

A Case Study

The Las Vegas Freeway and Arterial Management System

Use of a Systems Manager Contractor to Procure ITS



Federal Highway Administration Intelligent Transportation System
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16. Abstract Procurement of Intelligent Transportation System (ITS) projects using Federal-aid funds can present challenges that are not typically observed in traditional transportation projects. Many roadway improvement projects involve the two-step "Design-Bid-Build" process. This process is one in which the design contractor is chosen based on their qualifications, and the construction contractor is chosen based on the lowest cost estimate. However, ITS projects do not necessarily fit the normal definition of construction. These projects often involve application of complex telecommunications, computer, software, sensing, and electronics technologies that make it very difficult for agencies to develop specifications needed for bidding purposes. This can result in unrealistic bids and problems ensuring product quality. Many ITS projects are stand-alone in nature, and do not have to be procured under rules for construction. The installation of field devices and communications infrastructure often meets the definition of construction. However, if a project involves the development of software for the purpose of integrating field devices, then it does not meet this definition. The purpose of this series is to show that other procurement options are available under Federal-aid regulations for projects that do not meet the definition of construction. This study is one of a series that outlines procurement practices that can be used for ITS projects. The scope of this document is limited to Federal-aid procurement regulations and does not describe specific procurement issues that are apparent in state or local regulations. Some states may have regulations in place that are more stringent than the federal requirements. Some states also have regulations that exist for "high tech" projects. It is therefore recommended that state and local agencies review their respective statutory requirements in determining the legal implications of using a particular contracting technique.			
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Procurement Options for ITS Federal-aid Projects

Definition of Construction

The term "construction" means the supervising, inspecting, actual building, and all expenses incidental to the construction or reconstruction of a highway, including locating, surveying, mapping, resurfacing, restoration and rehabilitation, acquisition of rights-of-way, relocation assistance, elimination of hazards of railway grade crossings, elimination of roadside obstacles, acquisition of replacement housing sites, acquisition and rehabilitation, relocation, and construction of replacement housing, and improvements which directly facilitate and control traffic flow, such as grade separation of intersections, widening of lanes, channelization of traffic, traffic control systems, and passenger loading and unloading areas. The term also includes capital improvements which directly facilitate an effective vehicle weight enforcement program, such as scales, and also includes costs incurred by the State in performing Federal-aid project related audits which directly benefit the Federal-aid highway program.

ITS Projects that are not Construction

Section 112 of Title 23 requires competitive bidding for all construction projects. The definition of "construction" by FHWA does not include many ITS projects. If the project is just installing field devices, it is construction. However, if the project involves software to control the devices or integration of the devices with a control center or communications system, then it is not construction. Communications systems or traveler information systems that require only limited installation are not construction. Each project should be carefully examined to determine if it falls into the construction category. Many ITS projects do not.

Prequalification of Suppliers

Even if a project does fall under construction, agencies can establish a pre-qualification process to insure that all bidders are qualified to perform the work. The criteria for qualification are defined by the procuring agency. However, if the ITS project is a part of a larger construction project, it is recommended that the ITS portion be made a separate procurement.

State Procurement Practices

If the ITS project does not fall under construction, another alternative is to use the state's own procurement procedures in accordance with 49 CFR 18. This applies to all non construction projects. Since many states have recently established special procurement rules for technology projects, this could be advantageous to implementers ITS projects.

However, if you use federal aid procurement practices, then there are other alternatives available, which are:

- *Engineering or Design Services*

This contracting mechanism can be applied to a variety of ITS projects such as software development. It has also been successfully used to retain System Integrators and System Managers that can provide the entire spectrum of services required to implement an ITS Project, such as a traffic management center. This might include the specification, procurement, configuration and installation of all hardware and software to provide the functionality required. Even if field device installation is required of the system integrator, and not done under a separate construction contract, a design - build contract could be used under FHWA SEP14.

- *SEP - 14 (Special Experimental Project number 14)*

The SEP -14 process is aimed at encouraging innovative procurement practices of all types. It has been successfully used for Design -Build and Design -Build-Operate projects. However, other value oriented procurement processes can be employed using SEP-14. To use SEP-14, permission of FHWA is required, and the contract must be awarded under some form of competitive process. However, the selection criteria may vary from project to project and generally includes: value, quality of the completed product, schedule, and cost.



Table of Contents

Proposal Element	Page Number(s)
Preface	1
Background	2
Procurement Planning	2
Scope of Services	3
Procurement Challenges	3
Contract Evaluation and Award	4
Current Activities	4
Benefits of the Procurement Strategy	4

ACRONYMS

CMAQ	Congestion mitigation and air quality
FAST	Freeway and Arterial System of Transportation
FHWA	Federal Highway Administration
ITS	Intelligent Transportation System
LVACTS	Las Vegas Area Computer Traffic System
NDOT	Nevada Department of Transportation
RFP	Request for Proposal

Preface

Procurement of Intelligent Transportation System (ITS) projects using Federal-aid funds can present challenges that are not typically observed in traditional transportation projects. Many roadway improvement projects involve the two-step “Design-Bid-Build” process. This process is one in which the design contractor is chosen based on their qualifications, and the construction contractor is chosen based on the lowest cost estimate. However, ITS projects do not necessarily fit the normal definition of construction. These projects often involve application of complex telecommunications, computer, software, sensing, and electronics technologies that make it very difficult for agencies to develop specifications needed for bidding purposes. This can result in unrealistic bids and problems ensuring product quality.

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involves the development of software for the purpose of integrating field devices, then it does not meet this definition. The purpose of this series is to show that other procurement options are available under Federal-aid regulations for projects that do not meet the definition of construction.

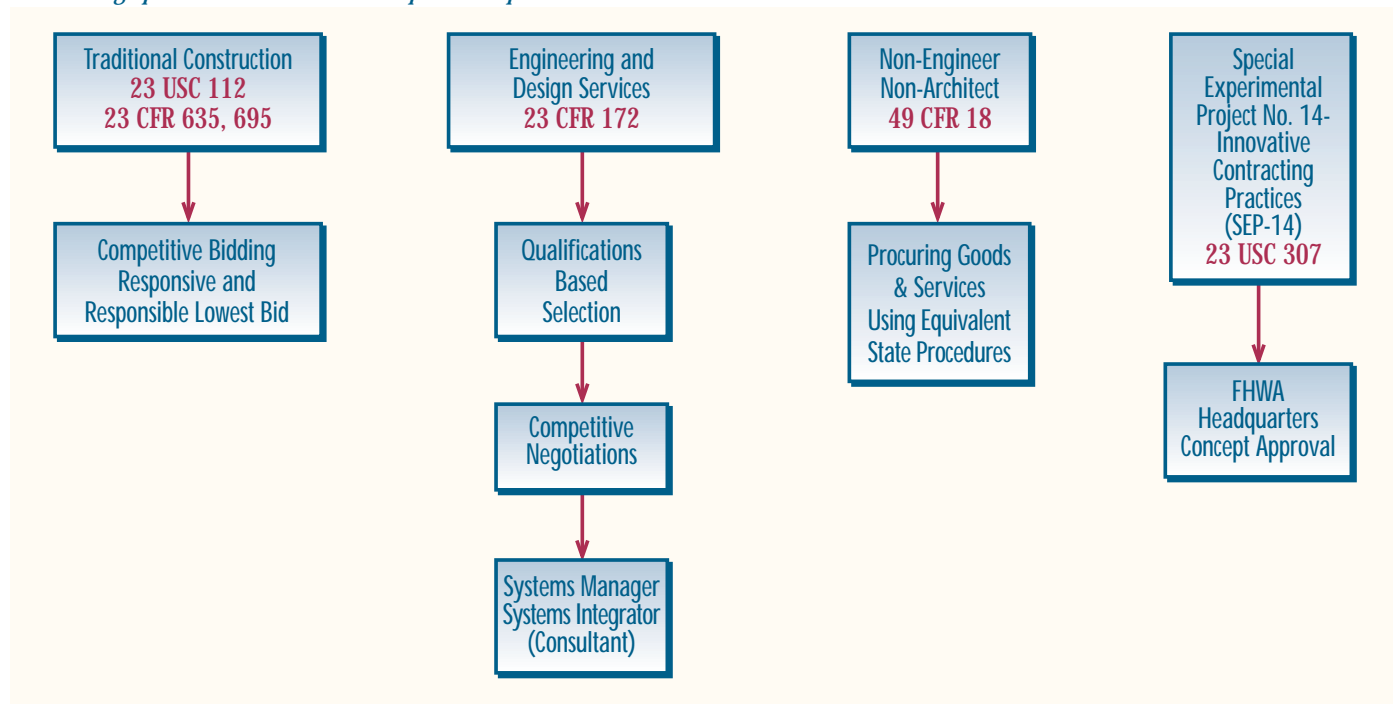
This study is one of a series that outlines procurement practices that can be used for ITS projects. The scope of this document is limited to Federal-aid procurement regulations and does not describe specific procurement issues that are apparent in state or local regulations. Some states may have regulations in place that are more



stringent than the federal requirements. Some states also have regulations that exist for “high tech” projects. It is therefore recommended that state and local agencies review their respective statutory

requirements in determining the legal implications of using a particular contracting technique.

Contracting options for Federal-aid transportation procurements





Background

This case study outlines several procurement methods employed for projects in Nevada. One project involves the development of an integrated roadway management system. The Freeway and Arterial System of Transportation (FAST) provides the opportunity to more efficiently manage traffic in the Las Vegas area while reducing congestion and the magnitude of safety concerns. This project was procured using a three-phase approach that involved various procurement methods, including use of a systems manager contract. This type of contract allows a single contractor to design the key software, communications, and hardware elements of the system. The systems manager contracting technique was also used for the Las Vegas Area Computer Traffic System (LVACTS) upgrade.

In 1996, a study was completed that analyzed how advanced technologies deployed in intelligent systems could reduce the severity of transportation-related problems in the Las Vegas region. The Las Vegas Intelligent Transportation System Early Deployment Study produced the idea of implementing FAST on a regional basis. The FAST system will deploy nearly all of the study objectives, including instrumentation of the pilot corridor, traveler information systems, and incident management strategies.

The Las Vegas Area Computer Traffic System was established in 1981 as one of the earliest multi-jurisdictional traffic signal systems in the United States. Several local agencies and cities founded the system, along with the Nevada Department of Transportation (NDOT). However, the traffic signal system technology became obsolete after several years, creating the need for the upgrade. Once the system had reached capacity, it was also unable to be expanded to provide control for additional traffic signals.

During the initial phase of the FAST project, the existing regional signal and arterial management system will be combined and integrated with a new freeway management system. The result will be a fully integrated freeway, regional traffic signal, and arterial management system.

Each project will involve the integration of field elements such as surveillance, information display,

and control. The field elements will be linked to the main control center through the use of a communications infrastructure. The control center will gather information from, and send information to, each of the field elements.

Procurement Planning

Several procurement methods will be used for the LVACTS project, including engineering and design services, systems manager, goods and services, and construction. For design services, NDOT plans to use a qualifications-based selection process. By law construction services for this project are required to be procured on a competitive basis to the lowest responsible bidder. The LVACTS system will use three separate construction contracts for the system. A consultant team will provide project management as well as construction administration expertise. The team's responsibilities will include design, preparation of plans, specifications, and estimates, software development, timing plan preparation, and system testing and integration. NDOT will administer all contracts related to construction and conduct all inspections for the project.





The first construction contract will be for the microwave backbone communications subsystem. This will be followed by the construction of the local traffic signal controllers. The last contract involves construction of all local communications, video surveillance, system detection, and the Traffic Management Center.

NDOT will purchase the signal controller hardware through their bidding process so that there will be only one entity to work with in resolving problems with the controllers, should problems arise. This approach will also allow NDOT to avoid unnecessary contractor handling costs and markup on controller purchase. A local agency force account will be used to install the local controller subsystem. This decision will reduce costs and ensure schedules are flexible but will be met while providing quality assurance.

The FAST system will be developed in several phases via a Task Order Contract. The first phase includes a High Level System Design and allows the FAST deployment to be combined with the LVACTS. This combination integrates freeway and arterial management components. The second phase focuses on designing a pilot corridor. The third phase focuses on constructing the initial field elements and communications infrastructure on the pilot corridor. A systems manager is responsible for the first two phases under Engineering and Design Services, which involve all aspects of the design and provide construction support services.



Scope of Services

The Request for Proposal (RFP) for each project identifies tasks to be completed by the systems manager. The following list of requirements was published in the RFPs.

Procurement Structure

- **Engineering and Design Services (via Task Order Contract*)**
 - Systems Manager
 - Project Management
 - P, S, & E Work
 - Software Development
 - Software Testing
 - System Integration
- **Goods and Services**
 - Procurement of Controllers and Other Field Devices
- **Local Agency Forces**
 - Signal Controller Installation/Replacement
- **Construction**
 - Microwave Backbone
 - Local Communications
 - CCTV
 - TMC (exclusive of hardware and software)
 - Pilot Corridor Field Elements

* The task order method allows an iterative step-wise approach that keeps the systems up to date with the latest technology.

The end product of these two projects is an integrated freeway and arterial management system. Therefore, the rest of this case study will make reference to only one project, but components of both FAST and LVACTS will be discussed.

Procurement Challenges

Traditional contracting techniques do not typically lend themselves to ITS projects. For example, the procurement of software and hardware is very time-constrained. The contractor needs time to bid on the project, receive the award, and develop the software that was initially bid. Without an expedited product delivery process, hardware and software become obsolete. The use of a multi-



phase contract allows the most current technology in software and hardware to be implemented.

While these projects are mainly comprised of state funds, these projects will maintain eligibility for federal aid funding in the event that they change to federal funding sources before award or completion. The LVACTS project must follow the federal aid requirements because it involves Congestion Mitigation and Air Quality (CMAQ) funding from federal sources. In order to qualify for CMAQ funding, agencies must demonstrate that projects are consistent with the national ITS Architecture and will provide for air quality improvement benefits.

Contract Evaluation and Award

A scoring system was used by NDOT in order to select a contractor. The evaluation of each proposer was based on their submitted RFP and interview. The following items were scored to evaluate each prospective contractor.

	Max Score
1 Qualifications and experience of prime consultant and subs	20 points
2 Expressed knowledge and creative ideas about the project	20 points
3 Professional background and experience of the Project Manager and key members of the team on similar projects	15 points
4 Acceptability of the proposed project Scope of Work and schedule	15 points
5 Staffing, current workload, ability to meet schedules in lieu of current activities	15 points
6 Nature, quality, and relevance of work completed within last 5 years	10 points
7 Local presence, local knowledge of ITS needs for Las Vegas	5 points
TOTAL	100 points

The team with the highest score was awarded the contract, which is an actual costs plus fixed fee type of award.

Current Activities

FAST will be put out for bid in mid-2000. The pilot corridor is scheduled for implementation by the first quarter of 2002, followed by several phases of infrastructure construction and implementation. The last phase of the project has a completion date of 2007. LVACTS is currently in the phase of the contract.

Benefits of the Procurement Strategy

The Nevada Department of Transportation has cited several benefits to the procurement methods that will be used. Included among these benefits are:

- Reduced costs
- Minimized time for implementation
- Reduced number of subcontractors
- Increased inter-agency cooperation
- Allows for the most recent technology in software

Over the past few years, the Las Vegas area has experienced the highest population growth in the United States. This surge in population has resulted in an increased demand for transportation facilities across the region. The procurement strategy adopted to implement the FAST program allows NDOT to respond to these challenges in a timely manner.

The best procurement process is not a sole guarantee of success; it is only one element. A good management style along with a team-based approach is necessary to achieve the full benefits of a particular procurement.

Procurement Resources

Documentation

- ITS Procurement Resource Guide, ITS Joint Program Office
 - FHWA Memorandum: Procurement Information for ITS Projects - *Discusses types of ITS projects and the alternatives available under federal aid.*
 - Virginia Department of Transportation Public-Private Procurement - Issues and Accomplishments *A lessons learned discussion of public- private partnerships*
 - Innovative Contracting Practices for ITS
Executive Summary & Final Report - *A detailed compendium of state and federal procurement laws and options*
 - FHWA Federal-Aid ITS Procurement Regulations and Contracting Practices
- The Road to Successful ITS Software Acquisition, ITS Joint Program Office
Executive Summary; Vol. I; Overview and Themes; Vol. II; Software Acquisition Process Reference Guide - *A discussion of the key issues and approaches to responding to those issues.*
- ITS Software: Effective Acquisition Practices, NCHRP - *This report will be available from AASHTO by the end of the year.*
- Successful ITS Procurement Case Studies (*Available 1/1/2000*)
(All DOT documents available via the ITS web site www.its.dot.gov)

Training (See NHI course listing)

- ITS Software Acquisition; *A two day course for project managers and engineers based upon "The Road to Successful Software Acquisition".*
- ITS Procurement Using Federal Aid; (*Available 1/1/2000*) *This one day workshop, aimed at project managers and procurement officials, will concentrate on the use of various contracting approaches allowed by federal aid for ITS projects.*

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