

e-Construction and Partnering: A Vision for the Future



Implementation Plan

Every Day Counts | Innovation Initiative

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Introduction to the Plan

This document assists the Federal Highway Administration (FHWA) with planning innovation deployment activities for Every Day Counts 4 (EDC-4). It is organized into sections beginning with background on e-Construction and Partnering (e-C&P) and the EDC-4 initiative for 2017–2018. It then discusses the advantages of combining e-Construction and Partnering, describes the target audience, and summarizes the current state of the practice. The national and innovation goals of the initiative, the challenges to be faced in implementing it, and the marketing research are presented. Self-reported practice ratings, the practitioner suggestions for deployment strategies, and a work plan that includes specific activities are followed by a discussion of contingency planning. Table 1 on page 12 provides a summary of the priority strategies for consideration, and Table 6 on page 23 provides a full list of deployment strategies. From this summary, FHWA can prioritize the implementation of specific strategies to maximize the benefits of this initiative.

Implementation Plan Mission Statement

Improve the ability of State departments of transportation to deliver construction projects effectively and efficiently, saving time and money for stakeholders while increasing quality and safety.

e-Construction and Partnering

e-C&P combines two current practices—e-Construction and Construction Partnering. When implementing and advancing e-C&P innovations, State departments of transportation (DOTs) and their industry partners realize important benefits that include:

- **Increased transparency** by applying technology to resolve issues and minimize disputes proactively.
- **Reduced time** for project teams, from project inspectors collecting information in the field on mobile devices to engineers managing and administering projects electronically.
- **Improved safety** by reducing inspector exposure through e-Ticketing applications and affording real-time access to data, minimizing travel to and from the office to gather paper documentation.
- **Reduced costs** through viewing electronic plans and contract documents, better communication, and fewer change orders and claims.

- **Increased coordination and collaboration** through enhanced and transparent workflows, stakeholder action item tracking, and a single source for project documentation.
- **Improved communication** by creating a team environment conducive to building mutual trust and respect.

An Every Day Counts 4 Activity

Promoting e-C&P is an EDC-4 initiative for 2017–2018. The EDC-4 effort identifies and prioritizes innovations by developing, launching, and administering strategic deployment programs. To advance the state of the practice in e-C&P, FHWA will target education and aid to decision-makers and other key stakeholders, such as State DOTs, contractors, local governments, and consultants.

Why Combine e-Construction and Partnering?

In close coordination with State DOTs, FHWA is combining these activities because they share similar goals and benefits and lead to the program’s overarching goal of improved project delivery. Although each practice is standalone, their joint application is complimentary and creates synergies of great value to all stakeholders.

e-Construction is the application of electronic construction administration, management, and collaboration software and electronic devices. It replaces paper with electronic processes that improve workflow, increase transparency, improve safety, enhance quality, and save time and money. Implementation of these tools has resulted in substantial benefits to date with the prospect of even greater cost and time savings in the future. e-Construction advances include using

Working Together
<p>e-Construction provides paperless construction administration, digital project management, and field tools. Benefits – Provides a single repository of critical documentation, improves workflow, increases transparency, and saves time and money.</p>
<p>Construction Partnering builds a strong team relationship of mutual trust and respect and improves communications among stakeholders. Benefits – Achieves mutually beneficial goals; resolves issues and minimizes disputes; and improves quality, profitability, and cost savings for public and private stakeholders.</p>
<p>e-C&P Together applies technology to improve efficiency in project management and delivery and creates collaborative environments. Benefits – Improves safety, reduces construction time, manages costs and budgets more efficiently, and improves quality of projects.</p>

project collaboration sites; deploying mobile devices in the field; electronically routing reviews and approvals; and using digital signatures. This level of secure project collaboration provides a means for streamlining and improving communication among project team members. State DOTs, local agencies, and FHWA have all benefitted from EDC-3 e-Construction activities and have an opportunity to continue supporting activities under EDC-4 that provide benefits and positive return on investment.

Construction Partnering is a project management practice by which transportation agencies, contractors, and other stakeholders create a team relationship founded on trust. The goal of Construction Partnering is to reduce risks and achieve mutually beneficial goals and project objectives. Through effective communication, the practice of Construction Partnering will improve quality on all levels by proactively facilitating issue resolution, reducing claims and litigation, minimizing waste, and achieving budgetary objectives. Additionally, Construction Partnering significantly increases the probability of on-time, on-budget completion of projects.

Construction Partnering has evolved from primarily a design-bid-build (DBB) approach to the common use of innovative contracting techniques. Historically, formal partnering was applied to all projects regardless of their cost or other contributing risk factors. Today, the industry and State DOTs consider other factors including complexity, project schedule, and critical environmental and stakeholder issues when deciding to use Construction Partnering. In addition, the influx of technology has changed how agencies and other stakeholders partner. Communication is more frequent, transparent, and efficient. Partnering was once an office-centric activity, but—with the advent and application of technology—boundaries that previously inhibited the high level of collaboration needed in today’s construction environment have been eliminated.

Every aspect of the Construction Partnering process is enhanced through the optimization of technology and the achievements



Figure 1. Michigan e-Construction Technology Bringing Stakeholders Together

made possible through the e-Construction environment, as presented in the following examples.

Efficiency in conducting periodic team evaluations – On most Construction Partnering projects, stakeholders use periodic evaluations to assess team performance and ascertain issues or potential problems. Traditionally, such activities have been completed by using paper survey forms or desktop computers. Today, evaluations are available through a wide variety of hand-held devices, and participation is faster and easier. Use of this technology enables team evaluations to be completed more efficiently. In turn, project managers are better informed and able to resolve project or relationship issues before they affect the project.

Effective dispute resolution decision making – When critical project information is located in a single, joint repository accessible by all project participants, project partners can accurately assess how to make the best decisions for the project.

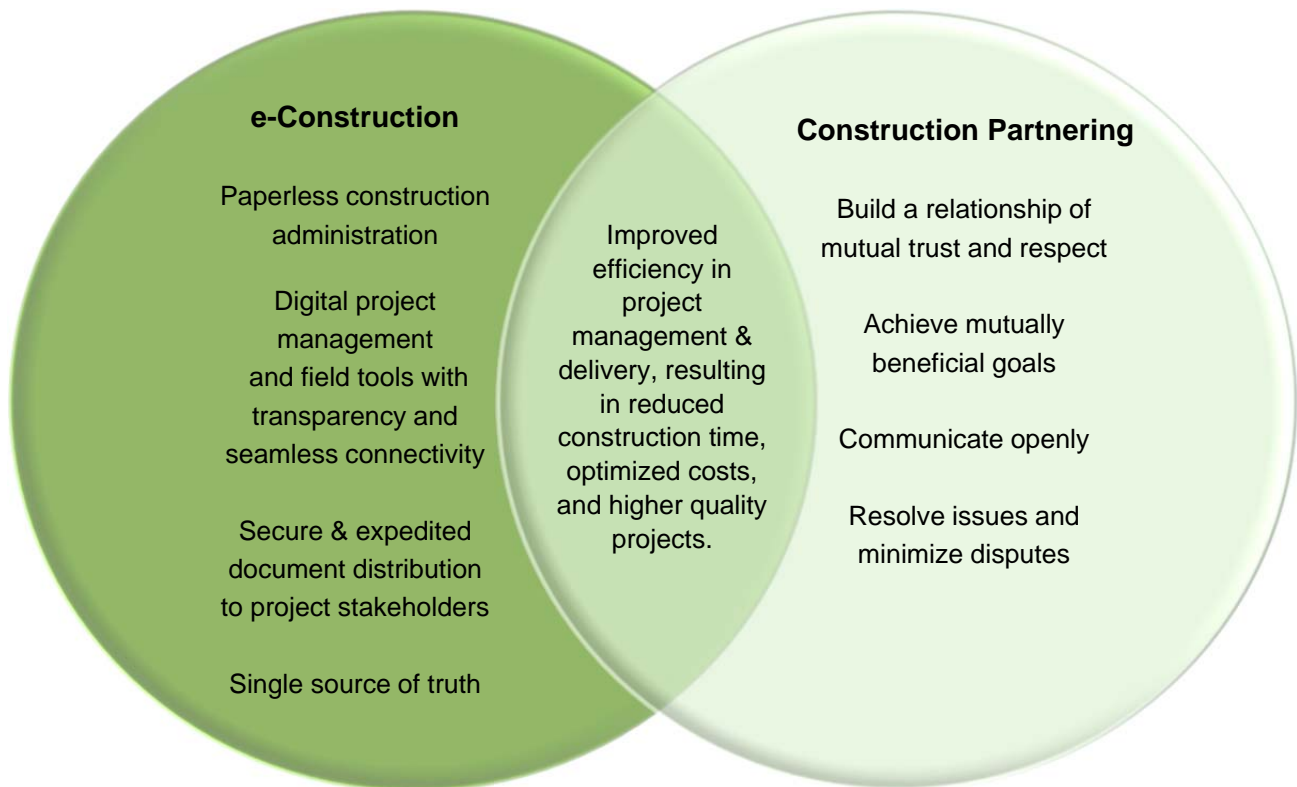


Figure 2. Synergies from Integration of e-Construction and Partnering

Combining these two practices creates an opportunity to promote specific e-Construction methodologies and technologies that will improve Construction Partnering among State DOTs and stakeholders. In addition, advancing Construction Partnering enhances the environment of trust and collaboration that is essential for maximizing the benefits of the e-Construction efforts.

Implementation Team and Key Stakeholders

Several key stakeholder groups are outlined in this section and will be consulted as applicable to ensure continuity and follow through.

Implementation Plan Leader owns the implementation plan and manages the execution of strategies. *FHWA staff.*

Implementation Plan Support Staff directly supports the implementation plan leader. *FHWA, DOT, and consultant personnel.*

Advisory Team reviews the approach and structure of the strategy and measures progress. *TWG personnel and AASHTO representatives.*

Tools and Tactical Team executes the strategy and develops the tools. Implementation plan leader and implementation plan support staff administer and identify tactical team members for individual tasks.

Key Stakeholders

Primary stakeholders are FHWA, members and affiliates of the American Association of State and Highway Transportation Officials (AASHTO), State DOTs and their respective subject matter experts (SME), contractors, consultants, local governments, vendors, and trade associations – all of which have adopted e-Construction and/or Construction Partnering. Secondary stakeholders are those primary stakeholders that have not yet adopted e-Construction or Construction Partnering initiatives.

FHWA VISION for e-C&P

Advance both the state of the practice and the state of the art for the integrated practice of e-C&P.

MISSION STATEMENT

Optimize construction and contract administration; enhance collaboration; minimize questions, claims, and disputes; improve safety; improving quality; and reduce project duration and cost.

e-C&P at the Regional Summits

In fall 2016 FHWA conducted seven Regional Summits across the country to highlight innovations and gather input from stakeholders on how best to implement the activities for EDC-4. These stakeholders consisted of representatives from State DOTs, FHWA, Local Agencies, the Army Corps of Engineers, the National Forest Service, and contractors and consultants. The backgrounds of the summit participants varied widely from construction practitioners to management to information technology (IT) personnel. Additionally, participant knowledge of e-C&P ranged from none to advanced. The findings and recommendations of the stakeholder discussions in each summit support the strategies recommended in this implementation plan.

A primary purpose of the Summit discussions was to identify strategies for advancing e-C&P practices during the EDC-4 implementation period and understand how best to support owner agencies. A summary of the Summit discussions was used as a basis for the deployment strategies included in this document's Work Plan (page 23), and stakeholder input was critical to the findings outlined in this plan.

Highlights from Summit participant suggestions and guidance are included in the following bulleted lists. These items are high-level statements that guided the development of the work plan. Additional detail on all Summit findings is available in the Regional Summit Notes document.

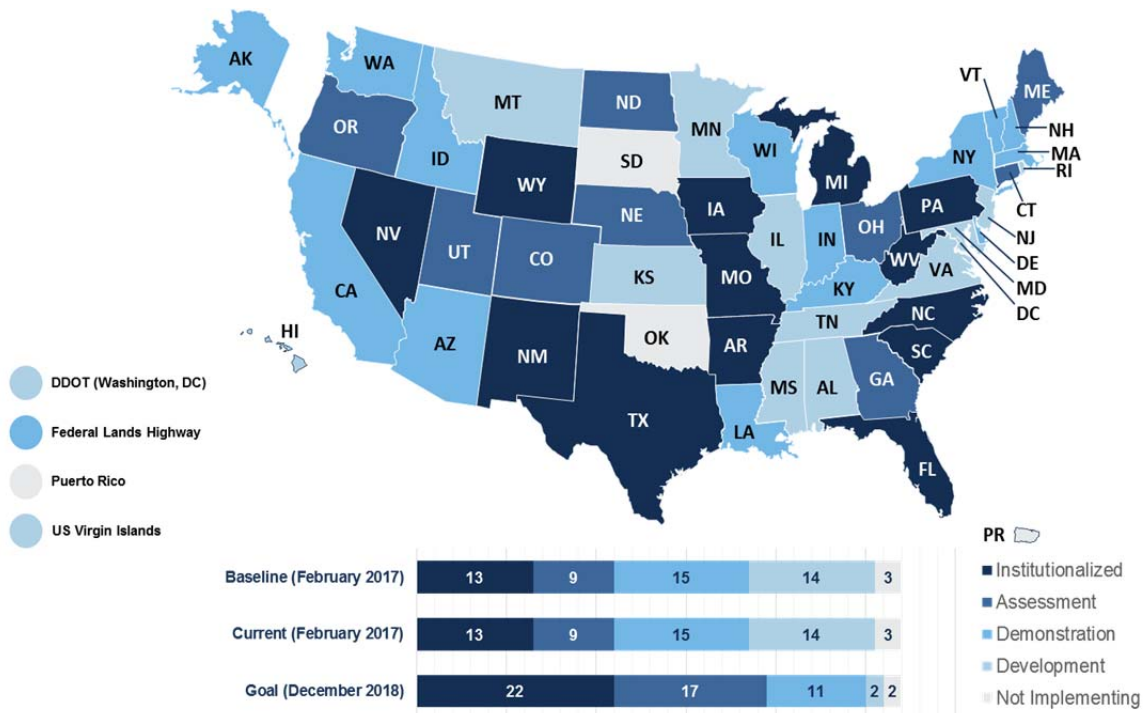
Construction Partnering:

- Promote consideration of project dollar value when deciding to use formal partnering, but agencies also will benefit from considering project complexity and risk.
- Facilitate updated partnering policies and guidelines to reflect the latest technology and applications.
- Focus on programmatic partnering also, such as between a DOT and a contractor association.
- Foster greater exchange of information between State DOTs and local public agencies.

e-Construction:

- Integrate local agencies with State DOT e-Construction systems to realize benefits of going paperless.
- Advance seamless data integration—from 3D design to construction to asset management and maintenance—is of primary importance for lead States when expanding their application of e-Construction technologies.
- Promote solutions to the issue of custom-developed versus commercially available e-Construction systems. Business processes should drive the software requirements.
- Promote topics that several States are interested in, including e-Ticketing, remote video monitoring, survey grade data on mobile devices (for use by project inspectors), seamless data integration throughout project life cycles, and unmanned aerial systems for quantity calculations.
- Promote use of a project collaboration tool as a first step for new States exploring implementation of e-Construction.
- Facilitate information sharing among neighboring States and regional contractors to ensure mutual understanding of how practices differ.

Over the past several years, FHWA has obtained detailed information on the state of the practice for e-Construction. Several sources provided information including peer exchanges and the resulting EDC-3 Lead State Profiles, the maturity matrix sheets from the Summits, and the survey of each FHWA EDC coordinator in each State. Figure 3 presents a national assessment of the maturity levels (current state of the practice) for States using e-Construction and is a result of only the survey of EDC coordinators as collected by FHWA's Center for Accelerating Innovation.



Not Implementing	The state is not pursuing the innovation.
Development	The state is collecting guidance and best practices, building support with partners and stakeholders, and developing an implementation process.
Demonstration	The state is testing and piloting the innovation.
Assessment	The state is assessing the performance of and process for carrying out the innovation and making adjustments to prepare for full deployment.
Institutionalized	The state has adopted the innovation as a standard process or practice and uses it regularly on projects.

Figure 3. e-Construction Maturity Levels by State (February 2017)

Although data on e-Construction maturity levels for each State has been available for some time, FHWA EDC coordinators also evaluated and rated combined State e-C&P practices in early 2017. Figure 4 shows these data, as collected by FHWA’s Center for Accelerating Innovation.

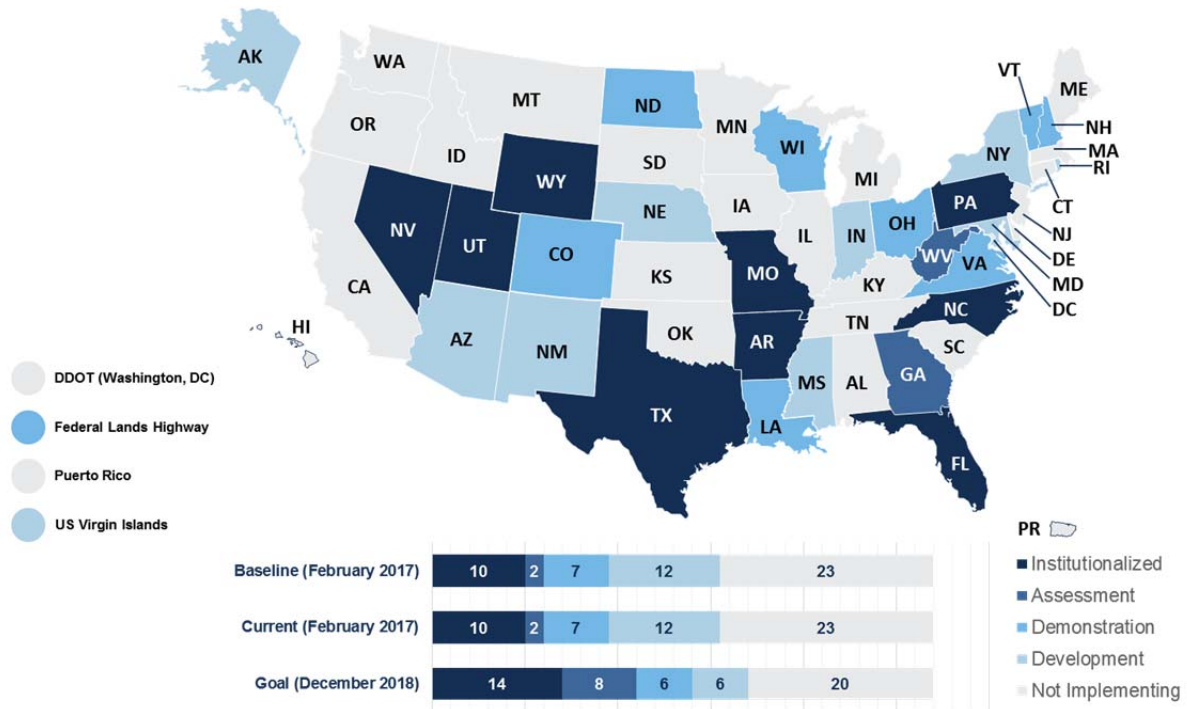


Figure 4. e-C&P Maturity Levels by State (February 2017)

Target Audience

Different groups will approach this initiative in a variety of ways, depending on several factors, including their role in the project delivery process, available funding, management support, maturity level and experience with e-Construction and Construction Partnering. Table 1 summarizes some of these factors and presents how the implementation plan strategies can ensure that a broad range of stakeholder groups will implement e-C&P.

Table 1. Target Audience Descriptors

Target Audience (TA)	Characteristics, Challenges, and Opportunities	Example Strategies and Product Types
TA-1: FHWA	Set strategic direction for implementation, fund activities, facilitate deployment.	Workshops and Webinars; awareness-level information; marketing and implementation plan.

Target Audience (TA)	Characteristics, Challenges, and Opportunities	Example Strategies and Product Types
TA-2: DOT Management and Decision-Makers	Make decisions on funding; make strategic decisions on business processes, activities, and tools; identify a leadership-level champion for implementation at their agencies.	Peer exchanges, training, executive-level marketing concepts, presentation materials, return on investment (ROI) information and analysis tools, and analysis assistance of available technologies.
TA-3: DOT Construction Engineers, inspectors, and IT personnel	Implementation and user-level champions for e-C&P, pilot technologies and practices and report on results.	How-to guides, presentation slides for selling concepts, software and process assessment results, case studies, regional and national discussion boards/blogs/workshops, in-person technology exchanges, self-paced web-based training, and podcasts/YouTube videos on specific tools and technologies.
TA-4: Contractors and Industry Representatives	User-level champions, very supportive of DOT led technology deployment, often demonstrate innovation, require access to DOT systems and can provide suggestions (through industry representation) on policies and practices implemented by owners.	Partnership exchanges, training, executive level marketing concepts, and presentation materials; Resource libraries, case study examples, benefits and ROI, and vendor showcases; Collaboration with agencies in technology development and deployment.
TA-5 Academia, University Researchers, Technical and Vocational Schools	Often funded by State DOTs to help improve practices; students and researchers that will have careers in the highway construction industry.	High-level overview information, guidance documents, and resources to assist with research to improve practices, marketing techniques that draw future employees to industry.
TA-6 Local Public Agencies	Implementation and user level champions for e-C&P, these users pilot technologies and practices and report on results. Typically follow DOT lead.	How-to guides, presentation slides for selling concepts, software and process assessment results; case studies, regional and national discussion boards/blogs/workshops, in-person technology exchanges, self-paced web-based training, and podcasts/YouTube videos on specific tools and technologies.

State of the Practice for Implementation

Implementation success relies on understanding current practices and the challenges that agencies face. By implementing strategies during the next two years (2017–2018), FHWA will help:

- Institutionalized States advance the state of the art for e-C&P.
- Assessment and demonstration States institutionalize the state of the practice.
- Development States advance their states of practice to implement e-C&P by taking the first step in implementation, such as developing a project collaboration tool.

Table 2 summarizes the strategies and benefits of implementation as they relate to each target audience group.

Table 2. e-C&P Deployment Strategies by Target Audience Group

Audience Group	Strategy	Anticipated Benefit
<p>Lead States A lead State is in the institutionalized category of implementation maturity.</p>	<ul style="list-style-type: none"> ■ Fund technical assistance for lead State pilot projects as well as evaluate and report on seamless e-Construction data integration; from 3D design to construction and asset management. ■ Develop and publish use cases on digital data and automated processes that use real-time data as the official e-Construction project record. ■ Develop and publish a business case to help other States achieve lead State status, and to document the need for continued focus and support of these efforts as technology continues to advance at an ever increasing pace. ■ Evaluate and document automated procedures for using e-Construction data post-construction, such as for maintenance of infrastructure components and future design. ■ Advance the state of the art for this target audience. Technical topics include unmanned aerial systems (for quantity calculations and inspections); e-Materials; digitally signed contracts, bonding, plans, and 3D models; use of advanced software 	<p>Integrated management of digital data for seamless delivery, 100% paperless project execution from project inception through closeout.</p>

Audience Group	Strategy	Anticipated Benefit
	<p>applications on mobile devices; and life-cycle uses of e-Construction data for asset Management and Civil Integrated Management (CIM).</p> <ul style="list-style-type: none"> ■ Expand e-Construction from use solely on State DOT projects to include local agencies and Tribes that currently do business with or through the institutionalized State DOTs. 	
<p>Advancing States The State is testing/piloting e-Construction innovations for project planning, design, and construction of highway facilities.</p> <p>An Advancing State is in the Assessment or Demonstration stage. The State is assessing the performance and the processes to prepare for full statewide deployment.</p>	<ul style="list-style-type: none"> ■ Fund a webinar series focused on detailed technical topics that can help advance the state of the practice for this target audience. Technical topics include e-Ticketing, data storage on collaboration sites, development and procurement of project collaboration sites, and use of basic software applications on mobile devices. ■ Provide labor and travel funding directly to State DOTs for e-C&P SMEs to fund State-to-State resource sharing by institutionalized States for technical support in advancing from piloting to statewide implementation. ■ Hold key stakeholder group discussion forums and support network with all State DOTs (through AASHTO). ■ Help expand e-C&P from use solely by State DOT employees to include local agencies, consultants, contractors, and subcontractors that currently do business with State DOTs. ■ Fund technical assistance to States to update policies and procedures for Construction Partnering. Research and document current state of the practice for Construction Partnering and publish benefits information on practices that can generate renewed interest. 	<p>Institutionalized practices for e-C&P, with a focus on collaboration, transparency, and trust.</p>

Audience Group	Strategy	Anticipated Benefit
<p>New Exploring States</p> <p>The State is in the development or not implementing stage. They are compiling guidance and best practices, building support, developing processes, and moving toward testing and piloting. They have a desire for implementation but need management buy-in, deployment champion identification, funding identification and assistance, and a plan for where to start.</p>	<ul style="list-style-type: none"> ■ Fund peer exchange opportunities for advancing and lead States to travel to the new exploring State and provide technical assistance. ■ ROI calculation assistance, tools to obtain management buy-in and support, change management, identify e-Construction champion, hold Implementation Plan or work plan development workshop, or both. ■ Fund roadmap to demonstration, capability matrix for self-evaluation and goal setting, and deployment of how-to guide and workshops. ■ Fund You-Tube video shorts (similar to Federal-aid essentials) focused on technical topics that can help advance the state of the practice for this target audience, facilitate entry into the e-Construction realm, share best practices and lessons learned, and provide framework to follow and resources to reach out to and use when first deploying e-Construction. ■ Provide labor and travel funding directly to State DOTs for e-C&P SMEs to help exploring States with implementation, including concepts of operation, system design, and procurement of commercial off-the-shelf systems, outsourced custom development, or in-house development. Further promote State Transportation Innovation Council (STIC) Grant Program. ■ Enhance the FHWA e-Construction and Partnering websites. ■ Establish a follow-up process to develop action plans for exploring states who participated in peer exchanges. Provide additional technical support to help them meet implementation goals. ■ Fund Regional workshop opportunities where multiple institutionalized States and industry travel to one location to provide technical assistance. 	<p>Initiating paperless practices and increasing communication and collaboration—taking the first step, such as through implementation of project collaboration site, electronic inspector daily reports, or electronic bidding.</p>

Audience Group	Strategy	Anticipated Benefit
<p>All stakeholder groups</p>	<ul style="list-style-type: none"> ■ Fund guidelines on application of Construction Partnering at the programmatic level, with industry associations and local governments. ■ Include examples based on project complexity and type of contracting mechanism. ■ Fund Research on e-C&P to advance the State-of-the-Art and support continued advancement of deployment. 	<p>Greater interest early in the project development process from all stakeholders.</p> <p>Real-time peer access to help with implementation</p>

Goals

National

The national goal is to continue the EDC-3 momentum to have 22 States reach institutionalized status for e-Construction by December 31, 2018. The definition of institutionalized is *e-Construction innovations for project planning, design and construction have been adopted by the State’s transportation community as the standard of practice and are used on all projects, or within the program, where appropriate, for 100% paperless project execution from project inception through closeout.* In addition, advance 17 States to the assessment stage for e-Construction with all States at least having demonstrated the technology.

For the integrated practice of e-C&P, the national goal is to have 14 States reach institutionalized status by December 31, 2018, and advance 8 States to the assessment stage. Discussion and interactions with specific agencies will help FHWA determine how to optimize these numbers.

Innovation Goal

For e-Construction, one primary goal is to accelerate adoption (change management and return on investment [ROI]) to create a new norm in construction-related project management, communication, and workflows.

Second, agency e-Construction use will reach the highest maturity level, and local agencies and contractors will expand use. This goal includes advancement in technology application, such as inspector use of survey grade positioning data on tablets and real-time data processing and analysis to automate functions. The materials management and asset management areas

could provide significant cost savings through advanced e-Construction applications that lead States are currently considering.

For Construction Partnering, a primary goal is to expand knowledge to all stakeholders about how today's technologies and modern methods can enhance partnering processes. As the state of the practice has advanced, States now can apply solid, time-tested principles in an environment that is rich in technology and takes advantage of new and innovative business relationships. The focus of partnering will be on "proactive" practices that help agencies and the private sector advance this new model while reducing risk and improving efficiency and project performance.

A primary goal of EDC-4 is to expand the use of e-Construction to advance Construction Partnering. Practicing e-C&P will raise accountability, improve communication, and add transparency in the management of projects. Practicing both together improves project collaboration by facilitating information sharing and the ability to identify a single, standardized repository for critical project records. In addition, e-C&P will provide for proactive digital project management and issue resolution in a way that reduces contract costs and time for all stakeholders.

Challenges

e-Construction. Each State's situation is unique—from the size of the construction program to the information technology (IT) resources available for implementation.

A key challenge lies in whether to develop a custom system or purchase a commercial product. Developing or procuring a new system requires meticulous decisions as to which approach would best match an agency's business processes or could be readily tailored. Rarely does the purchase of a commercial "off-the-shelf" product suffice without having to change long established processes and procedures. Such change can intimidate future users accustomed to the legacy systems. In addition, business processes might not match the design of these new systems.

The existence of legacy systems can complicate innovation deployment. Legacy systems might no longer meet the organization's needs, or agencies might use outdated or unsustainable technology. Some agencies are hesitant to

abandon legacy systems because they are often intertwined with other technology solutions serving other needs or departments. Ultimately, staff must decide and recommend to their management whether to upgrade or to replace legacy systems.

Another challenge is obtaining management buy-in so that critical resources including personnel and funding can be dedicated to implementation. Experience has shown the importance of credible ROI information for both agency management and those who control legislative budget processes. e-Construction technologies could have significant up-front costs, and ROI might not be achieved for 2 to 7 years, depending on the technology and level of deployment.

Construction Partnering. State DOTs have been using Partnering for several decades. This project management strategy began as a very formal and structured collaboration approach that suited the project delivery environment at the time. Construction Partnering, however, has not kept pace with innovations in project delivery, technology advances, and complexities inherent in today's project delivery environment. Policies



Figure 5. Mobile Devices for Enhanced Construction Inspection in Missouri

and practices need to change and adapt to innovations in areas such as e-Construction to remain relevant and effective for the effective delivery of projects.

Although States are using both e-Construction and Construction Partnering practices across the United States, challenges for advancing their combined application and achieving their potential synergies remain.

Benefits

Stakeholders will realize the benefit of practicing e-C&P together in the management and delivery of projects. For e-Construction, benefits include reduced printing costs, increased quantity and quality of electronic

documentation, time savings for inspectors, and greater confidence in a single source of truth for construction contract administration. Construction Partnering improves collaboration and builds trust and stronger relationships across stakeholders. With a renewed interest in partnering and expanded implementation of the e-C&P concepts and tools, agencies and other stakeholders benefit from greater transparency and a more proactive approach to identifying potential conflicts early in the process.

Some specific benefits of e-C&P include:

- Collaboration and communication across the public and private sector, resulting in better documentation for agencies and faster and more accurate payments to contractors;
- Transparency through project collaboration sites with documented correspondence, approvals, and a single source of truth;
- Reduced costs associated with claims and disputes;
- Improved document distribution and workflow processing; and,
- Efficient inspection, documentation, and overall time savings.

In addition, notable success has been achieved when States apply partnering principles to their industry relationships or with local governments. More recently, States are applying Construction Partnering in a less formal way with more emphasis on teamwork and collaboration in lieu of the very structured approach used for so many years. Regardless of whether a formal or informal approach is chosen, technology applications will be important and will play a key role in renewed industry interest in partnering concepts.

Marketing Research

A. General Research Approach

The key focus of marketing and market research for this initiative is to create a branding message that supports the deployment, adoption, and use of e-C&P technologies. The branding message will help increase awareness, understanding, and interest in the offerings and promote best practices for successful construction project management. This activity will include shaping industry perception around how to apply e-Construction tools that also enhance Partnering.

B. Obstacles, Opportunities, Strategies, and Tools/Tactics

To provide a clear path forward, the e-C&P Team evaluated potential obstacles, along with opportunities, strategies, tools, and tactics for mitigating the barriers to deployment and implementation of the innovation. Table 3 summarizes the Team’s evaluation, and Table 4 outlines marketing strategies.

Table 3. Opportunities, Obstacles, Strategies, Tools and Tactics

Opportunities/ Obstacles	Strategy	Tools/Tactics
Agencies that have not yet implemented e-Construction might need assistance selling concepts to management.	Develop presentation materials and tools that highlight benefits and ROI to key decision-makers.	<ul style="list-style-type: none"> ■ Presentation slides ■ Self-Assessment Maturity Matrix Tool ■ Calculation and reporting of ROI and key benefits ■ Executive level peer exchanges
Some agencies will have challenges in overcoming past experiences that have created current perceptions of Partnering.	Focus on practical examples from other States that show the benefits of renewed interest in Partnering, including claims avoidance, cost reductions, and schedule improvements.	<ul style="list-style-type: none"> ■ Interviews with States ■ Data collection and analysis of practices ■ Example case studies on risk-based partnering applications

Table 4. Marketing Tools and Tactics

Marketing Tool or Tactic	Activity Description	Level of Priority
Partnering Peer Technical Assistance Program	Set up peer group with listserv or similar communication techniques, regular newsletters, outreach materials, and conference presentations.	1
Posters for Future Conferences	Design and production of handouts, displays, and presentations for FHWA personnel or contractor team members to present or display on e-C&P at AASHTO Meetings, TRB, and others. Recommend including QR code on materials so that users can access additional materials, presentations and reports from the website. Design an e-C&P Logo for use on this and other products.	2

Performance Measures

To ensure the success of deployment goals, measures will be closely tracked. For each goal, State agencies will achieve specific objectives and FHWA will track those activities through input from EDC coordinators in each State and through

observations. FHWA will evaluate the progress of deployment activities and the advancement of States and others in adoption and standard use of the technologies and practices.

Table 5 summarizes the goals and performance measures suggested for evaluating e-C&P implementation across the nation.

Table 5. Goals and Performance Measurement

Goal Category	Monitoring and Measuring Progress	How do we tell if it's working?
Team Goals	Achieve the national goal by performing 10 peer exchanges and publishing at least 8 promotional documents.	<ul style="list-style-type: none"> ■ Number of peer exchanges or pilot projects that result in advancement of State's implementation. ■ Number of products published
National Goals	20 Institutionalized States for e-Construction and 12 institutionalized States for e-C&P. Increase each new and advancing state's maturity level by at least one level.	<ul style="list-style-type: none"> ■ FHWA Center for Accelerating Innovation (CAI) EDC-4 reporting metrics ■ Maturity matrix results ■ TWG member discussions
Innovation (Benefit) Goals	Accelerate deployment of e-Construction and e-C&P nationally and reduce costs, claims, and paper.	<ul style="list-style-type: none"> ■ Requests for peer exchanges ■ Agency engagement levels ■ Enhanced partnering results and improved maturity matrix scores ■ Growing membership in partnering peer technical assistance group

Work Plan

Table 6 highlights the identified activities and anticipated leads to follow up on in implementation. The identified implementation activities reflect feedback received from participants at the fall 2016 Summits held around the country. The feedback from those Summits also has helped in identifying potential audiences for these activities and the type of message that would successfully target those different audiences.

Activities are presented in three separate tracks: e-Construction, Construction Partnering, and e-C&P joined and implemented together. Table 6 is complimentary to Table 1, as it adds responsibility and due dates.

Table 6. Work Plan

Implementation Activity	Audience	Message	Responsible Party	Due	Comments
e-Construction Actions					
1. In-Person Peer Exchanges for non-institutionalized States	State and local agency construction personnel, IT staff, contractors, and vendors	Experience of national leaders shared with neighboring and other agencies accelerates knowledge transfer and adoption.	FHWA, state and local transportation agencies and industry organizations	2017/2018	Gather input directly from States on highest priority needs, SME technical assistance funded directly to States, tailored business case document resulting from peer exchange discussions.
2. e-Construction Technical Topics Webinar Series	State and local agency construction personnel, designers, contractors, and vendors	Experience of national leaders shared with neighboring and other agencies accelerates knowledge transfer and adoption; ROI calculations and state-of-the-art technologies.	FHWA, state and local transportation agencies and industry organizations	2017/2018	Conduct 90-minute webinars with guest speakers on highly technical topics (i.e., Q/A; e-Ticketing; data storage; project collaboration site development; mobile device apps; UAS's).

Implementation Activity	Audience	Message	Responsible Party	Due	Comments
3. Technical documents: Case Studies, Guidelines, and Best Practice Information	State and local agency construction personnel, designers, contractors and vendors	Case studies and guidance documents highlight new technology and innovative practices to educate e-C&P users.	FHWA and Industry organizations	2017/2018	Publications to accompany webinar information – business cases/processes; digitally signed contracts; 3D data integration; disseminate information on state-of-the-practice in e-Construction.
Construction Partnering Actions					
4. National Innovative and Effective Partnering Practices Conference	State DOT construction staff, local agency staff, contractors, consultants, and FHWA	To share Construction Partnering best practices among peers to promote greater use.	FHWA, state and local transportation agencies and industry organizations	4/2017	Nevada DOT hosted in Reno, Nevada, April 4–6, 2017.
5. Construction Partnering Peer Technical Assistance Group and State-of-Practice study	State DOT construction staff, local agency staff, contractors, consultants	How-to guidance for effective and efficient application of Construction Partnering concepts targeting new construction professionals.	FHWA and Industry organizations	2018	Provide help to States by revisiting Construction Partnering policies and procedures and case studies of risk-based and programmatic Construction Partnering.
6. Model Construction Partnering specification development	State DOT construction staff, local agency staff, contractors, consultants, and FHWA	Demonstrate how Construction Partnering adapts to the various alternative contracting methods / scenarios.	FHWA and Industry organizations	2018	Provides updated specification that can be used with a variety of project delivery models.

Implementation Activity	Audience	Message	Responsible Party	Due	Comments
7. Report on the application of Construction Partnering at the programmatic level with industry associations and local governments	State DOT construction staff, local agency staff, contractors, consultants, and FHWA	Case studies, examples, lessons learned, successful applications.	FHWA and Industry organizations	2018	Provides examples and case studies on successful application of Construction Partnering.
e-C&P Synergy Actions					
8. Outreach materials for e-Construction and Construction Partnering applications	DOT IT personnel and construction personnel, local agencies, Tribes, contractors, consultant, venders, industry, and Educational institutions	Inspire a culture of innovation among a new generation of transportation professionals by encouraging them to embrace innovation and technology throughout their careers as a way to advance their chosen profession. Answer - What is e-C&P? How does it affect me?	FHWA	2017	Promote awareness of e-C&P innovations and technology. (YouTube videos, career fairs, tech briefs and to include marketing efforts - logo messaging, and products).
9. Regional e-C&P Demonstration Workshops	State and local agency construction personnel, designers, contractors and vendors	Enhanced technical assistance on specific (AID Grant) projects demonstrating e-C&P technologies and practices with peer-exchange opportunity for each demo.	FHWA, state and local transportation agencies and industry organizations	2018	Two real-world projects at strategic locations for states in the 'Development' and 'Demonstration' implementation stages.
10. e-C&P Community of Practice	State DOT construction staff, local agency staff, FHWA	Website that allows users to exchange information and share ideas	AASHTO	2018	AASHTO contact - Keith Platte.

Implementation Activity	Audience	Message	Responsible Party	Due	Comments
11. Report on applying e-C&P to Alternative Delivery Methods	State DOT management and construction staff, FHWA	How innovative contracting affects the traditional partnering roles by stakeholder group	FHWA, AASHTO and industry organizations	2018	Focus on Design-Build, Construction Manager/General Contractor, and Innovative Financing projects.
12. Research studies in e-C&P to advance the state-of-the-art and continued support for advancement of the subjects	State DOT executive, IT and construction staff, local agency staff, contractors, consultants, and FHWA	<p>Advance state-of-the-art research, understanding, benefits, and best practices.</p> <p>Secure e-Construction data for future use in asset management and life-cycle.</p>	FHWA – TFHRC	2018	<p>e-C&P success stories, disaster recovery study of e-Construction data, archiving of e-Construction data BPs, single source of truth ROI and use, use of e-Construction data after construction in asset mgmt / lifecycle of assets.</p> <p>Methods of e-Construction data archiving, data storage, and data integrity.</p> <p>Research documents; asset management application of e-Construction data; data archiving, storage, and integrity; seamless lifecycle data use case studies.</p>

Summary

This implementation plan provides the first steps toward combining the e-Construction and Construction Partnering practices. Participation by FHWA, agencies, and States is necessary for success. In two years, the combination will maximize the effectiveness of construction programs. The result will be reduced claims, increased efficiencies, increased collaboration and trust, avoided costs, and accelerated project schedules.

every day counts 



U.S. Department of Transportation
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