

OVERCOMING BARRIERS TO ITS--
LESSONS FROM OTHER TECHNOLOGIES

FINAL TASK D REPORT

Prepared for the Federal Highway Administration

by

The Urban Institute
with
Cambridge Systematics, Inc.
Miller, Canfield, Paddock and Stone, P.L.C.
MTA/EMCI

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Proceedings of Task D Symposium

This report summarizes the results of a small, one day symposium held on March 27, 1995 in Washington D.C. as a part of the study being performed by the Urban Institute and its subcontractors (Cambridge Systematics, Inc., Miller, Canfield, Paddock and Stone, and MTA-EMCI, Inc.) for the Federal Highway Administration. The study is entitled, "Overcoming Barriers to ITS - Lessons from Other Technologies." The purpose of the symposium was to provide expert review and comment regarding the first three task reports in order to obtain input regarding the final report for the entire study. The three task reports discussed during the symposium were:

1. Final Task A Report. Institutional Barriers to ATMS/ATIS
2. Draft Task B Report. Lessons from Other Technologies
3. Draft Task C Report. Models of Public/Private Participation

The Co-principal Investigators, William A. Hyman of Cambridge Systematics, Inc. and Harley W. Radin, consultant to the Urban Institute, led the symposium discussion. Symposium participants are listed in the Roster which appears as Exhibit 1.

Presentation of the principal findings, conclusions and recommendations from each Task Report were followed by an open discussion. However, participants did offer comments during the overview of each Task Report. This pattern was followed throughout the day for Tasks A, B and C. Copies of the overheads used in presenting the reports appear in Exhibit 2.

The pattern of discussion consisted largely of specific comments in regards to points covered in the report and summarized in the overhead presentation. However, some issues such as franchising and access to and sale of data evoked considerable discussion.

In general, the participants were quite complementary of the Task Reports. The reports were viewed as well-written and a valuable set of resources for the ITS community.

The following summarizes the key points made by the symposium participants. The key points have been grouped together by topic.

Willingness-to-Pay

One participant questioned whether the conclusion that the willingness of consumers and taxpayers to pay is the principal barrier to deployment as stated in the Task A report. He noted that \$1 billion per year will pay for ATMS as indicated under the ITS America Strategic Plan, but this works out to a very low cost in terms of cost per gallon of gas or cost per mile traveled.

Willingness to pay for ATIS user services is also a key issue. People are probably willing to pay for Mayday service. They have shown this willingness to pay with respect to cellular telephones. Cellular phone service in many areas starts at less than \$25 a month for the basic “emergency service” level. Industry representatives have reported that this is the fastest growing segment of their market which suggests that many users are willing to pay for just the security that these devices offer.

There was a feeling expressed that the ITS community needs to more sharply define what people are willing to pay for ATMS and ATIS and communicate this effectively to the public/taxpayer.

Chicken-and-Egg Problem

The critical path for deployment is crucial, especially as it relates to chicken-and-egg problems. ATIS users want information, especially in real time, but cannot get it without in-vehicle equipment and suitable communication bandwidth. Auto manufacturers and telecommunications companies will not supply the in-vehicle equipment. The view was expressed that the ITS National System Architecture, especially the establishment of standards, will help overcome the chicken-and-egg problem.

Separate or Integrated ATMS/ATIS

The Loral National System Architecture, one of the four architectures developed under the first phase of the ITS National System Architecture effort, separated ATIS and ATMS in the belief that ATIS would evolve independently. The Loral team made this separation because the nation needs to support an architecture that might not have any public funds for ATIS. The reason is the private sector is more likely to deploy ATIS at the outset than the public sector. However, that is not to say all ATIS will be privately funded. The private sector will initially deploy some ATIS. Also, data from publicly funded ATMS will be fused with ATIS data bases.

ATMS and ATIS will not necessarily evolve sequentially. It was pointed out, for example, that in Seattle, Washington ATMS/ATIS is being sought as an integrated solution.

Public vs. Private

One of the most difficult deployment issues is getting public and private organizations to deal effectively with one another and to take into account each other’s perspective.

There are different views within the ITS community as to whether public data is needed for ATIS. The jury is still out. Private firms employ a variety of surveillance methods including using the vehicles of their clients (e.g. Federal Express, UPS) as probes and thus do not have to rely on data that arises from publicly funded ATMS systems.

Can the private sector eventually do anything that the public sector can do? The response of some symposium participants was definitely no. The public sector knows road closures. Also the public sector owns facilities and has the responsibility to control/ manage them.

There is a need to maintain the distinction between “public” and “private.” Such issues as air pollution demand management, and congestion will remain fundamentally “public”*.

One person asserted that the fundamental options do not consist solely of private provision or taxpayer subsidy as stated in the Task A report. There is another part of the equation: to let consumers sort out whether privately or publicly funded systems will survive.

A participant commented that there is tension because some people in the ITS community perceive government as going too fast, whereas others think deployment is occurring too slowly. The private sector may not show enough patience to allow government to work out complex institutional arrangements like that being developed for TravInfo in the San Francisco Bay Area. The Institutional framework for TravInfo consists of a formal partnership involving a large number of public agencies. It is supplemented by an even larger steering committee consisting of both private and public entities.

Another person argued that there exists no profit motive for local governments. However, even private operation of ATMS/ATIS can be badly mismanaged. One attendee pointed to a traffic reporting service that just makes up information once in a while -- there is no factual basis.

ITS is useful for safety, for example emergency medical services (EMS). Years ago all EMS was privately provided by funeral homes and hospitals. Because funeral homes and hospitals could not meet high quality standards of service, government stepped in. Now the direction is tipping back toward private provision.

Access to and Sale of Data

The ATIS information market is different from the ATIS technology market. The ATIS information market consists of the sale of traveler information useful for planning trips, changing routes while en-route, and accessing data bases concerning traveler services (e.g. gas, lodging, parking) and places of interest (businesses, recreational sites, etc.) The technology market consists of the sale of equipment and communications that can be used to access and transmit the information.

A key question is how to provide access of private ATIS providers to publicly generated data and how much the service provider should charge. It is important to set interchange standards for data as envisioned under the ITS National System Architecture. Then anyone who wants data or information can get access to it under whatever pay policy may exist.

The need for monopoly may be desirable in the incubation period for ATIS. but even if you offer a potential monopolist access to public data in order to provide ATIS service. the firm might decline because there may be more profitable businesses to invest in.

Data ownership can be contentious. One private ATIS provider claims it owns the traffic data it has. even if the traffic data comes from a public source. But the public agency from which the data came said the data is not private.

The company claimed that the data from the publicly-owned network should be considered to be theirs since they were liable for any mis-information that the system might produce. The company has now agreed that the state owns the data but the data has little value to the state since it is carried in a proprietary format that only the private sector company can read.

As soon as data becomes a potential source of revenue, it becomes a possible point of legal conflict. Public uses of private data and private uses of public data are both challenging issues.

Open Systems and Data Interchange Standards

Because of the need to recover the capital investment costs of developing new products, private sector companies often favor a closed system architecture as a way of limiting competition long enough to recover their initial investment. Using the development of personal computers as an evolutionary model, proprietary systems can later develop into open systems. However, it is unreasonable for the public sector to expect the private sector to develop open architectures for data interchange unless the public sector is willing to participate in start-up development.

One example of the difficulty of establishing open systems with nationwide standards has been the emergence of different approaches to electronic toll collection. One participant said that standards for electronic toll collection has become the Bosnia of ITS, implying that this issue has become tantamount to a war among vendors of transponders, and that obtaining a negotiated settlement has been exceedingly difficult. While there is a need for more uniformity in standards, symposium participants acknowledged that technological advance occurs faster without a single standard, but often to the detriment of failing to make a market.

An issue in the Task A report that deserves some attention is the relationship between digital maps used for ATIS and Geographic Information Systems. A question is whether there should be similar spatial data transfer and other standards for both. Also at issue is whether the public or private sector will be the most definitive source of information regarding the latest updates to the roadway network.

Low Bid and Contracting for Design Work

There was a brief discussion regarding low bid contracting as a barrier to ITS deployment. One person said that the real institutional barrier to changing the low bid process is political lobbying of the private sector. especially construction and paving contractors. Another person noted that

there are disincentives for design work that is intended to result in deployment. Private contractors who do design with the expectation of being able to construct a system often get burned when implementation is opened to competition.

Standards developed for the National System Architecture effort will help to overcome the problems with low-bid contracting, by allowing the bidder to specify what the bidder is buying.

Joint Public and Private Ownership

Colorado is probably typical of many states in that the state constitution prohibits the public sector from taking on any debts or obligations of private sector firms or jointly holding patents with a company. This creates difficulties when revenues and intellectual property are to be shared. Also, like many states, Colorado uses university foundations and corporations established by the legislature as ways of incubating new industries that may provide employment and other public benefits.

Possible Barrier to Public Provision of Traveler Information Services

In Colorado, state procurement agencies, permitting agencies, and the Attorney General's Office will often disagree on what is permissible in regards of use the state's rights-of-way insofar as providing travel information to the public.

Pre-deployment and Deployment

There was some discussion concerning how pre-deployment, operational tests, and early deployment activities would lead to deployment. Operational tests were seen as generally not leading to deployment, which can discourage private participation. Participants noted the growing interest in deployment as opposed to pre-deployment activities including operational tests.

The group felt that deployment should involve various promising models of public/private participation and the core elements of ATMS/ATIS identified by the US DOT. There was strong support among symposium participants for the federal government to provide funds dedicated to the purpose of encouraging public/private partnerships, a recommendation that should be reflected in the final report.

One person said there is a need to allow for incubation (i.e. natural evolution) of ATMS/ ATIS, implying that deployment has its own logic and timetable. To rush deployment may result in losing some important advantages such as technological advance or compatibility with a national architecture and standards.

There is a need for upward compatibility, another pointed out. In other words, initial deployment should accommodate subsequent improvements in hardware, software and telecommunications.

Deployment should not occur without thinking about how the change in technology over time affects travel decisions. For example, when Colorado had major storms five years ago, there were big traffic jams. Now with advanced weather forecasting technology, lots of people stay home and don't travel. It was suggested the research team consider what teleports and virtual meetings might mean for addressing congestion problems.

Role of Metropolitan Planning Organizations (MPOs)

Cities and counties look after their parochial interests, but there are important regional imperatives. A representative of the MPO community said there is a need to focus on the economic imperative in particular and satisfy this within a regional institutional context.

Further more this person emphasized the changing role of the MPO's. The traditional role of MPOs has been planning. Now with ISTEA, capital programming is a major focus. In the future MPOs' main mission will be management in order to deal with public sector issues. This role cannot be contracted out because of the nature of the public issues.

One person commented in response that collaboration will be pivotal, but there is a question as to whether it will be centered on the state, MPO or private sector.

A number of early deployment projects have been implemented and many more are underway. An incremental approach to implementing ATMS must be taken, but there is no consensus as to who will operate ATMS and how it will be done within regions across the country.

Local governments are very concerned about regional or privately run ATIS. It is inevitable that people will have information to go through local neighborhoods. Symposium participants recognized that local governments will try to take steps to prevent this, even if part of a regional system. Private firms offering ATIS navigation services will undoubtedly exploit the feasibility of local routing for private gain, partly because optimization of routes can be achieved locally but not globally.

It was pointed out that synchronizing local and global decisions might best be done through prices and not algorithmically.

Revenue Sources

A number of comments concerned potential revenue sources and the barriers to public agencies behaving like a business.

Every state has public acquisition regulations. Lawyers try to stretch the umbrella of these rules to cover revenue generating prospects. No one is truly in the business of operations, since regulations prevent states with operating responsibilities from acting like a business. One participant, expressing the frustration of several symposium participants, said that there is always someone in government who will tell you any way to make money is illegal.

Advertising can significantly affect cost recovery, especially real time advertising targeted to location. The New Jersey Highway Authority is moving in the direction of “adopt-a-sign” for advertising on variable message signs, and expects to be able to earn revenue from this strategy. There are institutional barriers to advertising that stem from the legacy of road beautification programs.

The New Jersey Highway Authority is also leveraging real-estate assets to move deployment along. Public rights-of-way has value to those who desire to deploy ITS. One manifestation of this is the Authority’s effort to generate revenues by selling dark fiber. A public agency can sell dark fiber in its rights-of-way, but not “lit” fiber, which puts it in competition with telecommunications providers, and is prohibited by regulations/law. Dark fiber is valuable for a number of reasons including redundancy. However, railroads, pipelines, and others are also selling access to rights-of-way to install fiber and lobby against public agencies granting permission to put fiber on public roads.

Most state utility accommodation policies prohibit putting utilities along an interstate highway.

Colorado DOT tried to list all state-level, public needs for optical fiber (e.g. schools, hospitals, libraries, real estate, etc.). The state was going to try to exchange access to rights-of-way in return for benefits. However, as soon as the state pursues a purpose that is no longer fundamentally public, it can no longer exercise the right of eminent domain.

A question raised by one participant is what should be put in a negotiated settlement between the public and private sector regarding things that will be put inside and outside the right-of-way?

Models of Deployment

A variety of different deployment models were discussed.

One participant remarked that innovation attracts venture capital but not patient capital. In many cases what is needed is patient capital. Another participant suggested this distinction implies two models of private sector deployment, one with venture capital and the other with patient capital. Many venture capitalists are currently shelling out considerable money for ATIS.

One might also distinguish between a model of ATIS deployment that uses venture capital and a deployment model that relies on advertising for cost recovery. Advertising can be non-personal and/or personal (i.e. information is targeted to individuals based upon their characteristics and prior buying behavior).

Another useful distinction pointed out was that between contracting for a system manager and providing services to retail customers. A person offered the metaphor of distinguishing between providing the movie theater and the movie as a way to separate deployment of a system from the provision of information.

One participant asked. “What is to prevent us from using the right of eminent domain to provide cover for the private sector to deploy ATMS under a utility model (e.g. electricity. gas)?” The state could exercise its right to acquire rights-of-way and at the same time provide an institutional framework to allow utilities and others (e.g. engineering companies. cable TV providers) to deploy ATMS in franchise territories. In Wisconsin there are prescribed service areas served by three utilities. What if ITS joined forces with them? They are all holding companies. They can all generate capital. There is a friendly Public Service Commission that administers the regulatory framework. The utilities are competitive in certain respects. Is this not a practical deployment approach?

There were differing views on the feasibility of franchising. One person held that deregulation will be the deathknell of the franchising route and there is little inclination within the US Congress for federal pre-emption or specialized treatment of monopoly providers.

Another person responded that in a home rule state you cannot have franchising at the state level (note: this does not preclude franchising on a local level).

Still another person said that once you broach the franchise model, local governments will support it because they can potentially earn significant revenues as many discovered with Cable TV.

In examining auction models. a person said it might be worthwhile to differentiate between regular and “Dutch” auctions. In a Dutch Auction you start with a high price, and progressively drop the price until someone makes a bid.

The group was quite interested in the National Weather Service Model. The research team pointed out that lessons learned from the history of deployment of the U.S. Weather Service would be included in the Final Task B Report. An outline of some of the key features of the weather service model, as offered by one symposium participant, is as follows:

- Basic service is free
- Digital and other cost more
- Private sector provides value-added services by adding information, and selling at higher cost.

There are potential parallels with respect to ATMS:

- Basic service could be free (e.g. 15 minute updates)
- Higher services (e.g. real time. video. FM subcarrier) sold for some incremental charge
- Value-added services where private sector adds information could be sold for more.

One participant said that TravInfo in the San Francisco Bay Area started out by following the National Weather Service Model. It may very well flip from public sector provision to a contractor-provided ATIS.

Bartering between the public and private sector is a model that should be examined. See the "Shared Resources Report" of Apogee Research.

Project California and the Center for Advanced Technology may serve as a pre-deployment and deployment model.

Intermediaries can be an effective model . For example, under HELP Inc., an intermediary consisting of a board of directors composed of public and private sector agencies was set up, and given the power to contract for services related to a variety of commercial vehicle operation services (weigh-in-motion, motor carrier safety checks) which facilitated private sector provision.

What about the Post Office Model? The Crown Corporation for the Toronto Tollway may have some similarities to the Post Office model.

It was strongly suggested by participants that the final report include examples of the open solicitation model of the type used in the states of Washington and Minnesota.

Cream Skimming and Cross Subsidies

One needs to be careful, as in the transit industry of taking a system with large public investment, letting the private sector have the best routes and then letting taxpayers pick up the costs of services with low demand.

Consider the issue of cross subsidies between ATMS and ATIS, just as there were cross subsidies between long distance and local telephone service prior to the AT&T divestiture.

Other Comments

The Task A Report sets out the full range of issues but some are paper tigers and others are more serious problems. The more serious issues need to be sorted out.

p. 82. Task B report: average salary of cellular telephone user is \$65,000 per year.

p. 4. Task C report. Twenty-seven models are listed in the tables, but only twenty-six are described in the executive summary.

Put title on Task A report.

Give more real world examples.

Some material in the task reports is now dated.

Change the slant at the beginning of the Task B report from industrial policy to an emphasis on ways of overcoming scarce funds.

Can the final report give more examples of how government failed to encourage technological development? For example, the development of technologically superior FM radio was held up for decades by a government policy that protected industry's investment in AM radio.

More footnotes desirable.

Map evolution of different industries to ITS.

The final report should reflect lessons from Travtek and other operational tests. What was ultimately deployed and what was not? Operational tests do not necessarily turn into operations.

Orient the final report not just to FHWA but also MPO's and states.

Speak to the possibility of a National Highway System that is established as a priority by USDOT for operating performance and how various institutional issues might be addressed.

Final Report

The Co-Principal Investigators talked about how the final report will address the discussion and comments above. They explained that a separate final report, 50 to 100 pages, will be prepared that will synthesize and integrate the results of the entire study including the feedback obtained from this symposium. Individual task reports still in draft form will be revised to reflect the discussion and comments of the symposium. All final task reports will become appendices to the final report. The final report will be aimed at the ITS community in general, and thus will be written for all levels of government and the private sector.

The final report will include as many specific examples as possible, and will be graphically pleasing.

Exhibit 1

Roster

ROSTER

March 27, 1995 Symposium

8:30 A.M.- 4:30 P.M.

Overcoming Barriers to IVHS - Lessons from other Technologies

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Exhibit 2

Overhead Presentation

Institutional Barriers to IVHS

Presentation March 27, 1995

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Slide No. 1

Project Team

- Prime contractor: Urban Institute
- Subcontractors:
 - Cambridge Systematics Inc
 - Miller, Canfield, Paddock & Stone
 - MTA/EMCI

Slide No. 2

Objectives of the Project

- Evaluate effect of institutional barriers on ITS
- Seek lessons from deployment of other technologies
- Examine alternative deployment models
- Make appropriate recommendations to FHWA and the ITS community

Slide No. 3

Project Focus

- Advanced traffic management systems
- Advanced traveler information systems

Slide No. 4

Project Overview

- Task A: Institutional barriers
- Task B: Lessons from other technologies
- Task C: Public/private deployment models
- Task D: First symposium
- Task E: Franchising and licensing issues
- Task F: Model franchise agreements
- Task G: Second symposium

Slide No. 5

Project Status

- Draft reports complete for all tasks
- First symposium in progress
- Second symposium in late spring
- Final task reports by summer 1995
- Final report due fall 1995

Slide No. 6

Agenda

- Morning
 - Task A presentation and discussion
 - Break
 - Task B presentation and discussion
- Lunch
- Afternoon
 - Task C presentation and discussion
 - General discussion

Slide No. 7

Task A

Slide No. 8

Three Axioms of Policymaking

- What we have, we don't want
- What we want, we don't need
- What we need, we can't get

Slide No. 9

Objective of Task A

Review and summarize
institutional barriers to ATMS/ATIS

Slide No. 10

Approach to Task A

- Literature search
- Discussions with experts
- Analysis and summary

Slide No. 11

Principal Issue Clusters

- *Public sector issues*
- Financial constraints to ITS deployment
- Public/private sector issues
- Private sector issues
- Consumer issues
- Societal issues

Slide No. 12

Public Sector Issues

- MPO issues
- Management systems mandated by ISTEA
- Contracting issues
- Organizational and jurisdictional issues
- Location and mapping issues

Slide No. 13

MPO Issues

- Logical focal point for regional planning
- New “clout” and influence provided by ISTEA
- MPOs lack staff to do analysis to get ATMS/ATIS projects to compete successfully for inclusion in TIPS

Slide No. 14

Management and Monitoring Systems

- Congestion management
- Safety management
- Traffic monitoring
- Pavement management
- Bridge management
- Intermodal transportation facilities
- Transit facilities and equipment

Slide No. 15

Contracting Issues

- Agency power to subdelegate authority to regional entity
- Consent of Congress in ISTEA to MPOs (but not to operating agencies)

Slide No. 16

Location and Mapping Issues

- Geographic information systems (GIS) a potential integrative tool
- Relationship of GIS specifications to digital map standards

Slide No. 17

Principal Issue Clusters

- Public sector issues
- *Financial constraints to ITS deployment*
- Public/private sector issues
- Private sector issues
- Consumer issues
- Societal issues

Slide No. 18

Financial Constraints

- Allocation of resources
- Allocation of risk
- Staffing and training

Slide No. 19

Principal Issue Clusters

- Public sector issues
- Financial constraints to ITS deployment
- *Public/private sector issues*
- Private sector issues
- Consumer issues
- Societal issues

Slide No. 20

Financial Constraints

- Allocation of resources
- Allocation of risk
- Staffing and training

Slide No. 19

Principal Issue Clusters

- Public sector issues
- Financial constraints to ITS deployment
- *Public/private sector issues*
- Private sector issues
- Consumer issues
- Societal issues

Slide No. 20

Public/Private Sector Issues

- Regulation of economic activity
- Cost recovery and cost allocation
- Administrative costs
- Contracting and procurement
- Opposition from competitors
- Legal issues
- Technical standards
- Safety and reliability

Slide No. 21

Regulation of Economic Activity

Objectives

- Assure an efficient, well functioning market
- Safeguard rights of buyers and sellers
- Limit undesirable side effects of a desirable activity

Slide No. 22

Regulation of Economic Activity

Policy Options

- Unregulated monopoly extreme: “charge what the traffic will bear”
- *Laissez faire* extreme: private ventures at private risk
- Centrist options
 - limited exclusionary rights, with rate regulation
 - limited antitrust exemption
 - positive focus vs. “eliminating barriers”

Slide No. 23

Cost Recovery and Cost Allocation

Objectives

- Government
 - Recovery of costs
 - Distribution of costs and benefits
- Private sector
 - Recovery of costs
 - Reasonable risk/reward ratio

Slide No. 24

Cost Recovery and Cost Allocation

Policy Options -Extremes

- . Unregulated monopoly extreme
 - Cost recovery virtually certain
 - Service limited to most profitable customers
 - If service is essential, general public is disserved
 - If service is not essential, it may become irrelevant
- *Laissez faire* extreme
 - Competitive marketplace balances costs and prices

Slide No. 25

Cost Recovery and Cost Allocation

Policy Options -Centrist

- Franchise with rate regulation
 - reasonable return
 - cost allocation
- Limited competition
 - Access to government information or facilities
 - Competitive marketplace balances costs and prices

Slide No. 26

Administrative Costs

- Regulatory overhead
- Regulatory delay in cost recovery delays deployment of new and efficient facilities
- Regulators' vs. franchisees' judgment
- Hidden cost of competition foregone

Slide No. 27

Contracting and Procurement

Some Generic Issues

- Should government provide services if the private sector can do so more efficiently?
- Are public funds really available?
- Does government have the expertise?
- Would private providers of essential services attain too much power?
- Can sufficient competition be assured to protect the public?

Slide No. 28

Contracting and Procurement *Problems*

- Traditional procurement cumbersome and a poor match to ITS technology
 - Traditional roles of public and private sectors
 - New public/private sector relationships
 - Multiple jurisdictions lead to conflicting regulations
 - Federal funds bring restrictions and costly financial controls

Slide No. 29

Contracting and Procurement *Problems (continued)*

- ITS not completely defined and policy decisions not yet made
- Potential conflicts of interest (private sector and government)

Slide No. 30

Contracting and Procurement *Policy Options*

- Public/private partnerships
 - Ethics problems
 - Private access to government facilities and information
 - Joint public/private management committees
 - Private participation in public decisionmaking
 - Negotiated public/private rulemakings
 - Joint public/private commercial services

Slide No. 31

Contracting and Procurement *Policy Options (continued)*

- Partition of services
 - Vehicle based services - private sector
 - Infrastructure based services - public sector
- Mostly private provision of services
 - Probably more efficient
 - Controls necessary to protect the public interest
 - Government concentrate on policy issues

Slide No. 32

Opposition from Competitors

- Railroads and airlines may object to ITS subsidies
- Public interest may lie in a balanced transportation policy

Slide No. 33

Legal Issues

- Tort liability
- Intellectual property
- Antitrust considerations
- Communications licenses

Slide No. 34

Tort Liability

- Potentially serious exposure for private sector
- Government liable if it *operates* ITS
- Allocation of liability in public/private projects
- Public must be adequately protected
- Limited case law

Slide No. 35

Intellectual Property *Existing Practice*

- Traditional contracting
 - Limited intellectual property (incidental)
 - Government pays and retains rights
- Defense and NASA contracting
 - Substantial intellectual property
 - Government *specifically* pays and retains rights

Slide No. 36

Intellectual Property

ITS Contracting

- Private sector concerns
 - Prior R&D investment
- Government concerns
 - Need continuing right to use
 - Avoid financing creation of sole source vendor
- Complex negotiation needed to resolve conflicting rights

Slide No. 37

Antitrust Considerations

- So far not a real problem
- Need for caution
 - In development of standards
 - In joint ventures and partnerships

Slide No. 38

Communications Licenses

- ITS agencies subject to the Communications Act
- Cannot guarantee continued availability of specific frequencies
- Who bears the risk of required changes?

Slide No. 39

Technical Standards

A Two Edged Sword

- Standards set too early foreclose innovation
 - Competition drives innovation
 - Technical standards reduce risk but retard competition
- Standards set too late fragment the market
 - Distinctions without differences
 - Lack of compatibility

Slide No. 40

Technical Standards

Relation to ITS

- Standards widely believed to be necessary
- Nonessential standards should be avoided
- Most believe standards should be voluntary
- Open standards promote competition
- Infrastructure and vehicle standards may require different treatment
- Market forces may yield *de facto* standards

Slide No. 41

Safety and Reliability

- Safety an important concern at every stage
- Reliability may be closely related to safety
- If millions of drivers rely on a complex system (e.g., ATMS) it must be highly reliable

Slide No. 42

Principal Issue Clusters

- Public sector issues
- Financial constraints to ITS deployment
- Public/private sector issues
- *Private sector issues*
- Consumer issues
- Societal issues

Slide No. 43

Private Sector Issues

- Profitability and risk
- If ITS is not potentially profitable, or if risk is too high, it will have to be funded by government

Slide No. 44

Principal Issue Clusters

- Public sector issues
 - Financial constraints to ITS deployment
 - Public/private sector issues
- Private sector issues
 - *Consumer issues*
 - Societal issues

Slide No. 45

Consumer Issues

- Consumer demand for ITS
 - Latent demand (e.g., for AVCS) if released, could saturate new capacity
 - Elasticity of demand could yield unpredictable results
- Consumer attitudes toward pay-for-use
 - The meter is always running!

Slide No. 46

Principal Issue Clusters

- Public sector issues
- Financial constraints to ITS deployment
- Public/private sector issues
- Private sector issues
- Consumer issues
- *Societal issues*

Slide No. 47

Societal Issues

- Privacy
- Pollution
- Distributional issues

Slide No. 48

Privacy

- Information privacy (where you have been)
 - Individuals should have control over use of their personal information
 - Unrestricted use of aggregate data
- Surveillance (where you are, or are going)
 - ITS vs. law enforcement interests
 - Could generate major public backlash
- Candor crucial in debate over privacy

Slide No. 49

Pollution

- Difficult to prove increase or decrease in pollution
- Evaluation of pollution impact needed for regulatory approval
- A key issue needing a lot of research
 - Financial resources
 - Education and training resources

Slide No. 50

Distributional Issues

- Inequitable distribution of benefits and costs
- Cream skimming (high income areas) by private sector in early years
- Urban vs. rural areas

Slide No. 5 1

Conclusions

- Willingness of consumers and taxpayers to cover costs is the greatest barrier
- Government has two choices:
 - Make sure that ITS services are profitable; or
 - Get ready to pay for them with tax dollars
- “Chicken and egg” problems will hamper deployment

Slide No. 52

Conclusions

(continued)

- . Lack of funds and staff for maintenance and operations of publicly owned systems is a severe potential problem
- MPOs lack staff to do analysis to get ATMS/ATIS projects in competition with other more traditional projects
- Local governments may not yield authority to centralized ATMS

Slide No. 53

Conclusions

(continued)

- ATIS operators must give users the type of information they really want, or risk lack of use or acceptance of the system (e.g., minimum cost vs. minimum time)
- Rights to intellectual property are a major issue for both public and private sectors

Slide No. 54

Conclusions

(continued)

- Public “backlash” may result from failure to consider privacy issues
- Need to assure equal access for all levels of society

Slide No. 55

Task B

Lessons from other technologies

Slide No. 56

Experience is a wonderful thing —
it helps us to recognize a mistake
when we make it again.

Slide No. 57

Objectives of Task B

- Examine issues concerning industrial policy
- Review history of deployment of other technologies/industries
- Identify lessons for ATMS/ATIS deployment

Slide No. 58

Approach to Task B

- Examine industrial policy issues
 - Federal
 - State
- Conduct case studies of other technologies

Slide No. 59

Status of Task B

- Draft report completed
- Incorporating FHWA comments
 - deeper examination of lessons learned
 - less description of technologies
- Conducting additional case studies
 - U.S. Weather Service
 - On line computer services
- Preparing Final Task B Report

Slide No. 60

Principal Issue Clusters

- *Industrial policy issues*
- Lessons from other technologies

Slide No. 61

Industrial Policy Issues

- Arguments favoring industrial policy
- Arguments against industrial policy
- Consensus
- Examples

Slide No. 62

Principal Issue Clusters

- Industrial policy issues
- *Lessons from other technologies*

Slide No. 63

Other Technologies Analyzed

- Cable television
- Direct broadcast satellite (DBS)
- Broadcast television
- High Definition Television (HDTV)
- Cellular telephone
- Telephone
- Geographic information systems (GIS)

Slide No. 64

Other Technologies Analyzed

continued

- Satellite global positioning systems (GPS)
- Electric power generation
- Water supply
- Refuse collection
- Electronic funds transfer
- U.S. Weather Service (*in progress*)
- Information services (*in progress*)

Slide No. 65

Cable Television

- Key characteristic: wire technology needing public right of way
- Policy adopted
 - Franchising to promote universal service
 - Policy evolved as market developed
- Lesson learned
 - Franchising encouraged rapid deployment but was co-opted by cable industry

Slide No. 66

Direct Broadcast Satellite (DBS)

- Key characteristic: limited spectrum yields limited exclusivity
- Policy adopted
 - Spectrum regulation
 - Mandated access to cable programming
- Lesson learned
 - Limited exclusivity needed to attract risk capital

Slide No. 67

Broadcast Television

- Key characteristic: Strongly consumer driven mass market
- Policy adopted
 - Mandated signal format standards
 - Limited content regulation (“fairness doctrine”)
- Lessons learned
 - Consumer demand essential
 - Technical standards a key element

Slide No. 68

High Definition Television (HDTV)

- Key characteristic: Luxury upgrade of TV
- Policy adopted
 - Signal format standards will be mandated
- Lessons learned
 - Delays in standards process have allowed major technology improvement
 - Broadcasters “pocketed” the HDTV spectrum and seek to use it for other purposes

Slide No. 69

Telephone

- Key characteristic:
 - Wired technology needing public right of way
 - Desire for universal service
- Policy adopted:
 - Initially, rate regulated franchises
 - Separation of local and long distance services
 - Deregulation of toll service
 - Pending deregulation of local service

Slide No. 70

Telephone

Lessons Learned

- Regulated franchises help to develop a market and to achieve universal service
- In a mature market, competition leads to greater innovation and lower prices
- Standards and interoperability successfully developed under a single nationwide private enterprise

Slide No. 7 1

Cellular Telephone

- Key characteristic: Wireless technology with limited available spectrum
- Policy adopted
 - Duopoly regime to promote competition
- Lesson learned
 - Overwhelmingly successful after a slow start

Slide No. 72

Geographic Information Systems

- Key characteristics:
 - GIS data cut across jurisdictional lines
 - GIS and digital maps for ATIS/ATMS are closely related
- Policy adopted:
 - Multijurisdictional agreements
 - Spatial data transfer standards

Slide No. 73

Geographic Information Systems

Lessons Learned

- GIS cooperative agreements instructive for ATIS/ATMS
- Nationwide common data formats are essential

Slide No. 74

Global Positioning Systems

- Key characteristics:
 - Can locate any object precisely anywhere on the globe
 - Global system virtually demands global standards
 - Civil use of military systems
 - Highly capital intensive technology with huge external benefits

Slide No. 75

Global Positioning Systems (continued)

- Policy adopted:
 - Evolved into a dual use (military/civilian) technology
 - Fully publicly financed
- Lesson learned:
 - Civilian markets have undermined centralized military control of accuracy
 - Without military justification the public financing would not have occurred

Slide No. 76

Electric Power Generation

Key Characteristics

- Triad of generation, transmission and distribution
- Use of public rights of way
- Need for system reliability
- Universal service essential

Slide No. 77

Electric Power Generation

Policies Adopted

- Forbearance toward monopoly varied over time
- Federal, state and local regulation
- Public and private providers
- Public utility districts and power pooling for reliability

Slide No. 78

Electric Power Generation

Lessons Learned

- Regulated franchises helped rapid deployment
- Natural monopoly difficult to justify over long term
- Reliability important but can be elusive

Slide No. 79

Water Supply

- Key characteristics
 - Distribution system requiring public rights of way
- Policies adopted
 - More and larger public than private systems
 - Opportunities for achieving standards and economies of scale are often passed by

Slide No. 80

Water Supply

(Lessons Learned)

- Regional and local approaches often in conflict
- Publicly owned and funded systems successful
- The right balance of regulation and technical standards can foster innovation

Slide No. 81

Refuse Collection

Key Characteristics

- Low technology service
- Mobile delivery of service
- Purpose is to enhance environment and public health
- Potential harm to environment and health if mismanaged

Slide No. 82

Refuse Collection

Policies Adopted

- Service provision evolved from private to public, and more recently back toward private
- Both regulated and market driven (e.g., recycling)

Slide No. 83

Refuse Collection

Lessons Learned

- Both public and private provision have been effective
- Regulation should specify outcomes (e.g., safety or cleanliness), not the methods for achieving them

Slide No. 84

Electronic Funds Transfer

Key Characteristics

- Electronic replacement for cash transactions (point of sale)
- Requires extremely high levels of security
- Extensive internetworking

Slide No. 85

Electronic Funds Transfer

Policies Adopted

- Government stayed out of the way
- States mandated sharing of ATMs
- Interstate cash withdrawals ruled consistent with interstate banking laws
- Competition increased by deregulation of financial services industry
- DOD encouraged use of bar codes by requiring them for products it purchased

Slide No. 86

Electronic Funds Transfer

Lessons Learned

- ATIS can “piggyback” on EFT
- It takes time for customers to become familiar with new technologies
- Customers clearly perceive their own interests--ITS will need to prove its value
- Electronic toll collection raises same privacy issues as EFT

Slide No. 87

Task B

Conclusions and Recommendations

Slide No. 88

Conclusions and Recommendations

- Conclusion: Industrial policy yields mixed results
- Recommendations:
 - Be cautious in seeking to influence private firms and markets
 - Make smallest possible intervention
 - Limit public sector concessions to minimum
 - Build fallback positions and exit strategies

Slide No. 89

Conclusions and Recommendations (*con timed*)

- Conclusion: Benefits that accrue to strong firms inevitably create strong interests
- Recommendations:
 - Build in sunset provisions, policy transitions and exit strategies
 - Balance conflicting interests in advance

Slide No. 90

Conclusions and Recommendations (*continued*)

- Conclusion: Justification of monopoly based on economies of scale often erodes with time
- Recommendations:
 - Substantial precedent for duopoly
 - Regulation of monopoly firms should include a way to foster innovation in the long run

Slide No. 91

Conclusions and Recommendations (*continued*)

- Conclusion: Government concern with short term cost may lead it to sacrifice long term public interest
 - Issuance of franchise itself may be too costly
 - Limited benefits (e.g., free service to schools) may not warrant long term costs
 - Benefits and costs may be different for different levels of government

Slide No. 92

Conclusions and Recommendations (*continued*)

- Recommendations:
 - Avoid mortgaging long term interests for short term budgetary convenience
 - Clearly lay out short/long run tradeoffs

Slide No. 93

Slide No. 94

Task C

Models of Public and Private Participation

Slide No. 95

The Map is Not the Territory

Slide No. 96

Objectives of Task C

- Examine full range of public and private participation in ATMS/ATIS
- Study possible deployment models
- Identify most suitable models

Slide No. 97

Approach to Task C

- Conduct literature search
- Apply team expertise
- Conduct case studies
- Interview experts and industry leaders
- Apply principles of regulatory economics
- Document different models
- Prepare evaluation and compatibility matrices

Slide No. 98

Status of Task C

- Draft task report completed
- Conducting additional case studies
- Incorporating reviewer comments
- Final report due before summer 1995

Slide No. 99

Public and Private Models

- Predeployment (5 models)
- Deployment (27 models)

Slide No. 100

Some Generic Models

- Cooperative Research and Development Agreements (CRDAs)
- Other Cooperative Agreements and Partnering Arrangements.
- Contracting (including turnkey projects)
- Purely private provision
- Intermediary
- Public/private cost sharing

Slide No. 10 1

Some Generic Models (continued)

- Public/private joint ownership
- Franchises
- Licenses
- Auctions
- Service provision under government aegis
- Competitive joint venture
- Open solicitation

Slide No. 102

Predeployment Models

- Program/system manager
- Cost sharing
- Partnering
- Cooperative Research and Development Agreements
- Design/build/operate

Slide No. 103

Deployment Models

Slide No. 104

Government Contracting

Government engages a private
(occasionally public) entity
through a contract

Slide No. 105

Government Contracting *Key Characteristics*

- Cost plus contracting can mitigate risk
- Some types can attract significant private capital (e.g., franchising and turnkey projects combined with toll collection)
- Standard low-bid contracting does not work for high-tech systems

Slide No. 106

Purely Private

Private firms compete with one another to provide a product or service, independently or in teaming arrangements

Slide No. 107

Purely Private *Key Characteristics*

- Under-provision of service in markets where private sector cannot capture public benefits
- Ability to attract private capital depends on market opportunity and potential profits
- No public funds involved
- Competition tends to lower prices and costs

Slide No. 108

Intermediary

An independent entity, such as a non-profit corporation, that represents both public and private sectors and can contract for services

Slide No. 109

Intermediary

Key Characteristics

- Needs a reason for being (e.g., business and public interest objectives)
- Insulates principals from management, operational and liability problems
- Government and private sector can procure services together
- Can give private sector access to public facilities

Slide No. 110

Public/Private Cost Sharing

Any cost sharing agreement between
public and private sector
organizations

Slide No. 111

Public/Private Cost Sharing

Key Characteristics

- Public and private capital can leverage one another
- Requires negotiated agreement regarding rights to future intellectual property
- Antitrust issues a concern
- Does not necessarily imply joint ownership and accompanying ownership rights

Slide No. 112

Public/Private Joint Ownership

Any joint ownership agreement
between public and private
organizations

Slide No. 113

Public/Private Joint Ownership

Key Characteristics

- Various ownership structures, e.g.
 - Partnerships
 - For profit corporations
 - Nonprofit corporations
- Vests in owners right to sell or lease any property owned and right to share revenues
- Antitrust issues may be a concern
- Joint ownership implies cost sharing

Slide No. 114

Franchises

Rights granted to a private party by government to use public property for public benefit and for profit

Slide No. 115

Franchises

Key Characteristics

- Usually exclusive, either *de jure* or *de facto*
- Usually involves use of or access to public property
- Usually price and rate of return regulated because of natural monopoly characteristics
- Includes a public interest obligation
- Often creates a market and revenue stream

Slide No. 116

Licenses

Permission granted by government to engage in a business or activity that would be illegal without a license

Slide No. 117

Licenses

Key Characteristics

- Usually does not convey right to occupy public property
- A license is not a contract
- No protected property interest in the license
- Licenses subject the licensee to regulations but contain few such clauses
- Licenses can grant some market exclusivity

Slide No. 118

Auctions

Sales through competitive bidding of public or private property or the right to use or occupy such property

Slide No. 119

Auctions

Key Characteristics

- Can attract significant investment capital or public sector revenue if rights sold are valuable
- Can sell franchises, concessions or licenses
- Can sometimes be used to regulate the degree of monopoly or competition
- Can place a price on property not previously valued

Slide No. 120

Service Provision under Government Aegis

Granting to the private sector the
right to provide a service under the
banner of government

Slide No. 121

Service Provision under Government Aegis *Key Characteristics*

- May create market opportunity or added revenue not otherwise possible
- Private firm an extension of government
- Cost sharing or provision of private services exchanged for right to act on behalf of gov't
- Revenue sharing can benefit public sector

Slide No. 122

Competitive Joint Venture

An institutional arrangement involving both joint ownership of an asset with natural monopoly characteristics and competitive provision of service

Slide No. 123

Competitive Joint Venture

Key Characteristics

- Applies where there are economies of scale that have historically been used to justify natural monopolies
- Can be compatible with franchising
- Innovative institutional arrangement for which there is little experience

Slide No. 124

Open Solicitation

Solicitation of ideas for new
public/private projects or ventures

Slide No. 125

Open Solicitation

Key Characteristics

- Procurement process for multiple projects in which government may share in the costs
- Fosters creative proposals for novel project concepts or solutions to existing needs
- Can attract substantial private capital
- Priorities must be established for state and regional Transportation Improvement Programs (TIPs)

Slide No. 126

Evaluation Matrix

- Public/private sector involvement over time
- Economic issues
 - Entry and exit
 - Economies of scale
 - Competition vs. monopoly
 - Costs and risks
 - Consumer price
 - Benefits

Slide No. 127

Evaluation Matrix (*con timed*)

- Adaptability to ATMS and ATIS
- Speed of deployment and market penetration

Slide No. 128

Compatibility Matrix

- Predeployment and deployment models
- Identifies possibilities for mixing and matching different models
- Identifies incompatibility of models
- Useful in designing institutional arrangements for ATMS/ATIS

Slide No. 129

Task C

Conclusions and Recommendations

Slide No. 130

Conclusions

- There is no single formula for public/private cooperation in ATMS/ATIS deployment
- The choice of models depends upon:
 - Public and private involvement at each stage of the life cycle
 - Issues of regulatory economics
 - Adaptability to ATMS/ATIS
 - Likely speed of deployment

Slide No. 131

Conclusions

(con timed)

- Necessary but not sufficient conditions for grant of exclusivity are:
 - Large fixed cost or “lumpy” investment
 - Significant economies of scale
 - Desire for rapid creation of a new market

Slide No. 132

Recommendations

- National architecture should accommodate a wide variety of institutional arrangements
- The government's institutional program should focus on deployment and not on operational tests
- Some models are more conducive to deployment of ATMS and/or ATIS

Slide No. 133

Recommendations

(con tined)

- Initial deployment should involve the following institutional arrangements, which can serve as models for other regions:
 - Purely private
 - Franchises
 - Intermediary
 - Competitive joint venture
 - Open solicitation

Slide No. 134

Recommendations

(continued)

- ATMS services should be “free” because users cannot easily be excluded from receiving benefits (except on toll roads)
- ATMS data should be sold to help recover costs unless
 - It would sharply reduce public benefits
 - Sale is politically untenable

Slide No. 135

Issues for Discussion

- Government should lead, follow, or get out of the way
- “Pay me now or pay me later”
- Partition a project into two parts:
 - high capital cost, low risk
 - low cost, high risk
- Business franchise vs. public franchise

Slide No. 136

Issues for Discussion

(continued)

- “Everything should be as simple as possible, but no simpler”
- “The meter is always running”
- Does the public want information (ATIS)?
- Does the public want another type of government control (ATMS)?

Slide No. 137

The End

Slide No. 138