>	<b>Train The Trainer</b>	<b>Toni Wilbur Marty Monahan</b>
<b>03/05/97 (R-5)</b>	<b>Olympia Fields, IL</b>	<b>Planning Module</b>	<b>Charlie Goodman Chris Sinclair</b>
<b>03/11/97 (R-4)</b>	<b>Atlanta, GA</b>	<b>Awareness Seminar</b>	<b>Bob Rupert Sam Zimmerman Marty Monahan Denis Symes</b>
<b>03/11/97 (R-4) Division</b>	<b>Atlanta, GA</b>	<b>Awareness Seminar</b>	<b>Bob Rupert Sam Zimmerman Marty Monahan Denis Symes</b>
<b>3/12/97 (R-4)</b>	<b>Atlanta, GA</b>	<b>Train The Trainer</b>	<b>Bob Rupert Sam Zimmerman Marty Monahan</b>
<b>3/12/97 (R-5)</b>	<b>Fort Worth, TX</b>	<b>Awareness Seminar</b>	<b>Toni Wilbur Charlie Goodman Marty Monahan</b>
<b>03/13/97 (R-6)</b>	<b>Fort Worth, TX</b>	<b>Train The Trainer</b>	<b>Toni Wilbur Marty Monahan</b>
<b>03/18/97 (R-8) Division</b>	<b>Madison, WI</b>	<b>Awareness Seminar</b>	<b>Marty Monahan</b>

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<b>03/18/97 (R-10)</b>	<b>Portland, OR</b>	<b>Awareness Seminar</b>	<b>Larry Darnes Dan Schierer Sheldon Edner</b>
<b>03/19/97 (R-10)</b>	<b>Portland, OR</b>	<b>Train The Trainer</b>	<b>Larry Darnes Dan Schierer</b>
<b>03/20/97 (R-5) Division</b>	<b>St. Paul, MN</b>	<b>Planning Module</b>	<b>Marty Monahan</b>
<b>03/24/97 (R-1)</b>	<b>Newington, CT</b>	<b>Awareness Seminar</b>	<b>Bob Rupert Marty Monahan</b>
<b>03/25/97 (R-1)</b>	<b>Newington, CT</b>	<b>Awareness Seminar</b>	<b>Bob Rupert Charlie Goodman Marty Monahan</b>
<b>04/01/97, 1/30/97 (R-9)</b>	<b>San Francisco, CA (Includes personnel from Los Angeles, CA Metropolitan Office)</b>	<b>Awareness Seminar</b>	<b>Mark Kehrli Dale Thompson</b>
<b>04/01/97 (R-8) Division</b>	<b>Springfield, IL</b>	<b>Awareness Seminar</b>	<b>Marty Monahan</b>
<b>04/02/97 (R-8)</b>	<b>Lakewood, CO</b>	<b>Awareness Seminar</b>	<b>Wayne Berman John Obenberger Charlie Goodman FTA-Ron Boenau</b>
<b>04/03/97 (R-8)</b>	<b>Lakewood, CO</b>	<b>Train The Trainer</b>	<b>Wayne Berman John Obenberger</b>

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<b>04/03/97 (R-5) Division</b>	<b>Indianapolis, IN</b>	<b>Awareness Seminar</b>	<b>Marty Monahan</b>
<b>04/15/97 (R-3)</b>	<b>Baltimore, MD</b>	<b>Train The Trainer</b>	<b>Bob Rupert Charlie Goodman</b>
<b>04/15/97 (R-5) Division</b>	<b>Columbus, OH</b>	<b>Awareness Seminar</b>	<b>Marty Monahan</b>
<b>04/17/97 (R-7)</b>	<b>Kansas City, MO</b>	<b>Awareness Seminar</b>	<b>Toni Wilbur Charlie Goodman FTA – Denis Symes</b>
<b>04/17/97 (R-8) Division</b>	<b>Cheyenne, WY</b>	<b>Awareness Seminar</b>	<b>Jeff Kolb</b>
<b>04/17/97 (R-5) Division</b>	<b>Lansing, MI</b>	<b>Awareness Seminar</b>	<b>Marty Monahan</b>
<b>04/22/97 (R-4) Division</b>	<b>Nashville, TN</b>	<b>Awareness Seminar</b>	<b>Mark Doctor Leigh Ann Tribble</b>
<b>04/24/97 (R-4) Division</b>	<b>Tallahassee, FL</b>	<b>Awareness Seminar</b>	<b>Grant Zammit</b>
<b>04/30/97 (R-8) Division</b>	<b>Salt Lake City, UT</b>	<b>Awareness Seminar</b>	<b>Martin Knopp</b>
<b>04/30/97 (R-10) FTA</b>	<b>Seattle, WA</b>	<b>Awareness Seminar</b>	<b>FTA-Ron Boenau FHWA-TBD</b>
<b>04/29/97 (R-10) Reg &amp; Div</b>	<b>Albany, NY</b>	<b>Awareness Seminar</b>	<b>FTA FHWA-Bob Rupert Charlie Goodman</b>

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<b>04/30/97 (R-1) Reg &amp; Div</b>	<b>Albany, NY</b>	<b>Awareness Seminar</b>	<b>FTA FHWA-Bob Rupert Charlie Goodman</b>
<b>05/13/97 (R-10) FTA</b>	<b>Philadelphia, PA</b>	<b>Awareness Seminar</b>	<b>FTA-Sean Ricketson FHWA-Bob Rupert Charlie Goodman Steve Clinger</b>
<b>05/15/97 (R-10) Division</b>	<b>Salem, OR</b>	<b>Awareness Seminar</b>	<b>Ed Fischer Lisa Hanf Tori Kinne</b>
<b>05/19/97 (R-4) Division</b>	<b>Montgomery, AL</b>	<b>Awareness Seminar</b>	<b>Mark Doctor Robby Anderson</b>
<b>05/20/97 (R-7) Division</b>	<b>Jefferson City, MO</b>	<b>Awareness Seminar</b>	<b>Bruce Baldwin John Cater Bob Thomas</b>
<b>05/21/97 (R-7) Division</b>	<b>Raleigh, NC</b>	<b>Awareness Seminar</b>	<b>Bob Rupert Mark Doctor</b>
<b>05/21/97 (R-1)</b>	<b>MPO Conference</b>	<b>Planning Module</b>	<b>Charlie Goodman</b>
<b>05/21/97 (R-7) Division</b>	<b>Topeka, KS</b>	<b>Awareness Seminar</b>	<b>Bruce Baldwin John Cater</b>
<b>05/22/97 (R-10) Division</b>	<b>Olympia, WA</b>	<b>Awareness Seminar</b>	<b>Ed Fischer Lisa Hanf Mike Morrow</b>
<b>05/27/97 (R-10) Division</b>	<b>Juneau, AK</b>	<b>Awareness Seminar</b>	<b>Ed Fischer Lisa Hanf</b>

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<b>05/28/97 (R-7) Division</b>	<b>Lincoln, NE</b>	<b>Awareness Seminar</b>	<b>Bruce Baldwin John Cater Milo Cress</b>
<b>05/29/97 (R-7) Division</b>	<b>Ames, Iowa</b>	<b>Awareness Seminar</b>	<b>Bruce Baldwin Byron Low Jim Hogan</b>
<b>06/10/97 (R-4) Division</b>	<b>Frankfort, KY</b>	<b>Awareness Seminar</b>	<b>Mark Doctor</b>
<b>06/11/97 (R-9)</b>	<b>Sacramento, CA</b>	<b>Planning Module</b>	<b>Chris Sinclair</b>
<b>06/12/97 (R-3)</b>	<b>Baltimore, MD</b>	<b>Awareness Seminar</b>	<b>Steve Clinger Pam Marston Tom Jacobs Steve Rapley</b>
<b>06/17/97 (R-6) Division</b>	<b>Baton Rouge, LA</b>	<b>Awareness Seminar</b>	<b>Marty Monahan</b>
<b>06/17/97 (R-1) FTA 8 Division</b>	<b>Cambridge, MA</b>	<b>Awareness Seminar</b>	<b>FTA- Max Vigil Bob Rupert or Jonathan McDade</b>
<b>06/18/97 (R-10) Division</b>	<b>Boise, ID</b>	<b>Awareness Seminar</b>	<b>Ed Fisher Lisa Hanf</b>
<b>06/19/97 (R-6) Division</b>	<b>Oklahoma City, OK</b>	<b>Awareness Seminar</b>	<b>Marty Monahan</b>
<b>06/19/97 (R-3) Division</b>	<b>Dover, DE</b>	<b>Awareness Seminar</b>	<b>Greg Murrill Steve Rapley</b>
<b>06/23/97 (R-3) Division</b>	<b>Washington, D.C.</b>	<b>Awareness Seminar</b>	<b>Steve Clinger Steve Rapley</b>

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<b>DATE OF PRESENTATION</b>	<b>LOCATION</b>	<b>TITLE OF PRESENTATION</b>	<b>TRAINER</b>
<b>06/24/97 (R-1) Division</b>	<b>Augusta, ME</b>	<b>Awareness Seminar</b>	<b>Bob Rupert</b>
<b>06/25/97 (R-1) Division</b>	<b>Portland, ME (MPO event.)</b>	<b>Awareness Seminar</b>	<b>Bob Rupert</b>
<b>06/25/97 (R-3) Division</b>	<b>Charleston, WV</b>	<b>Awareness Seminar</b>	<b>Steve Clinger Pam Marston</b>
<b>06/30/97 (R-3) Division</b>	<b>Harrisburg, PA</b>	<b>Awareness Seminar</b>	<b>Mike Castellano Joe Werning Dennis McGee</b>
<b>07/08/97 (R-4) Division</b>	<b>Columbia, SC</b>	<b>Awareness Seminar</b>	<b>Mark Doctor</b>
<b>07/15/97 (R-6) Division</b>	<b>Santa fe, NM</b>	<b>Awareness Seminar</b>	<b>Marty Monahan</b>
<b>07/17/97 (R-6) Division</b>	<b>Little Rock, AR</b>	<b>Awareness Seminar</b>	<b>Marty Monahan</b>
<b>07/26/97 (R-8)</b>	<b>Planning Conference</b>	<b>Planning Module</b>	<b>Sheldon Edner</b>
<b>07/29/97 (R-9)</b>	<b>Phoenix, AZ</b>	<b>Public/Private Partnership Module</b>	<b>Steve Lockwood</b>
<b>07/29/97 (R-9)</b>	<b>Sacramento, CA</b>	<b>Public/Private Partnership Module</b>	<b>Steve Lockwood</b>
<b>07/29/97 (R-6) Division</b>	<b>Austin, TX</b>	<b>Awareness Seminar</b>	<b>Marty Monahan</b>

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### FHWA/FTA ITS AWARENESS SEMINAR PRESENTATIONS

(Note: AS = Awareness Seminar; TTT = Train the Trainer)

<b>DATE OF PRESENTATION</b>	<b>LOCATION</b>	<b>TITLE OF PRESENTATION</b>	<b>TRAINER</b>
<b>08/02/97 (R-1)</b>	<b>ITE Annual Mtg. Boston, MA</b>	<b>Telecommunications Module</b>	<b>Gary Euler</b>
<b>08/11 – 12/97 (R-3)</b>	<b>Baltimore, MD</b>	<b>Awareness Seminar</b>	<b>Tom Jacobs</b>
<b>08/12/97 (R-8) Division</b>	<b>Helena, MT</b>	<b>Awareness Seminar</b>	<b>Robin Smith Jeff Kolb</b>
<b>08/12/97 (R-9)</b>	<b>Sacramento, CA</b>	<b>Telecommunications Module</b>	<b>Gary Euler</b>
<b>08/13/97 (R-9)</b>	<b>Phoenix, AZ</b>	<b>Telecommunications Module</b>	<b>Gary Euler</b>
<b>08/19/97 (R-8)</b>	<b>Bismarck, ND</b>	<b>Awareness Seminar</b>	<b>Robin Smith Jeff Kolb</b>
<b>08/19 - 21/97 (R-5)</b>	<b>Chicago, IL</b>	<b>Deploying Integrated Intelligent Transportation Systems (3 days)</b>	<b>Jack Kay Chris Sinclair (SAIC)</b>
<b>08/20/97 (R-4) Division</b>	<b>Jackson, MS</b>	<b>Awareness Seminar</b>	<b>Mark Doctor</b>
<b>08/20/97 (R-8) Division</b>	<b>Pierre, SD</b>	<b>Awareness Seminar</b>	<b>Robin Smith Jeff Kolb</b>
<b>08/26/97 (R-3) ½ day (PM)</b>	<b>Baltimore, MD</b>	<b>Public/Private Partnership Module</b>	<b>Steve Lockwood</b>
<b>08/26 - 28/97 (R-4)</b>	<b>Orlando, FL</b>	<b>Deploying Integrated Intelligent Transportation Systems (3 days)</b>	<b>Kern Jacobson Cary Vick (PBF)</b>

**Appendix B**  
**FHWA/FTA ITS AWARENESS SEMINAR PRESENTATIONS**

(Note: AS = Awareness Seminar; TTT = Train the Trainer)

<b>DATE OF PRESENTATION</b>	<b>LOCATION</b>	<b>TITLE OF PRESENTATION</b>	<b>TRAINER</b>
<b>08/28/97 (R-3) ½ Day (AM)</b>	<b>Baltimore, MD</b>	<b>Telecommunications Module</b>	<b>Gary Euler</b>
<b>09/08/97 (R-3) ½ Day (PM)</b>	<b>Fort Worth, TX</b>	<b>Public/Private Partnership Module</b>	<b>Tom Horan</b>
<b>09/09 – 11/97 (R-1)</b>	<b>Newington, CT</b>	<b>Deploying Integrated Intelligent Transportation Systems (3 days)</b>	<b>Walter Kraft Cary Vick (PBFI)</b>
<b>09/09 – 11/97 (R-5)</b>	<b>Fort Worth, TX</b>	<b>Deploying Integrated Intelligent Transportation Systems (3 days)</b>	<b>Allan Clelland TBD (SAIC)</b>
<b>09/15 – 17/97 (R-10)</b>	<b>Portland, OR</b>	<b>Deploying Integrated Intelligent Transportation Systems (3 days)</b>	<b>Kern Jacobson Glenn Fromme (PBFI)</b>
<b>09/15 – 18/97</b>	<b>Kansas City, MO</b>	<b>Deploying Integrated Intelligent Transportation Systems (3 days)</b>	<b>John M. Mason Mike Bolton (SAIC)</b>
<b>09/16/97 (R-5)</b>	<b>Olympia Fields, IL</b>	<b>Public/Private Partnership Module</b>	<b>Steve Lockwood</b>
<b>09/17/97 (R-5) 10:00 am – 3:00 pm</b>	<b>Olympia Fields, IL</b>	<b>Telecommunications Module</b>	<b>Gary Euler</b>

**Appendix B**  
**FHWA/FTA ITS AWARENESS SEMINAR PRESENTATIONS**

(Note: AS = Awareness Seminar; TTT = Train the Trainer)

<b>DATE OF PRESENTATION</b>	<b>LOCATION</b>	<b>TITLE OF PRESENTATION</b>	<b>TRAINER</b>
<b>09/23 - 25/97 (R-3)</b>	<b>Richmond, VA</b>	<b>Deploying Integrated Intelligent Transportation Systems (3 days)</b>	<b>Walter Kraft Cary Vick (PBFI)</b>
<b>09/23 - 25/97 (R-8)</b>	<b>Denver, CO</b>	<b>Deploying Integrated Intelligent Transportation Systems (3 days)</b>	<b>Alan Clelland TBD (SAIC)</b>
<b>10/02/97</b>	<b>Roanoke, VA</b>	<b>Telecommunications Module</b>	<b>Gary Euler</b>
<b>TBD (R-1) Division</b>	<b>Concord, NH</b>	<b>Awareness Seminar</b>	
<b>TBD (R-1) Division</b>	<b>Trenton, NJ</b>	<b>Awareness Seminar</b>	
<b>TBD (R-1) Division</b>	<b>Hato Rey, PR</b>	<b>Awareness Seminar</b>	
<b>TBD (R-1) Division</b>	<b>Providence, RI</b>	<b>Awareness Seminar</b>	
<b>TBD (R-1) Division</b>	<b>Montpelier, VT</b>	<b>Awareness Seminar</b>	
<b>TBD (R-3) Division</b>	<b>Richmond, VA</b>	<b>Awareness Seminar</b>	
<b>TBD (R-2) FTA</b>	<b>New York, NY And New York Metropolitan Office</b>	<b>Awareness Seminar</b>	<b>Bob Rupert</b>

## Appendix C: Catalog of PCB Courses

Legend	
FHWA	= Federal Highways Administration
FTA	= Federal Transit Administration
PCB	= ITS Professional Capacity Building Program
JPO	= Joint Program Office for ITS
CVO	= Commercial Vehicle Operations program
CT	= FHWA's Central Training program
NHI	= National Highway Institute
NTI	= National Transit Institute

Office	Seminar	Seminar Subject	Level of Intensity	Audience	Status
FHWA / FTA / PCB	One-Day General Awareness Seminar	ITS Awareness	Awareness Level 1	General transportation professionals and support staff at the Federal, regional, divisional, state and local levels	Started 3/3/97; currently available for scheduling
FHWA / FTA / PCB	Deploying Integrated Intelligent Transportation Systems	ITS & Integration	Overview Level 2	Senior technical and program staff at the Federal, regional, divisional, state and local levels	First presentation: June 16 – 19, 1997; currently available for scheduling

Office	Seminar	Seminar Subject	Level of Intensity	Audience	Status
FHWA / FTA / PCB	Seven One-Day Technical Seminars and Two Workshops	<ul style="list-style-type: none"> <li>• Planning for ITS Deployment Public / Private Partnerships Telecommunications</li> <li>• ITS in Transit</li> <li>• Commercial Vehicle Operations</li> <li>• Systems Engineering/ Architecture</li> <li>• Innovative Procurement Strategies</li> <li>• ITS Telecommunications Analysis Workshop</li> <li>• Shared Resources Workshop</li> </ul>	Overview Level 2	Technical staff at Federal state, and local levels	<ul style="list-style-type: none"> <li>• All courses scheduled by request. Delivery begins as follows:</li> <li>• Planning: June 1997</li> <li>• Transit: Spring 1998</li> <li>• CVO: July 1997</li> <li>• P/P Partnerships: July 1997</li> <li>• Procurement: Winter/Spring 1998</li> <li>• Telecommunications: August 1997</li> <li>• Syst. Eng/Arch: Fall 1997</li> <li>• Telecomm Analysis &amp; Shared Resources: available now</li> </ul>
FTA / PCB	ITS Transit Management (a 1-2 day short course)	APTS	Overview	Transit managers at Federal state, and local Levels	Ready Winter/Spring 1998
JPO/ PCB	Developing a series of seminars for standards	ITS Standards	All levels	Various audiences	not developed enough to know
CVO	Project Management Course – trial	CVO	Specialized		Trial took place in March 1997
CVO	Project Management Course – actual	CVO	Specialized		Presented in May at two sites - Wash. DC and Denver. Available

Office	Seminar	Seminar Subject	Level of Intensity	Audience	Status
CVO	Technical workshops	CVO technical applications, preparation of management and operational plans	Intensive	State OMC, technical coordinators, project managers	Continuing. Next one at Johns Hopkins 4/21 – 4/27/97
CVO	Information Focus Groups	CVO opinion/ knowledge gathering	Overview	Transit managers at Federal state, and local Levels	Ready Winter/Spring 1998
CVO	Technology Truck	CVO applications; "Classroom on the Road"	Awareness	State legislatures, key decision makers from OMC, State enforcement, road-side safety officers, truck and bus drivers	Beginning tour June 1997

Office	Seminar	Seminar Subject	Level of Intensity	Status
CT	Public Involvement in Transportation Decision making	Public Involvement	Overview	Field planning and program development staff
CT	Site Traffic Impact Analysis and Assessment	Traffic Engineering	Overview	Traffic engineers and transportation planners
CT	Statewide Transportation Planning	Planning	Overview	Transportation planners
CT	Workshop on Transportation Quality Analysis	Quality Analysis	Overview	Construction and oversight management staff
CT	Introduction to Metropolitan Transportation Planning	Planning	Overview	DOT field, state and local transportation program staff
CT	ISTEA Management Systems for Transit Operators	Management Systems	Overview	Transit managers and staff
CT	Project Development and Environmental Documentation	Environmental Analysis	Specialized	
CT	Promoting Planning Partnerships: Strategies for Achieving Consensus	Planning	Overview	
CT	Major Investment Studies	Planning	Overview	
CT	Admin. of FHWA Planning Grants	Planning	Overview	FHWA Staff
CT	Capacity and Planning Analysis for Arterial Analysis	Planning and Forecasting	Intensive	Planners and travel demand forecasting managers & staff
CT	Congestion Management for Technical Staff	Congestion Management	Intensive	Technical staff
CT	Estimating the Impacts of Transportation Alternatives	Planning	Intensive	Planning managers and staff
CT	Financial Planning & Forecasting for MPOs	Planning	Intensive	Planning managers and staff

Office	Seminar	Seminar Subject	Level of Intensity	Status
NHI	Highway Capacity and Quality of Flow	Design and Traffic Operations	Overview	Traffic engineers and transportation planners
NHI	Traffic Control Software and Signalization	Traffic Signals	Intensive	Traffic engineers involved in technical aspects of traffic engineering
NHI	Developing Traffic Control Strategies	Traffic control	Intensive	Professionals involved in developing and implementing traffic control plans, and strategies
NHI	Human Factors: Principles for Highway, Traffic and Design Engineers	Human factors	Overview	Transportation staff involved in highway traffic operations, safety, and design
NHI	Traffic Management Strategies	Traffic management	Overview	Staff responsible for planning, designing, implementing, or operating traffic operations improvement programs
NHI	Computerized Traffic Signal Systems	Traffic Signals	Specialized	Traffic engineers involved in technical aspects of traffic engineering
NHI	Estimating the Impacts of Urban Transportation Alternatives	Alternatives Analysis	Specialized	Transportation planners
NHI	Advanced Safety Management Systems	Safety	Intensive	Staff responsible for planning, designing, and implementing safety management systems
NHI	Incident Management	Incident Management	Intensive	Professionals responsible for responding to incidents on highways and streets.
NHI	Design and Application of Travel Demand Management Techniques Including Telecommuting	TDM	Intensive	Staff responsible for planning and managing TDM programs

Office	Seminar	Seminar Subject	Level of Intensity	Status
NHI	Design and Application of Travel Demand Management Techniques Not Including Telecommuting	TDM	Intensive	Staff responsible for planning and managing TDM programs
NHI	Design and Application of Telecommuting Projects	Telecommuting	Intensive	Staff responsible for planning and managing TDM and Telecommuting programs
NHI	High Occupancy Vehicle Facilities	HOV	Intensive	Staff responsible for planning, designing, implementing, maintaining, or operating HOV facilities
NHI	Advanced Traffic Signal Control	Traffic Signal Control	Intensive	Professionals involved in planning, design, and implementation of traffic signal controls
NHI	Freeway Traffic Operations	Traffic Operations	Overview	Professionals involved in freeway traffic operations
NHI	Innovative Highway Financing and Elements of Financial Planning -- Technical Methodologies	Planning	Overview to Intensive	Staff responsible for designing innovative financing programs and financial planning
NHI	Congestion Management for Technical Staff	Congestion Management	Specialized	Staff developing and implementing CMS
NHI	Advanced Urban Travel Demand Forecasting	Travel Demand Forecasting	Specialized	Staff with hands-on experience in the four-step travel demand forecasting process.

Office	Seminar	Seminar Subject	Level of Intensity	Status
NHI	Intelligent Transportation Systems Planning and Functional Requirements -- An Overview	Relating ITS planning to developing functional requirements for implementation	Overview	Federal, State, Local transportation professionals
NHI	Intelligent Transportation Systems for Transit: Solving Real Problems	Overview course presenting ITS technologies available for transit operations, cost-effective and innovative ways to provide better service more efficiently. Precursor to NTI's course on Procuring New Technologies for Transit.	Level 4	Senior field supervisors, managers, service planners, senior customer relations and security staff, and senior operational, maintenance, and fleet management staff.
NTI	Procuring New Technologies for Transit	Systems approach to successful procurement and implementation of new technologies for transit	Level 4	Transit agency personnel who are engaged in procuring new technologies, including end user of the proposed system, as well as specialists from the legal, procurement, and project management disciplines
NTI	Reinventing Transit: Using Information Technologies to Reinvent Transit Services	Transfer the latest knowledge on the possibilities for better coordinating and combining services resulting from rapidly improving Information Technologies.	Level 4	Management and professionals concerned with transit and/or paratransit service delivery structure.
NTI	Geographic Information Systems: Transit Applications	Approaches for selecting software, coordinating data collection with other agencies, and help for evolving to the next level.	Level 4	Professionals concerned with selecting a GIS platform

Office	Seminar	Seminar Subject	Level of Intensity	Status
NTI	Integrating Transit and Traffic ITS Applications	Supports improved agency-to-agency collaborations and partnerships that result in more cost-effective and beneficial information technology systems. Course brings together staff with disparate responsibilities and disparate sources of data within the same agency to recognize common needs and move their agency toward consensus on developing future information technology applications.	Level 4	Transit service planners, traffic engineering professionals, planning agency professionals.
NTI	Improving Transit System Performance: Using Information-based Strategies	Program is for transit trainers preparing to teach current employees and/or apprentices to troubleshoot electrical systems. Participants tour the MARTA transit facilities, receive an overview of MARTA's training program for master bus electricians, and discuss procurement practices with MARTA staff.	Level 4	Management, service planning professionals, and management information specialists.
NTI	Analytic Troubleshooting for the Advanced Technology Bus: Train-the-Trainer	Transit management, planning, operations, maintenance and procurement staff considering acquiring new technologies or implementing innovative practices	Level 3	Maintenance trainers and procurement personnel
NTI	Fellows Workshop on Advanced Technologies and Innovative Practices		Level 2	Transit management, planning, operations, maintenance and procurement staff

**Appendix D**  
**PCB Budget Information**  
**for Transportation Management and Traveler Information Services**

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**FY 1996 PCB Budget**  
(Approximate Funding)

1. Program Management and Support	\$350,000
2. Course/Seminar Development	\$1,750,000
3. Course Delivery (FY 97)	\$300,000
<b>Total</b>	<b>\$2,400,000</b>

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**FY 1997 PCB Budget\*\***  
(Approximate Funding)

1. Program Management and Support	\$600,000
2. Course/Seminar Development	\$1,500,000
3. Course Delivery (FY 97)	\$1,600,000
4. University Initiatives	\$300,000
<b>Total</b>	<b>\$4,000,000</b>

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**FY 1998 PCB Budget\*\***  
(Proposed Funding - Approximate Numbers)

1. Deliver Existing Courses	\$2,010,000
2. Develop New Materials and Update Existing Materials	\$1,700,000
3. University Programs	\$400,000
4. Future Curricula and KSA Development	\$575,000
5. Program Management and Support	\$575,000
<b>Total</b>	<b>\$5,260,000</b>

Note: This is subject to the current budget discussions and Congressional action.

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## Appendix E

### Selected Bibliography of Previous PCB Needs Assessments

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## **Appendix F**

### **Glossary of Terms and Acronyms**

AASHTO	American Association of State Highway and Transportation Officials
AHS	Automated Highway System
APTA	American Public Transit Association
APTS	Advanced Public Transportation Systems
ARTS	Advanced Rural Transportation systems
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
ATA	American Trucking Association
ATIS	Advanced traveler information systems; vehicle features and other media that give drivers information about traffic and transit conditions to help them plan trips
ATMIS	Advanced transportation management and information systems
ATMS	Advanced traffic management systems; institutional, human, hardware, and software components designed to monitor, control, and manage traffic
AVCSS	Advanced vehicle control and safety systems
AVL	Automatic vehicle location; a system that senses, at intervals, the locations of vehicles carrying special electronic equipment that communicates a signal back to a central control facility
AVI	Automated vehicle identification; the use of onboard transponders and roadside receivers to identify individual vehicles. Applications include electronic toll collection and stolen vehicle recovery
CATV	Community antenna television
CCTV	Closed-circuit television
CT	Central Training, FHWA

CUTA	Canadian Urban Transit Association
CVISN	Commercial Vehicle Information Systems and Networks
C V O	Commercial Vehicle Operations
DOT	Department of Transportation, U.S.
EIA	Electronic Industries Association
ETC	Electronic toll collection
FAA	Federal Aviation Administration, U.S.
FHWA	Federal Highway Administration, a component of the U.S. Department of Transportation that encompasses highway transportation in its broadest scope, seeking to coordinate highways with other modes of transportation to achieve the most effective balance of transportation systems and facilities under cohesive federal policies
FRA	Federal Railroad Administration, U.S.
FTA	Federal Transit Administration, a component of the U.S. Department of Transportation that assists in the development of improved mass transportation facilities, equipment, techniques, and methods; encourages the establishment of regional urban mass transportation systems; helps state and local governments finance such systems; and offers financial assistance to state and local governments to further national goals of mobility for elderly persons, persons with disabilities, and poor persons
FY	Fiscal year for the government (October 1 through September 30th)
GIS	Geographic information system; computerized data management system designed to capture, store, retrieve, analyze, and report geographic and demographic information
GPS	Global positioning system; U.S. government-owned system of satellites that allow receivers to compute latitude and longitude for high-accuracy position
HEP	FHWA's Office for Planning
HOV	High-occupancy vehicle; a designation used to restrict certain lane access to any vehicle with multiple occupants, usually during freeway rush hours

HTV	FHWA's Office of Traffic Management and ITS Application
IEEE	Institute of Electrical and Electronics Engineers
Infrastructure	In transportation planning, all the relevant elements of the environment in which a transportation system operates. In transit systems, all the fixed components of the system such as rights-of-way, tracks, signal equipment, stations, park-and-ride lots, bus stops, and maintenance facilities.
Intelligent Vehicle-Highway Systems Act of 1991	Section of the Intermodal Surface Transportation Efficiency Act of 1991 that proposed the establishment of a national ITS program to include the evaluation and implementation of ITS technologies, development of standards, establishment of an ITS information clearinghouse, use of advisory committees such as ITS America, and funding for ITS research, development, and testing
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991; U.S. public law that provides the primary federal funding for highway programs in the country
ITE	Institute of Transportation Engineers; an international scientific and education association of 15,000 members who are responsible for planning, designing, and operating surface transportation systems in more than 80 countries
ITS America	(ITSA) A nonprofit, public-private scientific and educational corporation working to advance a national program for safer, more economical, energy- efficient, and environmentally sound highway travel in the United States
ITS	Intelligent transportation systems; originally called IVHS
IVHS	Intelligent vehicle-highway systems
JPO	ITS Joint Program Office
KSA	Knowledge, Skills, Abilities
MPO	Metropolitan planning organization; a forum, formed in cooperation with the state, for developing transportation plans and programs for an urban area

MCSAP	Motor Carrier Safety Assistance Program; a federally funded program that provides grants to states (and D.C. and the territories) for carrying out motor carrier safety enforcement activities.
NEMA	National Electrical Manufacturers Association
NHI	National Highway Institute
NHS	National highway system; a federal program that funds transportation projects in the United States
NHTSA	National Highway Traffic Safety Administration, a branch of the U.S. Department of Transportation established to reduce the number of deaths, injuries, and economic losses resulting from motor vehicle crashes
NIST	National Institute of Standards and Technology
NTCIP	National Transportation Communications ITS Protocol
NTI	National Transit Institute
OMC	Office of Motor Carriers
PTI	Public Technologies, Inc.
RCE	Research Centers of Excellence; University based research programs recognized by the ITS program as centers of cutting-edge research. They also work to transfer the research knowledge into university courses.
RSPA	Research and Special Programs Administration; a branch of the U.S. Department of Transportation
SAE	Society of Automotive Engineers
TCIP	Transit Communications Interface Protocol
TDM	Transportation demand management; an attempt to reduce demand for transportation using means such as encouraging the use of high-occupancy vehicles, telecommuting, and alternative work hours
TMC	Traffic management center or transportation management center
TOC	Traffic operations center

- TRB            Transportation Research Board, U.S.; under the direction of the National Academy of Science's National Research Council, works to stimulate, correlate, and distribute transportation research in the United States
- TTI            Texas Transportation Institute
- The Volpe Center  
U.S. DOT's Volpe National Transportation Systems Center; a federal research center located in Boston, MA
- UTC            University Transportation Center program