

A Case Study: Georgia's Intelligent Transportation System

NAVIGATOR Systems Integrator Contract

Use of a Systems Integrator to Manage ITS Implementation



Federal Highway Administration Intelligent Transportation System
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16. Abstract This case is one of a series of case studies that examine procurement approaches used to deliver Intelligent Transportation System (ITS) projects. ITS projects are often complex and leverage the latest technology in telecommunications, computers, software, sensing, and electronics. ITS technologies can be implemented as stand-alone projects, expansions of legacy systems, or incorporated as part of traditional roadway construction projects. Procurement of ITS projects with Federal aid funds can present challenges. Agencies must optimize project quality and cost while meeting applicable procurement regulations. In many cases, the requirements of ITS projects cannot be easily specified at the beginning of a project. This makes it difficult to establish realistic low bids and ensure product quality. The purpose of these reports is to provide examples of successful strategies that have been used to overcome challenges to ITS procurement contained within the traditional "Design-Bid-Build" project delivery approach. In this contracting technique, two independent contracts are used. The first contract is used to design the project and the second to construct the project. This technique is generally not suited for projects that involve advanced technologies, software engineering, and computer-based integration. In many such ITS projects, it is very difficult to clearly establish the line between design and construction as in traditional roadway construction projects. 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.			
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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.

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ACRONYMS

CCTV	Closed-circuit television
FHWA	Federal Highway Administration
GDOT	Georgia Department of Transportation
HEROs	Highway Emergency Response Operators
ITS	Intelligent Transportation System
MARTA	Metropolitan Atlanta Rapid Transit Authority
PS&Es	Plans, Specifications, and Estimates
RFP	Request for Proposal
TCC	Transportation Control Center
TMC	Transportation Management Center
VMS	Variable Message Sign*

**more typically called Dynamic Message Sign (DMS)*





Preface

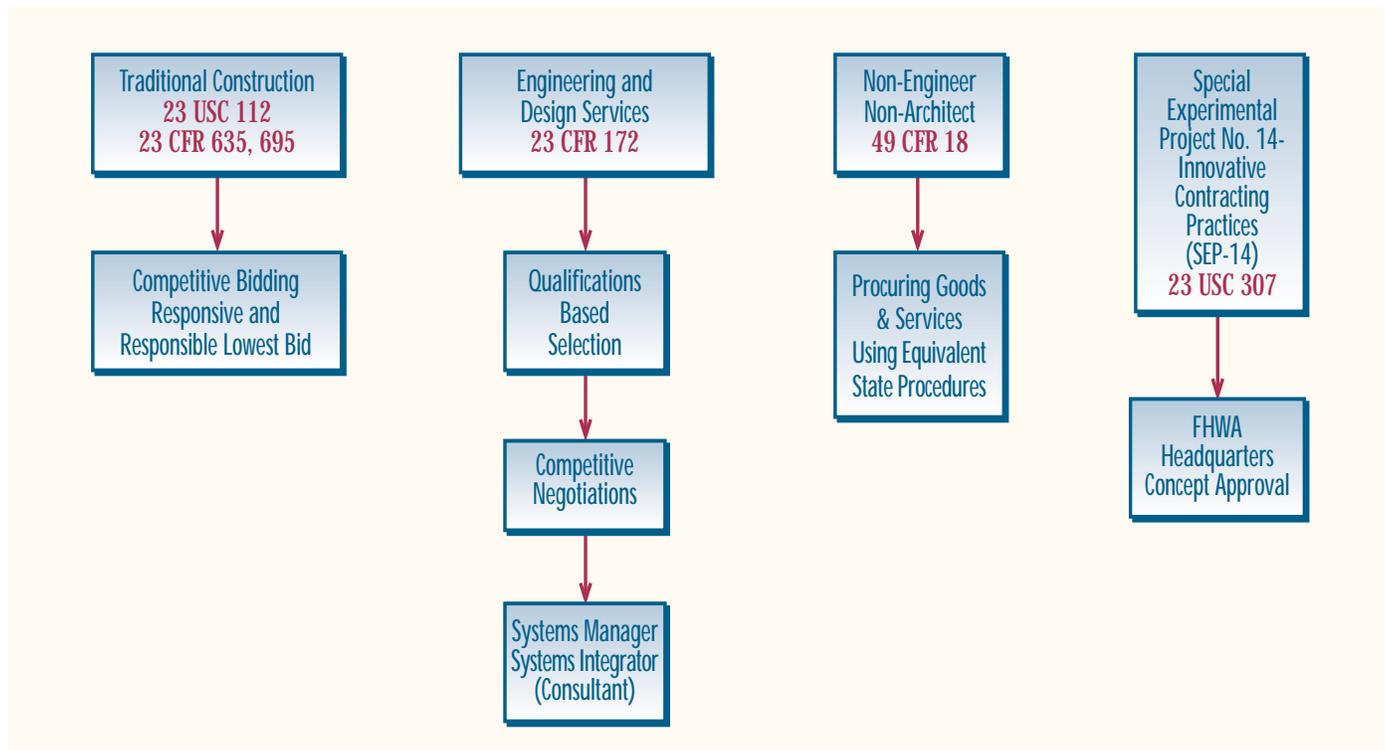
This case is one of a series of case studies that examine procurement approaches used to deliver Intelligent Transportation System (ITS) projects. ITS projects are often complex and leverage the latest technology in telecommunications, computers, software, sensing, and electronics. ITS technologies can be implemented as stand-alone projects, expansions of legacy systems, or incorporated as part of traditional roadway construction projects. Procurement of ITS projects with Federal aid funds can present challenges. Agencies must optimize project quality and cost while meeting applicable procurement regulations. In many cases, the requirements of ITS projects cannot be easily specified at the beginning of a project. This makes it difficult to establish realistic low bids and ensure product quality.

The purpose of these reports is to provide examples of successful strategies that have been used to overcome challenges to ITS procurement contained

within the traditional “Design-Bid-Build” project delivery approach. In this contracting technique, two independent contracts are used. The first contract is used to design the project and the second to construct the project. This technique is generally not suited for projects that involve advanced technologies, software engineering, and computer-based integration. In many such ITS projects, it is very difficult to clearly establish the line between design and construction as in traditional roadway construction projects.

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.

Contracting options for Federal-aid transportation procurements





Background

The following case study provides an overview of the Georgia NAVIGATOR systems integrator contract the Georgia Department of Transportation (GDOT) used to procure system engineering expertise for ITS software development, system support, and testing. The NAVIGATOR program evolved from the need to manage traffic congestion during the 1996 Olympic Games in Atlanta and included incident management and motorist assistance programs. Since its founding, the NAVIGATOR architecture has expanded to a statewide program providing traffic monitoring, traveler information, incident management, and traffic management services for travelers in the heavily congested Atlanta metropolitan area and throughout the State of Georgia.

The current effort will significantly upgrade the capabilities of the Transportation Management Center (TMC) in Atlanta to become the statewide coordination center for regional Transportation



Control Centers (TCCs) across the state. To enhance the NAVIGATOR program, GDOT procured the services of a systems integrator contractor. The contractor is responsible for much of the engineering and design services that are subsequently performed by various contractors under different design service contracts. The development and award of the systems integrator contract was conducted in accordance with existing Federal Highway Administration (FHWA) procurement regulations, and serves as a model for other agencies interested in establishing other similar contracts.

NAVIGATOR is designed to gather information from a variety of sources, process this information, and distribute it to travelers and incident response agencies. Currently focused on the Atlanta region, it is anticipated that NAVIGATOR will serve as part of GDOT's statewide freeway incident management program. The TMC in Atlanta is the heart of the NAVIGATOR program. The GDOT TMC serves as the clearinghouse for information gathered by NAVIGATOR components, including video detection and monitoring systems, Highway Emergency Response Operators (HEROs), and the general public. NAVIGATOR links the TMC with TCCs in five surrounding counties (Cobb, Gwinnet, Clayton, Fulton, and DeKalb), the City of Atlanta, and the Metropolitan Atlanta Rapid Transit Authority (MARTA). NAVIGATOR uses vehicle detectors, closed circuit television (CCTV), Variable Message Sign (VMS), and ramp meters to detect, verify, and respond to traffic incidents in real time.

GDOT is committed to deploying ITS statewide. The recently published *20-year Strategic Plan for ITS Deployment in Georgia for 1999-2019* describes a comprehensive program of deployment throughout the state. It is envisioned that the NAVIGATOR program will be a key element of this deployment strategy. GDOT determined that the best approach to successfully implementing the NAVIGATOR program was to procure the services of a systems integrator contractor. Under this project delivery approach, all project design is performed by a consultant and all subsequent construction activities are performed by various contractors under different construction contracts. The systems integrator contract overlaps both the design and construction phases and includes project sequencing and coordination, preparation



of plans, specifications and estimates (PS&Es), inspection, testing, and integration of the various subsystems into a single system.

Procurement Planning

GDOT gained considerable procurement experience as a result of TMC development for addressing traffic management needs during the 1996 Summer Olympic Games. Under Georgia procurement law, agencies are required to specify, in detail, the nature of products or services to be obtained. GDOT officials recognized that contracts dealing with ever-changing technology, such as ITS, are very difficult and time-consuming to develop. Under a “Design-Bid-Build” delivery approach, GDOT is required to develop very specific, detailed plans before letting improvement contracts for ITS system components. The “Systems Integrator” technique is a project delivery strategy that is designed to avoid these difficulties by allowing a qualified contractor to participate both in the design of system components and the integration of system elements that are procured using traditional construction contracting procedures.

Scope of Services

Under the terms of the resulting five-year contract, GDOT issues specific task orders for services including software development, systems support, system integration and testing, configuration management, plan design, and schedule maintenance. The contractor is required to prepare a project cost and schedule for each task. Following discussions with GDOT, the contractor will be instructed to proceed in accordance with the terms of the task. Among the types of tasks anticipated under this contract are the following:

- Program Management
- Modification to Existing Software
- Development of New Software Functionality
- Configuration Management
- Training of GDOT and Local Government Personnel
- Design and Plan Development.

The delivery of ITS system components, such as the construction of support structures, installation of communications media, and installation of field devices, is accomplished through the issuance of construction contracts based on the PS&Es developed in house and by the system integrator.

Procurement Challenges

Developing of the NAVIGATOR system integrator contract required the cooperation of GDOT and Federal Highway Administration (FHWA) division staffs. The services of the system integrator contractor are procured on the basis of qualification-based selection, followed by a competitive negotiation, as outlined in Title 23 CFR 172. This regulatory guidance defines “engineering and design services” as program management, construction management, feasibility studies, preliminary engineering, design, engineering, surveying, mapping, or architectural related services. Many of the services required for ITS development, including software engineering, software development, and systems integration, meet the definition of engineering and design services and thus may be procured using procedures contained in Title 23 CFR 172.

Contract Evaluation and Award

In August 1997, GDOT issued a Request for Proposal (RFP) to procure the services of a systems



integrator. The RFP required prospective contractors to submit a written proposal presenting their qualifications to perform the necessary work. Interested firms were provided the opportunity to examine existing NAVIGATOR ITS software and operations before preparing their responses. Each proposer was required to make an oral presentation to the evaluation team. Each proposal was rated on the following criteria:

- Quality of the human resources proposed for the completion of project tasks
- Ability of the contractor to maintain quality human resources for the project duration
- Past performance on tasks of similar scope and complexity
- Presentation of acceptable, logical, cost-efficient methodology to perform tasks as outlined
- Demonstration of an overall understanding of the goals and objectives of the ITS efforts in Georgia
- Oral presentation and response to questions from the evaluation team.

GDOT entered into negotiations with the highest ranked firm. At that time, the firm was requested to provide a cost proposal for required tasks. The final contract value was established based on the best negotiated estimates for the work outlined in the RFP.

A total of two firms submitted proposals. Each firm gave an oral presentation and each member of the review panel calculated a weighted score for each team. GDOT entered negotiations with the firm with the highest score. A contract was signed in May 1998 and with a period of performance of 54 months.

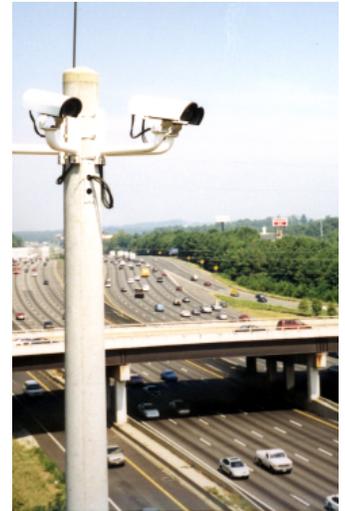
Current Activities

The systems integrator contract has been in effect for 18 months, with a total expected duration of 54 months. NAVIGATOR is currently being used in Savannah and Atlanta and will be implemented in several other cities in Georgia, including Macon and Augusta. The cities receive the same software throughout the state in order to avoid compatibility problems. If a city does not have the same system components required to use all of the software, only portions will be used. It is anticipated that upon

the completion of the systems integrator contract, GDOT will enter into another similar contract for continued updates to the system.

Benefits of the Procurement Strategy

Participants in the procurement planning and acquisition process for the NAVIGATOR program cited a number of benefits to the procurement strategy pursued. The main benefit involves the ability to keep up with the rapidly changing technology. If a contractor submits a proposal to perform specific software upgrades and a significant amount of time passes between the proposal and the actual implementation, the software will be outdated. By using a systems integrator, GDOT is able to have the most current technology at all times. Additional subcontracts are also awarded based on the lowest bidder, allowing the systems integrator to acquire the most recent hardware technology that is available. Also, the most current cost information can be identified in increments. An incremental project development approach is also used, as opposed to the use of a complete, detailed statewide design and construction process. This type of procurement has allowed for feasible updates to the NAVIGATOR system.



BENEFITS OF SYSTEMS INTEGRATION STRATEGY

- ➔ Maintained Current Technology
- ➔ Subcontracts Awarded on Cost Basis
- ➔ Project Costs Tracked Incrementally
- ➔ Feasible System Design Updates

Significant benefits have been cited for the systems integrator procurement strategy for NAVIGATOR.



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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