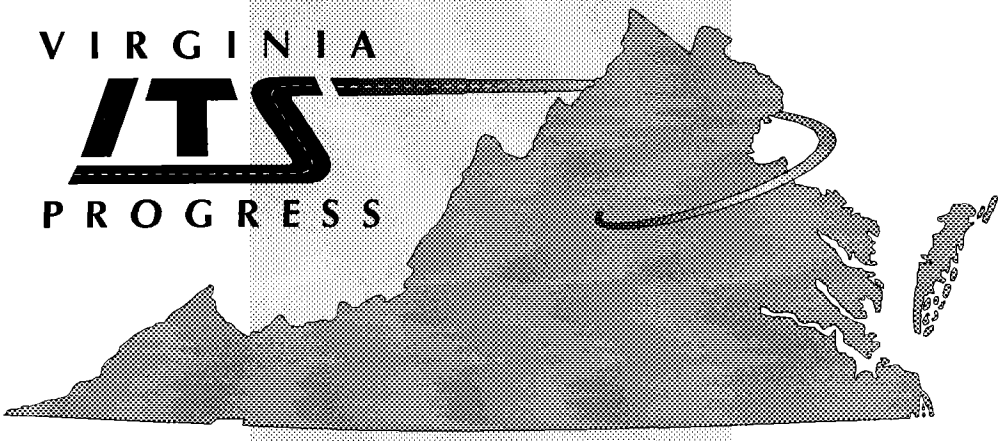
FINAL REPORT

# ITS PROCUREMENT: ANALYSIS AND RECOMMENDATIONS

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Abstract

Virginia has met with a variety of difficulties and delays in its procurement of intelligent vehicle highway systems, components and studies. The Fastoll Automatic Toll System was initiated in 1987, and construction has still not begun. It has been through three rounds of proposals and two court challenges. The Northern Virginia Traffic Management System has had durability and maintenance problems with the changeable message signs it purchased. A number of vendors were reluctant to participate in a preliminary study for the Hampton Roads IVHS Planning Study, because they were afraid they would be precluded from any resulting construction work.

To determine what options exist, the constraints imposed on procurement by federal and state law were examined. Under both Virginia and federal regulations and laws, competitive negotiation may be used with the proper authorization. Virginia law provides unsuccessful offerors the right to both administrative proceedings and court challenges. If federal research funds are used, limitations are placed on the extent to which Virginia can obtain intellectual property rights for any innovations or inventions that result.

There are two possible approaches to improving the procurement of IVHS within the existing statutory framework. One would be to alter the regulations and guidelines to improve the procurement process, clarifying when it is appropriate to use competitive negotiations and what type of specifications are appropriate with competitive negotiations. Another possible change would be the drafting of regulations authorizing the construction of highway systems through approaches like design-build and systems integration.

More drastic changes that should be considered include limiting court challenges of contract awards by unsuccessful offerors. This could take place either through placing limitations on the right to a court challenge, or by allowing the state to substitute some other process, such as alternative dispute resolution, for the court challenge. Either of these changes would require legislative approval.

# FINAL REPORT

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(The opinions, findings, and conclusions expressed in this report are those of the authors and not necessarily those of the sponsoring agencies.)

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## ABSTRACT

Virginia has met with a variety of difficulties and delays in its procurement of intelligent transportation systems, components, and studies. The Fastoll Automatic Toll System was initiated in 1987, and construction has still not begun. It has been through three rounds of proposals and two court challenges. The Northern Virginia Traffic Management System has had durability and maintenance problems with the changeable message signs it purchased. A number of vendors were reluctant to participate in a preliminary study for the Hampton Roads ITS Planning Study, because they were afraid they would be precluded from any resulting construction work.

To determine what options exist, the constraints imposed on procurement by federal and state law were examined. Under both Virginia and federal regulations and laws, competitive negotiations may be used with the proper authorization. Virginia law provides unsuccessful offerors the right to both administrative proceedings and court challenges. If federal research funds are used, limitations are placed on the extent to which Virginia can obtain intellectual property rights for any innovations or inventions that result.

There are two possible approaches to improving the procurement of ITS within the existing statutory framework. One would be to alter the regulations and guidelines to improve the procurement process, clarifying when it is appropriate to use competitive negotiations and what type of specifications are appropriate with competitive negotiations. Another possible change would be the drafting of regulations authorizing the construction of highway systems through approaches like design-build and systems integration.

More drastic changes that should be considered include limiting court challenges of contract awards by unsuccessful offerors. This could take place either through placing limitations on the right to a court challenge or by allowing the state to substitute some other process, such as alternative dispute resolution, for the court challenge. Either of these changes would require legislative approval.

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# EXECUTIVE SUMMARY

## Purpose

The Commonwealth of Virginia has encountered continuing difficulties in procuring intelligent transportation systems (ITS). The project most significantly affected has been Fastoll, an automatic toll collection system to be installed on the Dulles Toll Road, which after seven years of procurement effort is not yet under construction. The Northern Virginia Traffic Management System and the Hampton Roads ITS Planning Study (COMPARE) have also met with procurement-related obstacles. In response to this history, a series of recommendations follows, addressing the specific problems that have been experienced, and anticipating others likely to be associated with contracting for ITS-related work.

## Specific Problems Identified

Interviews, a review of relevant literature, and the history of various procurement efforts indicate that VDOT has encountered or is likely to encounter the following problems:

- Contract awards have been delayed by court challenges.
- Delays have resulted from Requests for Proposal that failed to attract the expected numbers of offerors and whose responding proposals were all judged inadequate.
- When VDOT used competitive negotiation, allegations were made that contract awards were arbitrary and capricious. Offerors have claimed that as part of the negotiation process, information pertaining to their proposal was transferred by VDOT to other offerors. They have also claimed that the process favored those offerors with whom negotiations were last conducted.
- When VDOT used competitive bidding, components were purchased that met the letter of the specifications and had the lowest cost, but had high maintenance costs and did not hold up well over time.
- When seeking consultant services for initial planning and evaluation, VDOT was faced with the question of whether the successful offeror would be barred from all further participation in the project. This question has not yet been completely resolved.
- It has not been possible to resolve legal questions with the speed and clarity sufficient to avoid delaying or impeding VDOT's procurement efforts.
- VDOT lacks personnel with expertise in ITS. Virginia is trying to attract people with the appropriate skills. Until these people are retained, the procurement officers will be overly dependent on proposals for ITS information and dependent on consultants to write specifications for the proposals.

- The implementation of ITS may be impeded by disputes with contractors over intellectual property rights. The state has no official policy, laws or regulations on obtaining rights to intellectual property developed with its funds. However, within the Master Agreement, which is intended to be the template for all VDOT consultant agreements, there is a clause indicating that rights to all intellectual property developed will be transferred to Virginia. Because this clause is not the result of any regulation or policy, it will be subject to removal at the discretion of the contracting officials and the Attorney General's Office. If improperly used, this discretion carries the risk that Virginia might not obtain valuable intellectual property rights that, if appropriate guidelines were in place, would otherwise have been obtained.

- Both when using its own and federal funds for the construction of ITS, Virginia is required to use competitive bidding, unless it can make the showing that competitive negotiation is more fiscally advantageous, or it is procuring professional services.

## Statutes and Regulations

The laws of Virginia provide for the purchasing of goods by either competitive sealed bidding, two-step competitive sealed bidding or competitive negotiation. Competitive negotiations has distinct advantages for the purchase of ITS. Unlike traditional highway construction, ITS often contains complex components such as computers and communications systems. It is more difficult to draft suitable descriptive specifications for ITS than for traditional highway construction. ITS is more likely to require discussions with the vendors as part of the procurement process. Finally, non-price-related factors often play an important role in the awarding decision.

Virginia and the federal government have indicated that competitive bidding is the preferred procurement method. Both require competitive negotiation when obtaining professional services (architecture, etc.). However, in Virginia competitive negotiations may be used to procure materials and non-professional services if there is a showing that it will be more fiscally advantageous to the public than competitive bidding. If federal funds are involved, competitive negotiation may be used only after a similar showing results in the approval of the FHWA Division Administrator. Because of the advantages that competitive negotiations provides for the procurement of ITS, in many cases the necessary showings should be made to allow its use.

In Virginia, bidders on state contracts have a statutorily created right to protest any contract award to the responsible agency and then to challenge it in a court of law. VDOT cannot limit this right, contractually or otherwise. In situations where the placement of a procurement contract can have far-reaching implications for an industry, such as in Fastoll, it

may be in an unsuccessful bidder's best interest to challenge any award no matter how exemplary the contract awarding process. Other states provide potential vendors with narrower rights. For example, in Pennsylvania an unsuccessful bidder, acting as a bidder, has no cause of action. Only taxpayers who can show a special interest have a right to file a legal complaint.

The procurement of ITS, unlike many of the products and services traditionally procured by VDOT, is likely to involve intellectual property. It might be important for the state to obtain intellectual property rights to the systems that it purchases, so the original vendor does not have a monopoly on all future work. If the state were to aggressively pursue intellectual property rights, some of those rights could become a source of future income for the state. However, some vendors have expressed concern about potential limitations on their retention of intellectual property rights and might not participate in the proposal process of a state with aggressive intellectual property policies.

Making the acquisition of intellectual property a consistent and effective part of Virginia's procurement efforts requires a unified policy. Virginia's current policy for intellectual property rights deals only with intellectual property developed wholly or partially by employees, and it is not aggressively enforced. VDOT's Master Agreement, which is intended to be a template for all consulting contracts that VDOT forms, contains clauses that would obtain intellectual property rights from contracting professional consultants. These clauses are not based in statute, regulation, or any explicitly developed policy, so the decision to include them is left largely to the contracting officer and the attorney general's office. In formulating Virginia's policy in this area, it will be important to keep in mind that when Virginia is a subgrantee on an FHWA funded highway planning and research project, the state is required to obtain certain rights for the federal government. Those rights include a nonexclusive, nontransferable, irrevocable, paid-up license to practice or to have practiced for or on behalf of the U.S. any subject invention throughout the world. Under these circumstances, Virginia cannot obtain ownership of the intellectual property that is developed. Lastly, Virginia law requires that when competitive negotiation is used, the best proposal must be accepted. The contracting officer may need to consider the intellectual property rights offered as part of determining which proposal to accept.

## Recommendations

Competitive negotiations offers advantages for the procurement of high-technology systems when it is difficult to write specifications that will allow all bidders to compete equally, when the award will be made on factors other than price, and when discussions with offerors are necessary. If an ITS procurement is subject to these conditions, Virginia should consider making the procurement by competitive negotiation. The use of this procurement method requires approval from the agency head or his designee and, if federal funds are involved, the FHWA Division Administrator. Although this requires going through the steps of the approval process,

the relevant approvals should be pursued if the procurement meets the conditions described above.

To prevent a repetition of the problems associated with the Fastoll project, either (1) the methods of procurement should be altered to limit the available grounds for legal action, or (2) the availability of court challenges of contract awards should be reduced. Limiting the offerors to only one round of proposals, after which they would have the opportunity only to clarify or substantiate their proposals, would probably reduce the risk of an unsuccessful offeror being able to obtain a preliminary injunction. However, this type of limitation is not recommended where the purchasers are unfamiliar with the technology being purchased. The present regulations call for general specifications to be used when a procurement is placed by competitive negotiation. These regulations should be followed since detailed specifications, typically used with competitive bidding, are inappropriate for competitive negotiations. In many cases, specifications describing performance or functional goals of the system should be considered to allow offerors to submit more innovative proposals. Regulations should be written indicating when such specifications are appropriate. Finally, the method for scoring price proposals should be re-evaluated, and a more objective system should be found.

The second option would involve eliminating the right to challenge state procurement decisions in court, the narrower approach of not allowing a court challenge for contracts awarded either in the ITS area or by competitive negotiation, or substituting some form of alternative dispute resolution for the judicial process. Such limitations would prove the most sure and complete solution to the problem typified by Fastoll, but they would require legislative modifications to the Code of Virginia.

In addition to improving the competitive negotiation process and limiting bid protests, a variety of other modifications may alleviate procurement difficulties. Alternative procurement models should be considered as an option to the traditional designer-contractor model. Examples include project management and design-build. A policy on the allocation of intellectual property between VDOT and its contractors should be adopted. A clear demarcation between professional and non-professional services, and between design and preliminary planning should be established. In addition, a more effective mechanism should be created for communication between the Attorney General's Office and VDOT to deal with procurement related questions, such as when planning constitutes a professional service or when consultants will be barred from later project involvement.

Most of the above changes in the procurement procedure would place a greater burden on VDOT's procurement personnel. To successfully operate under these reforms, even within the present system, VDOT will need to recruit or develop, and, more importantly, retain, staff with ITS expertise. Limitations on the number of rounds of proposals or the amount of discussion with potential vendors would probably contribute directly to this need for expertise. Under those

recommendations, contracting officers would need to know both how to determine the corrective measures for any deficiency and the general implications and costs of correcting such a deficiency.

# ITS PROCUREMENT:

# ANALYSIS AND RECOMMENDATIONS

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## INTRODUCTION

State highway administrations across the country are faced with ever-increasing environmental, legal, and political constraints on the construction of new highways. With increased traffic, changed traffic flow patterns, demands for greater safety, and requirements that roads be less environmentally hazardous, rather than turn to the traditional response of building more roads, highway administrations have begun to introduce advanced information technologies, such as electronics, controls, communications, and information processing, into their highway systems. Funds for testing many of these advanced information technologies were incorporated into the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA),[1] which provides a modern approach to solving society's transportation problems. These new information technologies will provide the traveler with information about current traffic conditions, will detect traffic conditions and direct traffic in an optimal fashion, and will decrease the likelihood of incidents by enhancing driver performance. These approaches, which use advanced technologies to improve transportation, are collectively referred to as Intelligent Transportation Systems (ITS).

The successful development and implementation of this technology depends on more than technical feasibility. Institutional, economic, social, and legal issues will affect the success or failure of ITS. Potential legal issues include product and tort liability, antitrust, privacy, intellectual property, regulation, and procurement. Because of the importance of these issues, VDOT has ongoing research projects to identify areas of particular concern and to suggest changes that will increase the likelihood of success. For example, the potential shift of tort liability for automobile accidents from drivers to ITS developers and operators has been examined.[2] That study concluded that significant liability problems are unlikely to arise with many forms of ITS; and that if they do, they are not a type of liability that should be addressed through government intervention.

This report on state procurement of ITS continues VDOT's investigation of legal constraints on ITS. Many ITS technologies will likely be implemented through state departments of transportation (DOTs) rather than marketed by private companies directly to the

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[1] Pub. L. No. 102-240, 105 Stat. 1914 (codified in part, as amended, in scattered sections of 23 U.S.C. (Supp. 1994)).

[2] D. Randal Ayers, Virginia Transportation Research Council, *Tort Reform and "Smart" Highways: Are Liability Concerns Impeding the Development of Cost-Effective Intelligent Vehicle Highway Systems*?, Report No. VTRC 94-R6 (1994).

public. Although implementation and funding will be provided by the state DOTs, actual system development will come from the private business sector. The ability of state DOTs to contract efficiently with vendors to provide ITS is crucial.

ITS use advanced technologies to make existing roads safer and more efficient. In developing this technology, ITS have typically been divided into six functional categories with distinct yet sometimes overlapping purposes. These six categories are Advanced Traffic Management Systems (ATMS), Advanced Traveler Information Systems (ATIS), Advanced Vehicle Control Systems (AVCS), Commercial Vehicle Operations (CVO), Advanced Public Transportation Systems (APTS), and Advanced Rural Transportation Systems (ARTS). Each of these categories uses similar technology for different goals. A brief discussion of each of these areas of ITS appears in the appendix. The ultimate success of ITS depends on the integration of these functional categories.

## PURPOSE AND SCOPE

Traditionally, VDOT procurements have not involved high-technology items like ITS. ITS present challenges for both VDOT engineers and purchasers wishing to use ITS in Virginia. This paper identifies procurement problems or obstacles that VDOT has encountered or will likely encounter due to new transportation technology. This study also addresses recommendations that may lead to more timely and efficient deployment of ITS. These include modifications in laws, regulations, and procedures. This paper does not address the formation of partnerships between VDOT and private contractors for ITS development outside the procurement structure or examine Virginia's high-technology procurements other than ITS.

## METHOD

Given the short history of ITS, little literature exists documenting state procurement difficulties. This study explores the history of three ITS procurement efforts conducted in Virginia during 1993 and 1994. These histories are not necessarily representative of all ITS procurements in Virginia, but they present a variety of ITS procurement experiences.

Since VDOT procurement practices are governed by the Virginia Public Procurement Act, this law is analyzed to determine its applicability and effect on ITS procurements. Federal law is also examined. Potential problems in the applicable state and federal laws are highlighted. These procurement laws provide the background necessary to understand the purchasing procedures discussed in each of the histories. Specific difficulties seen in each of these histories are identified and generalized.

Finally, possible modifications in VDOT procedures and state law are examined through comparison to other state and federal procedures and laws and through a review of relevant literature.

## LAWS AND REGULATIONS AFFECTING ITS PROCUREMENT

States generally have procurement laws regulating the purchase of goods and services by state agencies. These laws typically seek to preserve fairness to potential contractors and avoid the appearance of impropriety by the state. Although the procurement laws may further these goals, they may also be an impediment to efficient purchasing. In this section, Virginia laws and regulations are examined with emphasis on requirements that could potentially impede the procurement of ITS technologies. Federal law is also examined to determine its effect on state procurements.

### State Law

The procedures for contracting with private parties in Virginia are covered by the Virginia Public Procurement Act.[3] The Agency Procurement and Surplus Property Manual,[4] which applies to most state agencies including VDOT, gives procurement regulations implementing the laws in the Code. Finally, the Capital Outlay Manual provides specific regulations for contracting for professional services (including professional services not associated with Capital Outlay projects).[5]

The main thrust of Virginia's procurement law is competition. Virginia law requires that state agencies obtain goods and services through a competitive procedure.[6] Competition in public contracting is considered necessary to obtain high-quality goods and services at a reasonable cost. The Commonwealth also wishes to give all qualified vendors access to public business. Finally, competition helps ensure that the procurement procedures are fair and impartial, avoiding both the substance and the appearance of impropriety.

Competition is achieved through two types of contractor selection -- competitive bidding and competitive negotiations. In most other states the latter is called competitive proposals.[7] In Virginia, the preferred procurement method for goods and non-professional services is

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[3] Va. Code Ann. §§ 11-35 to -80 (Michie 1993 and Supp. 1994).

[4] Department of General Services, Commonwealth of Virginia, Agency Procurement and Surplus Property Manual (1993) [hereinafter Agency Manual].

[5] Agency Manual § 8.2.

[6] Va. Code Ann. § 11-41.

[7] Throughout this document the term competitive negotiations will be used to denote either competitive negotiations or competitive proposals since these two methods of procurement are essentially the same.

competitive sealed bidding; however, when competitive sealed bidding is not appropriate, competitive negotiations can be used.[8]

Competitive sealed bidding is a method of contractor selection in which an invitation for bid (IFB) is issued soliciting bids from potential contractors. The Agency Procurement Manual describes one-step and two-step competitive sealed bidding.[9] With one-step competitive sealed bidding, the IFB must describe accurately and completely the specifications for the item sought.[10] The bids are opened publicly and the contract is awarded to the lowest responsible bidder. This is the method used for the vast majority of highway construction.

Two-step competitive sealed bidding is used when it is impractical to prepare a definitive set of specifications. An IFB is issued, listing mandatory technical data, and requesting technical proposals, without pricing. The state then determines which proposals meet its criteria. It may request clarification or amplification of the material in the proposals, but the proposals must be evaluated as submitted. Vendors are selected on the basis of having acceptable proposals. Pricing information can either be submitted simultaneously with the technical proposal or can be obtained from the approved vendors as part of a second IFB.[11]

When competitive sealed bidding is neither practicable nor fiscally advantageous, competitive negotiations is used.[12] Competitive negotiations allows for more general specifications than the detailed mandatory specifications required with competitive sealed bidding and the opportunity through negotiations to change the content of an offer and pricing after opening.[13] In order to use the competitive negotiation method of procurement for goods and non-professional services, a determination must be set forth in writing that competitive sealed bidding is either not practicable or not fiscally advantageous to the public.[14] The writing must document the basis for the determination and must be signed by the Agency head or his designee.[15]

The process for procuring professional services, such as engineering consulting services, is covered in the Code of Virginia, sections 11-37 and 11-41. Professional services must be obtained through competitive negotiations. A Request for Proposal (RFP) is issued soliciting proposals from potential contractors. Responsive proposals typically include an outline of the contractor's special experience and capabilities.[16] On the basis of these initial responses, the state

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[8] Va. Code Ann. § 11-41.
[9] Agency Manual, *supra* note 4, §§ 3.1 - 3.2.
[10] Agency Manual § 3.1
[11] Agency Manual § 3.2
[12] Va. Code Ann. § 11-41.
[13] Agency Manual, *supra* note 4, § 3.3.
[14] Va. Code Ann. § 11-41(C).
[15] Agency Manual, *supra* note 4, § 3.3(a)(1).
[16] Division of Engineering and Buildings, Commonwealth of Virginia, Capital Outlay Manual, ch. VI § 4.3(3) (1991) [hereinafter Capital Outlay Manual].

agency must engage in discussions with two or more offerors deemed fully qualified, responsible, and suitable to provide the required services.[17] During these discussions, the offerors are encouraged to elaborate on their qualifications and performance data or staff expertise pertinent to the proposed project. At the conclusion of the discussions the agency must select in order of preference the offerors whose professional qualifications and proposed services are deemed most meritorious. Negotiations are then conducted, beginning with the offeror ranked first. If an agreement can be reached, the contract is awarded to that offeror. If not, negotiations are conducted with the offeror ranked second, and so on until an agreement can be reached.[18] For professional services, price criteria are not considered until after the offerors are ranked and negotiations begin.[19] This is in contrast to procurement by competitive negotiations of goods and non-professional services, which may consider price in the ranking of potential offerors.[20] A professional service differs from a non-professional service in that it requires that a license be obtained before the service is offered to the public.[21] In addition, the service must be limited to the personal services of the license holder.[22] The requirement that the services be personal is intended to prevent the use of this procurement technique in procuring other services offered by license holders. It does not mean that the state can only do business with individual license holders, since statutory provision is made for organizations of licensed individuals in the forms of professional corporations[23] and professional limited liability corporations.[24]

The Capital Outlay Manual, in describing the procedures to be used in obtaining engineering services, uses the language "engineering service" without reference to "professional service".[25] However, it does require that "Architectural, Civil, Structural, Mechanical and Electrical portions of the project shall be planned and designed by or under the immediate supervision of a licensed Architect or Engineer . . . ."[26] Therefore, the definition of engineering offered in the Capital Outlay Manual is not in disagreement with the statutory requirement that competitive negotiations without initial consideration of price be used only for the procurement of professional services. Non-professional services that are not covered by the requirements for licensing could still be obtained through competitive negotiations, but cost would be one of the factors that would need to be evaluated as part of the initial proposal.[27]

Often a project will consist of two phases — design and construction. VDOT typically acquires design and construction services separately. First an engineer or engineering firm is

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[17] Capital Outlay Manual, ch. VI, § 4.3(4).
[18] Va. Code Ann. § 11-37(3).
[19] Capital Outlay Manual, *supra* note 16, ch. VI, § 4.3(3).
[20] Va. Code Ann. § 11-37(3)(a)-(b).
[21] Va. Code Ann. § 13.1-543 (Michie Supp. 1994).
[22] Va. Code Ann. § 13.1-543.
[23] Va. Code Ann. § 13.1-543 to -556 (Michie 1993 and Supp. 1994).
[24] Va. Code Ann. § 13.1-1102 to -1123 (Michie 1993 and Supp. 1994).
[25] Capital Outlay Manual, *supra* note 16, ch. VI, § 4.3 (1)-(7).
[26] Capital Outlay Manual, ch. VI, § 2.0.
[27] Agency Manual, *supra* note 4, § 3.3(a)(3).

selected to design the project through competitive negotiations. Then, after the design is complete, a contractor is selected for the construction phase, usually through competitive bidding. To preserve the integrity of the procurement process, the Code of Virginia forbids an engineer or architect who designs a project from being involved with the construction phase of the project unless the project is a design-build project.[28]

The Code of Virginia authorizes the limited use of design-build construction as an alternative to the traditional approach requiring a separate designer and contractor. With the design-build approach, one source is selected at the outset for both the design and construction phases. Currently, design-build is permitted only for certain Capital Outlay projects. [29] In order to use the design-build method of construction for ITS projects, procedures must first be adopted by the Secretary of Administration after public hearing and approval of the House Appropriations and Senate Finance Committees.[30]

Another major aspect of Virginia procurement law is the availability of bid protests. Bidders who believe the source selection process was not conducted in accordance with state law and regulations may file a protest with the appropriate agency.[31] In addition to protesting the award with the procuring agency, the aggrieved party may file a claim with the appropriate court of law and seek cancellation of the bid award.[32]

As Virginia's law currently stands, VDOT cannot contractually prevent unsuccessful vendors from filing suit. The United States Court of Appeals for the Fourth Circuit has held that a contractual provision requiring that a bidder complete an administrative proceeding before filing a claim in court will not be enforced, as it conflicts with applicable state statutes.[33] The contract before the court in that case essentially contained a verbatim recitation of language from Va. Code Ann. § 11-71, with the addition that the administrative proceeding be exhausted before instituting legal proceedings.[34] A case can be brought before a federal court if the parties are from different states and the amount in dispute is $50,000 or greater.[35] Because of the number of contractors who are incorporated in other states, and because the size of ITS contracts will typically exceed $50,000, the federal court system will be available to most unsuccessful vendors in ITS contract award cases. Cases for less than $50,000, or involving only Virginia businesses, would be heard before the Virginia court system. Although no precedents

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[28] Va. Code Ann. § 11-41.1.
[29] Capital Outlay Manual, *supra* note 16, ch. IX, Procedures for Utilizing Design-Build (D/B) Contracts, B. Criteria for use of Design-Build Contracts (D/B).
[30] Va. Code Ann. § 11-41.2.
[31] Va. Code Ann. § 11-66.
[32] Va. Code Ann. § 11-70 (Michie 1993 and Supp. 1994).
[33] *W. M. Schlosser Co., Inc. v. Fairfax County,* 975 F.2d 1075, 1077 (4th Cir. 1992).
[34] *Id.* at 1078.
[35] 28 U.S.C. § 1332(a) (1988).

could be found, there is a reasonable probability that Virginia courts would reach the same conclusion as the Court of Appeals for the Fourth Circuit.

The Code of Virginia and the Agency Manual do not address the allocation of intellectual property rights that may arise as a result of a procurement. Although statutes exist dealing with intellectual property created by state employees,[36] they have little application to the intellectual property developed by private contractors. Even this policy is not aggressively enforced.[37] Ownership of any patent or copyright resulting from the contracted work should be established in the procurement contract, yet the Code and Agency Manual give no guidance or policy on how such rights should be allocated. The only guidance offered is the requirement that, if competitive negotiations is used, the state must obtain the best proposal. This could be construed to include a requirement that the state consider future ownership interests in intellectual property in determining which is the best proposal.[38] The failure of the Code and Agency Manual to provide clear and explicit direction on this subject could have an adverse effect on ITS procurements, which are likely to result in patentable technology.

## Federal Law

### Introduction

Virginia law provides that whenever the expenditure of federal funds is involved, federal laws or regulations not in conformance with the provisions of the Virginia Public Procurement Act may be followed if the receipt of federal funds is conditioned upon compliance with such federal laws or regulations.[39] A state agency may comply with the federal laws or regulations only upon a written determination of the Governor that states the specific provisions of the Virginia Public Procurement Act in conflict with the conditions of the grant or contract.[40] Because of this, federal law must be examined to determine when and where federal regulations apply to ITS procurements by VDOT.

### The Common Rule

The Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments govern procedures relating to federal grants.[41] These regulations

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[36] Va. Code Ann. § 2.1-20.1:1 (Michie 1987) (as implemented in Executive Memorandum 2-86).
[37] Telephone interview with Donna Knicely, Intellectual Property Coordinator, VDOT (July 26, 1994).
[38] *See* text accompanying notes 61-62 *infra.*
[39] Va. Code Ann. § 11-39.
[40] Va. Code Ann. § 11-39.
[41] 53 Fed. Reg. 8034 (1988) (codified, as amended, in scattered sections of the C.F.R.).

were adopted in two categories: the so-called common rule, which contains those provisions that became the basic part of each federal agency's regulations, and further regulations that were adopted separately by each of the various federal agencies. The resulting regulations for the United States Department of Transportation (USDOT) appear at 49 C.F.R. § 18. Section 18 applies to all grants and subgrants to governments except where inconsistent with federal statutes or with regulations published in the Federal Register.[42] Section 18.36 contains USDOT's regulations concerning procurement. Section 18.36(a) sets out the following rules for states receiving federal aid:

> When procuring property and services under a grant, a State will follow the same policies and procedures it uses for procurements from its non-Federal funds. The state will ensure that every purchase order or other contract includes any clauses required by Federal statutes and executive orders and their implementing regulations.[43]

Sections 18.4, 18.6, and 18.36 provide that a state Department of Transportation is expected to use its own procurement practices except where specifically stated otherwise in federal statutes, regulations, or executive orders. Section 18.36 (j)-(t) provides examples of statutes and regulations where states must use federal rules. One such statute is 23 U.S.C. § 112, which requires competitive bidding for certain projects.[44]

**Competitive Bidding**

23 U.S.C. § 112 provides specific instructions for recipients of highway construction grants. Section 112(a) requires recipients to use bidding methods that are "effective in securing competition."[45] In setting out the details of the required bidding procedure, 23 U.S.C. § 112(b) states: "construction of each project . . . shall be performed by contract awarded by competitive bidding, unless the state highway department demonstrates, to the satisfaction of the [U.S.] Secretary [of Transportation], that some other method is more cost effective or that an emergency exists." This authority granted to the Secretary has been delegated to the FHWA Division Administrator.[46]

The competitive bidding requirements of 23 U.S.C. § 112 apply only to construction. At 23 U.S.C. § 101, construction is defined as:

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[42] 49 C.F.R. §§ 18.4, 18.6 (1993).
[43] 49 C.F.R. § 18.36(a).
[44] 23 U.S.C. § 112(b) (1988).
[45] 23 U.S.C. § 112(a).
[46] 23 C.F.R. §§ 635.104 (b), 635.201-635.205 (1993).

> the supervising, inspecting, actual building, and all expenses incidental to the construction or reconstruction of a highway including locating, surveying, and 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 (fixed and portable), scale pits, scale installation, and scale houses and also includes cost incurred by the state in performing Federal-aid project related audits which directly benefit the Federal-aid highway program.[47]

"The term "highway" is defined in the same section to include "roads, streets, and parkways, and also includes rights-of-way, bridges, railroad-highway crossings, tunnels, drainage structures, signs, guardrails, and protective structures, in connection with highways."[48]

The explicit inclusion of "traffic control systems" in the definition of construction and the inclusion of "signs" in the definition of highways will probably result in the federal mandating of competitive bidding (as opposed to competitive negotiations or competitive proposals, some form of which is permitted by thirty-nine states)[49] for the construction of ATMS and ATIS. Weigh-in-motion systems and automatic toll collection facilities, which would include capital improvements to facilitate an effective vehicle weight enforcement system and which would facilitate traffic flow, might also be subject to the requirement for competitive bidding. The key element in determining if competitive bidding is federally mandated is whether actual construction is performed, as defined by 23 U.S.C. § 101.

The federal code and regulations (23 U.S.C. § 112, 23 C.F.R. § 635, and 49 C.F.R. § 18) do not clearly demarcate the border between those activities that would and would not be considered construction. When questioned about the applicability of the competitive bidding requirement to ITS, a representative of the FHWA placed emphasis on whether installation takes place.[50] If the contractor installs part of the system (for example lays cable in a communications system), the FHWA would consider the action construction. If, however, components are purchased and the state DOT installs the system, it would be considered the purchase of goods and services and 23 U.S.C. § 112 would not apply.

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[47] 23 U.S.C. § 101 (1988 and Supp. 1993).
[48] 23 U.S.C. § 101.
[49] The Council of State Governments, State and Local Government Purchasing, 64 (3rd ed. 1988).
[50] Telephone interview with Robert Hollis, Region 3 Representative, FHWA (August 17, 1993).

It should be noted that only limited federal funding is available for research, development, planning, operational tests and other ITS activities. Therefore, in many cases ITS will probably be one of many projects for which Federal construction money is sought. If federal construction funding is used, it may be important to identify the work as construction so that it does not fall into some other category, such as maintenance or operations, for which federal funds are not available.[51]

**Intellectual Property**

In addition to competitive bidding for construction, the Common Rule also requires that state and local grantees impose certain requirements pertaining to patents, copyrights, and rights in data with subgrantees.[52] Thus, while generally allowed to follow its own procurement procedures, a state DOT must adhere to the federal policy on patents, copyrights, and rights in data when federal funds are used. This rule is important to ITS procurements because some portion of the technology developed under ITS procurement contracts is likely to be patentable.

As an example, when the federal government wholly or partially funds any experimental, developmental or research work, its policy is to retain a nonexclusive, nontransferable, irrevocable, paid-up, world-wide license to practice or have practiced for or on the behalf of the U.S. any resulting invention.[53] The state DOT would have to include a clause to this effect in any agreement with a private party when federal funds are used.[54] This license has been construed by the FHWA (the granting agency) to include research and development and support services performed under a federal procurement contract and use of the subject invention on a federally owned road.[55] In addition to the license requirement and other requirements not addressed here, the federal agency retains "march-in rights." With march-in rights, the federal agency can force the patent holder to grant a license to a third party in the event certain conditions are met.[56] One such condition is the non-practice of the invention by the patent holder.

If federal funds for experimental, developmental, or research work are involved, the state cannot obtain title to the intellectual property from one of its contractors or subcontractors. If the federal government should obtain title, the subcontractor retains the right to a nonexclusive,

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[51] Letter from Julie Dingle, Senior Attorney, FHWA (received June 24, 1994).
[52] 49 C.F.R. §§ 18.34, 18.36(a), 18.37(a) (which invoke 35 U.S.C. § 210(c) (1988) as implemented in 37 C.F.R. §§ 401.1, 401.16 (1993)).
[53] 37 C.F.R. §§ 401.2(a), 401.14(b).
[54] 37 C.F.R. §§ 401.14(a), (g).
[55] Julie Dingle, *Intellectual Property Rights in FHWA-Funded ITS Projects* 10 (Jan. 25, 1994)(unpublished manuscript prepared for the Workshop on ITS and Intellectual Property cosponsored by ITS America and the FHWA).
[56] 35 U.S.C. § 203.

royalty-free license.[57] There are provisions for allowing exceptions to this bar against the transfer of ownership of the invention to the state.[58] However, one FHWA Senior Attorney who was interviewed was not aware of any contracts where a state had obtained greater rights than those allowed under normal FHWA policy. These requirements do not apply to inventions that arise out of work procured solely with state funds, nor do they apply to inventions that result from federal funds for work that is not experimental, developmental, or research oriented. Finally, the patent rights affected are only those arising out of inventions that are first conceived or reduced to practice as part of work performed under a federal funding agreement.[59]

In their manuscript, *Intellectual Property Rights and the National ITS Program,* Stern et al. suggested that those negotiating contracts for ITS may have a duty under state laws or constitutions prohibiting "gifts" or "waste" of public resources to obtain the most extensive possible intellectual property rights.[60] In the Commonwealth of Virginia, if non-professional services are procured by competitive negotiation, there is a requirement that those services be procured from "the offeror which . . . has made the best proposal."[61] This requirement could be construed to include any intellectual property rights available to the Commonwealth in the area of intellectual property, and to mean that those rights must be considered in determining which is the best proposal.

**Other Federal Requirements**

Although the competitive bidding requirements of 23 U.S.C. § 112 and the retention of intellectual property rights by the federal government will have the greatest effect on state procurement of ITS, other federal requirements that are not superseded by the Common Rule are worthy of mention.

23 U.S.C. § 112(b)(1) requires that "contracts for the construction of each project shall be awarded only on the basis of the lowest responsive bid submitted by a bidder meeting established criteria of responsibility." Only requirements specifically set forth in the advertised specifications can be imposed. Since this language is consistent with Virginia's procedure for sealed bidding,[62] 23 U.S.C. § 112(b)(1) should present no special concern when federal funds are used.

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[57] 37 C.F.R. § 401.14(e), (g).
[58] 37 C.F.R. § 401.3(a)(2).
[59] 37 C.F.R. § 401.2(d).
[60] Claude M. Stern et al., *Intellectual Property Rights and the National ITS Program* (31-32) (Dec. 1, 1993) (unpublished manuscript prepared for the Workshop on ITS and Intellectual Property co-sponsored by ITS America and the FHWA).
[61] Va. Code Ann. § 11-37(3)(b).
[62] Va. Code Ann. § 11-37.

23 U.S.C. § 112(b)(2) specifies requirements for contracting for engineering, architectural and other study and design services. However, § 112(b)(2)(B)(i) states that these requirements do not apply if the state adopts formal procedures for the procurement of such services. Since Virginia requires all services to be awarded by competitive methods and requires competitive negotiations for the procurement of professional services, § 112(b)(2) will probably have little effect.

23 U.S.C. § 112(e) requires standardized contract clauses concerning site conditions, suspension of work, and material changes in the scope of the work for highway construction contracts, except when the state has adopted by statute a formal procedure for the development of a contract clause including the above concerns or when the state has adopted a statute that does not permit inclusion of such a contract. Virginia has neither type of statute, so care should be taken to ensure compliance with federal regulations whenever federal funds are involved. This requirement is not specific to ITS, but it should not be ignored on ITS "highway construction" projects.

Other federal requirements applicable regardless of whether or not "construction" is involved include the Buy America provisions imposed by the Federal Transit Administration,[63] provisions relating to the employment of persons without regard to race, color, creed, national origin or sex,[64] and provisions requiring the preferential employment of Native Americans on road projects and contracts on or near Indian reservations.[65] Finally, 49 C.F.R. § 23 imposes requirements for the participation of minority and women-owned business enterprises in federally funded projects, a concern that is similarly addressed in § 11-44 of the Code of Virginia.[66]

## Inappropriateness of Competitive Bidding for ITS

Depending on how FHWA subsequently defines interpretation of construction, competitive bidding requirements under 23 U.S.C. § 112 may impede the appropriate deployment of ITS. Many states have recognized the utility of more flexible means of source selection, such as competitive negotiations. They have also recognized that the goals of competitive procurements need not be sacrificed just because competitive bidding is inappropriate for certain purposes. Many federal agencies allow competitive negotiations for the

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[63] 49 C.F.R. §§ 660-661.

[64] 23 U.S.C. § 140(a) (1988).

[65] 23 U.S.C. § 140(b) (Supp. 1992).

[66] Va. Code Ann. § 11-44 (1993). ("In the solicitation or awarding of contracts, no public body shall discriminate because of the race, religion, color, sex, or national origin of the bidder or offeror. Whenever solicitations are made, each public body shall include businesses selected from a list made available by the Department of Minority Business Enterprise.")

procurement of goods and services even when "construction" is involved.

If Virginia chooses to pursue competitive negotiation on a project involving federal funds, it will need to demonstrate to the FHWA Division Administrator that competitive bidding is not the most cost-effective procurement technique.[67] This section discusses factors that could be used to make such a case to the FHWA Division Administrator. It should be noted that this approach was not always available. Prior to the Competition in Contracting Act,[68] competitive bidding was required for all contracts over $10,000 unless negotiation was justified under one of the statutory exemptions then found in 41 U.S.C. § 252(c) and 10 U.S.C. § 2304(a).[69]

Since passage of the Competition in Contracting Act, a federal executive agency is required to "use the competitive procedure that is best suited under the circumstances of the procurement."[70] 41 U.S.C. § 253(a)(2) codifies the criteria for the selection of competitive procedures that federal agencies should follow. An agency is directed to:

> (A) solicit bids if —
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> (i) time permits the solicitation, submission, and evaluation of sealed bids;
> (ii) the award will be made on the basis of price and other price-related factors;
> (iii) it is not necessary to conduct discussion with the responding sources about their bids; and
> (iv) there is a reasonable expectation of receiving more than one sealed bid; and
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> (B) . . . request competitive proposals if sealed bids are not appropriate under clause (A).[71]

Commentators have suggested the use of competitive negotiations rather than competitive bidding when procurements involve high-technology items such as computers or communications systems,[72] when it is difficult to construct suitable descriptive specifications for bidders to compete on a common and equal basis,[73] when the award will probably be made on the basis of non-price-related factors, and when there is a necessity to conduct discussions with other offerors.[74] Additionally, USDOT has produced a manual that discusses the criteria for selecting competitive negotiations instead of competitive bidding in contracting for vehicle maintenance

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[67] 23 U.S.C. § 112(b) and 23 C.F.R. § 635.104(b).
[68] Competition in Contracting Act of 1984, Pub. L. No. 98-369, §§ 2701-2753, 98 Stat. 494 (1984) (codified in part in scattered sections of the U.S. Code).
[69] John Cibinic, Jr. and Ralph C. Nash, Jr., Formation of Government Contracts 289 (1986).
[70] 41 U.S.C. § 253(a)(1)(B) (1988).
[71] 41 U.S.C. § 253(a)(2) (emphasis added).
[72] The Council of State Governments, State and Local Government Purchasing 64 (3rd ed. 1988).
[73] The Council of State Governments, State and Local Government Purchasing 6.6 (1st ed. 1975).
[74] Cibinic, *supra* note 70, at 291.

services.[75] The manual recommends use of competitive negotiations whenever any of the following five criteria are met:

1. There is a significant variation in the methods that may be used to deliver a specific service.

2. There are attributes other than price that should be included as criteria for selecting a contractor.

3. There is a need for bidders to have the opportunity to revise their work plans after initial evaluation of proposals (including the price of the services).

4. The award should be based on a comparative evaluation.

5. An RFP would result in a more beneficial contract for the agency.[76]

Based on criteria given in the United States Code, commentary by academics, and USDOT's manual for contracting for vehicle services, competitive negotiations is not justified for the procurement of traditional highway construction. Traditional highway construction does not require discussions concerning bids or selection on anything other than the basis of price. Traditional highway construction is not "high-tech," nor are specifications difficult to draft. Finally, traditional highway construction does not need to be based on a comparative evaluation (except for price), nor is there a significant variation in the method that may be used to deliver a specific service. Therefore, the competitive bidding requirement under 23 U.S.C. § 112 relating to traditional highway construction is not misplaced. However, many systems and sub-systems of ITS do meet the criteria set forth above for the use of competitive negotiations and therefore should be exempt from the 23 U.S.C. § 112 requirements. This exemption can be justified by envisioning most forms of ITS as outside the sphere of traditional highway construction or by the states demonstrating that competitive negotiation is a more cost-effective means of procuring ITS.[77]

Of course, all technological systems go through a cycle of evolution. Early in the cycle, where ITS is now, there are many possible approaches to problems that are encountered. As the technology matures, standardization tends to occur, both because it is imposed by government and industry, and also because the most successful approaches begin to predominate. An analysis of whether ITS should be purchased through competitive negotiation or competitive bidding can only examine the technology as it now exists. At some unknown point in the future

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[75] T. H. Maze *et al*, Manual on Contracting for Vehicle Maintenance Services, FTA Contract No. 1A 11 008-92/1 (1992).
[76] *Id.* at 81-83.
[77] *See* 23 U.S.C. § 112(b)(1).

(possibly the distant future because of the complexity of ITS systems) ITS may reach a level of standardization that makes competitive bidding the appropriate means of purchasing.

Advanced Traffic Management Systems (ATMS) are likely to be affected by the competitive bidding requirements of 23 U.S.C. § 112. ATMS include: devices to measure traffic flow and detect incidents, such as video cameras and inductive loops; image processors and devices to control traffic, such as changeable message signs, ramp meters, and reversible lanes; and ancillary devices, such as communications networks that tie together the monitoring and control aspects of ATMS. Many of these items are already procured by states through a competitive bidding procedure, and therefore the federal requirements for competitive bidding have little effect. However, with some aspects of ATMS, the flexibility in source selection of competitive negotiation is desirable. Examples of ATMS procurements that might benefit from competitive negotiations are the procurement of Automatic Toll Collection (ATC) systems and communications systems.

ATC allows motorists to pay tolls automatically without stopping. A stationary antenna reads a small transponder attached to passing automobiles. As the vehicles pass the antenna, they are identified and their tolls are automatically debited from a pre-paid account. An ATC system consists of many subsystems that require customized system integration. Subsystems can include an enforcement system to deter motorists without transponders from passing the toll without paying, a preclassification system for determining the class of vehicle (2-axle, 4-axle, etc.) and thus the appropriate toll, a communications system to link the toll booths to a control center, and a system for identifying a given vehicle and its corresponding account number.

Such a system is a prime candidate for competitive negotiations rather than competitive bidding. Since each subsystem could be designed in a variety of ways, discussions between the responding contractors and the state DOT are necessary to determine if the proposed means are acceptable. In addition, because of the complexity of each subsystem, specifications that would allow bidders to compete on a common and equal basis are difficult to write. Finally, the award of such a contract should not be based primarily on initial price, since quality, compatibility with future systems, and flexibility to make improvements may affect long-term cost to the DOT more than initial price.[78] The ultimate cost to the DOT and the public it serves will most certainly be affected by such criteria, which are not easily or directly considered in a competitive bidding process.

Because of general lack of experience with ATC systems, and because the technology of such systems is constantly advancing, it is important that a DOT conduct discussions with potential offerors to determine the applicability of any proposed system to its perceived needs.

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[78] One might argue that quality and expandability could be written into the specifications, allowing the DOT to reap the benefits of both low price and quality with competitive bidding. This argument, however, presupposes that the DOT has the ability to write such specifications.

The DOT may in the process determine that offerors can perform much more efficiently than originally expected.

With these justifications for the use of competitive negotiations, it is no surprise that almost every ATC system in the country has been procured through competitive negotiation processes. ATC system procurements in Virginia,[79] Texas,[80] California,[81] Illinois,[82] and Florida[83] have all used the competitive negotiation process. Texas, which generally does not allow competitive negotiations for goods, classified its ATC system as a combination of services and telecommunications equipment in addition to goods. Since services and telecommunications equipment must be procured in Texas through a competitive negotiation process, the Texas Turnpike Authority was consequently able to use an RFP to obtain the entire system.[84] All of these states were permitted by state law to use competitive negotiations for the procurement of ATC systems; however, this might not be the case when federal funds are involved.

With the passage of the ISTEA, federal aid may be used for the creation of toll roads to a much greater extent than previously was possible. Future ATC facilities may, as a result, be financed with federal funds and thus be subject to federal requirements under 23 U.S.C. § 112. Depending upon the FHWA's interpretation of "highway construction," states may be forced to revert to competitive bidding, which is probably not the preferable method of acquiring ATC systems.

As discussed earlier, a representative of the FHWA has indicated that, if installation is involved, competitive bidding is required for the purchase of communications systems that are part of an ATMS. Nevertheless, competitive negotiation is probably the preferred method of source selection because the purchase of a communications system would likely require discussions with responding sources, the award would be based on factors other than initial purchase price, a rapidly advancing field of technology is involved, and there may be significant variation in the methods that are used to deliver the system. In fact, *State and Local Government Purchasing* gives the following as an example of a situation where either two-stage procurement and/or competitive negotiations, but not sealed bidding, would be appropriate:

> *The design and development of communications network.* A new concept of networking for real-time display of information tied to a central computer using voice integration has been conceived as a result of in-house studies. A general description of the concept is available. Several industrial firms have expressed

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[79] *Round Three for Fastoll: Virginia to Issue New RFP*, Inside IVHS, June 21, 1993, at 1.
[80] *Turnpike Authority to Stick with Amtech AVI on Dallas North Tollway*, Inside IVHS, Dec. 21, 1992, at 6.
[81] *California Toll Agencies Seek Exemption from State Spec*, Inside IVHS, Oct. 26, 1992, at 1.
[82] *Amtech Sues Illinois Agency over AT/Comm's AVI-Toll Award*, Inside IVHS, Feb. 15, 1993, at 3, 4
[83] *Armed with Test Results, FDOT Prepares RFP for Release in August*, Inside IVHS, Apr. 26, 1993, at 12.
[84] Telephone interview with Jerry Shelton, Director of Administration, Texas Turnpike Authority (August 1993).

interest in the project, each taking a somewhat different approach toward implementation.[85]

Obviously, a communications system is another ideal candidate for competitive negotiations. However, if any installation is involved (for example laying cable), the FHWA would allow only competitive bidding.

The federal competitive bidding requirements will most likely affect ATIS less than ATMS. Since many ATIS components incorporate currently existing forms of communications, such as telephone lines and broadcast air waves, they would not require "installation," which seems to be the trigger for the 23 U.S.C. § 112 competitive bidding requirements. However, it is possible that where the state wishes to provide continuous traffic information to kiosks at major activity centers such as shopping malls, the installation of dedicated lines will be required. Such action could trigger the competitive bidding requirement. Although competitive bidding may not be appropriate in this circumstance, the FHWA may require it.

Another situation that might call for competitive bidding under § 112 is the purchase of changeable message signs and other devices that disseminate traffic flow information. Since § 101 includes "signs" as part of a highway, it is likely that competitive bidding for changeable message signs would be federally mandated. The desirability of using competitive bidding for the procurement of changeable message signs is debatable. In some respects, they resemble "off-the-shelf" items since many manufacturers now produce them. On the other hand, competitive negotiations may be useful in weeding out inferior products or selecting a more advanced sign that meets the particular needs of the state DOT.[86] It is hardly clear that competitive bidding should always be used. It might be more appropriate for the federal government to maintain consistency with its policy set out in the Common Rule and defer to the states' judgment on appropriate procurement procedures for this type of purchase.

Weigh-in-motion (WIM) systems are likely to be affected by § 112 since "improvements which directly facilitate an effective vehicle weight enforcement program" are included in the definition of highway construction (§ 101). VDOT has been active in research and development of WIM systems and has conducted a study of these systems.[87] This study identified three types of systems and commented on the strengths and weaknesses of each. Although all of the systems include sophisticated electronics, they differ greatly in approach. WIM systems, like ATC and communications systems, are appropriate devices to be procured through a negotiated process. It is necessary to conduct discussions with the offerors, and the selection is likely to be made on other than initial price-related factors. For example, most systems have limited lifetimes, which

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[85] The Council of State Governments, State and Local Government Purchasing 6.6 (1st ed. 1975).

[86] *See* discussion on problems with purchasing changeable message signs in the section on the Northern Virginia TMS *infra* at pp. 26-27.

[87] B. H. Cotrell, Jr., Virginia Transportation Research Council, *Evaluation of Weigh-In-Motion Systems*, Report No. VTRC 92-R8 (1992).

makes life-cycle costs an important consideration. Although such systems are prime candidates for competitive negotiations, this option is most probably foreclosed by federal regulation since § 101 specifically includes weight enforcement systems.

## Application of State and Federal Law to ITS

Because of the Common Rule, most required procedures for the procurement of ITS technologies will be dictated by Virginia law. The major exceptions, which surface only when federal funds are used, are competitive bidding requirements for construction and federal retention of intellectual property rights. The option of source selection by competitive negotiations could expedite the growth of ITS in Virginia. ITS products are novel and technologically oriented, making competitive bidding problematic. It is also very difficult to write specifications that ensure quality, yet do not foreclose alternative design approaches, which is especially important with ITS. The ability to consider quality in addition to price and to write specifications in general terms, which competitive negotiations offers, is important to ITS development. Some states do not have this advantage and are restricted to low-bid source selection. Others have allowed the the exemption from competitive bidding of certain ITS procurements.[88]

Under Virginia law competitive negotiations is available with the proper showings, which could be very advantageous for the procurement of ITS. On the other hand, some aspects of Virginia procurement law, such as bid protests, could be major obstacles. The impact of delays associated with bid protests could be especially harmful to technologically-oriented procurements. When combined with the delay inherent to a bifurcated designer-contractor selection procedure, designs may be rendered obsolete before installation finally begins. Although competitive negotiations may be the most appropriate procurement method for ITS because it allows consideration of factors other than price, it may appear to be more subjective than competitive bidding. This is likely to lead to more bid protests. In addition, since compatibility among systems and the setting of standards for ITS technology is perceived as a precondition to the success of ITS,[89] contractors have significant long-term incentives to establish themselves in the industry, and thus may be more willing to accept the short-term costs, such as legal fees, associated with bid protests.

The lack of appropriate procedures permitting design-build construction of ITS could also be an impediment to ITS procurement in Virginia. The emergence of former defense contractors and electronics and communications companies, which generally perform both design and construction of their products, in new ITS industries may make the traditional designer-contractor procurement model inappropriate. The prohibition barring an engineer from being involved in both the design and construction phases of a project may discourage qualified

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[88] *See* discussion of Texas Turnpike Authority *infra* at p. 31

[89] IVHS America, Strategic Plan for Intelligent Vehicle Highway Systems in the United States, at I-18 (1992).

companies from pursuing design contracts because that would preclude their involvement in more lucrative construction contracts.

The final aspect of Virginia law that is likely to have an effect on ITS procurement is the absence of any policy in the law on the ownership and licensing of intellectual property rights developed by contractors. Without any guidance from the Code or Agency Manual, it appears that the purchaser is free to negotiate for these rights. If federal money for research, development or experimentation is used, the state is required to include certain contract clauses guaranteeing limited intellectual property rights to the federal agency providing the money.[90]

If a state funds a project where intellectual property is likely to be developed, that state may want to claim some rights to any resulting patents or copyrights. Examples of possible patentable subject matter include the software developed for an Advanced Traffic Management System. On the other hand, contractors will often participate in a project mainly for developmental purposes with the goal of developing technology that can be marketed in the future. Without rights to that technology, or some kind of protection against others using it, a contractor may choose not to enter into the relationship with the state or may charge a higher price. The policy Virginia takes on its retention of intellectual property rights, as well as the flexibility it allows in deviating from that policy for purposes of an individual procurement, is likely to be an important factor in the development of ITS in Virginia. Members of private industry working in ITS have complained of the reluctance or inability of some state DOTs to grant all intellectual property rights to contractors and are hesitant to pursue projects in which intellectual property rights must be relinquished. On the other hand, defense contractors, many of whom are now entering the ITS market, have long worked with the federal government under contracts that required relinquishing at least some intellectual property rights. Although the ability to negotiate for intellectual property rights could be an advantage, it could also pose problems since negotiations concerning intellectual property not yet in existence would likely be complex and time consuming.[91]

As discussed earlier, the federal government requires state governments to impose certain requirements with respect to patents, copyrights, and data. The FHWA commissioned a study to examine the likely effect of this requirement on the development of ITS.[92] That study determined that current law would not prevent private parties from protecting their preexisting

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[90] *See* discussion *supra* at p. 10.

[91] Several options exist for state retention of intellectual property rights. One option, which has been employed in Texas, is state retention of a license for use within the state with patent ownership going to the contractor. This arrangement is usually agreeable to both parties because it allows the contractor to develop exclusive marketing rights to a technology in all but one state while the state avoids paying a premium for technology developed with state funds. Another option that serves these goals, but is seen as less attractive to private contractors, is to grant the contractor all intellectual property rights while giving the state the right to receive receiving royalties on all proceeds. State DOTs may seek this option because of its revenue generating possibilities.

[92] Claude M. Stern *et al.*, *Intellectual Property Rights and the National ITS Program* (Dec. 1, 1993)(unpublished manuscript prepared for the FHWA, under FHWA Contract DTFH61-93-C-00087).

intellectual property, nor would it prevent private developers from acquiring commercially valuable intellectual property arising from federally funded procurement. However, it also determined that the ambiguity and complexity of the current law may constrain ITS development to the extent that potential developers fear their intellectual property rights will be taken by the federal government.[93] If Virginia were to aggressively pursue intellectual property rights in its negotiations with potential contractors, it would likely generate comparable fears.

## Summary of Laws and Regulations Affecting ITS Procurement

Laws and regulations affecting ITS procurement exist at both the state and federal levels. Federal law, which is applicable when a project is federally funded, directs the states to follow their own procurement practices except where inconsistent with certain enumerated exceptions.

Two of the most important exceptions are the competitive bidding requirements for "highway construction" and the retention of intellectual property rights for the federal government, both of which may constrain ITS development. Under the federal requirements for intellectual property, private contractors are able to acquire commercially valuable intellectual property. However, ambiguity in the law may limit ITS development to the extent that potential developers fear their intellectual property rights will be taken by the federal government.[94] The competitive bidding requirements for highway construction will likely impede ITS development to the extent that they mandate competitive bidding where another form of procurement, such as competitive negotiations, would be more effective. Although these requirements may impede ITS development, they exist only if federal funding is used. The Virginia Department of Transportation will be released from federal requirements for competitive bidding if it can satisfy the FHWA Division Administrator that competitive negotiations are a more cost-effective method of procurement in a particular case.[95] Where only state funds are involved, the Virginia Secretary of Transportation or his designee can make a similar determination that competitive negotiations should be used when competitive bidding is not practicable or fiscally advantageous to the public.[96]

Virginia procurement law has the potential both to impede and to aid ITS installation. The option to substitute competitive negotiations for traditional competitive bidding source selection procedures creates an environment conducive to ITS development. However, the law also provides for bid protests, which can delay procurements and retard ITS deployment. Although statute permits its use, design-build construction, which may be appropriate for ITS, remains off-limits to ITS projects in the absence of implementing regulations. Finally, Virginia's

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[93] *Id.* at 33-34.
[94] *Id.*
[95] 23 U.S.C. § 112(b).
[96] Va. Code Ann. § 11-41.

lack of a general intellectual property policy with respect to private contractors offers VDOT the opportunity to formulate an appropriate policy keeping ITS procurements in mind.

## PROBLEMS ASSOCIATED WITH ITS PROCUREMENT

Certain aspects of procurement law will likely aid in the effective procurement of ITS while some will likely be impediments. The procedures and actions of individual purchasers will determine whether the advantages provided by the Code of Virginia are fully exploited and whether the effects of the weaknesses are minimized. Three examples of Virginia ITS procurement efforts were assembled to ascertain specific problems encountered and the effectiveness of past ITS procurements. These procurements were an ATC system, an ATMS, and an ITS architectural design. Two Texas procurements were also examined for comparison. Both specific and general problems with VDOT's procurement of ITS can be identified from these examples. However, since all states are likely to face similar difficulties, a brief summary of what the ITS community perceives to be potential impediments to ITS procurement begins the discussion below.

### Literature Review

In early 1993, ITS America at the request of USDOT, prepared an issues paper describing the ways in which traditional public contracting and acquisition practices may inhibit the development and adoption of ITS technologies. Based on the perceptions of members of the ITS community, the paper identified eight issues, some of which were discussed in the previous section. Those issues are:

1. Allocation of intellectual property rights between the government and the contractor.

2. Organizational conflict of interest restrictions.

3. Multi-jurisdictional control over projects leading to overlapping requirements.

4. Cost accounting, cost certification, and auditing requirements.

5. Distribution of risk for liability between the government and private vendors.

6. Cost of compliance with procurement regulations, including contract administration and oversight, audits, and additional requirements such as socioeconomic regulations.

7. Unfamiliarity of state and local highway officials and smaller companies with procurement rules used in high technology procurements.

8. Heightened project uncertainties due to the procurement process, including the potential for termination/cancellation of the project by the agency, delays, uneven and uncertain funding due to lack of multi-year funding, and earmarking by Congress of appropriated funds.[97]

Contract issues arising in the acquisition of an automatic toll collection system are described in a paper by Mitchell E. Ostrer.[98] The issues identified by Ostrer include: (1) the legality of a consortium of states for the purpose of jointly procuring a toll system, (2) allocation of intellectual property rights, (3) indemnification from infringement of intellectual property rights, (4) protection from the impact of changing regulatory standards (for example, Federal Communication Commission licenses), and (5) federal contract requirements such as intellectual property clauses.

The above lists illustrate the variety of issues associated with ITS procurements. VDOT is likely to confront each of these issues eventually, although some are of more immediate concern than others. As the following examples demonstrate, the lack of experience of state and local highway officials with rules applicable to high technology procurements poses a significant obstacle to VDOT's ITS program.

## Procurement Examples

### Fastoll Automatic Toll System

The Virginia Fastoll project is an ongoing procurement of an ATC system for use on the Dulles Toll Road. The project began in 1987, has passed through two failed procurement attempts, and is currently awaiting trial on challenge to the contract award. This is an example of ITS procurement where technology is integrated based on VDOT's needs. The procurement process included planning, consultant selection, design, submission of a request for proposals, contractor selection, bid protest and court action. These steps are described in detail below.

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[97] Gena Cadieux, *Procurement Issues in ITS Development and Deployment* (Jan. 22, 1993)(draft unpublished report).

[98] Mitchel E. Ostrer, *Contract Issues In Toll Road Agency Procurement of Intelligent Vehicle Highway Systems*, 1993 Proceedings of the IVHS America Annual Meeting 199.

In 1987, VDOT was interested in installing an ATC system on the Dulles Toll Road in order to reduce congestion and increase throughput on the toll road. Being unfamiliar with automatic toll systems, VDOT sought assistance from a consultant in designing and building the toll collection system. Following the procedure for the selection of professional services discussed above, VDOT selected Castle Rock Consultants (CRC) late in 1987. The project had eight phases: (1) feasibility analysis, (2) concept development, (3) detailed system design, (4) plans and specifications, (5) equipment procurement, (6) acceptance tests, (7) installation and maintenance, and (8) system evaluation. In April 1988, CRC issued a report detailing the results of the feasibility analysis. In August 1988, CRC summarized the concept development phase work in a written report. The detailed system design, plans and specifications were completed later.

Having the plans and specifications for the proposed automatic toll system, now termed Fastoll, VDOT needed a contractor to build the toll system. VDOT determined that competitive negotiations would be the appropriate procurement method for the Fastoll project and justified its decision in a memo written by the Assistant Commissioner for Operations of VDOT, David R. Gehr, on March 8, 1990. CRC prepared an RFP soliciting proposals to build Fastoll from potential contractors. VDOT received bids from only two companies -- Westinghouse and Automatic Toll Systems (now part of Cubic Toll Systems (Cubic)). After rejecting both proposals as inadequate, VDOT initiated an entirely new procurement process in June 1991.

The second RFP was announced on September 1, 1991, and was followed in September and October by three addenda clarifying project specifications. Due to the complexity of the acquisition, the due date for bids, originally October 31, was postponed until December 2. During the interim, VDOT answered numerous questions from prospective contractors. VDOT answered all questions in writing and sent both questions and answers to all potential contractors. By the due date, VDOT had received four proposals. The contractors submitting bids were: Kiewit Technologies (now MFS Technologies), Science Applications International Corp. (SAIC), Cubic, and Westinghouse.

The ATC system was to include automatic vehicle identification (AVI), which would allow automobiles to pay tolls without stopping. AVI consists of a vehicle "tag", which can be read by an antenna as an automobile carrying the tag passes over it. After the tag identifies the car, the driver's prepaid account is debited for the toll. For this aspect of the ATC system, Cubic, Westinghouse, and SAIC proposed a Vapor Technologies system, and Kiewit proposed a system built by Texas Instruments. In May 1992, VDOT tested both AVI systems and determined that both worked appropriately.

In competitive negotiations, a source evaluation committee is usually assembled to determine which contractor has made the best proposal. For the Fastoll procurement, the source evaluation committee consisted of the following VDOT officials: an Assistant Division Administrator for Procurement, a Procurement Manager, a Traffic Engineer, a Research Engineer, and a Deputy District Administrator. Following the procedures set forth in the Agency

Manual, the committee evaluated the four offerors' proposals. The RFP listed technical approach, experience, past performance, management, personnel, facilities, and price as criteria for selection of a contractor. It is common practice for the relative weights of selection criteria to escape mention in an RFP; however, the weighting system must be disclosed prior to the due date for proposals.[99] In this case, the weighting system was posted in Richmond, Virginia, on the day before proposals were due, making it unrealistic for any offeror to know the relative importance of each of the above criteria before preparing its proposal. VDOT personnel follow this procedure to deter offerors from tailoring their proposals to the scoring scheme.

The typical evaluation procedure consists of the members of the selection committee, or judges, individually scoring each offeror on all categories. The judges then discuss their evaluations of the offerors and are permitted to change their scores. Finally, the low and high scores for each category are dropped and the remaining three are averaged. Usually, two or more offerors are determined to be fully qualified and best suited, and those are then selected for negotiations. However, if during the evaluation phase it is determined that only one offeror is fully qualified, or that one offeror is clearly more qualified than the others under consideration, then negotiations may be conducted with only one offeror.[100] In such a case, a written determination must be prepared and retained in the contract file to document the meaningful and convincing facts supporting the decision to select and negotiate with only one offeror.[101] With respect to Fastoll, the evaluation committee determined by this process that Cubic was clearly more qualified than the other three offerors and chose to pursue negotiations only with Cubic.

On September 9, 1992, VDOT held negotiations with Cubic. These negotiations led Cubic to submit a revised proposal one week later. In response to the revised proposal, VDOT informed Cubic that VDOT had concerns about the pricing and the automatic coin machines presented in Cubic's proposal. As a result, Cubic lowered its pricing and offered to replace the proposed coin machine with one of VDOT's choosing. VDOT subsequently chose to negotiate with the other offerors. These negotiations took place during November 1992. After these negotiations, each offeror submitted a revised pricing scheme. On December 21, 1992, the evaluation team met and evaluated the revised proposals, including Cubic's revised proposal. The same procedure was used in the second scoring as was used in the first. Based on these evaluations, notice of intent to award the contract to Kiewit followed on December 23, 1992, and was posted on January 4, 1993. A notice of intent to award is recommended for use whenever considerable bidder interest has been expressed about the potential award, and/or an agency suspects that an award decision may be challenged.[102] The alternative is to award a contract to the successful offeror without posting an intent to award. Following the notice of intent to award, Cubic protested the decision.

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[99] Agency Manual, *supra* note 4, § 3.3(a)(3).
[100] Agency Manual § 3.3(b)(3).
[101] Agency Manual § 3.3(b)(3).
[102] Agency Manual § 2.2(b).

In a letter to the Administrator of VDOT's Administrative Services Division, dated January 11, 1993, Cubic formally protested the decision to award the Fastoll contract to Kiewit. The Code of Virginia § 11-66 provides that any bidder or offeror who desires to protest the award or decision to award a contract must submit a protest in writing to the public body no later than ten days after the award or announcement of the decision to award. SAIC also protested the intent to award decision in a letter to VDOT on January 14, 1993.

Cubic alleged three grounds for the protest. They were: (1) that the process followed by VDOT in negotiating with offerors was biased and prejudicial toward Cubic and resulted in a decision to award that was arbitrary or capricious; (2) that unannounced changes in the application of evaluation factors to proposal scoring and lack of consistency or consideration of standards in scoring the proposals made the award arbitrary or capricious; and (3) that the award to Kiewit was arbitrary or capricious because their proposal either did not meet the requirements of the RFP or it represented an unannounced change in the terms of the RFP.

Specific allegations made with respect to VDOT's *procedure* were that Cubic was denied the right to submit a Best and Final Offer (BAFO), sequential discussions are biased in favor of those offerors who negotiate later in the process, and that technical transfusion[103] and technical leveling[104] took place. The specific allegations made concerning VDOT's *scoring* were that past performance was ignored, that ongoing costs were not evaluated in the RFP, that completely subjective standards for evaluating price proposals were used, and that the technical-approach scoring standards appeared to differ between the two rounds of scoring. The Administrator of VDOT's Administrative Services Division responded to both SAIC and Cubic by denying their protests.

In addition to following the traditional channels for a bid protest, Cubic also pursued methods that are not described in the Code of Virginia. Cubic contacted the VDOT Commissioner and asked that the procurement process be repeated. Additionally, Cubic's attorney wrote to state politicians, including the Governor and a state senator, in an attempt to get the bid decision changed. Contacted officials referred the matter to the Commissioner, who let the decision stand.

Having had its protest denied, SAIC dropped the matter. Cubic chose to take its complaint to court. Cubic filed a complaint in the Circuit Court for the County of Fairfax on February 1, 1993. The Code of Virginia § 11-70 permits a bidder whose protest of a decision to award under § 11-66 is denied to bring an action in the appropriate circuit court challenging the intent to award. In order to reverse the award decision, the petitioner must establish that the award was not an honest exercise of discretion, but rather was arbitrary or capricious or otherwise not in accordance with the Constitution of Virginia, Virginia statutes, regulations or

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[103] Technical transfusion is the transfer of technical information from one vendor to another.

[104] Technical leveling is the standardization of proposals that can occur during the course of negotiations as a result of technical transfusion.

the terms and conditions of the RFP. Cubic alleged in its complaint that the procurement process, VDOT's evaluation of the proposals, and the proposed award were arbitrary or capricious.

Cubic's allegations concerning the procurement *process* were similar to those they made in their protest to VDOT. Cubic alleged that VDOT failed to negotiate with Cubic as required by the Code of Virginia § 11-37 and the RFP. Cubic also alleged that VDOT denied Cubic the right to submit a BAFO. Additionally, Cubic alleged that VDOT's entry into sequential negotiations, followed by sequential BAFOs, was unfair to Cubic as the first offeror because of potential and/or actual technical leveling, technical transfusion, and leaking of price information. Finally, Cubic alleged that VDOT allowed Kiewit to make changes to its offer that it would not allow Cubic to make.

In criticizing VDOT's *evaluation* of the proposals, Cubic alleged that VDOT failed to consider the Past Performance criteria as stated in the RFP, failed to consider on-going maintenance costs in price scoring as stated in the RFP, considered technical merit in price scoring and price in technical scoring, applied inconsistent standards for scoring the proposals between the two rounds of scoring and between offerors, failed to properly and accurately score Cubic's proposal, and overestimated Cubic's bid price by $2.1 million. Finally, Cubic alleged that the award was arbitrary or capricious because the Kiewit proposal (the winning proposal) did not comply in all material respects with the RFP. Specifically, Kiewit's proposal was alleged not to comply with specifications for the security and enforcement cameras, AVI, implementation schedule, and preclassification system.

The complaint was first filed in February, 1993, and, although the state demanded an expedited trial because of the importance of the procurement, the trial was not scheduled until the middle of June. In order to speed the trial process, both parties agreed to a statement of the relevant facts and participated in an expedited discovery process.

In the meantime, Cubic informed VDOT that Kiewit's proposal was in error with respect to the proposed automatic coin counting machine. Evidently, Kiewit had proposed an Australian machine but provided detailed data for a French machine. Based on this information, VDOT determined that the proposal was invalid and therefore canceled notice of intent to award the contract to Kiewit in June 1993. Subsequently, Cubic dropped its suit.

A third RFP was issued. VDOT took additional steps to assure that the contract award was reached in compliance with all applicable laws and regulations. One such step was the inclusion of a member of the Attorney General's Office on the committee charged with negotiating the contract. General specifications were used, as is recommended in the Agency Manual for competitive negotiations. A single scoring round was used to eliminate the problems of differing scores between the two rounds, and VDOT did not allow bidders to present a best and final offer. By this process, Cubic was selected in March 1994 to build the toll system.

Kiewit, which by this point had become MFS Technologies, filed a protest and followed it with a court challenge of the contract award to Cubic. MFS alleged that it was at an unfair competitive disadvantage because of release of proprietary information during the second round of bidding. Other potentially less serious allegations were raised; for example, that Cubic's quote included equipment that it was not authorized to sell. It should be noted that there were no allegations of technical transfer, technical leveling, or auctioning during the third round. The case was scheduled to go to trial on August 22, 1994.

The Administrator of VDOT's Administrative Services Division has suggested that since ITS is an infant industry, early contracts will help establish the technical standards in the industry, and therefore will be of exaggerated importance to their recipients. Because of this, he suggested that unsuccessful bidders are likely to challenge any contract award.[105]

**Northern Virginia Traffic Management System**

A second example of ITS procurement in Virginia is the Northern Virginia Traffic Management System (TMS). The Northern Virginia TMS contrasts with Fastoll in two distinct areas. First, the history of the Northern Virginia TMS illustrates issues associated with procurements that occur over a long period of time, rather than as a single one-time purchase. Second, the items procured are generally available off-the-shelf, while the ATC system for Fastoll was designed specifically for VDOT purposes.

The Northern Virginia TMS monitors a 10-mile stretch of I-66 between I-495 and the Roosevelt Bridge, an 11.5 mile segment of the Shirley Highway (I-395) between I-495 and the 14th Street Bridge, and 10 miles of I-95 in the area of the Woodrow Wilson Bridge. In addition to monitoring traffic conditions through the use of loop detectors and closed circuit television, the TMS is responsible for incident and congestion management.

Twenty-six ramp meters are positioned throughout the network to regulate traffic flow onto the interstates during peak travel periods. One hundred changeable message signs are used to provide travelers with information concerning traffic conditions. These signs also provide information concerning HOV restrictions and the opening/closing of reversible lanes on I-395.

The main components of the TMS are loop detectors, closed-circuit televisions and cameras, changeable message signs, communications equipment, and software. With the exception of the hiring of consultants to write software, all purchases are made by competitive sealed bidding procedures. According to the Agency Manual, goods or services to be procured must be capable of being described so that bids submitted by potential contractors can be evaluated against the description set forth in the Invitation for Bids (IFB), and an award made to

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[105] Telephone Interview with William A. Lindsey, Administrator, Administrative Services Division, VDOT (June 20, 1994).

the lowest responsive and responsible bidder.[106] The IFB must describe the requirements accurately and completely, but must avoid unnecessarily restrictive specifications or terms and conditions that unduly limit competition.[107]

For example, when closed circuit TVs are needed, the IFB must describe the required specifications without reference to any specific brand, even if the purchaser wishes to buy a specific brand.[108] Sealed bids are then accepted, with the contract going to the lowest responsive and responsible bidder.[109] In order to be responsive, a bid must comply in all material respects with the IFB. A number of general factors given in the Agency Manual (§ 2.27) are used to determine whether the bidder is responsible.

The Transportation Engineer/Program Supervisor who manages the TMS has found that competitive bidding does not always allow him to purchase quality equipment that meets VDOT's needs. The TMS manager has noted occasions when a low bidder technically met the specifications of the IFB, but the product procured thereby was not useful to the Department, either because it proved to be of poor quality and was difficult and expensive to maintain or because it differed slightly from what was actually sought.

Specifications written for competitive bidding procurements are generally very detailed in order to assure that quality goods are purchased. Since price is the only factor in source selection, the contractor need only meet the specifications without regard to quality. Detailed specifications are the only way to ensure the procurement by competitive bidding of quality goods. But even while detailed specifications are desirable, writing detailed specifications carries costs, such as an engineer's time, and cannot always be done in a way that ensures the procurement of quality goods.

One recurring example of this problem has arisen in the acquisition of changeable message signs for the TMS. According to the TMS manager, these signs are often purchased as part of a large construction project in which the prime contractor is selected by competitive bidding. Since the prime contractor is encouraged by the Department to offer the lowest price possible, he typically will offer the cheapest changeable message sign that meets the specifications. In the past, this has resulted in VDOT acquiring changeable message signs that have high maintenance costs and do not hold up well over time.

The TMS manager offered a possible solution to this type of problem. His proposal was, first, that the ITS portion of the bidding be taken out of the general contract to allow the department to select the vendor of the changeable message sign. In conjunction with this,

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[106] Agency Manual, *supra* note 4, § 3.1.
[107] Agency Manual § 3.1.
[108] Brand names may, however, be used to convey the general style, type, character, and quality of the article desired. Va. Code Ann. § 11-49 (1993).
[109] Agency Manual, *supra* note 4, § 3.1(b).

changeable message sign vendors should be required to include life-cycle (maintenance) costs in their bids or be held responsible for all maintenance. In this manner, vendors would be encouraged to offer a cost-effective, quality product. One disadvantage to this approach is that it increases the number of contractors involved in the project and creates a scenario where two parties, rather than one, are potentially responsible if problems occur during installation.

**COMPARE Project**

A third example of ITS procurement undertaken by VDOT is the Hampton Roads ITS Planning Study, officially known as the COMPARE (Congestion Management Plan: A Regional Effort) project. Unlike the two examples above, in which a products were purchased from contractors (either made-to-order or off-the-shelf), in this case services were the subject of the procurement effort . The intent of the COMPARE project was to hire a consultant to perform a detailed study of the Hampton Roads area to determine what ITS technology would be appropriate and most helpful to the area's transportation system and to develop a plan for the deployment of such technology.

Because of organizational conflict of interest statutes in the Code of Virginia and in other state codes, which prohibit an engineer or architect from being involved in both construction and design stages of a project, several potential contractors contacted VDOT and asked if their involvement in the COMPARE study/design would preclude their later participation in construction of some of the ITS projects resulting from the study. The Department concluded that they would. The pertinent Virginia statute is § 11-41.1, which states: "[a] person or firm who has been engaged as an architect or engineer for the same project under a separate contract shall not be eligible to bid on or submit a proposal for any such contract or to have the contract awarded to him." The pertinent regulation appearing in § 2.25 of the Agency Manual reaffirms the Code of Virginia, but adds:

> [A]n independent contractor employed by a state agency to design a project, develop a scope of work, write specifications or otherwise define contract requirements is not eligible to compete for or receive the resulting contract. In addition the contractor may not be a subcontractor or supplier for the entity which is awarded the contract or any of that entity's subcontractors, however far removed."[110]

Thus, § 2.25(b) appears to expand the construction prohibition beyond persons performing architectural or engineering services to anyone involved in defining the construction contract requirements.

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[110] Agency Manual § 2.25(b).

In response to a request by VDOT, the Director of the Department of General Services determined that a contract for systems integration services can provide for planning of a project without precluding a contractor from competing for further design or construction contracts. Thus, if projects such as the COMPARE project are classified as planning, then the contractor for the planning stage could bid on the implementation stage of the project. Because COMPARE was determined to involve a small amount of design work, it was decided that contractors would have to be excluded from later phases of the project. On a subsequent, similar project, the Northern Virginia Early Deployment Study, VDOT allowed contractors to bid on the construction stage of the project in addition to performing the preliminary planning. This resulted from a determination made at a meeting of the Director of the Department of General Services, VDOT personnel, and a representative of the Attorney General's Office that this sort of arrangement does not violate state law.

This example points out two important considerations in ITS procurements. First, problems with the separation of the roles of designers and constructors are likely with ITS because, unlike traditional highway construction, potential contractors have the capability (and willingness) to perform both design and construction. Second, although organizational barriers delayed their involvement in the consideration of these issues, the input of the Attorney General's Office, as well as that of the Department of General Services, resulted in a greater number of offerors.

**Texas Procurements**

Two recent ITS procurements in Texas illustrate ways in which procurement difficulties can be overcome. The San Antonio, Texas area was interested in developing an ATMS. Although constrained by Texas' competitive bidding laws, which required that the project go to the lowest bidder, the city was able to successfully select a contractor. The engineers responsible for this procurement have been praised by the ITS industry for "doing it right," with particular emphasis on the quality of the final product.

The San Antonio ATMS will include incident detection equipment, changeable message signs, lane control signs that direct motorists to change lanes because of an incident ahead of them, and traffic signal controls that allow traffic on the highway to be diverted to access roads. The system is also tied into the police department. The entire system requires sophisticated communications equipment to carry information to and from the control center.

The San Antonio ATMS was designed primarily in-house by engineers without experience in the area. The engineers read all they could about ITS and developed a design. They then sent the design to the aerospace and defense industry and asked for comments. After receiving comments, they modified the original design and repeated the process until settling on a final design. Thus, although they received help from industry (without charge), no procurement was necessary for the design portion of the project. The downside of this approach

was that the Texas DOT engineers went through a lengthy learning process, one that could potentially have been shortened by contracting out design work to specialists.

In order to accomplish the construction phase, the Texas DOT had to deal with the low-bid method of contractor selection. Texas does not allow competitive negotiations except under limited circumstances. To ensure that they hired a highly qualified contractor capable of integrating the entire system, they used very detailed specifications. Potential contractors were required to be prequalified in terms of both technical ability and financial stability. In the technical area, the firms were required to meet specifications and have experience in seven different categories. The financial prequalification process caused problems for some firms who found it necessary to create a separate company just to compete for this contract. After prequalification, the firms were given two months to bid on the project. Allied-Signal was selected as the contractor and is currently building the ATMS.

Texas officials have also worked with their state's procurement laws by seeking definition of statutory exceptions to competitive bidding. In acquiring an automatic toll system for the Dallas North Freeway, the Texas Turnpike Authority, with help from a private sector attorney, obtained a ruling from the state Attorney General that classified an automatic toll system as primarily an automatic data processing or communications project. This classification allowed the Texas Turnpike Authority to use competitive negotiations, rather than competitive bidding, for the automatic toll system acquisition, which probably contributed to the successful procurement of the toll system.

Although Texas' ITS procurements are conducted under a different set of laws and regulations, they illustrate an important point about ITS procurement. Texas demonstrated that even under a very restrictive procurement regime, ITS products can be successfully acquired.

## Identified Problems

The above examples represent some of the various types of ITS procurements likely to occur in Virginia. The Fastoll project is an example of a made-to-order system purchased through a competitive negotiation process. The Northern Virginia TMS purchases represent procurements that occur over a period of time and use competitive bidding. The COMPARE project is an example of the procurement of specialized services, which is likely to increase with the further development of ITS.

VDOT is experienced in contracting for both professional and non-professional services,[111] including the types of services sought in the COMPARE project. However, because of the capabilities and practices of private contractors providing ITS consulting services, VDOT

[111] Professional services consist of those requiring a license for their performance. Va. Code Ann. §13.1-543 (Supp. 1994).

experienced problems with the traditional division of roles between designer and constructor. The general and preliminary nature of the planning services sought in the Northern Virginia Early Deployment Study was judged, based on the specific facts of this type of preliminary planning project, not to require the exclusion of contractors from work that might later arise out of the project. Nevertheless, the potential for difficulties with the separation of roles remains.

The Northern Virginia TMS example illustrates the problems associated with conducting ITS procurements through competitive bidding. The primary concern is VDOT's inability to acquire quality merchandise consistently, because of the difficulty of writing specifications that ensure quality without stifling competition.

The Fastoll project illustrates the obstacles involved in acquiring ITS technology through competitive negotiations. These difficulties can be categorized into two major areas -- time and quality. The procurement process for ITS systems is presently too slow. First, by separating the design and construction phases of a project, two procurements must be performed instead of one. Second, as the Fastoll study showed, there may be no contractors capable of building the project as designed, forcing the state either to redesign it or to wait for more contractors to become available. Third, because of the need to conduct discussions with contractors for made-to-order items, these items are generally procured through competitive negotiations, which introduce a certain amount of subjectivity into the source selection process and increase the likelihood of a bid protest. As the Fastoll example has repeatedly shown, bid protests can seriously delay a procurement.

It is generally in a state's best interest to conduct timely procurements and to minimize the time between project inception and delivery of the final product. With ITS and other high technology items, the importance of timely procurement increases. Technology that changes rapidly, such as ITS, is likely to be obsolete, or at a minimum not state-of-the-art, by the time a lengthy procurement process is completed. Additionally, the more efficient and timely the procurement process, the better the resulting ITS is likely to be, and the more federal and state funds are likely to be available.

## POSSIBLE REFORMS

### Improved Competitive Negotiation Process

Competitive negotiations is more appropriate than competitive bidding for ITS procurement and is used extensively in states that allow such a procedure. However, VDOT is relatively inexperienced with competitive negotiations. It is to be expected, and it is borne out by the Fastoll procurement, that problems are most likely to arise where competitive negotiations differ greatly from traditional competitive bidding procedures. The major differences between

competitive bidding and competitive negotiations are that competitive negotiations considers quality, in addition to price, and that competitive negotiations allows for discussions with potential contractors. It is in these areas that the advantages, as well as the risks, of competitive negotiations lie. Procedures directly and indirectly associated with discussing proposals with offerors should be scrutinized to ascertain whether they are effective at obtaining the best value for Virginia without leading to endless negotiation or to litigation. The procedures followed as a part of the second round of the Fastoll acquisition invite this type of scrutiny.

An important step in any procurement by competitive negotiations is the determination of which vendors submitting proposals should be invited to participate in negotiations. At one extreme, VDOT could negotiate with every firm submitting a proposal. At the other, VDOT could hold negotiations with the one contractor deemed to be most qualified based on initial proposals. In the Fastoll example, discussions were originally conducted with only one contractor. When a suitable agreement could not be reached, discussions were then held with the other three contractors. The Code and Agency Manual allow VDOT to limit discussions to only one offeror when it is clear that one proposal is far superior to the others;[112] however, little other guidance is given as to when discussions should take place with more than one contractor.

The Department of Defense (DOD) Four Step source selection procedure provides some insight into when and with whom discussions should take place. The Four Step procedure is an optional procedure for the DOD. Although not designed to increase the speed of procurements, the procedure is usually quicker than standard procurement procedures. The Four Step procedure is used primarily for large contracts in an effort to avoid technical transfusion, technical leveling, and auctioning techniques.[113] However, the procedure is considered to be most appropriate when government evaluation of initial proposals, without discussion of proposal deficiencies, will be sufficient to determine the best overall offer to the government.

The Four Step procedure includes (1) submission and evaluation of technical proposals, (2) submission and evaluation of cost proposals, (3) establishment of the competitive range and selection of the apparent successful offeror, and (4) negotiation of a definitive contract with that offeror. The main difference between this method and standard source selection procedures is that under the Four Step procedure offerors are not advised of deficiencies in their proposals, but only of areas in which the intent or meaning is unclear or that require additional substantiating data for evaluation. This is meant to preclude technical transfusion, technical leveling, and auctioning.

The Four Step procedure is quicker because it avoids the reevaluation of proposals after each round of negotiations. In addition, some commentators feel that the Four Step procedure may improve the quality of initial proposals because each offeror knows there is no chance of

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[112] Agency Manual *supra* note 4, § 3.3(b)(3).

[113] Auctioning techniques are those that communicate to the vendors that their price is too high and have the potential of causing them to lower their prices.

technical transfusion or of improving its proposal through government advice on its deficiencies.[114] The Four Step procedure decreases the possibility of a challenge to the contract award on the basis of technical transfusion, technical leveling, or auctioning, and may be quicker. However, these advantages are gained by severely limiting discussions with multiple offerors, discussions that generally result in a more informed source selection. Also, if a proposal contains a deficiency, but that deficiency is not so serious as to eliminate the proposal from consideration, the person evaluating the proposal is forced to guess at the likely effect of the deficiency and the probable implications of correcting it.[115] This process demands a high level of familiarity with the technology that VDOT currently uses, as well as that which it is seeking to acquire.

Because discussions with offerors are limited, the Four Step procedure is appropriate only when the evaluation of initial proposals is sufficient to determine the best offer without further negotiations. Since transportation engineers and procurement officers are often less familiar with ITS technology than with materials involved in their usual procurements, the Four Step procedure may be inappropriate for ITS procurements. Ironically, the procedures followed in the second and third rounds of the Fastoll procurement had similarities to the Four Step procedure. In the second round, after the submission of initial proposals, VDOT chose to engage in discussions with only one offeror. It was not until negotiations with that offeror broke down that VDOT engaged in discussions with other offerors. Apparently, these discussions were helpful in choosing the best offeror since the relative scoring of offerors changed dramatically after the discussions. In the third round the potential vendors were not given the opportunity to submit a best and final offer. This was done to limit the activities that could later be challenged as part of a legal challenge to the contract award. Limiting the discussion to one offeror, as the Four Step procedure does, reduces the likelihood of having the contract award overturned by the courts. However, such a process also runs the risk of denying the purchasing agent information that might be obtained from discussions with multiple offerors, information potentially important in determining which vendor's proposal would provide the state with the best value. As procurement officials gain familiarity with ITS technology, the potential problems associated with the absence of discussions should decrease. Since advantages and disadvantages of limiting discussions to one offeror exist, careful analysis should be made on a case-by-case basis to determine when such a limitation is appropriate.

Another area where competitive negotiations differs from competitive bidding is in the content and detail required in documents soliciting bids or proposals. Traditionally, IFBs are very detailed and describe exactly what the contractor should provide. This is necessary since the state is compelled to accept the lowest bid that meets the specifications of the IFB. With competitive negotiations, however, price is only one criterion and the state does not need to include overly detailed specifications in its RFP to ensure quality. General specifications may

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[114] Gregory A. Smith, *The New "Four Step" Source Selection Procedure: Is the Solution Worse than the Problem?*, Vol. 11, No. 1, Public Contract L.J. 322, 326 (1979).
[115] *Id.* at 327-29.

allow contractors to submit more innovative proposals. This option is not available with in one-step competitive bidding and has not been used effectively in two-step competitive bidding.

One contracting officer in Arizona who deals frequently with competitive proposals suggests the use of more general and less detailed specifications for competitive negotiations than competitive bidding.[116] In the Fastoll procurement, the initial specifications for the project were extremely detailed and originally were written with competitive bidding in mind.[117] The Agency Manual adopts the view that an RFP should be written in general terms and that mandatory requirements should be kept to a minimum.[118] Thus, to be consistent with the Agency Manual, RFPs should be written in more general form than is customarily used with IFBs.

Performance or functional specifications, which might be considered a subset of general specifications, have been recommended for their ability to allow the offerors to submit more innovative proposals.[119] Performance specifications are those whose "requirements describe the capabilities that are necessary to satisfy the intended use for the article. Tests or criteria are developed to measure a product's ability to perform and to last as required."[120]

Although the Agency Manual provides for the use of generic specifications, it does not offer a definition of what it means by that term.[121] In the same subsection that calls for generic specifications, the Agency Manual indicates that "[u]nder appropriate circumstances, performance specifications (setting forth the performance requirements), design specifications (setting forth the essential characteristics of the item solicited), or qualified products list may be used."[122] It is notable that, unlike generic specifications, these last three terms are defined in the Agency Manual.[123] However, the Agency Manual offers no indication of the appropriate circumstances for the use of these alternatives to generic specifications, when one alternative should be preferred to another, or who has discretion to make that determination. Since none of these specification types are universally applicable,[124] it may be important to provide offerors with guidelines as to when each type of specification should be used. In addition, it would

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[116] Telephone interview with Kathy Dougherty, Special Projects Procurement Officer, Arizona DOT (February 18, 1994).
[117] Telephone interview with Charles Hall, Traffic Engineer, VDOT (June 6, 1994).
[118] Agency Manual, *supra* note 4, § 3.3(a)(3).
[119] The Council of State Governments, State and Local Government Purchasing, 11.7 (1st ed.); Ivan J. Tether, Government Procurement and Operations 28 (1977); Colin Turpin, Government Procurement and Contracts 137 (1989).
[120] The Council of State Governments, State and Local Government Purchasing, 11.7 (1st ed.). *See also*, Agency Manual, *supra* note 4, A-5.
[121] Agency Manual, *supra* note 4, § 4.3(a).
[122] Agency Manual § 4.3(a).
[123] Agency Manual A-3, A-5, A-6.
[124] The Council of State Governments, State and Local Government Purchasing 11.7 (1st ed.) .

probably be important to disclose any discretion given to procurement officers in operating under these guidelines, and whether approval is necessary before deviating from these guidelines. It may prove difficult to draft a rule that clearly demarcates the areas where each type of specification should be used, since "[m]ost specifications are combinations of performance and design."[125] However, guidelines would probably be useful in making sure that design-oriented specifications are not used when it is clearly more appropriate to use specifications that emphasize performance.

As mentioned above, one distinctive feature of competitive negotiations is that considerations other than price, beyond just determining if a bid is responsible and responsive, may be taken into account. This places purchasers in the position of having to weigh price against quality, something they do not have to do in competitive bidding. The Code and Agency Manual require the purchaser to assign a weight to each criterion before proposals are submitted and suggest a weight of 20-25% for price. Each criterion is scored similarly and the offeror with the highest score is deemed most qualified. Appendix D of the Agency Manual gives step-by-step procedures on how properly to prepare an RFP. Under *Step 10 - Evaluate Proposals,* the Manual states that "the lowest price shall be scored the maximum number of evaluation points for price," and that the other prices are to be scored based on a given formula. This procedure is meant to eliminate the subjectivity in what should be an objective evaluation.

This procedure was not used in the second round of the Fastoll procurement. Instead of adhering to a preset formula, each judge scored price based on his own criteria, which resulted in different scores for different judges. One VDOT purchaser stated that in scoring price, he looked for "balance" in the proposal, that is, whether all unit prices were reasonable. He did this in order to guard against disproportionate increases in overall price due to poor estimation of the number of units required. This approach may or may not have merit. Nevertheless, it does add subjectivity to what many feel should be an objective evaluation.[126] That subjectivity results in an increased likelihood of bid protests can hardly be disputed. The protest that followed the second round of the Fastoll procurement bears this out. One of the primary complaints in that protest concerned inconsistent scoring of price.

Another problem with scoring proposals is the point at which price should be considered. The Code of Virginia and the Agency Manual do not address this point. One view is to examine price and quality criteria concurrently. Another is to examine price only after quality has been scored. The second approach is thought to promote fairer scoring and avoids "double counting" of the price category. The argument is that merit or quality scoring

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[125] Ivan J. Tether, Government Procurement and Operations 28 (1977).

[126] It is apparent that the Agency Manual considers price an objective criterion. Agency Manual, *supra* note 4, D-13.

is unduly influenced if price is known. The Fastoll protest included allegations that price was considered in the scoring of quality and that the two categories were not distinct. It is true that the judges examined the price proposals before scoring merit categories; however, whether price was knowingly or subconsciously considered in their merit scoring is unknown. The appearance of such conduct, and the increased likelihood of bid protest resulting therefrom, might suggest that an alternative procedure should be considered. On the other hand, scoring merit in a vacuum, without relation to price, places a great deal of emphasis on selecting the appropriate weight allocation for price criteria and on assigning proper values between more and less attractive proposals.

A third option, which is probably inconsistent with the Agency Manual, is not to score price at all. This "best value" selection is used by some federal agencies. With best value selection, all merit categories are scored without consideration of price. The different proposals are then compared based on total merit score and price. Thus, the purchaser is allowed to balance marginal increases in quality against the price that quality entails. This approach relies on the ability of the purchaser to weigh price versus quality, but still allows for the objective evaluation of merit. Although this approach would arguably result in the best value for the state, it appears to be inherently subjective and thus more susceptible to bid protests.

In addition to modifying these aspects of competitive negotiations, the criteria for forgoing competitive bidding must be examined and possibly revised. Unfortunately, the Code of Virginia and the Agency Manual give little advice on when to use competitive negotiations. Competitive negotiations may sometimes be appropriate in circumstances where VDOT is still using competitive bidding. For example, the use of competitive negotiations might alleviate certain difficulties that the TMS manager has faced in procuring changeable message signs. On the other hand, the extra time and expense involved may not justify the use of competitive negotiations.

Two recommendations for revising the competitive negotiation process were made by one of the judges on the Fastoll evaluation panel. To guard against the appearance of impropriety, and to aid in the defense of a bid protest, it was suggested that discussions with potential contractors be recorded. This could help to avoid misunderstandings and could serve as a check on improper communications between VDOT personnel and potential contractors. However, since the recordings may be available to the public under the Freedom of Information Act, contractors would be reluctant to disclose proprietary information during these discussions. Therefore, despite its advantages, recording discussions with contractors is not recommended. The other recommendation was to encourage alternative bids from the same contractors, which is common practice among federal agencies. This would allow VDOT more alternatives in selecting a proposal, which hopefully would result in a better procurement for the state. The risk associated with this recommendation is that each vendor will submit numerous proposals

with only minor variations between them, resulting in a large, fruitless increase in the evaluator's workload. Allowing more than one proposal per vendor has merit and may be appropriate for use. The greater lesson, however, is that the current procedures need to evolve as VDOT becomes more familiar with competitive negotiations.

### Exemption from Competitive Bidding and Limitations on Court Challenges

Improvement of the RFP process might reduce the likelihood of bid protests, reducing many of the impediments to the timely procurement of ITS technology and leading to better quality purchases. However, more direct approaches to solving the problem could be considered. Four alternative approaches are: changing the law to exempt ITS purchases from the Virginia Public Procurement Act entirely; changing the law to exempt ITS purchases from court challenges of the contract award; changing the law to exempt competitive negotiations from court challenges; and finally, substituting some form of alternative dispute resolution (ADR) for court challenges.

An argument can be made that high-technology procurements, such as ITS, should receive some sort of exemption from the Procurement Act's requirement that procurements be competitive. It is imperative that procurement of high-technology items result in the purchase of goods that are compatible with systems that are already in place. Nearly as important is the requirement that procurement be completed in a timely manner since slow procurements can result in the purchase of obsolete goods. The use of competitive negotiations increases the susceptibility of high-tech procurements to bid protests, with associated delays. Alternatively, when competitive bidding is used, specifications must be very detailed to ensure the procurement of quality goods. The high-tech nature of the products involved makes specification writing more difficult than normal. Therefore, under current implementation, neither competitive negotiations nor competitive bidding are satisfactory methods of ITS procurement, thus ITS procurement should be exempted from the competition requirement.

This position has some weaknesses. First, the reasons for exempting ITS procurement from the competition requirement derive in part from the difficulty of administering current procurement procedures effectively. Instead of exempting high-tech items, it can be argued that procedures should be developed, consistent with the Procurement Act, that help improve the procurement process. Second, exemption from the competition requirement of the Procurement Act could result in a loss of the goals underlying the Act -- giving all qualified vendors access to public business, avoiding the appearance of impropriety, and obtaining high-quality goods at a reasonable cost. Third, by exempting ITS procurement, a precedent would be set for seeking exemption whenever the Procurement Act is overly burdensome rather than endeavoring to improve the procurement process as a whole. The exemption might also be subject to misuse, with those seeking to avoid the possibility of bid protests improperly

identifying what they are purchasing as ITS-related. Fourth, technology-oriented federal agencies such as NASA, DOD, and DOE operate under the constraints of competitive procurement requirements, which suggests that states can effectively do the same with respect to ITS. Finally, political barriers may exist to the total exemption of ITS procurement from the Procurement Act. Thus, while an argument can be made in support of exempting ITS procurement from the Procurement Act, the above reasons suggest that an alternative approach may be prudent.

Another option is to place ITS procurements (or at least major ones) under the control of a state agency that is currently exempt from state procurement laws. The Center for Innovative Technology (CIT) is the only such agency in Virginia. (An exemption from competitive procurement is also given to institutes of higher education, but is limited to software meeting specific requirements.)[127] The Innovative Technology Act created CIT with the purpose, among others, of attracting high-tech jobs and facilities to Virginia.[128] CIT has the power to receive money from the Commonwealth to be "held, used, and applied only for the purposes for which such grants and contributions may be made."[129] That money may be used "to accomplish, in whole or in part, any of the purposes of [The Innovative Technology Act]." This approach could be implemented only if not barred by the statutory and regulatory restrictions on VDOT's procurement practices. This would need to be definitively established before VDOT took any action to procure ITS through CIT. It seems unlikely that this approach to ITS procurement could be accomplished without legislative authorization. If that is true, the barriers to gaining authorization for VDOT to procure ITS through CIT would probably be as numerous as those to directly eliminating the requirement of competitive procurement. In addition, this approach may in fact conflict with the purpose of CIT.

One approach that might limit court challenges, but would not require a change in the laws or regulations, would be to award contracts without announcing an intent to award. In Virginia, a state agency can either award the contract to the successful offeror or announce an intent to award the contract.[130] The latter method is recommended by the Agency Manual where a bid protest is expected. However, if the contract is awarded and performance has begun, even if the bid dispute results in a finding that the award was arbitrary and capricious, the public agency may declare the contract void only upon a finding that doing so would be in the best interest of the public. If a substantial portion of the work has already been completed, or if the work is of a nature such that a second contractor could not efficiently continue the efforts of the first, (which is probably the case with ITS projects) it is unlikely that the public agency would find it in the public's best interest to rebid the project. Therefore, by awarding

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[127] Va. Code Ann. § 11-41.3.
[128] Va. Code Ann. § 9-252.
[129] Va. Code Ann. § 9-254.
[130] Agency Manual, *supra* note 4, § 2.2.

the contract rather than announcing an intent to award, the purchasing agent diminishes the chances that a subsequent protest will hinder the speedy procurement of the desired materials or services.

The validity of a contract is not affected by the fact that a protest or complaint has been filed.[131] And, although the Code specifically discusses when performance can be enjoined after the determination that an award was arbitrary or capricious, it is not clear that the courts are empowered to stop the successful contractor from performing his part of the contract while the dispute is being settled. Since the relief granted to the bidder after a determination by a court that the award was arbitrary or capricious is only a statement to that effect, and the contract will only be canceled upon a determination by the public agency that doing so is in the best interests of the public, it is unlikely that a court will enjoin performance by the successful bidder while a dispute is pending. However, if a protest is filed before the award is made, no further action to award the contract can be taken unless there is a written determination that proceeding without delay is necessary to protect the public interest.[132] Thus, if no notice of intent to award is given, performance can begin and probably continue during the life of the protest. Even if an award is determined to have been arbitrary and capricious, the contractor may finish the work if VDOT determines it is in the public's best interest for it to do so. This approach to ITS procurement would not require a change in the law. It would also provide a forum for protesters to be heard, before a disinterested party, without the delays normally associated with such protests.

There are two downsides to this approach. First, it requires that one recommendation of the Agency Manual not be followed. Although not stated in mandatory language, the Manual recommends posting a notice of intent to award when a protest is expected. Nevertheless, the Agency Manual specifically states that an award need not be delayed for the period allowed for a protest.[133] Second, if it is determined that an award was arbitrary and capricious, VDOT has two options. It can cancel the contract if it finds that doing so is in the best interests of the public. VDOT then must compensate the party originally awarded the contract for all performance up to the time of the arbitrary and capricious declaration. Or it can continue with the contract, with the possibility that it will be subjected to political pressure.

In the most recent court challenge to the Fastoll project, a state circuit court judge granted a preliminary injunction after the awarding of the contract. It has been suggested that the judge did not properly apply the law in granting the injunction and that the decision is likely to be overturned on appeal.

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[131] Agency Manual § 12.2(e).
[132] Agency Manual § 12.2(f).
[133] Agency Manual § 12.2(f).

Another approach would not exempt ITS procurements from the competition requirement, but would remove the option of challenging the contract awards before a court of law. This approach addresses the delay that can result from a legal challenge to a procurement decision, delay that, for reasons mentioned above, can be particularly harmful in the context of ITS procurements. The justifications for this course of action are stronger than those for seeking exemption from the Procurement Act. Total exemption runs the risk of limiting access to public contracts, of appearing improper, and of the state not obtaining quality in its purchases. Limiting contract award challenges before the courts would be less likely to have these consequences. A related approach would be to exempt procurements conducted by competitive negotiations from challenge in the courts. This approach was suggested by the Court of Appeals for the District of Columbia:

> Negotiation does not involve the concept of responsiveness developed in sealed bidding even though the term is sometimes used in negotiations. The concept of responsiveness was developed in sealed bidding where a contracting officer is prohibited from considering a bid which deviates from the IFB. This prohibition is not applicable to negotiations where the contracting officer is permitted and encouraged to conduct oral and written discussions with offerors whose proposals vary from the RFP.[134]

Under either approach, administrative protests will remain available. Recent changes in the law, requiring the person reviewing the protest to be a disinterested party who is not a member of the government body that awarded the contract, will give this process a greater appearance of objectivity.[135] Summarizing court holdings on judicial review of the letting of public contracts, American Jurisprudence indicates:

> Public authorities are generally vested with a wide discretion in determining who is the lowest responsible bidder, and indeed, usually are vested with power to reject all bids and ask for new ones, and while doubtless the courts will interfere with an arbitrary or dishonest exercise of that discretion by preventing the award of a contract to one who upon the basis of his bid is not legally entitled thereto, as a general rule a bidder, though his bid may be the lowest submitted, and he may be a reliable and responsible contractor, cannot by judicial action compel the public authorities to award the contract to him or otherwise found an action in his own right upon the denial of the contract to him.[136]

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[134] *Elcon Enterprises, Inc. v. Washington Metropolitan Transit Authority*, 977 F.2d 1472, 1483-84 (D.C. Cir. 1992)(quoting form John Cibinic, Jr. & Ralph Nash, Jr., Formation of Government Contracts 534-24 (2d ed. 1986) (citations omitted)).

[135] Va. Code Ann. § 11-71 (Supp. 1994) (Effective July 1, 1995).

Courts in other states have been similarly dismissive concerning the right of a disappointed bidder to obtain an injunction to prevent the awarding of a contract to another bidder.

> Neither does a bidder for public work, though he may be the lowest reliable and responsible one, have any such vested or absolute right to a compliance with bidding statutes as will entitle him to maintain an injunction against their violation by public officials. The fact that other bids do not follow the specifications of the proposal, or that such other bidders fail to tender good and satisfactory bonds as required, and even though the plans and specifications upon which the bids are to be submitted do not meet legal requirements necessary to place the bidding on a competitive basis, or that the parties are required to prepare their own specifications, by reason of which the award may be invalid, does not entitle a bidder to an injunction against the awarding of the contract to another bidder.[137]

Pennsylvania is an example of a state that limits judicial review of contract awards. The Commonwealth Court of Pennsylvania has held that "a disappointed bidder has sustained no injury which entitles him to redress in court, even if the public official who refuses to award him the contract has a statutory obligation to award it to the bidder."[138] More recently, the court found, summarizing the relevant precedents, that:

> A mere disappointed bidder on a public contract does not have standing to challenge the contract award unless he is also an aggrieved taxpayer who has a substantial, direct or immediate interest in the contract award which interest is greater than that of the common taxpayer. Furthermore, standing will not be conferred where the causal connection between the action complained of (the award of the contract) and the injury to the taxpayer (the payment of the tax) is too remote.[139]

These holdings seem to be largely the product of court formulations, since Pennsylvania statutes do not specifically deny bidders the opportunity for a court challenge. Pennsylvania laws provide significant direction to state officials in contracting for highway construction:

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[136] 64 Am. Jur. 2d *Public Works and Contracts* § 87 (1972) (citations omitted).
[137] *Id.* at § 88 (citations omitted).
[138] *J. P. Mascaro & Sons, Inc. v. Township of Bethel*, 505 A.2d 1071, 1073 (Pa. Comwlth. 1986) (citing *Highway Express, Inc. v. Winter*, 200 A.2d 300 (Pa. 1964); *R. S. Noonan, Inc. v. York School District*, 62 A.2d 623 (Pa. 1960); *Ogden Foods, Inc. v. State Farm Products Show Commission*, 325 A.2d 329 (Pa. 1974)).
[139] *C. O. Falter Constr. Corp. v. Towanda Mun. Auth.*, 614 A.2d 328, 329-330 (Pa. Comwlth. 1992) (citing *William Penn Parking Garage v. City of Pittsburgh*, 346 A.2d 269 (Pa. 1975)).

> In awarding any contract, the work shall be given to the lowest responsible bidder, with the option on the part of the secretary to reject any or all bids, if the prices named for the work or materials to be used are higher than the estimated cost, or for any other reason appearing to the secretary.[140]

The typical strategy adopted by unsuccessful bidders in Pennsylvania is to have an employee or subcontractor sue on their behalf. Vendors seeking to challenge a contract award face greater difficulties in Pennsylvania than they do in many other states.[141] Nevertheless, firms do not appear to be reluctant to prepare proposals or to do business with Pennsylvania.[142]

Changing Virginia's laws to read similarly to those of Pennsylvania would probably be insufficient to overturn Virginia's judicial precedent allowing unsuccessful offerors to appeal to courts, even though those precedents are based on statutes. Instead, it would probably be necessary to explicitly adopt, in statutory form, something equivalent to the holdings of the Pennsylvania courts in order to effectuate such a change in Virginia's law.

If the law in Virginia were altered to limit judicial review of contract awards, the extent to which contracts like the Fastoll contract would be delayed by lawsuits might be reduced. Although suits would still be possible, a preliminary injunction would be more difficult to obtain. Four factors are typically used to determine if a preliminary injunction should be granted: "(a) plaintiff's likelihood of success in the underlying dispute between the parties; (b) whether plaintiff will suffer irreparable injury if interim relief is denied; (c) the injury to the defendant if an injunction is issued; and (d) the public interest."[143] The barriers confronting unsuccessful bidders in states like Pennsylvania make it more difficult for them to make a showing of likely success. In cases where an unsuccessful bidder is unable to obtain an injunction, he or she may nevertheless seek damages. However, in many states damage awards are simply not available:

> It is the acceptance, and not the tender of a bid for public work which constitutes the contract, and it follows, therefore, that the mere submission of the lowest bid in answer to an advertisement for bids for public work cannot be the foundation of an action for damages based upon the refusal or failure of public authorities to accept such bid, and this is true although a statute requires the contract to be let to the lowest bidder, where the advertisement reserves the right to reject any and all bids. So when a public official in good faith refuses

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[140] 36 Pa. Cons. Stat. Ann. § 670-404 (Purdon 1961 and Supp. 1994).

[141] Telephone interview with Gary Ankabrandt, Assistant Council, Pennsylvania Dept. of General Services (July 18, 1994).

[142] Telephone interview with Paul Wolf, Chief of the Standards and Specifications Division, Pennsylvania Dept. of General Services (July 8, 1994).

[143] *North Carolina Ports v. Dart Containerline*, 529 F.2d 749, 750 (4th. Cir. 1979).

> to award a contract, the bidder has no right of action against him for damages, although his bid is the lowest, and it has been held that no right of action exists even though the public official acted maliciously.[144]

In Virginia, an unsuccessful bidder's only available remedy is a finding that the award was arbitrary or capricious followed by a possible cancellation of the award or a revision of the award to comply with state law.[145]

One substantial hurdle to any change in the Virginia statutes governing procurement is the fact that such a change would have to be legislatively enacted. Vendors that stood to lose their ability to challenge contract awards in court would likely lobby against such a change. This could also lead to publicity, to which some legislators might prove sensitive. Even so, some legislators might see this as an opportunity to slow the ever-accelerating growth of litigation in at least one area of our law. Assuming that political obstacles would arise to any attempt to change the law in this area, those obstacles are likely to be less significant if the proposed changes in the law are confined to ITS and ITS-related procurements. A change of this sort would be comparable to what was done with the Center for Innovative Technology.[146]

Whether or not an offeror has the option of bringing a civil action in a state court, if federal funding is involved, he may file suit in a federal court. A bidder might claim that, under 42 U.S.C. §§ 1983 and 1985, he or she had been deprived of a property interest or right secured by the Constitution and laws of the United States. In *Sowell's Meats and Services, Inc. v. McSwain*, the Court of Appeals for the Fourth Circuit rejected such a claim, holding that an unsuccessful bidder on a contract being offered by a state agency had no standing to bring any action, other than what was provided for in state law, even though the agency was disbursing federal funds. [147] Under South Carolina law, the unsuccessful bidder was found to have no property interest in the award of the contract.[148] The court held that, since the federal government expressly provides for the enforcement of federal standards, a private right of action is foreclosed.[149] The applicable federal regulations do not require that unsuccessful offerors to states acting as subgrantees be given the opportunity to challenge awards before a court of law. In addition, the regulations do provide the federal government with a means of enforcing its standards.[150] Therefore, if Virginia law were changed to indicate that an unsuccessful bidder has no property interest in the contract, and if the statutory right to bring a claim against the contract

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[144] 64 Am. Jur. 2d *Public Works and Contracts* § 86 (1972) (citations omitted).
[145] Va. Code Ann. § 11-66.
[146] *See* discussion *supra* at p. 38.
[147] 788 F.2d 226 (1986).
[148] *Id.* at 228.
[149] *Id.* at 229.
[150] 49 C.F.R. § 18.43.

award were eliminated, challenges of contract awards in the federal courts would also be foreclosed.

If changing state law to limit legal actions by unsuccessful offerors is thought to be inappropriate, one alternative might be to require alternative dispute resolution proceedings in lieu of court proceedings. A 1990 law review article, examining the use of the "minitrial" by NASA, the U.S. Corps of Engineers, the Department of the Navy, and the Department of Energy, found:

> Every agency minitrial except one has avoided years of litigation and a full-fledged hearing, while producing outcomes that appear to have satisfied nearly every party that took part. Even in the one Navy case in which settlement was not produced, ADR significantly narrowed the issues and reduced the hearing burden.[151]

In a minitrial, each side presents an abbreviated summary of its case to senior officials of both the government agency and the contractor. Following these presentations, the officials seek to negotiate a settlement.[152] The positive experiences of federal agencies with alternative means of dispute resolution suggest that Virginia might similarly benefit by incorporating ADR into its procedures for resolving contract award disputes.

A series of legislative changes would be necessary, however, before ADR could be used to resolve contract award disputes. The Supreme Court of Virginia has held that the Commonwealth may not enter into arbitration agreements.[153] The legislature would have to specifically approve of the state's entrance into arbitration agreements to overturn this ruling. Additionally, courts in Virginia have held that arbitration agreements can be revoked by either party prior to the granting of an award.[154] For ADR to be an effective answer to the problem of delay, the Commonwealth would have to adopt statutes making arbitration agreements irrevocable. This would bring Virginia law into line with a number of other states, many of which have statutes providing "that an arbitration agreement is valid, enforceable, and irrevocable, except on such grounds as exist at law or in equity for the revocation of any contract."[155] Because, by definition, no other relevant contract exists between the state and the unsuccessful bidders, some consideration has to exist to make an arbitration agreement a valid contract. Courts have found that the consideration requirement is satisfied by the mutual

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[151] Eldon H. Crowell and Charles Pou, Jr., *Study -- Appealing Government Contract Decisions: Reducing the Cost and Delay of Litigation with Alternative Dispute Resolution Techniques*, Maryland Law Review, Vol. 49 183, 198, n. 81 (1990).

[152] *Id.* at 200.

[153] *Richard L. Deal and Associates, Inc. v. Commonwealth of Virginia, Inc.*, 299 S.E.2d 346, 348 (Va. 1983).

[154] *Doris Temple King v. Cyrus W. Beale*, 96 S.E. 2d 765, 769 (Va. 1957).

[155] 5 Am. Jur. 2d *Arbitration and Award* § 41 (1962 and Supp. 1994).

promises of the parties to abide by the award.[156] The Virginia Supreme Court has followed this approach, holding that an arbitration agreement consists of "a contract between the parties whereby they mutually agree to submit their controversy to a named arbitrator, and a grant of power by each party authorizing the arbitrator to act in his behalf and settle and determine the matter in controversy."[157]

The U.S. Arbitration Act[158] will have a direct bearing on any arbitration agreements entered into by Virginia. If a contract dispute involves interstate commerce, which ITS contracts almost always do, federal law preempts state law.[159] The U.S. Arbitration Act makes arbitration agreements in contracts involving interstate commerce valid, irrevocable, and enforceable except where grounds exist for revocation of a contract.[160] If one of the parties to an arbitration agreement brings suit in federal court on an issue subject to arbitration, the court has the authority to stay the judicial proceedings pending the outcome of the arbitration.[161]

Although legislative action would be necessary to incorporate ADR into the ITS procurement process in Virginia, this approach might be more politically feasible than eliminating or limiting bidders' opportunities to challenge contract awards in court, because it would replace one review procedure with another.

## Alternative Procurement Models

Another approach to improving procurement of ITS technology would be to take advantage of alternative methods of procurement provided for in the Code. Two such methods authorized in the Code are project management and design-build construction.[162] However, regulations for these types of procurements would need to be promulgated before they could be employed. These two alternatives offer some advantages that might be particularly helpful where ITS procurement is concerned.

Project management, also known as construction management, program management or systems integration, consists of a single entity, such as a consultant or consulting company assuming overall managerial duties for a particular project. The project manager's duties include preliminary design and program definition, preparation of bid documents, selection of

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[156] *Id.* at § 24.
[157] *Temple King*, 96 S.E. 2d at 769.
[158] 9 U.S.C. § 1-307 (1988 and Supp. 1993) (as amended).
[159] *Maxum Foundations, Inc. v. Salus Corp.*, 779 F.2d 974, 978 (4th Cir. 1985).
[160] 9 U.S.C. § 2.
[161] 9 U.S.C. § 3.
[162] Va. Code Ann. § 11-41.2.

contractors, and supervision of their work. In effect, a project manager does everything VDOT would normally do. One advantage to the project management arrangement is that the project manager may have special technical knowledge not available within VDOT. A project manager is typically paid in the same manner as a consultant. And, generally, project managers are only liable for their fee on a project, but some managers assume greater financial and legal liability.[163]

In design-build construction the state selects a contractor to complete a project from initial concept to final completion. All design and construction work is performed by a single contractor. Typically, the state agency involved will solicit proposals based on a general project description. Responsive proposals typically describe the capabilities of a firm, include a partially completed design, and quote pricing information. Based on these proposals, a designer-builder is selected and a contract is negotiated. The designer-builder then handles all the subcontracting and purchasing needed to complete the project.

These two alternative procurement methods offer different advantages over the traditional design/bid/build approach. The major advantage provided by the project manager approach, especially in the areas of ATMS and ATIS, is the assurance of compatibility between successive designs and separate elements of a large project. Compatibility is achieved by having a single, technically qualified person or company, familiar with ITS, in charge of all designs and procurements. The project manager can make sure that all elements of an ATMS or ATIS are properly conceived and work together. Although switching to the project management concept is not necessary to obtain well qualified personnel, this approach assures that ITS matters are handled by personnel familiar with the technology. The main disadvantage of the project manager approach is that all of the problems associated with competitive procurements remain, since all procurements are still subject to state procurement laws. Thus, the time required to complete a project may not be significantly reduced, and the quality of the individual procurements may not be improved.

Several RFPs have been issued seeking project managers (or systems integrators) for ITS projects in other states. Examples include a traffic management and information system in Boston and a traffic management system in Houston. The project manager concept is particularly promising for the procurement of ATMS and ATIS. It places a well-qualified person in charge of a large, long-term project that needs to be designed and implemented with every element of the system in mind from the start. ATMS and ATIS are not particularly well-suited to piecemeal construction. An overall approach is more appropriate, and the project management approach provides that sort of organization. Although the long-term nature of ATMS projects might suggest hiring qualified people from the private sector to perform management duties "in-house", consideration should also be given to the special knowledge consultants are able to accumulate through their exposure to non-VDOT projects, and the loss of exposure that may

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[163] *The Top 100 Construction Management Firms*, Engineering New-Record, June 13, 1994, at 38.

occur once they are brought in-house. Another consideration is that salary constraints associated with state government may make it difficult to attract and retain people with sufficient expertise.

The design-build approach offers different advantages. Design-build construction of buildings is gaining acceptance in private industry and with federal agencies. It is also used in DOD procurements. Design-build is widely used in other countries for transportation projects. Although some transportation officials advocate its use,[164] it is not commonly used in the United States for transportation projects. The Florida DOT conducted a trial use of design-build for traditional transportation projects such as resurfacing. The analysis of that test recommended further use of design-build.[165] However, except for a few projects, ITS procurements have thus far not used the design-build approach.

The main advantage of the design-build approach for the construction of buildings and for traditional highway projects is expedited project completion. The Florida study estimated an average total project time of 36% less than what was common under the traditional approach.[166] Since the designer and contractor are the same firm, design-build also places responsibility for the project in one source rather than two. Although some argue design-build can lead to lower project costs,[167] the Florida study discovered that the sample design-build projects resulted in slightly higher costs than those complete in the traditional manner.

Design-build offers additional advantages for ITS. Project time is typically reduced because of the reduction in the number of procurements (one instead of two) and because the designer-builder can undertake what are normally sequential tasks simultaneously. In some cases, that means that construction can begin even before the design is complete. Having one party responsible for the entire project can also be advantageous. Because of the close contact between designers and builders under this approach, and because one entity is responsible for both, it is much more likely that the design will be constructible. The Fastoll project initially attracted only two offerors, far fewer than was expected and neither of which was acceptable. This may have occurred because, as some have suggested, the project specifications were unrealistic. Companies aggressively pursuing ITS business include Hughes, Lockheed, AT&T, Allied-Signal, Motorola, and Texas Instruments. These companies traditionally perform both design and manufacturing functioning in producing their products. Design-build procurement

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[164] *Searching for Solutions: A Policy Discussion Series: Public and Private Sector Roles in Intelligent Vehicle - Highway Systems (IVHS) Deployment* 20-21 (Publication No. FHWA-PL-92-024, 1993).

[165] Ralph Ellis *et al.*, University of Florida, College of Engineering, Department of Civil Engineering, *Evaluation of the FDOT Design/Build Program*, Report No. 4910450433012 (1991).

[166] *Id.* at 39-39.

[167] *Design-Build Use Grows as Controversy Persists*, American Consulting Engineer, 3d Quarter, 1993, at 15; Jack L. Kay, *White Paper: Design and Deployment Alternatives: ATMS and ATIS Components of ITS* 15 (unpublished draft report prepared for FHWA, DTFH61-92-P-00284, Feb. 1992).

methods would be a particularly appropriate means of taking advantage of these companies' knowledge, experience, and desire to participate in the ITS industry.

Design-build procurements are not, however, without disadvantages. Probably the greatest weaknesses of design-build procurements are the absence of state regulations on the administration design-build contracts and the unfamiliarity of VDOT personnel with design-build procurement methods. Problems with ITS procurement can be partially attributed to a relative lack of experience with competitive negotiations. Design-build would be a completely new approach. The introduction of this procurement method would necessitate a period of learning and adjustment at VDOT. Another potential problem is cost, both to the state and to private firms. In addition to finding slightly higher costs on design-build projects than on projects completed in the traditional manner, the Florida study recommended compensating unsuccessful bidders for some of their design work. This recommendation sought to ensure that small firms, who may not have the financial ability to devote time to preparing preliminary designs without compensation, will continue to bid on state projects. The absence of an independent designer, without a financial stake in the construction stage, is also seen as disadvantageous by some. Finally, design-build construction methods could face a political challenge from independent consultants fearing a loss of business.

## CONCLUSIONS

As the Virginia Department of Transportation began to procure ITS, it encountered a number of difficulties. The Fastoll project has been delayed by unsatisfactory responses to an RFP, administrative protests, and court challenges of contract awards. Problems arose in the procurement of the COMPARE project because those involved in the design phase were barred from participating in the resulting construction. The Northern Virginia Traffic Management System has suffered maintenance and durability problems with some of the products it has purchased through competitive bidding. More generally, the allocation of intellectual property rights has been identified as a likely source of future difficulties.

The problems associated with the procurement of ITS seem to have resulted, at least in part, from the unfamiliar and rapidly evolving nature of the technology. Traditionally VDOT procurements have involved established and stable technologies. VDOT's current procurement practices, both written and unwritten, developed in that environment. In addition, VDOT has amassed a great deal of in-house expertise specific to those technologies. In that setting, the use of detailed specifications, competitive sealed bidding, and separate designers and constructors continues to work fairly well.

When VDOT began the process of procuring ITS, it used its traditional approaches, as well as new methods, with mixed results. The use of competitive sealed bidding has been problematic with some of the more complicated components, such as changeable message signs.

This may be attributable to the difficulty of writing specifications that describe completely the desired operational, maintenance, and durability specifications for these components. Attempts to incorporate the most recent developments in the field into the specifications, not to mention the developments that might take place by the time the procurement was completed, would only complicate things even more. When VDOT attempted to use competitive negotiations to obtain the Fastoll project, allegations were made that VDOT, among other things, engaged in technical leveling and technical transfusion. As long as the information the procurement officers received in the proposals contributes substantially to their knowledge concerning the project and as long as they engage in conversations with offerors about their proposals, technical transfusion and technical leveling will, in fact, be very difficult to avoid.

The importance of these early ITS contracts to potential vendors has been a second factor contributing to the difficulties VDOT has faced in procuring ITS technology. A corporation that is successful in obtaining one of these early contracts would likely be at an advantage in seeking future contracts because of the resulting experience gained, the economies of already having established their production capability, and, perhaps most importantly, the need on the state or national level to make whatever standards are eventually established consistent with the technical characteristics of already installed systems. Unlike an established industry, where all members have access to dominant technology, in ITS there are a number of technological approaches to any particular project. The selection of one technology will largely exclude other technologies and, as a result, their sponsors. For the corporations involved, whether a contract is won or lost will have financial repercussions that extend far beyond the profits associated with that single contract. Therefore, in their struggle to obtain ITS contracts, those involved have every incentive to challenge contracts awarded to their competitors at every possible level, no matter how frivolous those challenges might be.

Another effect of the evolving nature of this technology is that intellectual property is likely to be developed under state contracts to design or develop ITS projects. Vendors have voiced concerns about participating in contracts that require them to give up some of their intellectual property rights. If Virginia aggressively pursues these rights, it may be that the number of vendors interested in contracting with the Commonwealth will decline. On the other hand, if the Commonwealth does not pursue its intellectual property rights, it runs the risk of being locked into a sole-source relationship with a vendor that has developed intellectual property, at least in part, using Virginia's money.

Finally, problems have arisen because of statutory and regulatory bars to the participation in the construction of projects by those who design them. The corporations that are currently positioning themselves as ITS suppliers are not clearly divided between design firms and construction corporations, a division upon which the statutes and regulations governing VDOT procurements are based. Many of these corporations have backgrounds in defense contracting, where design and manufacturing work are often performed by the same entity. Because the

construction portion of many ITS projects is likely to be more lucrative, the prohibition against contractors acting in the dual role of designer/builder is likely to have negative implications for the Commonwealth's ability to attract the best possible designer for many IVHS projects.

Although a panacea for these problems does not exist, they are not beyond solution. However, it is important that Virginia act quickly to avoid costly and embarrassing repetitions of past experiences. One set of possible solutions, organized in part as a series of alternatives, is presented in the next section.

## RECOMMENDATIONS

### Competitive Negotiations

1. VDOT should thoroughly evaluate its use of competitive negotiations for ITS procurements with the goals of improving the efficiency of the procurement process and eliminating any grounds for the filing of legal complaints. VDOT's evaluation should focus on the following recommendations:

(A) Guidelines as to when competitive negotiations should be used should be added to the Agency Manual.

(B) When using competitive negotiations, specifications should not be written in the detailed form customarily used with IFBs. Instead, general specifications, functional (performance) specifications, or design specifications should be used to allow offerors to submit more innovative proposals. The Agency Manual should provide guidelines as to when each type of specification should be used.

(C) Limitations on discussions with offerors should be considered to eliminate any possible grounds for allegations of technical leveling, technical transfusion, or auctioning. These limitations could include, for example, restricting discussions with offerors to matters of clarification and substantiation. Those limitations found to be appropriate should be included in the Agency Manual.

(D) One round of scoring, precluding a best and final offer, may be appropriate for competitive negotiations where VDOT purchasers are familiar with the technology involved and discussions are not essential. The Agency Manual should provide guidelines on when it is appropriate to limit offerors to submitting only one proposal.

(E) If only one round of proposals is allowed, offerors should be barred from submitting unsolicited amendments, revisions, or additions to proposals.

(F) VDOT should take steps to assure that vendors are able to protect trade secrets and proprietary information throughout the procurement process and that VDOT personnel respect the confidentiality of bidders' trade secrets and proprietary information.

(G) The present formulas for scoring should be re-evaluated, updated if necessary, and then rigidly applied.

2. VDOT should make use of competitive negotiations wherever they are fiscally advantageous. For projects that are not federally funded, this will require the approval of the state agency head or his designee. For projects involving federal funds, the approval of the FHWA Division Administrator will also be necessary.

**Limiting Court Challenges**

3. VDOT should seek to avoid procurement delays resulting from court challenges of contract awards. The likelihood of court challenges could be reduced by:

(A) the enactment of a statutory provision, governing procurements generally, stating, first, that an unsuccessful bidder has no property interest in the award of a contract, and thereby limiting the ability of an unsuccessful bidder to bring suit in federal court under 42 U.S.C. §§ 1983 and 1985, and, second, that:

> A mere disappointed bidder on a public contract does not have standing to challenge the contract award unless he is also an aggrieved taxpayer who has a substantial, direct or immediate interest in the contract award which interest is greater than that of the common taxpayer. Furthermore, standing will not be conferred where the causal connection between the action complained of (the award of the contract) and the injury to the taxpayer (the payment of the tax) is too remote,[168]

and thereby limiting the ability of an unsuccessful bidder to bring suit in state court; or

(B) the enactment of a similar statutory provision applicable solely to ITS procurements; or

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[168] *C. O. Falter*,614 A.2d at 329-330 (quoted above at p. 41).

(C) revisions in state law allowing VDOT to enter into arbitration agreements with offerers and making alternative dispute resolution a viable, enforceable mechanism for resolving disputes over contract awards.

**Alternative Procurement Methods**

4. VDOT should consider using the project management/systems integrator procurement method in its ITS program. Using this method would require the enactment of a set of regulations governing its application to highway construction, but would not require legislative action.

5. VDOT should consider using the design-build method in its procurement of ITS systems, bearing in mind that VDOT may have to go through a period of familiarization before it could work effectively with this method. Using this method would require the enactment of a set of regulations governing its application to highway construction, but would not require legislative action.

**Other Recommendations**

6. VDOT should continue to attempt to hire personnel with special expertise in ITS. If discussions between VDOT and bidders are limited in order to reduce future bid protests (see Recommendation 1(C) above), the knowledge and experience of VDOT personnel scoring bids will become more important. This is especially true if best and final offers are not allowed (see Recommendation 1(d) above).

7. VDOT should develop a policy concerning the allocation of intellectual property developed by private contractors under state contracts. This policy must balance the potential financial advantages to the Commonwealth of obtaining intellectual property rights from vendors against the effects of aggressively pursuing intellectual property rights on the willingness of potential vendors to do business with Virginia. This policy must also be compatible with the requirement that the state accept the best proposal in competitive negotiations.

8. Because the procurement of ITS is likely to raise legal questions on an ongoing basis, and because it will be necessary, on occasion, to provide contracting officers with timely, clear legal advice, a more effective mechanism for communication between the Attorney General's office and VDOT personnel involved in making procurement decisions should be established.

# APPENDIX A

**Advanced Traffic Management Systems (ATMS)**
**Advanced Traffic Information Systems (ATIS)**
**Advanced Vehicle Control Systems (AVCS)**
**Commercial Vehicle Operations (CVO)**
**Advanced Public Transportation Systems (APTS)**
**Advanced Rural Transportation Systems (ARTS)**

# APPENDIX A

## Advanced Traffic Management Systems (ATMS)

ATMS are a means of controlling traffic in order to achieve optimal system efficiency and safety. In a rudimentary way, a city's traffic signal system is a traffic management system. The difference between ATMS and less modern management systems is that ATMS react to real-time traffic conditions, while older systems do not.

Traffic control takes place by collecting information about the movement of vehicles and then altering that movement to reduce congestion. Traffic conditions can be determined in a number of ways. The two most common methods are induction loop detectors, devices usually buried in the pavement, which can not only count, but can also be configured to classify and determine the speed of vehicles, and video surveillance cameras, which are placed at intervals along busy highways.

Once traffic conditions are known, the real task of ATMS begins. One of the most important components of many ATMS is the changeable message sign, which provides drivers with information about traffic conditions ahead and on alternative routes. Another common tool is freeway ramp metering, which regulates the entry of automobiles onto the freeway. More advanced methods of traffic control include real-time traffic-adaptive arterial signal control. For example, traffic signals on highway access roads can remain green for extended periods to facilitate the diversion of traffic around an accident on the main highway. Also gaining acceptance are lane control signals, which direct drivers to change lanes in order to avoid an incident far ahead in a particular lane. Finally, ATMS are intended to improve traffic conditions by early incident detection. Timely incident detection allows earlier dispatch of emergency medical and accident-clearing services. ATMS directly improve traffic flow across the whole city-wide area by determining traffic conditions and making appropriate adjustments.

## Advanced Traffic Information Systems (ATIS)

ATIS use many of the same tools as ATMS, but with a slightly different (yet overlapping) purpose. The goal of ATIS is to provide information to travelers to help them more efficiently reach their destinations. These systems are oriented toward serving the individual traveler and not toward addressing traffic congestion as a whole (although the actions of individual travelers affect traffic as a whole).

Often ATMS and ATIS will work together, both using information obtained by the ATMS. For example, information of congestion on a particular highway could be used by an ATMS to control traffic signals and direct drivers into a different lane. At the same time, the information could be sent to kiosks in a shopping mall, and to local television stations, giving potential travelers an opportunity to choose to travel on a different route or delay their departure. This function could be part of an ATIS. Traveler information can also be provided to drivers inside their vehicles through the use of in-vehicle displays or highway advisory radio. In-vehicle displays could show traffic conditions, and also act as a guidance system in conjunction with a global positioning system, indicating to drivers where to turn to reach their destinations. In-vehicle displays could also provide a detailed map of the area, and offer alternate routes based on current traffic conditions.

### Advanced Vehicle Control Systems (AVCS)

AVCS seek to automate vehicles to reduce accidents and increase highway capacity by decreasing headway between vehicles. Common, though rudimentary, forms of AVCS are cruise control and antilock brakes. More modern forms of AVCS could include infrared technology to enhance a driver's vision at night or under conidtions of poor visibility, and automatic braking or steering systems in which control of the vehicle is surrendered temporarily by the driver to avoid an accident. This function would likely be preceded by collision detection and warning devices, detecting unsafe proximity to another vehicle and warning the driver that another vehicle is too close. Currently, Greyhound buses use a form of vehicle detection and warning system. [169] In the future, it is possible that limited access automated lanes will be developed that take over complete control of a vehicle from its operator. This could improve safety, as well as make possible greater efficiency by allowing for decreased headways and lane widths. Unlike other forms of ITS, many AVCS are likely to delivered by automobile manufacturers and marketed directly to consumers. However, automated highways, one possible culmination of these technologies, will require public sector involvement.

### Commercial Vehicle Operations (CVO)

CVO apply technology to help alleviate problems specific to commercial vehicles. CVO typically incorporate Weigh-In-Motion (WIM) systems and Automatic Vehicle Classification systems. These allow for a one-time weight classification, performed while the truck is moving, and electronic storage of this classification throughout a geographical zone, thus allowing commercial trucks to avoid multiple stops at weigh stations. Another technology used by CVO

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[169] *Six Parts of the Whole*, Intelligent Vehicle Highway Systems: Supplement to Engineering News-Record, Dec. 6, 1993, at 15.

is Automatic Vehicle Location (AVL) systems. One form of AVL, Global Positioning Systems (GPS), uses satellites to determine the location and velocity of a specific vehicle. Used with Vehicle Classification System, global positioning can instantly locate any vehicle in a commercial fleet. This system is useful to taxicab dispatchers and commercial truck companies in keeping track of the location of their vehicles.

## Advanced Public Transportation Systems (APTS)

APTS use many of the technologies found inother ITS areas to enhance public transportation systems. Examples include real-time ride matching for car-poolers and optimization of timed transfer between transit vehicles. Another example is Smart Cards, a debit -card system that will enable consumers to board transit vehicles and pay tolls and parking fees without cash.

## Advanced Rural Transportation Systems (ARTS)

ARTS use advanced technologies to improve transportation on rural roads. These technologies tend to focus on two problems that are of particular concern in rural areas.

First, emergency facilities are often widely spaced in rural areas, necessitating early accident detection so that emergency services can arrive as quickly as possible. The National Highway Traffic Safety Administration (NHTSA) is currently investigating a system that will automatically call Emergency Medical Services (EMS) following an accident and provide information on the location of the accident. Drivers can also be alerted to accidents in their area by an in-vehicle incident warning sent from a roadside transponder. In addition, emergency signals can be transmitted from a car involved in an accident to give its location.

Second, rural roads are often thought to be more hazardous than city roads because of slow-moving vehicles, curves, and narrower shoulders. These hazards can be minimized with in-vehicle crash avoidance systems that detect slow-moving cars and other obstacles in the road ahead. In addition, hazardous road condition alerts can be received in the vehicle from roadside transmitters. ITS technology used in ATMS and ATIS also has rural applications. In some cases, where the area is prone to snow, ice, and poor visibility, changeable message signs can be used to convey road condition information to motorists.