

# **Intelligent Transportation Systems (ITS) Professional Capacity Building (PCB) Strategic Plan, 2017-2021**

Prepare Transportation Industry  
Professionals for What's Next in ITS

[www.its.dot.gov/index.htm](http://www.its.dot.gov/index.htm)

**Final Report – October 2017  
FHWA-JPO-18-619**



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<b>16. Abstract</b> This document describes the strategy that the Intelligent Transportation Systems (ITS) Professional Capacity Building (PCB) Program is pursuing to create a 21st century learning environment and build an ITS professional that leads the world in the innovative use of ITS technologies. The strategic plan presents: <ul style="list-style-type: none"> <li>• <b>Introduction.</b> Provides an overview of the ITS PCB Program and this strategic plan.</li> <li>• <b>History of ITS PCB Program.</b> Describes how the PCB Program is shifting its strategic approach to better meet customer needs.</li> <li>• <b>Vision and Mission.</b> States the updated vision and mission of the program.</li> <li>• <b>Goals and Objectives.</b> Describes the strategic plan for 2017 to 2021. Outlines four strategic goals and sets objectives.</li> <li>• <b>Role of Training and Industry Partners.</b> Describes the critical role of partnership and coordination in achieving the ITS PCB Program's vision and mission.</li> <li>• <b>Summary of Activities.</b> Details the activities the ITS PCB Program will pursue under each goal and objective.</li> </ul>		<b>13. Type of Report and Period Covered</b>	
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# Chapter 1. Introduction

For over two decades, the Intelligent Transportation Systems (ITS) Professional Capacity Building (PCB) Program has provided the transportation workforce with flexible, accessible ITS learning and support through live and on-demand training, technical assistance, and educational resources. Housed within the U.S. Department of Transportation (USDOT) ITS Joint Program Office (JPO), the program assists current and future transportation professionals in developing their knowledge, skills, and abilities (KSAs) to build technical proficiency while furthering their career paths.

ITS technologies are advancing to facilitate a connected and automated transportation system that is information-intensive to better serve the interests of users and be responsive to the needs of travelers and system operators. These technologies have the potential to save lives, enhance roadway system capacity, and provide other accessibility and mobility benefits to transportation users. As new ITS technologies and systems evolve into market-ready products, successful deployment and operation of these new technologies depend largely on a knowledgeable, trained, and skilled workforce to support them.

The ITS PCB Program supports a variety of ITS learning opportunities to ultimately result in better ITS deployments and more efficient operations. The program cooperates with other federal agencies, public sector entities, academia, private sector organizations, and other partners to support the current and future ITS workforce.

Over the years, the ITS PCB Program has provided training and educational opportunities through many outlets and methods, attempting to utilize the most effective method to ensure that multidisciplinary and multimodal stakeholders receive the services needed to plan, design, procure, implement, operate, maintain, and manage innovative transportation technologies.

## Purpose of the ITS PCB Strategic Plan

This strategic plan outlines the ITS PCB Program direction over the next four years (through 2021). The plan identifies four program goals focusing on partnerships, training, communications, and evaluation. Corresponding objectives, along with general and specific activities, support the ongoing awareness, outreach, training, and education functions of the ITS PCB Program.

The program not only focuses on producing ITS materials, events, and other learning opportunities, but also has a very important role in coordinating all ITS training, including those products developed by others—federal modal offices; professional organizations; academic institutions; and state, local, and regional agencies, among others. This plan highlights the ITS PCB Program's roles in both the development and delivery of training products and facilitation of the efficient exchange of knowledge and learning among all necessary stakeholders.

## Organization of the Strategic Plan

The strategic plan is organized as follows:

- **Introduction.** Provides an overview of the ITS PCB Program and this strategic plan.
- **History of ITS PCB Program.** Describes how the PCB Program is shifting its strategic approach to better meet customer needs.
- **Vision and Mission.** States the updated vision and mission of the program.
- **Goals and Objectives.** Describes the strategic plan for 2017 to 2021. Outlines four strategic goals and sets objectives.
- **Role of Training and Industry Partners.** Describes the critical role of partnership and coordination in achieving the ITS PCB Program's vision and mission.
- **Summary of Activities.** Identifies the activities the ITS PCB Program will pursue under each goal and objective.

## ITS PCB Program Strategies

The program employs multiple strategies to share ITS information and advance the state of the practice, such as:

- Deliver ITS learning in partnership with professional associations, universities, and USDOT modal administrations
- Determine core skills and competency areas needed for ITS professionals
- Provide structured learning directly or through partners in key areas where ITS knowledge is emerging
- Serve as a clearinghouse for learning opportunities
- Facilitate knowledge sharing among researchers, practitioners, and decision makers
- Leverage and connect the expertise needed to transfer research into practice and the marketplace.

## ITS PCB Program Audience

The ITS PCB Program's audience has grown significantly over the past 20 years. This audience includes both mid-career and emerging ITS professionals in the public and private arenas, as well as researchers, decision-makers, and other agency staff that are actively engaged in evaluating or implementing ITS technologies.

## ITS PCB Program Portfolio of Products

The following are the ITS PCB Program's key resources:

- **Webinars** – Talking Technology and Transportation (T3), Talking Technology and Transportation in Education (T3e), Deployers' Roundtable, partner webinars



- **Workshops** – ITS State Chapter Workshops, tie-in with other and federal program-sponsored and other association-sponsored workshops
- **Online Training Modules** – ITS standards, ITS transit standards, ITS ePrimer
- **Technical Assistance** – Peer events, Peer Application Clearinghouse, ITS Help Line, Ask-the-Experts (Q&A online-post webinars), Deployers’ Roundtable, Training Outreach (internal outreach and awareness and knowledge building to increase the ability of USDOT staff to assist state and local partners)
- **Classroom/Courses** –National Highway Institute (NHI) live and online courses; courses developed by other partners and third parties
- **Guidance and Educational Materials** - ITS ePrimer modules; transit technology fact sheets, ITS Knowledge Resources Database; ITS, connected vehicle, and automated vehicle video (and accompanying fact sheet)
- **Academic Support** – ITS case studies; university ITS curriculum list (online); supplemental ITS training slides; community college/technical school ITS, connected vehicle, and automated vehicle connected communities lesson plans and career pathway databank; secondary education (middle school and high school) ITS, connected vehicle, and automated vehicle connected communities lesson plans; ITS Solutions Challenge; University Student Video Challenge; other challenges.



# Chapter 2. History of ITS PCB Program

The ITS PCB Program was launched in 1996 with the recognition that transforming the transportation infrastructure through ITS would require a different set of transportation workforce competencies than previously required. The adoption of new technologies, in particular, fast and successful adoption, depends on a workforce that is:

- Aware of new technologies and research results
- Knowledgeable about procurement and specifications
- Skilled in incorporating new technologies into existing systems
- Trained to oversee the implementation process from a system's perspective
- Capable of putting ITS technologies into use.

As a cross-cutting program within the USDOT ITS JPO, the ITS PCB Program works to ensure the effective planning, implementation, and operation of ITS. Since its inception, the program has successfully advanced knowledge and awareness of ITS through training, technical assistance, and outreach to the ITS practitioner and decision maker. Additionally, the program has worked with educators to increase the knowledge of future ITS professionals.

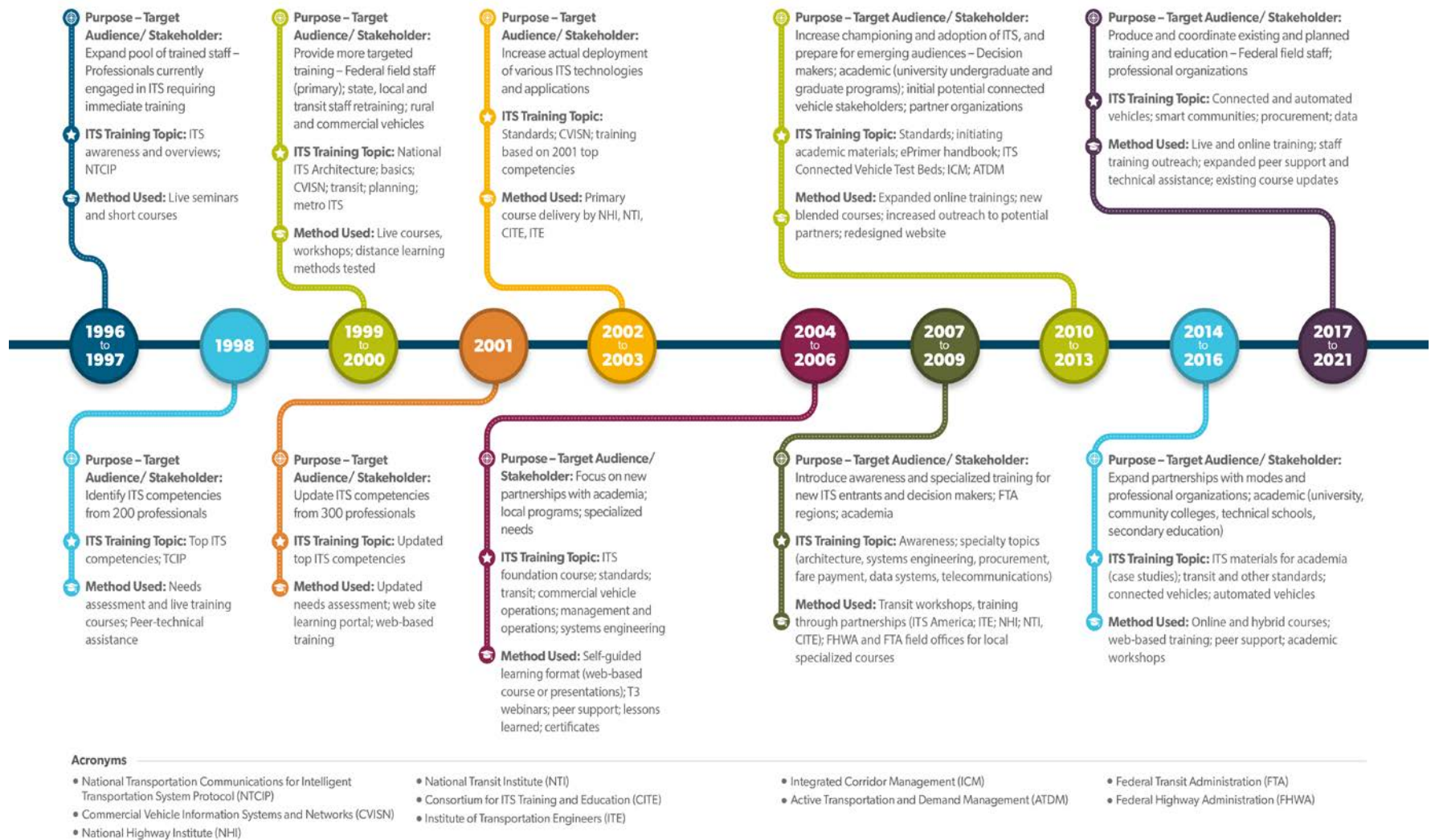
The concept of the ITS PCB Program is approaching three decades. With the 1991 *Intermodal Surface Transportation Efficiency Act of 1991* (ISTEA), the ITS Program was directed to provide technical assistance to State and local governments seeking to use and evaluate ITS technologies. In 1998, the *Transportation Equity Act for the 21st Century* (TEA-21) specifically called for the development of a capable ITS workforce. This requirement was carried forth in the 2005 *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users* (SAFETEA-LU) and reinforced in the 2012 *Moving Ahead for Progress in the 21st Century Act* (MAP-21).

***To develop a workforce capable of developing, operating, and maintaining intelligent transportation systems.”***  
– SAFETEA-LU, Sec. 5303(b)(7) and MAP-21, Sec. 514(b)(7)

This provision supporting the ITS PCB Program was maintained with the 2016 *Fixing America's Surface Transportation Act* (FAST Act).

## ITS PCB Program Focus by Year

Because the technology and systems defined as “ITS” have evolved, the focus of the ITS PCB Program has likewise adapted through the years in support of ITS JPO research. Figure 1 shows how the ITS PCB Program's focus has changed throughout its 20-year history.



**Acronyms**

- National Transportation Communications for Intelligent Transportation System Protocol (NTCIP)
- Commercial Vehicle Information Systems and Networks (CVISN)
- National Highway Institute (NHI)
- National Transit Institute (NTI)
- Consortium for ITS Training and Education (CITE)
- Institute of Transportation Engineers (ITE)
- Integrated Corridor Management (ICM)
- Active Transportation and Demand Management (ATDM)
- Federal Transit Administration (FTA)
- Federal Highway Administration (FHWA)

*\*NOTE: Building knowledge and expertise of practitioners is the ITS PCB Program’s primary mission and thus, current ITS practitioners remain the key audience during each period. Source: USDOT, September 2017*

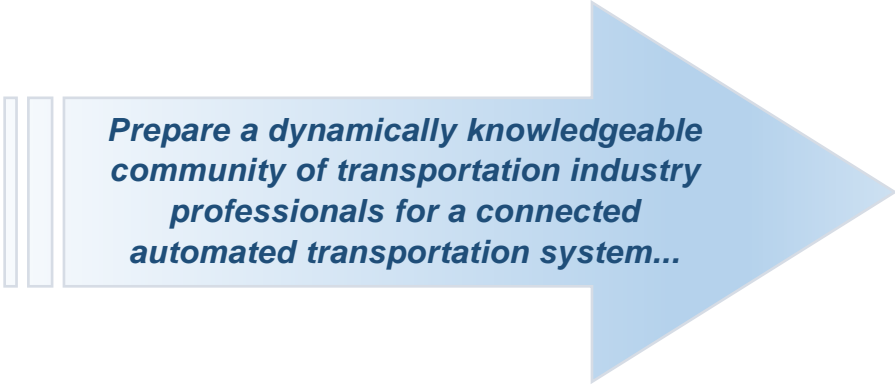
**Figure 1. ITS PCB Program Focus by Period**

# Chapter 3. Vision and Mission

There are over 1.5 million professionals working in transportation that are candidates for some level of ITS training and education. These transportation professionals must be able to adapt to the continuous introduction of new and emerging technologies and applications, such as connected and automated vehicles, smart communities, and big data and analytics. Developing, deploying, and integrating these rapidly evolving technologies requires a capable, well-trained workforce with the skills to create, embrace, and use them. As these technologies progress, the workforce will need new knowledge, skills, and abilities to drive implementation.

## Vision

The ITS PCB Program is the USDOT's primary vehicle for educating the current and emerging transportation workforce about ITS technologies.



***Prepare a dynamically knowledgeable community of transportation industry professionals for a connected automated transportation system...***

New ITS technologies, such as connected vehicles, connected infrastructure, and automated vehicles, are transforming the landscape of our nation's transportation system. These technological innovations are merging the physical and digital worlds of transportation and yielding new opportunities to improve the safety, mobility, and efficiency of our roads. However, successful deployment and operation of these new technologies depends largely on a knowledgeable, trained, and skilled workforce to support them.

Thus, the ITS PCB Program's vision is to ***prepare a dynamically knowledgeable community of transportation industry professionals for a connected automated transportation system***. The program connects ITS practitioners and decision makers with researchers, educators and trainers, and peers to advance the state of ITS practice.

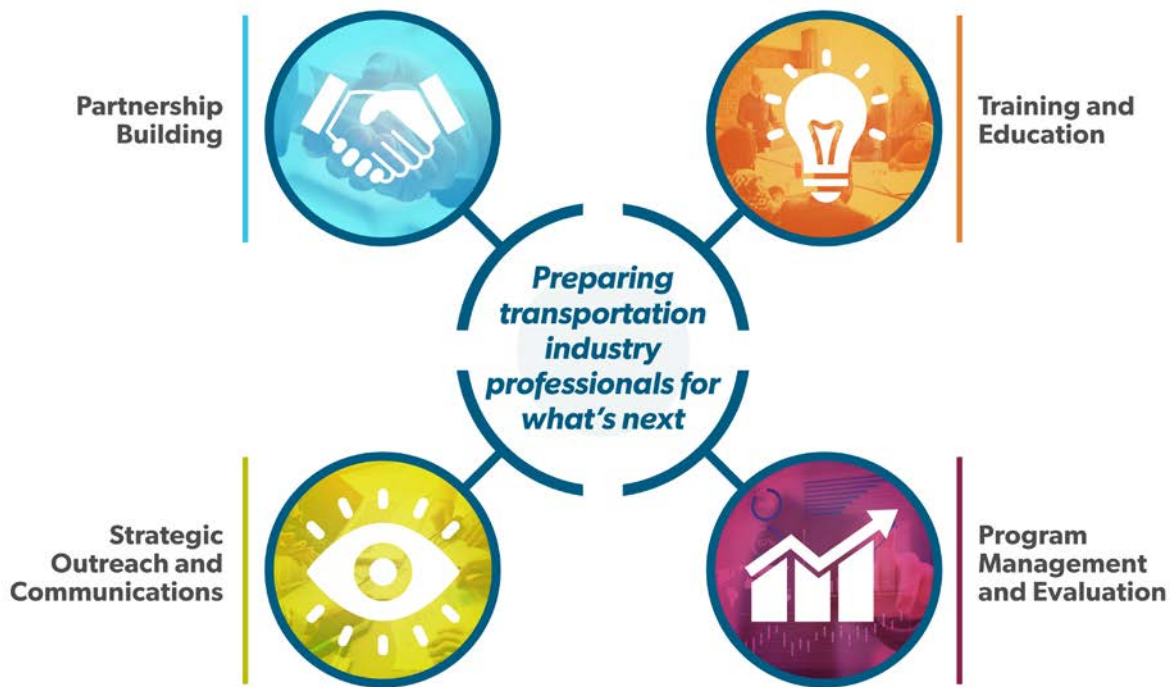
## Mission

The mission of the ITS PCB Program is to ***provide a multimodal and multi-disciplinary capacity building program for all levels of current and future transportation professionals to accelerate preparation for and the deployment of innovative ITS.***

***Provide a multimodal and multi-disciplinary capacity building program for all levels of current and future transportation professionals to accelerate preparation for and the deployment of innovative intelligent transportation systems***

# Chapter 4. Goals and Objectives

From 2017 to 2021, the primary focus of the ITS PCB Program is on coordinating ITS training and developing the current and future ITS workforce. The program seeks to leverage the most engaging and effective learning platforms to deliver the latest in best practices in ITS research results to targeted audiences. To help accelerate the adoption of ITS and a connected automated transportation system, connect partners, coordinate and deliver learning in the most effective and engaging manner, increase awareness of the program and learning opportunities, and continuously evaluate the program for maximum impact, the ITS PCB Program has adopted four interrelated goals, shown in Figure 2. These goals guide the program toward achieving its vision of preparing a dynamically knowledgeable community of transportation industry professionals for a connected automated transportation system.



Source: USDOT, September 2017

**Figure 2. ITS PCB Program Goals**

Each goal is supported by strategic objectives that outline the activities and initiatives the ITS PCB Program will conduct over the next 5 years.

## GOAL #1: Partnership Building

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The goal of partnership building is to develop strategic partnerships with public and private entities across all transportation modes. This goal has the following objectives:

- Expand coordination with other USDOT programs (e.g., USDOT’s internal Professional Capacity Building, Outreach, Education, Training and Technology Transfer (POET3) Team) to maintain a multimodal, multidiscipline focus
- Broaden work with universities and community colleges (and other academic institutions)
- Serve as a link to national/regional workforce centers and state and local public-sector training programs

## GOAL #2: Training and Education

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This goal aims to prepare all levels of current and future transportation professionals for a career in the dynamic field of ITS and promote the transition from research to deployment of innovative ITS solutions through the transfer of knowledge. The goal has the following objectives:

- Implement a core curriculum on how to deploy, operate, and maintain ITS
- Continuously update products and materials to reflect the latest developments in ITS technologies, particularly, connected automated transportation concepts
- Offer a standing webinar series on core competency areas
- Serve as a resource for and a partner in the development of ITS-related course materials (e.g., NHI, NTI, USDOT Program Offices) including crosscutting areas such as architecture, standards, data, cybersecurity, and policy
- Promote peer exchanges and workshops at the agency, regional, and national levels.

## GOAL #3: Strategic Outreach and Communications

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This goal aims to increase awareness of, understanding of, and interest in the ITS PCB Program’s education and training efforts. The goal has the following objectives:

- Develop core messaging for internal and external stakeholders
- Increase outreach to USDOT staff in the field to improve their ITS proficiency to serve as ambassadors for deployment
- Increase awareness of current and future PCB products, efforts, and impacts
- Sustain and expand awareness of ITS PCB efforts specifically related to connected automated transportation



## GOAL #4: Program Management and Evaluation

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This goal aims to establish processes and procedures to manage, track, and report on the use and outcome of training and education efforts sponsored and coordinated by the ITS PCB Program. The goal has the following objectives:

- Create actionable measures to evaluate the progress and reach of the ITS PCB Program
- Conduct monthly and annual evaluations to ascertain the effectiveness and efficiency of the full ITS PCB Program and individual training and educational offerings
- Track advancements in connected and automated vehicle technologies to ensure development of appropriate training and educational materials
- Develop a review process to assess whether training and educational efforts are outdated or content is no longer relevant.



# Chapter 5. Role of Training and Industry Partners

There are numerous educational offerings and learning providers in the ITS field. Courses are offered by a variety of organizations including state or local agencies; federal training partners such as FHWA, National Transit Institute (NTI), and National Highway Institute (NHI); and universities, professional associations, and private sector vendors of ITS technologies.

The ITS PCB Program works in partnership with these professional associations, universities, and the training programs of USDOT modal administrations to engage the broad technical and organizational expertise needed to develop and deliver ITS learning.



Source: USDOT, September 2017

Figure 3. ITS PCB Program Partners

Through partnerships, the ITS PCB Program is able to:

- Determine the knowledge and skills needed for the ITS workforce and develop an ITS and connected automated curriculum
- Provide structured learning directly or through partners in key areas of ITS learning
- Serve as a clearinghouse for ITS learning opportunities and instructional techniques
- Facilitate knowledge sharing among researchers, practitioners, and decision makers so that everyone gains from the experience of applying ITS in the real world, and new research results are quickly adopted and put into practice.

Because of these mutual benefits, the ITS PCB Program has established long-lasting partnerships with several key organizations:

- American Public Transportation Association (APTA)
- Consortium for ITS Training and Education (CITE)
- Institute of Transportation Engineers (ITE)
- Intelligent Transportation Society of America (ITS America)
- National Operations Center of Excellence (NOCoE)
- National Highway Institute (NHI)
- National Transit Institute (NTI)
- Vehicle to Infrastructure Deployment Coalition (V2I DC).

These partners play a critical role in helping the ITS PCB Program address any gaps in training offerings; coordinate efforts, where possible, to avoid overlap and offer a consistent curriculum in ITS and connected automated technologies; and reach an expanded set of stakeholders.

But this list is not exhaustive, and the ITS PCB Program is continuously looking to increase its partnerships to ensure the program can continue to meet the needs of the industry, coordinate and provide comprehensive ITS training, and reach an ever-expanding community of stakeholders.

# Chapter 6. Summary of Activities

To achieve its vision and mission, the ITS PCB Program will conduct a series of activities over the next 5 years in support of its goals and objectives. These activities are outlined in Table 1 and designated as near term (within 1 year), mid term (within 3 years), and long term (within 5 years).

**Table 1. ITS PCB Program Activities by Goal and Objective**

<b>GOAL #1: Partnership Building</b>		
<b>Objective</b>	<b>Activities</b>	<b>Timing</b>
1. Expand coordination with other USDOT programs (e.g., POET3, PCB Council) to maintain a multimodal, multidiscipline focus	✓ Lead monthly POET3 meetings to maintain a forum for information sharing among ITS research and outreach programs throughout the USDOT	Near Term
	✓ Coordinate in the development of a multi-discipline speaker's bureau	Near Term
	✓ Conduct internal outreach and awareness and knowledge building to increase the ability of USDOT staff to assist state and local partners	Near Term
	✓ Continue to lead the PCB Council to strengthen the broader coordination among multimodal capacity building programs	Near Term
2. Broaden work with universities and community colleges (and other academic institutions)	✓ Plan and host annual workshops to improve the coordination between the ITS PCB Program and academic institutions	Near Term
	✓ Produce materials such as case studies, educational videos, informational one-pagers, and slides that educators can download and apply to courses	Near Term
	✓ Sponsor an ITS Issues Solution Competition to challenge students to resolve ITS, connected vehicle, automated vehicle, and smart community problems	Mid Term
3. Serve as a link to national/regional workforce centers and state and local public-sector training programs	✓ Increase peer exchanges, workshops, and resource development between the national, division, and regional offices to promote the growth of ITS proficiency throughout the USDOT	Near Term

<b>GOAL #2: Training and Education</b>		
<b>Objective</b>	<b>Activities</b>	<b>Timing</b>
1. Implement a core curriculum on how to deploy, operate, and maintain ITS	✓ Design a rollout plan to implement the core curriculum	Near Term
	✓ Create and deliver core curriculum course(s) in accordance with implementation plan	Near/Mid Term
	✓ Improve the course search functionality on the ITS PCB web site	Near/Mid Term
2. Continuously update products and materials to reflect the latest developments in ITS technologies, particularly, connected automated transportation concepts	✓ Leverage information gained from technology scans, peer exchanges, and ITS deployments to update materials based on the latest ITS concepts	Mid Term
	✓ Establish a dedicated process for updating products and materials to promote consistency in databases and shared sites	Near Term
	✓ Establish an email address dedicated to handling inquiries for training and website materials	Mid Term
3. Offer a standing webinar series on core competency areas	✓ Institute continuously occurring webinar series on core competency areas	Near Term
4. Serve as a resource for and a partner in the development of ITS-related course materials including crosscutting areas such as architecture, standards, data, cybersecurity, and policy	✓ Lead coordination among training partners, educators, program managers, and subject matter experts to develop and update training materials in accordance with the PCB Course Plan	Mid Term
	✓ Create and maintain a training calendar for all offerings by the ITS PCB Program and its partners	Near Term
5. Promote peer exchanges and workshops at the agency, regional, and national levels	✓ Facilitate peer exchanges and workshops as part of the improved regional outreach that utilizes field staff's proficiency and real-world knowledge of ITS	Near Term

<b>GOAL #3: Strategic Outreach and Communications</b>		
<b>Objective</b>	<b>Activities</b>	<b>Timing</b>
1. Develop core messaging for internal and external stakeholders	✓ Create an ITS PCB icon that provides instant recognition of an ITS PCB product	Near Term
	✓ Increase the social media/web presence of the ITS PCB Program and its partners to encourage and retain audience engagement	Mid Term
2. Increase outreach to USDOT staff in the field to improve their ITS proficiency to serve as ambassadors for deployment	✓ Develop and implement the staff training plan for USDOT staff in field offices	Mid Term
	✓ Participate in existing meetings to provide regular updates on USDOT offerings available	Near Term

<b>GOAL #3: Strategic Outreach and Communications</b>		
<b>Objective</b>	<b>Activities</b>	<b>Timing</b>
3. Increase awareness of current and future ITS PCB products, efforts, and impacts	✓ Provide an ITS PCB Program presence at transportation conferences, symposia, and other events	Near Term
	✓ Expand marketing and communications products for the ITS PCB Program and its partners using infographics, brochures and fact sheets, articles, and blog posts	Near Term
	✓ Conduct outreach to additional media outlets for articles and ads	Near Term
	✓ Leverage USDOT modal partnerships with stakeholders	Near Term
4. Sustain and expand awareness of ITS PCB efforts specifically related to connected and automated transportation	✓ Coordinate with the ITS JPO Communications Program Manager in the development of consistent messaging on agency-specific positions on connected and automated vehicles	Near Term
	✓ Coordinate with the ITS JPO Communications Program Manager in the development of a suite of materials on agency-specific positions on connected and automated vehicles	Long Term

<b>GOAL #4: Program Management and Evaluation</b>		
<b>Objective</b>	<b>Activities</b>	<b>Timing</b>
1. Create actionable measures to evaluate the progress and reach of the ITS PCB Program	✓ Research performance measures used by other government agencies to evaluate similar training programs and institute PCB-specific metrics	Long Term
	✓ Conduct research into the latest training methods and techniques to apply to ITS PCB offerings	Mid Term
	✓ Coordinate with the ITS JPO evaluation activities to support and work in conjunction with their overall goals	Near Term
2. Conduct monthly and annual evaluations to ascertain the effectiveness and efficiency of the full ITS PCB Program and individual training and educational offerings	✓ Maintain a log of relevant educational offerings to monitor status such as number of deliveries, types of audiences that requested material, and required content updates	Near Term
	✓ Perform a year-end assessment of all ITS PCB Program products to determine the needs and direction of offerings for the upcoming year	Near Term
3. Track advancements in connected and automated vehicle technologies to	✓ Track advancements in transportation technologies through tech scan papers that monitor innovations that influence the next	Mid Term

<b>GOAL #4: Program Management and Evaluation</b>		
<b>Objective</b>	<b>Activities</b>	<b>Timing</b>
ensure development of appropriate training and educational materials	generation of ITS to plan for the associated training needs	
	✓ Create a template for tech scans to establish consistency among materials and make it available via the ITS PCB Program website	Mid Term
4. Develop a review process to assess whether training and educational efforts are outdated or content is no longer relevant	✓ Implement standard quality assurance methods to have courses reviewed by subject matter experts on an annual basis	Mid Term
	✓ Conduct post-delivery surveys of all trainings to determine the usefulness of the materials to each audience type	Mid Term



# Appendix A. Detailed History of ITS PCB Program

Because the technology and systems defined as “ITS” have evolved, the focus of the ITS PCB Program has likewise adapted through the years in support of ITS JPO research. In March 1996, the USDOT adopted a *Five-Year Strategic Plan for Professional Capacity Building (PCB) for Intelligent Transportation Systems (ITS) Transportation Management and Traveler Information Services* (the 1996 PCB Strategic Plan). The focus was on roadway management systems and information services. Since that initial strategic plan, several documents and plans have been developed that provided direction for the ITS PCB Program:

- [\*ITS PCB Program: Framework and Overview for Establishing a Professional Capacity Building Program for Transportation Management and Traveler Information Services in Support of ITS Deployment\*](#) (FY1997 Edition – September 30, 1997)
- [\*ITS PCB Program: Planning and Deploying ITS: Six White Papers Describing Current and Planned Programs of Five Transportation Associations and Four University ITS Research Centers of Excellence\*](#) (December 1997)
- [\*ITS PCB Program: ITS Training and Education Needs Assessment Baseline: A Review and Synthesis of Thirteen Prior Studies, Field Interviews, and a Summary Assessment of ITS Needs\*](#) (December 1997)
- [\*Building Professional Capacity in ITS: Documentation and Analysis of Training and Education Needs in Support of ITS Deployment\*](#) (April 1999)
- [\*National ITS Program Plan – Five-Year Horizon\*](#); USDOT ITS JPO (August 2000)
- *ITS PCB Needs Assessment 2001: ITS Training Needs Assessment* (Updated 2001): Summary and Program Recommendations (February 2002)
- *ITS PCB Needs Assessment 2001: Professional Development* (Updated 2001): Summary and Program Recommendations (February 2002)
- *ITS Curriculum Guide – A Systematic Approach to Building Professional Capacity in ITS* (2002)
- [\*Five-Year ITS Program Plan – 2006-2010\*](#) (2006)
- [\*ITS Research Results: ITS Program Plan\*](#) (2008)
- [\*ITS PCB Program Strategic Plan\*](#) (2010-2014)
- [\*Transforming Transportation Through Connectivity: ITS Strategic Plan, 2014-2014: Progress Update 2012\*](#) (October 2012)
- [\*ITS Strategic Plan, 2015-2019\*](#) (2015).

Each of these documents framed periods within the ITS PCB Program that identified new or expanded training directions accompanied by their targeted stakeholders.

As the legislation directed, the ITS PCB Program was charged with building a capable ITS workforce. Various needs assessments through the years have established a diverse, and ever-changing, list of competencies needed by the ITS professionals. Table 2 highlights top competencies identified in needs assessments across the years. While primary competencies have changed, general knowledge of technologies and their applications and how to best collect, utilize, store, and share data obtained from these technologies remain as top knowledge topics over the past two decades.

**Table 2. Assessment of ITS Competencies (1998, 2001, and 2017)**

Top ITS Competencies by Year			
	1998	2001	2017
	Coalition Building with New Stakeholders	Coalition Building with New Stakeholders	Architecture
	Data Analysis and Management	Data Analysis and Management	Data Management
	Financing	Financing	Legal
	ITS Planning and Regional Concept of Operations	ITS Planning and the Regional Concept of Operations	Operations
	Managing Contractors	Operations ( <i>new</i> )	Procurement
	Organizational/Institutional Changes	Organizational/Institutional Changes	Standards
	System Analysis and Design	Project Evaluation ( <i>new</i> )	Strategy/Challenges
	Systems Integration	Project Management ( <i>new</i> )	Systems Engineering
	Technology Options	Systems Integration (including Systems Analysis and Design by many respondents)	System Security
	Writing/Communications*	Technology Options	Technologies/ Applications
	<i>39 total competencies were listed in 1998</i>	<i>17 total competencies were listed in 2001</i>	<i>10 total competencies were listed in 2017</i>

\*Includes writing specifications and differentiating and communicating functional requirements, operational requirements, and technology options.

Figure 1 in Chapter 2 shows the educational or training methods used during each period of years. The ITS PCB Program has worked to continuously improve and diversify its methods deployed to reach new and expanding audiences. Table 3 presents some of the more significant methods used and products deployed.

**Table 3. ITS PCB Program Products – Year Introduced**

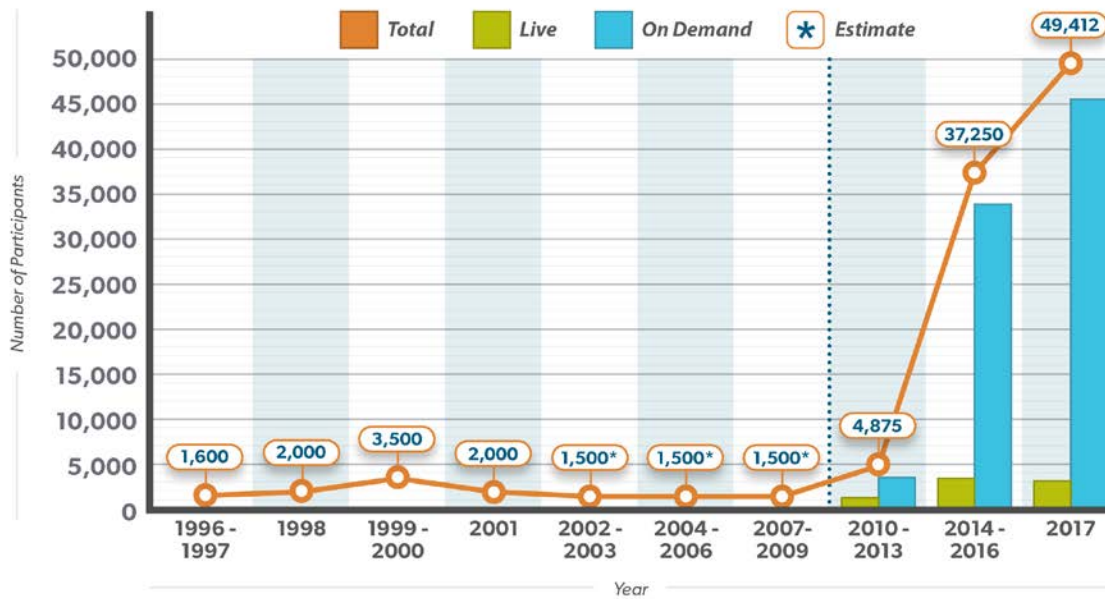
Product	Initial Year	Product	Initial Year
NHI courses	1997	ITS University Workshops	2011
NTI courses	1999	ITS Standards Modules	2011
CITE courses	2000	ITS ePrimer	2012
Peer-to-Peer Initiative	2000	ITS Academic Case Studies	2012

Product	Initial Year	Product	Initial Year
ITS America Workshops	2003	ITS Transit Standards Modules	2015
T3 Webinars	2003	ITS Training for Secondary Schools (STEM Program)	2015
T3 Webinar Archives	2007	ITS Community College / Technical Schools Workshop	2017

## ITS PCB Program Reach (Annual Average by Period)

A 1995 ITE and Federal Highway Administration (FHWA) survey revealed that only 50 percent of state agencies rated their ability to operate advanced systems as fair or poor, and rated their ability to maintain such systems worse than their ability to operate them. When the ITS PCB Program was established in 1996, there was a significant 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. In 1996, these trained professionals did not exist in sufficient numbers to effectively deliver the expected goals for widespread deployment of ITS. A major early goal of the ITS PCB Program was to overcome staff KSA shortfalls in deploying ITS. In the first couple of years, the program trained over 1,600 existing practitioners. *Source: USDOT, September 2017*

Figure 4 displays the increase in participation with ITS training products over the years.



NOTE: Spike in users between 2010 and 2014 was a direct result of offering FREE training for all courses funded by the ITS PCB Program.

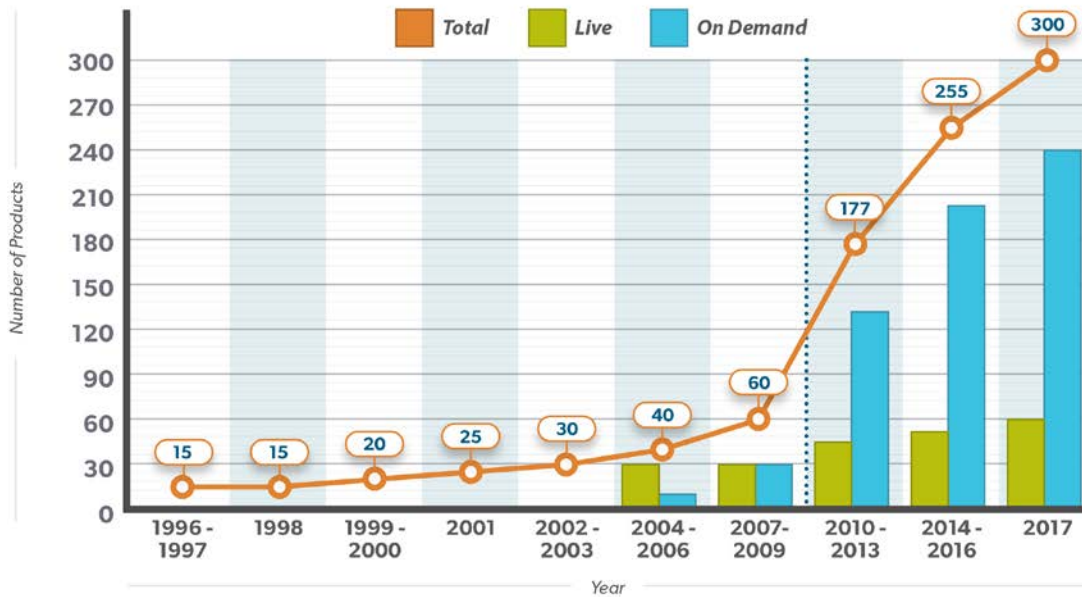
*Source: USDOT, September 2017*

**Figure 4. Average Annual Participation**

In subsequent years, the ITS PCB Program has reached well beyond the effort to create a cadre of trained professionals with ever-increasing educational opportunities available through live training or on demand via the ITS PCB website training portal. It is expected that these product offerings, which now

number over 300, will expand further as coordination with current and additional partners continues to grow. Increased coordination with academia, professional associations, and modal partners will greatly aid in identifying additional ITS-relevant training and educational materials that these partners are producing, reducing duplication of effort, and making it easier for current and future ITS practitioners to locate necessary (and wide-ranging) training when required. *Source: USDOT, September 2017*

Figure 5 illustrates the increase in ITS training products that are available **free** of charge to any participant.



NOTE: Limited on-demand (archived) products were available during the first decade of the ITS PCB Program. Since 2012, there have been extensive additions to the archived (online) offerings.

*Source: USDOT, September 2017*

**Figure 5. Number of ITS PCB Product Offerings**

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