



U.S. Department  
of Transportation

**Federal Highway  
Administration**

# Memorandum

WESTERN FEDERAL LANDS HIGHWAY DIVISION  
610 EAST FIFTH STREET  
VANCOUVER, WA 98661-3801

Subject: ACTION: FY 2005 TDIPP Proposals

Date: March 10, 2005

Reply to: HFL-17

File: 741

From: Daniel D. Donovan, P.E.  
Director of Program Administration

Reference: #26122M\_BJR

Thru: Ronald W. Carmichael, P.E.  
Division Engineer

To: Arthur E. Hamilton, P.E.  
Associate Administrator for  
Office of Federal Lands Highway

Attached are 12 FY 2005 proposals for Technology Deployment Funds. The total WFLHD FY 2005 Technology Deployment Initiative Partnership Program (TDIPP) is summarized in the attached executive summary. Please allocate a total of \$1,145,000 of TDIPP funds for the WFLHD FY 2005 Technology Deployment Program.

We have developed these proposals through a systematic process, following the FLH Technology Road Map and the WFLHD multi-year Technology Deployment Action Plan. These proposals have been coordinated with all functional areas within WFLHD, principle stakeholders and customers.

Attachments:  
Executive Summary  
Proposals

cc: Monica Gourdine, HQ FLH  
Gary Brown, EFLHD  
Roger Surdahl, CFLHD  
Amit Armstrong, WFLHD

cc: Ronald W. Carmichael, WFLHD  
Dan D. Donovan, WFLHD



# Executive Summary

## Technology Deployment Initiative and Partnership Program Requests for Funding FY 2005

A brief summary of the following twelve FY 2005 requests is provided:

Project	Amount	Priority	Focus Area	Champion
Use of spatial technologies for enhanced productivity in project delivery	\$350,000	1	GIS	Ted Wood
Showcasing of Technology Deployment Initiatives	\$50,000	2	All	Amit Armstrong
Evaluate and incorporate design visualization techniques for project delivery	\$100,000	3	DV	Ninh Phan
Locating sensitive natural and cultural resources for project planning using remote sensing technology	\$100,000	4	CSS	Mike Boynton
Quality assurance of accelerated construction techniques	\$110,000	5	AC	Marty Flores
Crash Test Evaluation for 2-Tube Curb Mount Bridge Rail	\$100,000	6	CSS	Jeff Berg
Evaluation of remote monitoring systems for road construction	\$70,000	7	AC	Bob Lale
Evaluation of construction lighting systems for road construction	\$25,000	8	AC	Howe Crockett
Plenary Session at National Trust for Historic Preservation Annual Conference	\$25,000	9	CSS	George Fekaris
Enhance report generation capabilities of Materials MLT and QL-PAY	\$10,000	10	None	Bruce Wasill
Importing Microsoft documents into MicroStation	\$5,000	11	None	Steve Pratt
Digital Highway Measurement Technology	\$200,000	12	GIS	Amit Armstrong
<b>Total</b>	<b>\$1,145,000</b>			

Attached are the 12 FY2005 WFLHD Technology Deployment Initiative Partnership Program (TDIPP) Request for Funding statements. The total proposed WFLHD Technology Deployment Program is \$1,145,000.

We have developed these proposals through a systematic process following the FLH Focus Technology Road Map. These proposals have been coordinated with all functional areas within WFLHD and our customers.

<p><b>Project Title:</b> Use of spatial technologies for enhanced productivity in project delivery</p>	<p><b>FHWA Strategic Goal Area:</b> Productivity Human and Natural Environment</p>
<p><b>Background:</b> Spatial data is essential for highway design projects. The current practice of using traditional point based survey data for highway design is antiquated and inefficient. This proposal presents a way to spatially enable all aspects of the project delivery process for highway design in WFLHD. The FLH partner agencies are increasingly using spatial technologies to map their resources and analyze this data for planning and engineering. Additionally, the A&amp;E contactors are using spatial technologies for delivering our products. However, the WFLHD is lacking in leveraging spatial technologies. The use of spatial technology is limited to planning section only. Through the use of spatial technology, WFLHD can share natural resource information with client agencies, resource agencies, and A&amp;E consultants. Additionally, WFLHD can benefit from spatial technology during planning activities, reconnaissance trips, and PS&amp;E field reviews.</p>	<p><b>Estimated Costs:</b> Total estimated cost including deployment is \$600,000.  FY 2005-\$350,000 FY 2006-\$250,000</p> <p><b>Duration:</b> March 1, 2005-September 2006</p>
<p><b>Scope:</b> This proposal will be used as a proof of concept to evaluate the productivity enhancement of spatial data in project delivery process. The initial system will be tested by following activities that represent a subset of all project delivery and technical services activities:</p> <ul style="list-style-type: none"> <li>• Task 1 <ul style="list-style-type: none"> <li>▪ Setup a spatial database</li> <li>▪ Setup a spatial data server and web server</li> <li>▪ Setup data interchange between CADD system and spatial data</li> </ul> </li> <li>• Task 2 <ul style="list-style-type: none"> <li>▪ Purchase base level topographic data and imagery data</li> <li>▪ Setup workflow processes using GPS tools (i.e., field notes using GPS tools, using GPS tools for geotechnical and/or hydraulic field data collection, etc.)</li> </ul> </li> <li>• Task 3 <ul style="list-style-type: none"> <li>▪ Spatial data sharing with customers, partners, contractors, and state DOTs</li> <li>▪ Summarize results and experiences in a Final Report</li> </ul> </li> <li>• Task 4 <ul style="list-style-type: none"> <li>▪ Disseminate information through publications, demonstrations, and presentations</li> </ul> </li> </ul>	<p><b>Champions:</b> Ted Wood 360-619-7715</p>

<p><b>Project Title:</b> Showcasing of Technology Deployment Initiatives</p>	<p><b>FHWA Strategic Goal Area:</b> Productivity</p>
<p><b>Background:</b> The Federal Lands Highway (FLH) Technology Deployment team coordinates communication, outreach, and marketing services to showcase agency wide technology and innovation activities. Specifically, FLH makes presentations at conferences, conducts workshop, develops training CD/DVDs, and publishes reports and technical briefs for new and under utilized technology. As these activities are requested throughout the fiscal year, a mechanism is needed for timely funding order to address the needs of our internal customers and external partners in a timely manner.</p>	<p><b>Estimated Costs:</b> Total estimated cost including deployment is \$50,000</p> <p><b>Duration:</b> March 1- September 30, 2005</p>
<p><b>Scope:</b> The Technology Deployment (TD) team deploys research and provides products and services that are essential, indispensable, and connected to our Federal Land Management customers and partners. The initiatives the team promotes are critical to innovation. The TD program includes a broad mix of projects that cut across traditional transportation modes and technical disciplines. Our program continually evolves to meet changing national priorities and client needs.</p>	<p><b>Champions:</b> Amit Armstrong 360-619-7668</p>

<p><b>Project Title:</b> Evaluate and incorporate design visualization techniques for project delivery</p>	<p><b>FHWA Strategic Goal Area:</b> Mobility, Productivity</p>
<p><b>Background:</b> WFLHD is in cooperation with GNP in planning, designing and administrating the Going-to-the-Sun Road (GTSR) rehabilitation projects. The projects encompass five major areas: road rehabilitation; visitor use and experience improvements; information; information technology improvements; and transit elements.</p> <p>The April 2003 GTSR Environmental Impact Statement (EIS) and subsequent Record includes implementation of a transit system and an integrated deployment of Intelligent Transportation System (ITS) functions to support the construction, transit system, available alternate route and traveler related park information, as well as associated comfort stations, shelters, benches, and signage.</p> <p>The proposed redevelopment of the Loop site includes reconfiguration of the parking to improve safety, pedestrian crossing, installation of new historical viewing and interpretive areas, formalize existing pedestrian overlook, construction comfort station, and transit stops for shuttle buses within the existing ground disturbance.</p>	<p><b>Estimated Costs:</b> The total estimated cost of this proposal including deployment is \$200,000</p> <p><b>Duration:</b> March 2005-October 2006</p>
<p><b>Scope:</b> Establish a design visualization infrastructure, process, and methodology to enable various agencies to visualize conceptual, proposed, and finalized solutions. This would be accomplished by utilizing computer-generated 3-D design visualization images, modeling, and/or virtual simulations. In addition, sophisticated third party applications will be employed to produce photo realistic images, modeling, and virtual simulations. The resulting design visualization workflow, process, and methodology will be documented to develop a training format to properly train the key participants within this process.</p> <p>To facilitate ideas and seek agreements at the various milestones to achieve the final site development proposal(s), FLH will fully utilize the visualization medium to communicate ideas between landscape architects, cultural resource specialists, engineers and State officials.</p>	<p><b>Champions:</b> Ninh Phan, WFLHD 360-619-7590 Richard McDaniel, EFLHD 703-404-6362</p>

<p><b>Project Title:</b> Locating sensitive natural and cultural resources for project planning using remote sensing technology</p>	<p><b>FHWA Strategic Goal Area:</b> Productivity Human &amp; Natural Environment</p>
<p><b>Background:</b> At present, project planning typically involves development of a preliminary alignment before resource inventories are undertaken. Road locations are typically within high-sensitivity resource areas. Resource surveys are taken at a project-specific level, and conflicts often result in additional survey and design.</p>	<p><b>Estimated Costs:</b> The total estimated cost of this proposal including deployment is \$100,000</p> <p><b>Duration:</b> March 1, 2005-September 30, 2006</p>
<p><b>Scope:</b> Explore the practicability and accuracy of resource inventories at the landscape level to identify high-probability landforms for natural and cultural resources. The Thompson River Road project will be utilized for this proposal. The following objectives will be achieved during this project:</p> <ul style="list-style-type: none"> <li>• Use landform analysis and environmental reconstruction for site predictive modeling.</li> <li>• Use spatial technology and geomorphology to highlight and isolate such landforms for field verification, to improve site predictive modeling on a landscape level.</li> <li>• Use LandSat and Eros band comparison imagery, and other remote sensing technology, to document changes in landscape.</li> </ul>	<p><b>Champions:</b> Michael Boynton 360-619-7983</p>

<p><b>Project Title:</b> Quality assurance of accelerated construction techniques</p>	<p><b>FHWA Strategic Goal Area:</b> Productivity</p>
<p><b>Background:</b> The highway construction industry has begun utilizing GPS technology for construction staking and/or stakeless construction for FLH projects resulting in accelerated construction. The FP and SCRs do not reference the use of GPS technology. Contractors are becoming more and more proficient at using this technology. GPS technology is clearly gaining a foothold in the highway construction industry and we need to familiarize and train ourselves to be able to improve our contract specifications to enable the efficient use of this technology. As size of project staff is reduced, quality assurance is important to monitor contractor's work quality during accelerated construction. Using current practices, this task requires at least two WFL employees to check contractor's staking, organize data, handle instruments, and do the physical checking. By utilizing GPS technology, the crew size can be reduced to one individual.</p>	<p><b>Estimated Costs:</b> Total estimated cost including deployment is \$110,000</p> <p><b>Duration:</b> January 2005-September 2006</p>
<p><b>Scope:</b> The WFLHD construction branch proposes to purchase a survey grade RTK GPS system with base station to use primarily in the Yellowstone and Grand Teton National Parks. The NPS program in this region is quite large. Significant major projects are scheduled for construction over the next ten years. The GPS system will be used to check contractor's earthwork and drainage activities. Project staff will be trained in its use. Knowledge gained from its use will be transformed into an introductory training class for construction orientation. In addition knowledge gained will be used to provide recommendations for the next FP rewrite or if deemed appropriate suggestions may be advanced for the modification of the current SCR.</p>	<p><b>Champions:</b> Marty Flores 360-619-7992</p>

<p><b>Project Title:</b> Crash Test Evaluation for 2-Tube Curb Mount Bridge Rail</p>	<p><b>FHWA Strategic Goal Area:</b> Productivity</p>
<p><b>Background:</b> FLH bridge engineers and NPS architects are focused on constructing crashworthy bridge appurtenances that are aesthetically compatible with the local environment and that match or simulate bridge rail that has historically been used in the region.</p> <p>The 2-Tube Curb Mount Bridge Rail is a steel post and beam rail that has been used on several bridge projects in the last decade within YNP. This bridge rail has not been tested and evaluated to the guidelines specified in National Cooperative Highway Research Program (NCHRP) Report 350,</p>	<p><b>Estimated Costs:</b> The total estimated cost including deployment is \$100,000.</p> <p>Phase I, <i>FY 2005</i>     \$50,000 Phase II, <i>FY 2005</i>     \$50,000</p> <p><b>Duration:</b> Two years</p>
<p><b>Scope:</b> <i>Phase I:</i> Crash test and evaluate the performance of the 2-Tube Curb Mount Bridge Rail in accordance with the guidelines presented in NCHRP Report 350 test 2-11 (a 2000-kg pickup truck). <i>Phase II:</i> If the 2-Tube Curb Mount Bridge Rail fails to meet the guidelines in NCHRP Report No. 350. The tube mount rail will be redesigned and retested in accordance NCHRP Report 350 test 2-11.</p> <p>If Phase I is successful, Phase II will crash test the tube mount bridge rail to stone masonry transition in accordance with NCHRP Report 350, test2-21.</p>	<p><b>Champions:</b> Jeff Berg, WFLHD 360-619-7729</p>



<p><b>Project Title:</b> Evaluation of remote monitoring systems for road construction</p>	<p><b>FHWA Strategic Goal Area:</b> Safety, Productivity</p>
<p><b>Background:</b> Our typical projects include several site locations spread out over 2 to 5 miles and our typical staffing is around 2 to 4 people per project. The inspectors and project engineers are usually required to allocate their time to the sites or operations with the most risk and leave some work unsupervised for extended periods of time. Additionally, overtime hours needed to cover the understaffing continues to be a problem for our office.</p>	<p><b>Estimated Costs:</b> The total estimated cost of this proposal including deployment is \$70,000</p> <p><b>Duration:</b> March 2005-October 2005</p>
<p><b>Scope:</b> Deploy an autonomous remote wireless video monitoring system at two constructions sites during the summer of 2005. This system will be a portable or semi-fixed standalone system customized to the construction activity requirements. The time-lapsed digital imagery will be wirelessly transmitted for viewing at the project engineer's office and the engineering support personnel at WFLHD.</p>	<p><b>Champions:</b> Robert Lale, WFLHD, 360-619-7717</p>

<p><b>Project Title:</b> Evaluation of construction lighting systems for road construction</p>	<p><b>FHWA Strategic Goal Area:</b> Safety, Productivity</p>
<p><b>Background:</b> Traffic and other restrictions and concerns often dictate that construction activities should be performed at night at such locations as YNP or GNP. Some of the of the major concerns that arise are:</p> <ul style="list-style-type: none"> <li>- Increased safety risk to traveling public and construction personnel and resources.</li> <li>- Decreased efficiency</li> <li>- Inadequate lighting or improper use and placement of systems leading to safety issues</li> <li>- Inconsistent quality</li> <li>- Logistical considerations of lighting large areas.</li> </ul> <p>To improve safety for the traveling public and the construction personnel, efficiency, and assure the quality of the work in these historic parks, better night work lighting systems need to be explored.</p>	<p><b>Estimated Costs:</b> Total estimated cost including deployment is \$25,000</p> <p><b>Duration:</b> March 2005 – October 2006</p>
<p><b>Scope:</b> Research will be conducted to determine feasibility of the “Airstar space lighting” system, or similar system, for use in low ambient light and nighttime construction scenarios. At least two types of systems will be purchased or leased to determine the impacts, limitations, and feasibility for future use on construction projects. The systems will be tested on construction projects in YNP and GNP during the 2005 construction season. The lighting units will be tested in both fixed usage locations and affixed to construction equipment such as a motor grader and/or paving machine.</p>	<p><b>Champions:</b> Howe Crockett, WFLHD 360-619-7750</p>

<p><b>Project Title:</b> Plenary Session at National Trust for Historic Preservation Annual Conference</p>	<p><b>FHWA Strategic Goal Area:</b> Human &amp; Natural Environment</p>
<p><b>Background:</b> The National Trust for Historic Preservation Conference is the premier educational event for historic preservation in the United States. Each year it is the principal educational mechanism for community preservationists across the United States. It enables 2,000 to 2,500 participants to</p> <ul style="list-style-type: none"> <li>• learn from leading experts and practitioners from across the United States,</li> <li>• share techniques and achievements with each other,</li> <li>• learn from on-site exploration of the host city/region, and</li> <li>• return to their communities with new knowledge and inspiration.</li> </ul> <p>The conference takes place in a different region of the country each year. Portland successfully competed to host the 2005 Conference because of its wealth of historic places, livability of the city, and surrounding countryside.</p>	<p><b>Estimated Costs:</b> Total estimated cost including deployment is \$25,000</p> <p><b>Duration:</b> September 27- October 2, 2005</p>
<p><b>Scope:</b> FLH/FHWA will sponsor the closing Plenary Session. The session marks the official close of the educational components of the conference. The benefits to FHWA and WFLHD are significant:</p> <ul style="list-style-type: none"> <li>• The conference brings to Portland the best in historic preservation and community revitalization experts so that transportation community leaders from Portland and the Pacific Northwest can access this expertise with minimal cost and time.</li> <li>• Local scholarship programs greatly increase this access and resulting benefits.</li> <li>• Four complimentary conference registrations, invitation to Patrons Dinner, and two tickets to closing party.</li> <li>• FLH/FHWA exposure to various national and regional groups and our partners.</li> </ul>	<p><b>Champions:</b> George Fekaris 360-619-7766</p>

<p><b>Project Title:</b> Enhance report generation capabilities of Materials MLT and QL-PAY</p>	<p><b>FHWA Strategic Goal Area:</b> Productivity</p>
<p><b>Background:</b> Current versions of in-house Materials MLT and QL-PAY programs produce reports that at best are sent directly to a specific printer, and in many cases are in 'raw', unformatted ASCII text. It often is necessary only to view reports on a computer but in some cases this cannot be done; a printed copy must be produced. In cases where reports must be sent elsewhere, transmitting them requires mailing, faxing, or scanning printed copies. "Raw" ASCII documents are considered less than professional by present-day standards.</p>	<p><b>Estimated Costs:</b> Total estimated cost including deployment is \$10,000.</p> <p><b>Duration:</b> March 2005-September 2005</p>
<p><b>Scope:</b> MLT and QL-PAY programs will produce reports in the form of PDF files. Programs will use the Acrobat Reader to view and print reports. PDF output will be accomplished by modifying the appropriate programs to produce PDF files as output (as opposed to outputting directly to a printer, or to ASCII files. Programs that currently produce unformatted output will be modified to format their output. Reports will have a more professional appearance with modern formatting. They will be produced without dependence on specific hardware and will be easily transferable via such means as email. Local users will more easily access them. Local and remote users will need only the Acrobat reader to view or print reports.</p>	<p><b>Champions:</b> Bruce Wasill 360-619-7703</p>

<p><b>Project Title:</b> Importing Microsoft documents into MicroStation</p>	<p><b>FHWA Strategic Goal Area:</b> Productivity</p>
<p><b>Background:</b> WFLHD has always needed an easy and flexible method for importing Excel Spreadsheets and other Microsoft documents into MicroStation.</p> <p>A copy of copy of Axiom's Office Importer software will be used for evaluation. During the evaluation period, productivity enhancement and software effectiveness will be tested.</p>	<p><b>Estimated Costs:</b> Total estimated cost including deployment is \$5,000.</p> <p><b>Duration:</b> March 2005-September 2005</p>
<p><b>Scope:</b> Microsoft Office Importer enables MicroStation users to import and link nearly unlimited quantities of spreadsheet data into MicroStation with ease, formatting and reliability vastly superior to MicroStation's built-in LiveLinks command. On a test conducted, Microsoft Office Importer had no problem in pasting a Microsoft Excel spreadsheet containing 14 columns and 700 rows of data with a single paste.</p> <p>Microsoft Office Importer allows the linked data in the MicroStation file to be updated automatically each time it is opened or on command from the user. Microsoft Office Importer also provides far greater formatting control of the elements it creates in MicroStation; the linked data retains the grid lines, text size, italics, bolding, underline, line spacing and other visual aspects of the spreadsheet or word processing file being placed.</p>	<p><b>Champions:</b> Steve Pratt 360-619-7589</p>

<p><b>Project Title:</b> Digital Highway Measurement Technology</p>	<p><b>FHWA Strategic Goal Area:</b> Productivity Safety</p>
<p><b>Background:</b> Surveying existing highways for planning and design purpose requires a significant amount of resources. Typical project identification (scoping) exercise for a proposed FLH project costs up to \$50,000. Majority of this work involves creating a road log; identifying signs, utilities, culverts, and structures; cataloging road geometry; and identifying significant features of the highway corridor. Many of these tasks can be accomplished in an automatic fashion by utilizing the Digital Highway Measurement vehicle currently under development at TFHRC.</p> <p>In addition, the NPS Road Inventory program currently uses the ARAN vehicle that uses relatively outdated technology. The Forest Highway Inventory Program and Indian Reservation Roads Inventory Programs are also looking for automated digital highway measurement technology. The proposed DHM vehicle can also accomplish these tasks.</p>	<p><b>Estimated Costs:</b> Total estimated cost including deployment is \$850,000</p> <p>FY2005- \$200,000 FY2006- \$375,000 FY2007- \$275,000</p> <p><b>Duration:</b> March 2005- September 2007</p>
<p><b>Scope:</b> It is proposed to collaborate with TFHRC Advanced Technology Group to deploy this technology for FLH project identification reports, Road Inventory Program, and GIS data collection. A new digital highway vehicle will be designed to meet FLH needs. This DHM vehicle will be used among the FLH divisions and its partners.</p> <p>The use of DHM vehicle will results in significant cost saving during preparation of project identification reports, road inventory programs, as-built data collection, pavement conditions, and sign inventory. In addition, the data collected by the DHM vehicle can be incorporated into the GIS system.</p>	<p><b>Champions:</b> Amit Armstrong/Brad Roberts 360-619-7668</p>

## WFLHD Proposals

### Technology Deployment Initiative and Partnership Program Requests for Funding FY 2005

[CLICK on any of the 12 Project Titles below to view the full proposal.](#)

Project	Amount	Priority	Focus Area	Champion
Use of spatial technologies for enhanced productivity in project delivery	\$350,000	1	GIS	Ted Wood
Showcasing of Technology Deployment Initiatives	\$50,000	2	All	Amit Armstrong
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Enhance report generation capabilities of Materials MLT and QL-PAY	\$10,000	10	None	Bruce Wasill
Importing Microsoft documents into MicroStation	\$5,000	11	None	Steve Pratt
Digital Highway Measurement Technology	\$200,000	12	GIS	Amit Armstrong
<b>Total</b>	<b>\$1,145,000</b>			

# Technology Deployment Initiatives and Partnership Program Request for Funding FY 2005

**FHWA Strategic Goal Area:** Productivity, Human & Natural Environment

**Focus Technology:** Geographic Information Systems

**Project Title:** Use of spatial technologies for enhanced productivity in project delivery

**Problem Statement:** Spatial data is essential for highway design projects. The current practice of using traditional point based survey data for highway design is antiquated and inefficient. This proposal presents a way to spatially enable all aspects of the project delivery process for highway design in WFLHD.

The FLH partner agencies are increasingly using spatial technologies to map their resources and analyze this data for planning and engineering. Additionally, the A&E contactors are using spatial technologies for delivering our products. However, the WFLHD is lacking in leveraging spatial technologies. The use of spatial technology is limited to planning section only. Through the use of spatial technology, WFLHD can share natural resource information with client agencies, resource agencies, and A&E consultants. Additionally, WFLHD can benefit from spatial technology during planning activities, reconnaissance trips, and PS&E field reviews.

A range of spatial technologies will be used to leverage the productivity enhancement for project delivery. The tasks will include data interchange between CADD system and spatial system, creating a spatial database, enabling various sections in project delivery to use tools to populate this database, and utilizing this data for planning and design.

**Proposal:** A spatial database stores condition and attributes of roads, forests, wetlands, habitat resources and provides capabilities to analyze them by querying on coordinates and/or associated attributes. This proposal includes setting up a spatial data workflow process for WFLHD for evaluation purpose. Once, this system is evaluated and fine-tuned it can be rolled out to other FLH divisions. The system will include setting up a spatial database, purchasing data and software for base-layer data, setting up data interchange between CADD/spatial data, developing processes for including collected GPS data into spatial database, and using spatial data for highway planning and design activities.

This proposal will be used as a proof of concept to evaluate the productivity enhancement of spatial data in project delivery process. The initial system will be tested by following activities that represent a subset of all project delivery and technical services activities:

- Task 1
  - Setup a spatial database
  - Setup a spatial data server and web server
  - Setup data interchange between CADD system and spatial data
- Task 2
  - Purchase base level topographic data and imagery data
  - Setup workflow processes using GPS tools (i.e., field notes using GPS tools, using GPS



tools for geotechnical and/or hydraulic field data collection, etc.)

- Task 3
  - Spatial data sharing with customers, partners, contractors, and state DOTs
  - Summarize results and experiences in a Final Report
- Task 4
  - Disseminate information through publications, demonstrations, and presentations

**Benefits:** Start relying on GPS spatial referencing in the field. Quickly locate proposed design locations and references. Start using the expensive surveyed data to the maximum potential by integrating attributes data to the cultural features. Increase the ability to share data across functional areas and client agencies. Visually identify and run reports on features.

**Resources/Cost:** For the two years duration this project, the following total cost of \$600,000 will be incurred:

<i>Tasks</i>	<i>FY2005</i>	<i>FY2006</i>
<i>Task 1</i>	\$200,000	\$100,000
<i>Task 2</i>	\$100,000	\$50,000
<i>Task 3</i>	\$50,000	\$50,000
<i>Task 4</i>	\$0	\$50,000
<i>Total</i>	\$350,000	\$250,000

**Duration:** February 1, 2005-September 2006

**Organization/Method:** The spatial data server and database will be developed and supported by a consultant/contractor for initial design as well as maintenance and support. The workflow processes for using spatial tools will be developed in-house with some consultant support. The spatial/CADD data interchange will be designed and supported by the respective software vendors through a consulting contract. Once the system is developed, a limited number of highway design projects will use this for evaluation. After the evaluation period, the system will be rolled out to other FLH divisions for comprehensive use in project delivery process.

**Submitter:**

**Agency/Division:** Western Federal Lands Highway Division  
**Name:** Amit Armstrong, Ph.D., P.E., Technology Deployment Engineer  
**Phone:** 360-619-7668  
**Date:** January 18, 2005

**Champion:**

**Name:** Ted Wood, P.E., Project Delivery Engineer  
**Phone:** 360-619-7715

# Technology Deployment Initiatives and Partnership Program Request for Funding FY2005

**FHWA Strategic Goal Area:**           Productivity

**Focus Technology:**   All

**Project Title:**           Showcasing of Technology Deployment Initiatives

**Problem Statement:** The Federal Lands Highway (FLH) Technology Deployment team coordinates communication, outreach, and marketing services to showcase agency wide technology and innovation activities. Specifically, FLH makes presentations at conferences, conducts workshop, develops training CD/DVDs, and publishes reports and technical briefs for new and under utilized technology. As these activities are requested throughout the fiscal year, a mechanism is needed for timely funding order to address the needs of our internal customers and external partners in a timely manner.

**Proposal:**       The Technology Deployment (TD) team deploys research and provides products and services that are essential, indispensable, and connected to our Federal Land Management customers and partners. The initiatives the team promotes are critical to innovation. The TD program includes a broad mix of projects that cut across traditional transportation modes and technical disciplines. Our program continually evolves to meet changing national priorities and client needs.

**Benefits:**       Facilitating deployment by showcasing new or under utilized technology builds skills and agency capacity and competence; improves collaboration, communication, and feedback on technology with our customers and partners; provide a forum for FLMA / state / industry / academic input into development of the technology program; and allow the dissemination of lessons learned, best practices, solutions, and resources. Travel and miscellaneous technology activities will be authorized to promote and showcase products.

**Resources/Cost:** The total estimated cost for deployment between the three divisions during FY2005 is \$150,000.

WFLHD - \$50,000

CFLHD - \$50,000

EFLHD - \$50,000

**Duration:** February 1- September 30, 2005

**Organization/Method:**       The audience beyond Federal Lands includes practitioners who design and maintain roadways, such as State DOT engineers, Federal land agencies (NPS, USFS, and BLM), and engineering consultants. The Technology Deployment team uses a variety of communication "tools" - such as brochures, tech briefs, presentations, and the Federal Lands Web site - to acquaint the potential user groups with new and under utilized technology.

**Submitter:**

**Agency/Division:** Western Federal Lands Highway Division  
**Name:** Amit Armstrong, Ph.D., P.E., Technology Deployment Engineer  
**Phone:** 360-619-7668  
**Date:** February 15, 2005

**Champion:**

**Name:** Amit Armstrong/Brad Roberts  
**Phone:** 360-619-7668

# **Technology Deployment Initiatives and Partnership Program**

## **Request for Funding FY 2005**

**FHWA Strategic Goal Area(s):** Productivity

**Focus Technology:** Design Visualization

**Project Title:** Evaluate and incorporate design visualization techniques for project delivery

**Problem Statement:** The Western Federal Lands Highway Division (WFLHD) is in cooperation with Glacier National Park (GNP) in planning, designing and administrating the Going-to-the-Sun Road (GTSR) rehabilitation projects. The projects encompass five major areas. They are road rehabilitation, visitor use and experience improvements, information, information technology improvements, and transit elements.

GNP is located in Northwestern Montana, adjacent to the Canadian border. GTSR provides unique opportunities for visitors to access spectacular scenery in high alpine environments via the Going-to-the-Sun Road (GTSR), one of only two roads in the United States that is designated a National Historic Landmark. Nearly 2 million visitors visit GNP each year with a vast majority of visitors accessing the road via private automobiles.

The April 2003 GTSR Environmental Impact Statement (EIS) and subsequent Record of Decision selected a direction for rehabilitation. This included implementation of a transit system and an integrated deployment of Intelligent Transportation System (ITS) functions to support the construction, transit system, available alternate route and traveler related park information, as well as associated comfort stations, shelters, benches, and signage. The Transit Center is an integral hub for the mitigation activities and an essential component of the overarching Federal Highways-funded project (estimated \$180 Million Dollars in construction over the next 10 years).

This project is to aid the design of a major transit stop, referred to as the "Loop", which is located near Milepost 23.5 of Going to the Sun Road. Park staff and FHA have selected the location for the site and have done preliminary site work including detailed topographic surveys, archeological and vegetations surveys, and geotechnical borings and analysis.

The proposed redevelopment of the Loop site would include reconfiguration of the parking to improve safety, pedestrian crossing, installation of new historical viewing and interpretive areas, formalize existing pedestrian overlook, construction comfort station, and transit stops for shuttle buses within the existing ground disturbance. The conceptual designs and layouts would require reviews from various disciplines involved in the project, and the State Historical Preservation Office.

**Proposal:** Establish a design visualization infrastructure, process, and methodology to enable various agencies to visualize conceptual, proposed, and finalized solutions. This would be accomplished by utilizing computer-generated 3-D design visualization images, modeling, and/or virtual simulations. FLHD currently uses Bentley's MicroStation V.8 and GEOPAK Civil Engineering Suite as its core graphics program and civil design solution, each has the capacity to

generate basic conceptual 3-D images, models, and virtual simulations. In addition, sophisticated third party applications will be employed to produce photo realistic images, modeling, and virtual simulations. Additional skills and expertise in related tools and methodologies as applied to engineering project team interaction may be contracted as identified. The resulting design visualization workflow, process, and methodology will be documented to develop a training format to properly train the key participants within this process.

To facilitate ideas and seek agreements at the various milestones to achieve the final site development proposal(s), FLH will fully utilize the visualization medium to communicate ideas between landscape architects, cultural resource specialists, engineers and State officials. The project development process for GTSR currently uses the standard 2-D drawings to simulate design concepts. Currently, the representation of 2-D data has limitations in assisting the stakeholders' ability to visualize the milestones due to the long and narrow switchback with two levels of parking areas. 3-D design visualization models will bridge these limitations in all phases of the design, public involvement, and construction processes.

**Benefits:** With the help of 3-D design visualization, all agencies will be able to better identify all of the aspects of the design proposals by visualizing the potential impacts and formulating possible construction sequences that could reduce impacts to the lands and visitor experiences. This will enhance the project workflow processes and methodologies by shortening the time to major milestones. This will be realized as a result of improved stakeholder understanding, collaboration, communication, and effective decision-making through the use of virtual visualization applications. The design visualizations will also help the highway engineers and technical disciplines realize any potential engineering conflicts in their effort to finalize the chosen design scheme.

<b><u>Resources/Cost:</u></b>	FY 2005	Design Visualization Infrastructure	\$100,000
	FY 2006	Design Visualization for GTSR	\$100,000
	<b><i>TOTAL:</i></b>		<b>\$200,000</b>

**Duration:** March 2005-October 2006

**Organization/Method:** The infrastructure, process, and mechanism for generating design visualization will be defined, tested, and deployed by FLH resources and contracted resources. This design visualization proof of concept for the Loop will be funded by Technology Deployment funds. Additional sites and design visualizations models and imagery will be generated by utilizing the project funds.

**Submitter:**

**Agency/Division:** Western Federal Lands Highway Division  
**Name:** Amit Armstrong, Ph.D., P.E., Technology Deployment Engineer  
**Phone:** 360-619-7668  
**Date:** February 17, 2005

**Champions:**

**Name:** Ninh Phan, P.E., Design Team Leader

**Phone:** 360-619-7590

**Name:** Richard McDaniel, EFLHD, Design Visualization Coordinator

**Phone:** 703-404-6362

# **Technology Deployment Initiatives and Partnership Program**

## **Request for Funding FY 2005**

**FHWA Strategic Goal Area:** Productivity; Human & Natural Environment

**Focus Technology:** Context Sensitive Solutions

**Project Title:** Locating sensitive natural and cultural resources for project planning using remote sensing technology

**Problem Statement:** At present, project planning typically involves development of a preliminary alignment before resource inventories are undertaken. Road locations are typically within high-sensitivity resource areas. Resource surveys are taken at a project-specific level, and conflicts often result in additional survey and design.

**Proposal:** Explore the practicability and accuracy of resource inventories at the landscape level to identify high-probability landforms for natural and cultural resources. The Thompson River Road project will be utilized for this proposal. The following objectives will be achieved during this project:

1. Use landform analysis and environmental reconstruction for site predictive modeling. The following attributes can be isolated for field inventory and verification:
  - Saddles
  - Moraines
  - Ridges
  - Meadow “islands”
  - Stream Confluences
  - Rapids with associated terraces
  - Ecotones
  - Transhumance corridors
  - Talus slopes
  - Mineral deposits (licks)
  - Geological strata of tool-quality stone locations
2. Human preferences for unique or advantageous landscapes and environmental features are well known. Use spatial technology and geomorphology to highlight and isolate such landforms for field verification, to improve site predictive modeling on a landscape level. Apply regional pollen analyses to an environmental reconstruction to model potential changes in site location due to climatic change and shifting ecotones over the last 12,000 years. The modeling will map the expansion/contraction (environmental succession) of plant and animal resources, and by extension human use, over time within the region

Human subsistence and use of the landscape follows change in climate and ecotones. Current observations of site patterning are based upon very recent conditions. Use of deep-time climate

and subsistence analysis should enable better site inventory and evaluation, especially in locations currently classified as low or moderate probability.

3. Use LandSat and Eros band comparison imagery, and other remote sensing technology, to document:
  - Vegetation changes since 1972 due to logging and fire management
  - Road development and changes since 1972
  - Seasonal changes in local hydrology (springs, seeps, permanent water sources)
  - Mineral deposits or licks
  - Diurnal and annual temperature gradients in Thompson River Valley fall through spring, where “hot spots” of warmer temperatures may attract use.

Remote sensing technology offers capabilities on a landscape level that are not available elsewhere. Seasonal fluctuations in hydrology and temperature gradients are significant influences on human use of the landscape. Humans will have exploited animal use of the landscape at locations advantageous to both.

**Benefits:** The benefit is to undertake critical resource inventories prior to the commitment of substantive design resources. This will enable designers to holistically apply the principles of Context Sensitive Design/Context Sensitive Solution at a synthetic and landscape level rather than at a site-specific, incremental approach.

**Resources/Cost:** \$100,000

**Duration:** March 1, 2005-September 30, 2006

**Organization/Method:** The work will be performed through a Reimbursable Agreement with the Confederated Salish and Kootenai Tribes of the Flathead Indian Reservation.

**Submitter:**

**Agency/Division:** Western Federal Lands Highway Division  
**Name:** Amit Armstrong, Ph.D., P.E., Technology Deployment Engineer  
**Phone:** 360-619-7668  
**Date:** January 18, 2005

**Champion:**

**Name:** Michael Boynton  
**Phone:** 360-619-7983



# Technology Deployment Initiatives and Partnership Program Request for Funding FY 2005

**FHWA Strategic Goal Area:**          Productivity

**Focus Technology:**    Accelerated Construction

**Project Title:** Quality assurance of accelerated construction techniques

**Problem Statement:** The highway construction industry has begun utilizing GPS technology for construction staking and/or stake-less construction for FLH projects resulting in accelerated construction. The FP and SCRs do not reference the use of GPS technology. Contractors are becoming more and more proficient at using this technology. GPS technology is clearly gaining a foothold in the highway construction industry and we need to familiarize and train ourselves to be able to improve our contract specifications to enable the efficient use of this technology. As size of project staff is reduced, quality assurance is important to monitor contractor's work quality during accelerated construction. Using current practices, this task requires at least two WFL employees to check contractor's staking, organize data, handle instruments, and do the physical checking. By utilizing GPS technology, the crew size can be reduced to one individual.

**Proposal:**          The WFLHD construction branch proposes to purchase a survey grade RTK GPS system with base station to use primarily in the Yellowstone and Grand Teton National Parks. The NPS program in this region is quite large. Significant major projects are scheduled for construction over the next ten years. The GPS system will be used to check contractor's earthwork and drainage activities. Project staff will be trained in its use. Knowledge gained from its use will be transformed into an introductory training class for construction orientation. In addition knowledge gained will be used to provide recommendations for the next FP rewrite or if deemed appropriate suggestions may be advanced for the modification of the current SCR.

**Benefits:**          This proposal will provide following benefits:

- The crew size will be reduced for quality assurance.
- A training module will be developed.
- SCR and FP revisions will be recommended.
- WFL employee will utilize current and new technologies.

As this technology matures, FHWA could specify in contract that contractors use GPS to map completed projects for as-built and provide electronic data for inventory mapping. By utilizing this technology during plan-in-hand reviews, the WFL personnel can graphically show client agencies on-site location of alignment and grade.

**Resources/Cost:**          The total cost is estimated at \$110,000.

GPS system	\$100,000
Training	\$10,000

**Duration:**          January 2005-September 2006

**Organization/Method:** WFL personnel will accomplish the work for this proposal. A training module will be developed after using this system during two construction seasons. At the end of evaluation period, specification recommendations will be made that can be incorporated into FP.

**Submitter:**

**Agency/Division:** Western Federal Lands Highway Division  
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**Date:** January 18, 2005

**Champion:**

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# **Technology Deployment Initiatives and Partnership Program**

## **Request for Funding ~ FY 2005**

**FHWA Strategic Goal Area(s):** Safety, Mobility

**Focus Technology:** High Performance Materials

**Project Title:** Crash Test Evaluation for 2-Tube Curb Mount Bridge Rail

**Problem Statement:** Research has developed railings to withstand impact loads from vehicles of ever-increasing size. However, aesthetic considerations have been overshadowed by safety and structural requirements. FLH bridge engineers and National Park Service architects are focused on constructing crashworthy bridge appurtenances that are aesthetically compatible with the local environment and that match or simulate bridge rail that has historically been used in the region.

The 2-Tube Curb Mount Bridge Rail is a steel post and beam rail that has been designed to be aesthetically pleasing as well as structurally sound, and has been used on several bridge projects in the last decade within Yellowstone National Park. However, this bridge rail has not been tested and evaluated to the guidelines specified in National Cooperative Highway Research Program (NCHRP) Report 350, *Recommended Procedures for the Safety Performance Evaluation of Highway Features*.

**Proposal:** **Phase I:** Modify the existing 2-Tube Mount Bridge Rail design by moving the rail to be flush with the face of the curb and the stone masonry parapet. These two major design modifications will address the concerns of vehicular vaulting due to the curb offset and vehicular snagging at the rail to stone masonry transition point. A safety evaluation will be completed to assure the design meets all applicable current standards. Crash test and evaluate the performance of the 2-Tube Curb Mount Bridge Rail in accordance with the guidelines presented in NCHRP Report 350 test 2-11 (a 2000-kg pickup truck).

**Phase II:** If the 2-Tube Curb Mount Bridge Rail fails to meet the guidelines in NCHRP Report No. 350, the data will be analyzed and the appropriate design modifications will be the responsibility of FLH. A safety evaluation will be completed to assure the design meets all applicable current standards. The tube mount rail will be retested in accordance with the guidelines presented in NCHRP Report 350 test 2-11 (a 2000-kg pickup truck). Future funding will be sought to crash test the masonry to rail transition.

If Phase I is successful there will be no need for a further redesign or testing of the tube rail. Phase II will focus on the tube mount bridge rail to stone masonry transition. The modified design with the approved tube mount railing will be crash tested and the performance of the tube mount bridge rail to stone masonry transition evaluated in accordance with the guidelines presented in NCHRP Report 350 test 2-21 of the 2-Tube Curb Mount Bridge Rail.

**Benefits:** Upon satisfactory crash test results, the design will be included in the Standard Drawings for FLH bridge projects and made available to other transportation agencies throughout the United States.

<b><u>Resources/Cost:</u></b>	Phase I,	<i>FY 2005</i>	\$50,000
	Phase II,	<i>FY 2005</i>	\$50,000
	<b><i>TOTAL:</i></b>		<b>\$100,000</b>

**Duration:** Two years

**Organization/Method:** A minimum of two reports will be provided presenting the details of the modified 2-Tube Curb Mount Bridge Rail, the results of the NCHRP Report 350 test 1-11 and the evaluation of the rail's performance according to the guidelines of NCHRP Report 350.

**Submitter:**

**Agency/Division:** Western Federal Lands Highway Division  
**Name:** Amit Armstrong, Ph.D., P.E., Technology Deployment Engineer  
**Phone:** 360-619-7668  
**Date:** February 17, 2005

**Champion:**

**Name:** Jeff Berg, P.E., Bridge Design Engineer  
**Phone:** 360-619-7719

**Technology Deployment Initiatives and Partnership Program**  
**Request for Funding FY 2005**

**FHWA Strategic Goal Area(s):** Safety, Productivity

**Focus Technology:** None

**Project Title:** Evaluation of remote monitoring systems for road construction

**Problem Statement:** With an increasing annual program size and fluctuating project loads, and the number of project staff resources available to perform contract oversight at a fixed level, innovative ways to execute our responsibilities need to be identified and explored. Additionally, we are operating under an objective to minimize construction-engineering costs to optimize facility improvements.

Our typical projects include several site locations spread out over 2 to 5 miles and our typical staffing is around 2 to 4 people per project. The inspectors and project engineers are usually required to allocate their time to the sites or operations with the most risk and leave some work unsupervised for extended periods of time. Additionally, overtime hours needed to cover the understaffing continues to be a problem for our office.

A technology that allows one person to view two or more sites or simultaneous construction activities at the same time could potentially increase efficiency, reduce staff overload, and help intercept construction problems before they become unmanageable.

**Proposal:** To deploy a remote monitoring system at two constructions sites during the summer of 2005. This system will be a portable or semi-fixed standalone system customized to each site's unique construction activity requirements. This will include installation, customization, training, and support required to deploy an autonomous wireless video surveillance and remote site management system. The time-lapsed digital imagery will be wirelessly transmitted for viewing at the project engineer's office and the engineering support personnel at Vancouver, WA.

**Benefits:** A remote monitoring system will enable the construction project engineer to oversee multiple construction sites on a project simultaneously. In addition, this will provide high-resolution data for the engineering support personnel in Vancouver, WA and their primary stakeholders. This will result in both time and cost savings for construction engineering. Data can be recorded and archived for future use if problems or questions arise. In areas where there is a confined construction activity or direct observation is either unpractical or dangerous, this will provide a safer method of monitoring.

<b><u>Resources/Cost:</u></b>	Remote Monitoring System	\$50,000
	<u>Installation and Support</u>	<u>\$20,000</u>
	<b><i>TOTAL:</i></b>	<b><i>\$70,000</i></b>

**Duration:** March 2005-October 2005

**Organization/Method:** The systems will be deployed and supported by the manufacturer during the evaluation period. The two sites will be selected during the construction season on the basis of their importance in consultation with WFLHD Construction Engineer.

**Submitter:**

**Agency/Division:** Western Federal Lands Highway Division  
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**Phone:** 360-619-7668  
**Date:** February 17, 2005

**Champion:**

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# **Technology Deployment Initiatives and Partnership Program**

## **Request for Funding FY 2005**

**FHWA Strategic Goal Area(s):** Safety, Productivity

**Focus Technology:** None

**Project Title:** Evaluation of construction lighting systems for road construction

**Problem Statement:** Traffic and other restrictions and concerns often dictate that construction activities should be performed at night at such locations as Yellowstone or Glacier National Parks. Some of the of the major concerns that arise are:

- Increased safety risk to traveling public and construction personnel and resources.
- Decreased efficiency
- Inadequate lighting or improper use and placement of systems leading to safety issues
- Inconsistent quality
- Logistical considerations of lighting large areas.

A substantial program of projects is scheduled in Yellowstone National Park for many years into the future. Most likely every project will involve extensive night work just to accomplish the contract work in a reasonable amount of time. Likewise, an enormous sequence of work is proposed for Glacier National Park in the near future to restore the historic Going-to-the-Sun highway. Again, night work will be required. To improve safety for the traveling public and the construction personnel, efficiency, and assure the quality of the work in these historic parks, better night work lighting systems need to be explored.

**Proposal:** Research will be conducted to determine feasibility of the “Airstar space lighting” system, or similar system, for use in low ambient light and nighttime construction scenarios. If preliminary indications are positive, we propose that at least two types of systems be purchased or leased to determine the impacts, limitations, and feasibility for future use on construction projects. The two minimal systems suggested should be equivalent to the “Sirocco HMI 1200W and the “Embarked Balloon” with trailer capable of lighting 10,000 m<sup>2</sup>. The systems will be tested on the WY PRA-YELL 13(3) and/or Yell 10(12) (and potentially GLAC 10(17&18) if night work is performed) construction projects during the 2005 construction season. The smaller lighting units should be tested in both fixed usage locations and affixed to construction equipment such as a motor grader and/or paving machine.

**Benefits:** This will enable the construction project engineer to perform construction activities during nighttime and low ambient light conditions with an easy to install mobile lighting system. Proper utilization of this high-diffusion light(s) instead of the standard array of projection lights will improve the quality of visibility for construction related activities and ultimately reduce the safety risks to the traveling public and construction personnel and resources.

**Resources/Cost:**      Remote Monitoring System    \$20,000  
   Installation and Support       \$ 5,000  
**TOTAL:**                               **\$25,000**

**Duration:**    March 2005-October 2006

**Organization/Method:**    The systems will be deployed and supported by the manufacturer during the evaluation period. The two sites will be selected during the construction season on the basis of their importance in consultation with WFLHD Construction Engineer.

**Submitter:**

**Agency/Division:**      Western Federal Lands Highway Division  
**Name:**                      Amit Armstrong, Ph.D., P.E., Technology Deployment Engineer  
**Phone:**                    360-619-7668  
**Date:**                        February 17, 2005

**Champion:**

**Name:**                      Howe Crockett, P.E., Construction Operations Engineer  
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# Technology Deployment Initiatives and Partnership Program Request for Funding FY 2005

**FHWA Strategic Goal Area:** Human & Natural Environment

**Focus Technology:** Context Sensitive Design/ Context Sensitive Solutions

**Project Title:** Plenary Session at National Trust for Historic Preservation Annual Conference

**Problem Statement:** The National Trust for Historic Preservation Conference is the premier educational event for historic preservation in the United States. Each year it is the principal educational mechanism for community preservationists across the United States. It enables 2,000 to 2,500 participants to

- learn from leading experts and practitioners from across the United States,
- share techniques and achievements with each other,
- learn from on-site exploration of the host city/region, and
- return to their own communities with new knowledge and inspiration.

The conference takes place in a different region of the country each year. Portland successfully competed to host the 2005 Conference because of its wealth of historic places, livability of the city, and surrounding countryside.

The conference is unique in that it uses the host city and region as a laboratory to explore current issues and strategies in community preservation and revitalization. More than 30 field sessions will take place throughout the city and region. These will include transportation strategies and heritage tourism. These field sessions are supplemented by 50 educational sessions, presenting the best case studies and approaches from across the country.

An overall theme for the conference is carried out through plenary sessions and special presentations. The theme for the Portland conference is “Sustain America: Vision, Economics, and Preservation”.

Planning of the conference is highly collaborative. A local advisory committee, in which 300 plus community leaders are invited to participate, spreads the net so that all ideas are considered. Members of this group propose specific field sessions. A planning committee of 15-20 members guides the process. WFLHD has accepted an invitation to participate on the planning committee.

**Proposal:** FLH/FHWA will sponsor the closing Plenary Session. The session marks the official close of the educational components of the conference.

**Benefits:** The benefits to FHWA and WFLHD are significant:

- The conference brings to Portland the best in historic preservation and community revitalization experts so that transportation community leaders from Portland and the Pacific Northwest can access this expertise with minimal cost and time.

- Local scholarship programs greatly increase this access and resulting benefits.
- Four complimentary conference registrations, invitation to Patrons Dinner, and two tickets to closing party.
- FLH/FHWA exposure to various national and regional groups and our partners.

The goal of the National Trust in the conference is to provide attendees with the best in preservation strategies, techniques, case studies, and networking so they return to their communities with greatly expanded knowledge and inspiration. A parallel goal is to leave lasting benefit in the host city. Sponsoring the opening plenary allows helps registration cost remain affordable. The National Trust also uses funds to pay for a national diversity scholarship program and for the national awards program, a highlight of the conference.

**Resources/Cost:**        \$25,000

**Duration:**        September 27 to October 2, 2005

**Organization/Method:**        The sponsorship funds will be transferred to the National Trust for Historic Preservation.

**Submitter:**

**Agency/Division:**        Western Federal Lands Highway Division  
**Name:**                        Amit Armstrong, Ph.D., P.E., Technology Deployment Engineer  
**Phone:**                        360-619-7668  
**Date:**                            February 15, 2005

**Champion:**

**Name:**                        George Fekaris  
**Phone:**                        360-619-7766

# Technology Deployment Initiatives and Partnership Program Request for Funding FY 2005

**FHWA Strategic Goal Area:**           Productivity

**Focus Technology:**   None

**Project Title:** Enhance report generation capabilities of Materials MLT and QL-PAY

**Problem Statement:** Current versions of in-house Materials MLT and QL-PAY programs produce reports that at best are sent directly to a specific printer, and in many cases are in 'raw', unformatted ASCII text. It often is necessary only to view reports on a computer but in some cases this cannot be done; a printed copy must be produced. In cases where reports must be sent elsewhere, transmitting them requires mailing, faxing, or scanning printed copies. "Raw" ASCII documents are considered less than professional by present-day standards.

**Proposal:**       MLT and QL-PAY programs will produce reports in the form of PDF files. Programs will use the Acrobat Reader to view and print reports. PDF output will be accomplished by modifying the appropriate programs to produce PDF files as output (as opposed to outputting directly to a printer, or to ASCII files. Programs that currently produce unformatted output will be modified to format their output.

**Benefits:**       Reports will have a more professional appearance with modern formatting. They will be produced without dependence on specific hardware and will be easily transferable via such means as email. Local users will more easily access them. Local and remote users will need only the Acrobat reader to view or print reports.

**Resources/Cost:**       \$10,000

**Duration:**       March 2005-September 2005

**Organization/Method:** PDFLib software will be acquired and incorporated into MLT and QL-PAY software to produce reports in the form of PDF files. In-house programmers will accomplish this work.

**Submitter:**

**Agency/Division:**   Western Federal Lands Highway Division  
**Name:**                Amit Armstrong, Ph.D., P.E., Technology Deployment Engineer  
**Phone:**               360-619-7668  
**Date:**                 February 15, 2005

**Champion:**

**Name:**                Bruce Wasill, P.E.  
**Phone:**               360-619-7703

# Technology Deployment Initiatives and Partnership Program Request for Funding FY 2005

**FHWA Strategic Goal Area:**           Productivity

**Focus Technology:**   None

**Project Title:**           Importing Microsoft documents into MicroStation

**Problem Statement:** WFLHD has always needed an easy and flexible method for importing Excel Spreadsheets and other Microsoft documents into MicroStation.

**Proposal:**       A copy of Axiom's Office Importer software will be used for evaluation. During the evaluation period, productivity enhancement and software effectiveness will be tested.

**Benefits:**       Microsoft Office Importer enables MicroStation users to import and link nearly unlimited quantities of spreadsheet data into MicroStation with ease, formatting and reliability vastly superior to MicroStation's built-in LiveLinks command. On a test conducted, Microsoft Office Importer had no problem in pasting a Microsoft Excel spreadsheet containing 14 columns and 700 rows of data with a single paste.

Microsoft Office Importer allows the linked data in the MicroStation file to be updated automatically each time it is opened or on command from the user. Microsoft Office Importer also provides far greater formatting control of the elements it creates in MicroStation; the linked data retains the grid lines, text size, italics, bolding, underline, line spacing and other visual aspects of the spreadsheet or word processing file being placed. Microsoft Office Importer can also import and link in data from Microsoft Word files.

- When pasted in MicroStation, the color and weight of text appear the same as they do in the source document
- When pasted in MicroStation, the color, weight and line style of borders appear the same as they do in the source document.
- Users now have the option to paste text and borders using the symbology from the active MicroStation file or to select specific color, weight, line style and level regardless of the active symbology.
- Links are updated automatically every time the MicroStation file is opened or can be updated while working on the MicroStation file.
- Creates clean, presentation-quality output.
- Great for tabular data like bill of materials, equipment schedules, estimates and quantities.
- Great for text data such as installation notes and detail notes.
- Use familiar Windows applications to create, sort and tabulate your data, and then paste it to your design file after it is formatted

- Native MicroStation text and linear elements minimize design file size and plotting issues.
- Enables personnel without CAD training to prepare schedules and notes in familiar Windows applications.
- Saves time creating tabular data in MicroStation.

**Resources/Cost:** \$5000

**Duration:** February 1-September 30, 2005

**Organization/Method:** WFLHD CADD staff would maintain this software.

**Submitter:**

**Agency/Division:** Western Federal Lands Highway Division  
**Name:** Amit Armstrong, Ph.D., P.E., Technology Deployment Engineer  
**Phone:** 360-619-7668  
**Date:** February 15, 2005

**Champion:**

**Name:** Steve Pratt  
**Phone:** 360-619-7589

# Technology Deployment Initiatives and Partnership Program Request for Funding FY 2005

**FHWA Strategic Goal Area:** Productivity; Safety

**Focus Technology:** Geographic Information System; Non-Destructive Technologies

**Project Title:** Digital Highway Measurement (DHM) Technology

**Problem Statement:** Surveying existing highways for planning and design purpose requires a significant amount of resources. Typical project identification (scoping) exercise for a proposed FLH project costs up to \$50,000. Majority of this work involves creating a road log; identifying signs, utilities, culverts, and structures; cataloging road geometry; and identifying significant features of the highway corridor. Many of these tasks can be accomplished in an automatic fashion by utilizing the Digital Highway Measurement vehicle currently under development at TFHRC.

In addition, the NPS Road Inventory program currently uses the ARAN vehicle that uses relatively outdated technology. The Forest Highway Inventory Program and Indian Reservation Roads Inventory Programs are also looking for automated digital highway measurement technology. The proposed DHM vehicle can also accomplish these tasks.

**Proposal:** It is proposed to collaborate with TFHRC Advanced Technology Group to deploy this technology for FLH project identification reports, Road Inventory Program, and GIS data collection. A new digital highway vehicle will be designed to meet FLH needs. This DHM vehicle will be used among the FLH divisions and its partners. The DHM vehicle will contain the following sensors: INU, GPS, GPR, Scanning Laser, Stereoscopic Cameras, Five Lasers, Three Accelerometers, Temperature gage, On-board Computers. The DHM will also contain Data Acquisition software, Data Viewing software, Data Analysis software, including, geometry, image processing, Ground Penetrating Radar processing, Pavement Surface Analysis, Data Visualization software. The final training module will include documentation on Software, Hardware, Maintenance, and Operations.

**Benefits:** The use of DHM vehicle will results in significant cost saving during preparation of project identification reports, road inventory programs, as-built data collection, pavement conditions, and sign inventory. In addition, the data collected by the DHM vehicle can be incorporated into the GIS system.

**Resources/Cost:** The total cost for this deployment and evaluation period will be \$850,000.

FY2005	\$200,000
FY2006	\$375,000
FY2007	\$275,000

**Duration:** March 2005-September 2007

**Organization/Method:** The DHM vehicle will be developed at TFHRC and will be deployed

at all three FLH divisions.

**Submitter:**

**Agency/Division:** Western Federal Lands Highway Division  
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**Phone:** 360-619-7668  
**Date:** January 18, 2005

**Champion:**

**Name:** Amit Armstrong/Brad Roberts  
**Phone:** 360-619-7668