

**TRANSPORTATION ORGANIZATIONS AND
THE CHALLENGES OF OPERATIONS
DRAFT FORUM REPORT**



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Summary

The Chairman of the Forum, Tom Larson, summarized the topic for the forum as managing change, and bringing institutions along, so that they are contemporary with the world they are in. The mission is to make our transportation facilities function as an entire system, and bring everyone together, and develop the human capacity more rapidly in order to manage systematically. It comes down to very basic questions. Are our existing local, metropolitan, state, and federal agencies structured to meet the needs of system operations? Do they have the necessary skills? Are organizational arrangements consistent with the needs for system coordination? Can the agencies work effectively with private organizations? Are new attitudes, and new orientations towards customers needed?

Dr. Christine Johnson described the new operations and management mission. Our mission is the very sophisticated management of the system, which is broader than ITS. Through the development of ITS architecture, we have evolved an understanding of ITS as a system, and as an information and communication platform that enables a new level of management of the system. There is a phenomenal level of information, and a capability of responding, not just within one system like the freeway system, but across a common platform for all systems, even though agencies can still have their own turf. The platform makes intermodalism possible, and enables agencies to manage for efficiency.

Participants cited many highly relevant “success stories” in integrating operations planning and achieving multi-agency cooperation and coordination. Successes have been notable for states, for MPOs, for special regional operators, for ITS agencies, for transit agencies, and for groups of agencies acting together. In Houston, there is change being created, trust being developed, and disciplines pulled together. Operations planning is occurring in the TIP process. Doug Wiersig of TranStar noted that the key to success is creating change in peoples’ heads, about how to do better. TranStar, bringing together the operators, is a culmination of twenty years of institutional and operational evolutions that have brought about cultural change and greater flexibility.

David McCormick, of the Washington State DOT, pointed out the key items of flexibility and customer orientation. The Department has changed from standards-driven and project-oriented to a structure that looks at preservation of the system, operation of the system, safety of the system, and new improvements. Larry Dahms of the MTC cited many instances of positive institutional coordination in the Bay area. MTC has provided money to the congestion management agencies in the counties, has created a Traffic Engineering Technical Assistance Program (TETAP) to make traffic consulting expertise available to communities, and has created a regional traffic signal operations program to do coordinated signal improvements, in addition to freeway service patrols, TravInfo, and TranLinks. Eva Lerner-Lam identified another major success story for the Transit Communications Interface Protocol (TCIP) which is being developed as an open data interface.

Steve Lockwood presented a strong view of operations which identifies the range of customers, the service levels and the performance being achieved, and the need to adjust supply and demand. Other key aspects include monitoring performance and fine-tuning the system, and communicating system status to others with influence over the system, and upgrading and maintaining the best available technology. Four levels of operational planning are needed which are: 1) real-time immediate adjustments in the field, 2) short-term or low-cost changes in software, system information, etc., which are not capital intensive, 3) mid-range, still mostly low capital intensive technology upgrades, hardware, and software, and 4) high-range system operations investments. Dr. Christine Johnson summarized the basic need: to bring operations planning to the forefront, and to make it happen better and faster.

Bob Kochanowski said that improvements in the operations and management of the system, and improvements in the planning of the system, must be completely integrated. Each region should have a strategic plan for where congestion management and ITS applications are needed in the region. The region also needs to identify what new institutions in each of these applications areas would be needed to implement the strategic plan.

Jim Robinson said that new inter- and intra-agency working relationships are needed, new business practices need to be developed and implemented, and the attitudes of both the public and private sector need adjustment, since the private sector is no more prepared for the new challenges of operations and ITS than is the private sector. There

needs to be peer-to-peer exchanges of information, such as among state DOT commissioners, if workable models and risk-taking are to be spread among agencies.

Jim Wright of Minnesota DOT identified the needs for additional skills, including systems managers, persons with private sector management skills, persons with facilitation skills, and overall, a need for a culture of quick responsiveness. A spirit of experimentation is needed. A great need is for a customer focus similar to what is done by the private sector in gathering customer requirements.

Bill Millar stressed the concept of managing the whole transportation system, rural and urban, and even taking advantage of where communications could substitute for transportation. There should be a campaign to get the public to understand the need to manage the whole system, because we have not previously helped the public to understand. Money needs to be invested not only in training for current professionals, but also in curriculum development.

Steve Lockwood suggested that in the future, more and more of the attributes important to the user will be supplied by the private sector. He noted that other enterprising, high-tech, service-providing, network-based public services and utilities are all privately managed.

The participants addressed the issue of how perceptible changes in operations performance would be to the public. Damian Kulash noted that there may be thresholds of changes in performance after which operations impacts become noticeable

to the public. Doug Wiersig stressed the need for defining performance standards if we are to get any further along in the process. What are you supposed to be doing? How do we attach performance standards to market-driven components that the customers can touch and feel? Dr. Christine Johnson suggested that if we start measuring the end result for the customer, a lot of the necessary processes will tend to sort themselves out. Communicating, at the operational level - in real-time, in the short-term, and after the fact, could also help performance both currently and next time.

Rick Schuman said that it was amazing that a small amount of financial incentives could make a lot of problems go away. Damian Kulash suggested using a pot of ITS funds for rapid, flexible backing of champions, winners, and movers. The major elements of incentives were identified as creating the right perspective, providing financial incentives, developing incentives for new skill sets, and developing incentives to create partnerships. Financial incentives are desirable for operations planning, for increasing cooperation, and for developing functional requirements and standards.

Dennis Judycki said that there should be a sense of urgency about bringing about integration of operations. If the leaders lead, others may follow quickly. We can't have a situation in which ITS is merely added to the checklist of items to include in the planning process. Eva Lerner-Lam suggested that we have a very solid framework in the U.S., which should evolve rather than being throw out. Involving users is a potential key to bringing about further positive evolution.

Participants agreed upon the importance of a federal role as a supplier of financial incentives, although there was disagreement as to whether financial incentives should be spread around or made competitive (as with the current Model Deployment Initiative or MDI). There was also general agreement on a federal role as a “coach,” rather than as a prescriber of practice. Participants also agreed on the need for a federal role in helping to foster experimentation and to publicize successful experiences.

Purpose and Objectives

Damian Kulash provided welcoming remarks and introductions of the participants. The overall transportation mission, over the recent decades, has become increasingly one of preserving and maintaining the system, and increasingly one of operating the whole system including the physical infrastructure and the new operations tools that are becoming available. What is the challenge of this evolving mission for each of us in our different capacities?

Tom Larson summarized the topic for the forum as managing change, and bringing institutions along, so that they are contemporary with the world they are in. There are deep cultures and histories at our state DOTs and other transportation institutions, and now the mission is not so clear, and we have to reinvent ourselves. This is a continuing evolution of the state transportation world as we know it, which has progressed through the periods of getting the farmers out of the mud, implementing the Interstate, adapting to NEPA (the National Environmental Policy Act of 1970), and now adapting to ISTEA (the Inter-modal Surface Transportation Efficiency Act of 1991). Now the mission is to make our transportation facilities function as an entire system, and bring everyone together, and develop the human capacity more rapidly in order to manage systematically.

It comes down to very basic questions. Are our existing local, metropolitan, state, and federal agencies structured to meet the needs of system operations? Do they have the necessary skills? Are organizational arrangements consistent with the needs for system

coordination? Can the agencies work effectively with private organizations? Are new attitudes, and new orientations towards customers needed?

Dr. Christine Johnson described the new operations and management mission and the focus of the forum on incorporating operations planning into the planning process. The concern of today is with the overall planning processes, the tools for decision-making, the finance methods and differences between operations and capital finance, and the institutional structures. Some of the best operational tests of ITS have come from outside the planning process.

Through the development of ITS architecture, we have evolved an understanding of ITS as a system, and as an information and communication platform that enables a new level of management of the system. There is a phenomenal level of information, and a capability of responding, not just within one system like the freeway system, but across a common platform for all systems, even though agencies can still have their own turf. The platform makes intermodalism possible, and enables agencies to manage for efficiency .

What some agencies have already been doing in maintenance and operations has not been trackable because of the way budgets are constructed. In New Jersey, for example, the maintenance and operational management of the system was capitalized in the budget. At other agencies, such as the Port Authority of New York and New Jersey, it was necessary to conduct much of the capital planning outside of line operations. The

FAA is an example of an agency that has transitioned nearly entirely from new airports to operations.

Our mission is the very sophisticated management of the system, which is broader than ITS. Capital construction is not going to stop, but actions such as constructing new freeways will be a relatively small percentage of our overall system actions. Dr. Johnson noted the need for addressing operations planning in the overall planning process, without replacing capital planning.

Participants noted that there were differences in the amount of new highway construction and widenings being implemented in different regions of the country, but that this did not diminish the need to consider operations and new technologies. The role of technology and system management is not an alternative to new construction. We need to show how all of these things work together, and to consider the land use side as well.

Participants noted that there were multiple missions that needed to be fit together. Concentrating on one element, and beating the drum for that element, will confuse **the** legislators and the public. Steve Lockwood developed the theme that **the** multiple missions all derive ultimately from constituencies. There has been a less visible and less vocal constituency for systems operations. This may **be** because the expectations about **operations** are low. Participants also noted that there are some who have attacked ITS **and operations** as a diversion away from other issues such as land use.

Success Stories

Participants cited many highly relevant “success stories” in integrating operations planning and achieving multi-agency cooperation and coordination. Successes have been notable for states, for MPOs, for special regional operators, for ITS agencies, for transit agencies, and for groups of agencies acting together.

Houston provides a good example of success, with four agencies having four different primary mobility missions, but each concerned with how they can do a whole lot more by operating more effectively. In Houston, there is change being created, trust being developed, and disciplines pulled together. Operations planning is occurring in the TIP process. Doug Wiersig of TranStar noted that the key to success is creating change in peoples’ heads, about how to do better. Creative ways have been found of capitalizing maintenance, but operations is still low on the totem pole of the budgetary process. A customer-oriented approach to market driven service is necessary. The transit agency is the best example in Houston of a customer-oriented agency.

Multiple groups, multiple disciplines, and multiple agencies, have to work together to operate the system. Institutional actions are necessary to get them to work together. TranStar, bringing together the operators, is a culmination of twenty years of institutional and operational evolutions. Cultural change has to occur, particularly within agencies in which operations is not the career path to the top. TranStar has brought about cultural change and greater flexibility. Emergency management was brought into TranStar as an afterthought, but it is now a major element.

David McCormick, of the Washington State DOT, pointed out the key items of flexibility and customer focus. Fine tuning is happening in each focus area, and we have really expanded our view of who is the system operator. Transit agencies have become more cohesive and consolidated. Within the Department, there are many more disciplines and specialists.

The organization of the Department has changed from standards-driven and project-oriented to a structure that looks at preservation of the system, operation of the system, safety of the system, and new improvements. Operations now has the same profile within the agency, and before the Legislature, as maintenance and the capital program. This has been extremely successful in getting attention to operations, and has resulted in operations getting more funding than they asked for in the last Legislature. ITS preservation was now a sub-program within the preservation category, giving it increased priority. In addition, capital and operations improvements are attached in the budgets, when necessary.

Flexibility has also been a key to achieving improvements, and this ties into operations. Operations is also tied more closely to transit agencies and to enforcement agencies. The transit operators lead in a lot of the operations coordination efforts in Washington State.

Larry Dahms of the MTC cited Steve Lockwood's three contexts as keys to success: inter-jurisdictional institutions negotiating operations, incremental development with real-time experience, and technical upgrades as technology becomes available. The

history of the Bay Area includes many instances of positive institutional coordination. In 1978, a transit operator coordinating council was created. In 1980, MTC developed a pavement management system to be used by the jurisdictions, and shortly thereafter, a transit data base.

Fare technology initiatives included a community fast pass in 1984. In 1989, the emergency response to the earthquake brought the agencies together to accomplish quick reconstruction, and the freeway call box program and commute checks came shortly afterward.

A big emphasis came with ISTEA and the partnership program. In 1992, MTC provided money to the congestion management agencies in the counties. We created a Traffic Engineering Technical Assistance Program (TETAP) to make traffic consulting expertise available to communities. A regional traffic signal operations program was created to do coordinated signal improvements. Freeway service patrols were started. TravInfo and TranLinks are recent comprehensive efforts. The TravInfo program has a management board, on which CalTrans, CHP, and MTC have membership. So even though there may be lots of different definitions of system integration, we might be doing a better job than we think we are. Many of the operations coordination successes are also on a project-by-project basis.

Tom Larson asked how we could make better use of the success models that exist?

Eva Lerner-Lam identified another major success story fostered by ITE in the development of transit standards. The Transit Communications Interface Protocol (TCIP) is being developed as an open data interface. Users wanted plug-and-play compatibility for various components. The operations people are literally writing the standards.

Tom Deen cited the ITS activities in the Washington, D.C. metropolitan area, and the establishment of an operations group that really got down to establishing consensus and enthusiasm about what they wanted to do. They placed priority on education and on planning. He suggested that a key to success was that there was a necessary threshold level of activities already in ITS.

Doug Wiersig noted that all these success stories were “jump started” in different ways. Sometimes a crisis or big problem was the easiest way to get it rolling. Some responded to dollars. Success needs flexibility, however, and efforts can’t be defined narrowly. The window of opportunity to strive for something depends on: 1) the organizational structure, 2) having the policies in place, and 3) having the people in place to go latch onto those market-driven opportunities in a short period of time, with minimal dollars. The thing you get from accomplishing something is political empowerment. What we want in operations is a flexible box, which can move with market forces.

The Challenge to Agencies in Planning for Operations

Steve Lockwood described the current operations centers as the blue collar end of the game. Operations means operating and is not a CEO-type of function. Tom Brahms cited the need for training of personnel to keep operations hardware and software functioning. Continued investment and replacement is the key, and has sometimes been neglected after a new system has been put into place.

Larry Dahms said that there was a danger that operations planning and maintenance could get on the public and political agenda in a negative way if we did not find a way to put it on positively. Institutions still honor the builders, not the managers and operators. We need operations planning to be integrated with capital planning even before the capital facilities go in place, because you can't easily correct the design problems later which impact on operations. Planning and building have to be concerned with operations, and not leave decisions about how facilities will be operated to after they are built.

Steve Lockwood provided a comprehensive overview of operations and planning issues. Operations has to include all strategies including demand management, and the term operations has to include system operations and demand management, both direct and indirect.

Steve advocated a strong view of operations which identifies the range of customers, the service levels and the performance being achieved, and the need to adjust supply

and demand. Steve suggested that priorities be: 1) operations, 2) maintenance, and 3) other improvements, whereas operations today is in the second or third rank of priorities. Accountability is also key. People know today who to call if the bus doesn't show up on **time**, but they don't know who to call if the highway system is not operating satisfactorily.

Other key aspects include monitoring performance and fine-tuning the system, and communicating system status to others with influence over the system, and upgrading and maintaining the best available technology. The private sector service providers are likely to become increasingly important in interacting with transit and highway users.

Four levels of operational planning are needed which are: 1) real-time immediate adjustments in the field, 2) short-term or low-cost changes in software, system information, etc., which are not capital intensive, 3) mid-range, still mostly low capital intensive technology upgrades, hardware, and software, and 4) high-range system' operations investments.

There is a need to stand the process on its head, and to ask, not how operations fit into planning and building, but rather how the other activities fit into systems and operations. A framework is needed that is also multimodal and multi-jurisdictional. Given the characteristics of operations, we also need more convenient ways to budget for these systems needs, and methods to evaluate the benefits of incremental changes and adjustments. We also need to demonstrate the impacts of a failure to operate systems effectively.

The major institutional needs are to look at the “four-c” spectrum, from communication to cooperation to coordination to consolidation. Both vertical and horizontal jurisdictional reorganizations have to be considered, which may require in some places a fundamental reallocation of responsibilities. There is also a need to identify staffing needs and meet them. Currently, it is hard to find experienced operations people.

Steve suggested that a major question was the conscious evolution of a metropolitan operations authority, like the transit authority in Houston, which could take on some functions which are coordinated on an ad hoc basis today. Arlee Reno added that we had first professionalized the transportation organizations, then horizontalized them by making them responsible for many modes and many impacts. Now the issue was “verticalizing” as Steve suggested, across many functions. Steve noted that there was a lot of diversity of circumstances, in different regions, and urban versus rural, that could not be dealt with abstractly.

Tom Deen suggested looking at the other enterprises which deal with capital and operations issues. Every one of these except the military and education have revenue streams which are related to customer responses.

Dr. Christine Johnson summarized the basic need: to bring operations planning to the forefront, and make it happen better and faster.

What Can Be Done to Reorient Transportation Agencies to Meet Tomorrow's Needs

Bob Kochanowski presented a comprehensive and integrated approach to meet the challenges facing agencies. He presented his recommendations in the context that improvements in the operations and management of the system, and improvements in the planning of the system, must be completely integrated. In addition, the integrated improvements have to be concerned with a broad range of goals, not just mobility, and must be driven by public perception and the results that the public sees in the performance of the system as it affects them. Key questions for the public are where they can live and work, their mobility, the reliability of the systems, and the quality of their trips.

MPOs will continue to be empowered to make the basic kinds of comprehensive planning and programming decisions. Building upon the concept of a congestion management system as a truly functional management system is a key to a successful comprehensive approach. In the regional context, we need to look at where congestion can and cannot be tolerated, at where capital improvements can help, and what is the remaining congestion which it is most important to relieve. The region should scrutinize the available ITS technologies and operations improvements. Each region should have a strategic plan for where congestion management and ITS applications are needed in the region.

The region also needs to identify what new institutions in each of these applications areas would be needed to implement the strategic plan. Each region's institutional

needs may be unique. Should new agencies be formed for operations and system rationalization? Should transit agencies' operating authority be broadened in certain regions.

Jim Robinson outlined a set of high-priority actions that his agency, and other agencies, should undertake in the short term, with a focus on high-priority institutional actions. New inter- and intra-agency working relationships are needed, new business practices need to be developed and implemented, and the attitudes of both the public and private sector need adjustment, since the private sector is no more prepared for new challenges of operations and ITS than is the public sector. A programmatic and systems approach is necessary for the development and deployment of ITS, in lieu of the traditional project-by-project approach. This requires a fundamental cultural change for both the public and private agencies in the transportation industry.

Jim Robinson said his goal is now to work himself out of a job (in seven years and six months) because ITS technology cuts across everything the Department does, so we don't need an ITS unit, we need to incorporate ITS wherever it belongs. A second goal is to have operations recognized as part of the core business of VDOT, along with construction and maintenance.

ITS also represents one area of management systems and technology initiatives, along with other major initiatives such as GIS, management information systems, the integrated maintenance management system, and the data warehouse, which all need to be integrated and geared towards better decision making and better asset management.

New processes are needed to change the culture of transportation agencies. There needs to be peer-to-peer exchanges of information, such as among state DOT commissioners, if workable models and risk-taking are to be spread among agencies. They need to get the message across that ITS is more than traffic management and more than an urban area issue.

ITS procurements are also different and do not conform well to the books of procedures built up already. Design-build is an exception for traditional projects, but is the way it should be done in ITS. ITS procurements need to follow a different process.

ITS and operations also have an impact on personnel and training needs. We need systems engineers, and it is better to teach them what they need to know about transportation than try to turn transportation engineers into systems engineers. We also need to show the internal personnel the benefits of ITS and operations to the agency as well as the benefits to the public.

Jim Wright of Minnesota DOT provided a comprehensive list of specific gaps that exist between the current missions of transportation agencies and that required for operations and maintenance, and a set of actions based on Minnesota DOT's experience. He stressed that there is a lot of experience to build on in operations planning. Freeway management and arterial management have been underway, and have gone through the planning process and evaluations and have been funded.

There are needs for additional skills, including systems managers, persons with private sector management skills, persons with facilitation skills, and overall, a need for a culture of quick responsiveness. Internally for Minnesota DOT, there is a need to know whether they are being successful in producing something and they need to be accountable for delivery of services to their customers. A spirit of experimentation is needed.

A very great need is for a customer focus similar to what is done by the private sector in gathering customer requirements. Market research can give additional perspectives depending on what questions are asked and how they are asked. The private sector also needs to be involved, and issues of partnerships versus low bids need to be addressed issue by issue. A major question is how much public and how much private?

Benefits realization is very important in terms of user satisfaction. Specific programs such as highway helper and accident delay reduction have been successful. Customer input is critical to an understanding of what is meaningful.

Bringing along organizations that grew up around facility planning, construction, and maintenance to the point where they are responsive and effective real-time operators of systems will require organizational strategic visions, time tables for delivery, performance measures, consistent management awareness and leadership, business plans, customer input, and new skills and attitudes.

Bill Millar stressed the concept of managing the whole transportation system, rural and urban, and even taking advantage of where communications could substitute for transportation. There should be a campaign to get the public to understand the need to manage the whole system, because we have not previously helped the public to understand. Money needs to be invested not only in training for current professionals, but also in curriculum development. Also, a little bit of money aimed at getting people to cooperate can go a long way, but there is a need to get over the one year funding cycle in order to foster operations.

A major issue identified by participants was in identifying, developing and showing the benefits of operations and ITS. Al Martinez identified the need to justify projects and clearly define the benefits. Al Martinez suggested that for the typical politician, they could understand the capital side, but that we had not been successful yet in explaining the ITS side and the benefits that would be received. Alan Kiepper said that operations planning must include demand management in order to be successful, since the growth in the number of autos was going to overwhelm everything else, worldwide, unless a comprehensive approach is taken to operational planning.

Participants discussed the role of the private sector, although this was not a major emphasis. Dr. Joseph Sussman cited the need for new kinds of organizational relationships with the private sector, fully integrated with the new framework. This would include development of public/private partnerships, and new thinking at state

agencies about an effective private sector for profit role. Jim Robinson said that the private sector will deliver the consumer services directly to the consumer.

Steve Lockwood suggested that in the future, more and more of the attributes important to the user will be supplied by the private sector. He noted that other enterprising, high-tech, service-providing, network-based public services and utilities are all privately managed. They are competitive, use the best private management techniques, are priced, and are revenue-driven and customer-sensitive. Transportation infrastructure in the U.S. is the last “Soviet style” monopoly that remains. Overseas, upper-level transportation infrastructure is moving towards being a priced, enterprise-type of operation. Arlee Reno noted that the model for many of these other areas was a franchise arrangement.

Steve also noted that it was difficult to describe a transition scenario for transportation in the U.S. to become enterprising, service-providing and privately managed. It will have to go through incremental steps of tolls, pricing, and cross subsidies to move to an enterprise framework.

Performance Measures and Standards

Participants had a spirited and detailed discussion of performance measures and standards, and their role in operations planning and ITS. Howard Kraye of Santa Fe Technologies pointed out that ITS planning has been characterized by clear definitions of problems, but not of success criteria. How to define the success of ITS and operations planning is a major operation. Tying success to whether customers became happy and whether value was created may be the answer.

Much discussion addressed the issue of how perceptible changes in operations performance would be to the public. It was noted that there was pressure to “hit a home run” through a major change (which would more likely be a major capital action), whereas many operations actions looked like singles or bunts, or good base running or good fielding, which may have more impact on performance in the long run. Performance change built incrementally may be more doable also. Damian Kulash noted that there may be thresholds of changes in performance after which operations impacts become noticeable to the public.

Public perception was noted as being of great importance. If the public perceives good performance as simply doing the job you are supposed to do, there is less motivation to the agency. Also, some of the public sometimes wants lower performance (e.g., speed bumps) rather than better performance.

Doug Wiersig stressed the need for defining performance standards if we are to get any further along in the process. What are you supposed to be doing? These help define productivity. How do we attach performance standards to market-driven components that the customers can touch and feel?

The need for identifying multiple objectives that we want out of the transportation system was emphasized by Hank Dittmar of the STPP. It should not just be about accommodating the automobile. Communities may have conflicting needs, and the process has to deal with these. People place the highest priority on fixing the current roads, secondarily on transit, and thirdly on new roads and bicycle and pedestrian facilities.

Steve Lockwood identified the need for performance monitoring as a key element of managing operations. Related to this is the need to communicate system status to others, and developing coordinated responses. Tom Horan suggested thinking of high performance as the product of transportation systems, and benchmarking performance. The financial support may improve if performance is seen to improve. Steve Lockwood suggested that the question was sort of whether performance could be a “pseudo-market” to be used for providing incentives for institutions to do better. He noted that the state DOT ideology was that no state could be compared to any other in terms of performance, but performance could play a key role. There is benchmarking going on, although states do not wish to be compared to other states. Steve said that a

performance framework could be tied to rewards and operational tests. Tom Larson observed that measuring performance changes behavior, so care is necessary.

Whether or not the system worked for the customer was cited by several participants as an important performance concern. Dr. Christine Johnson suggested that if we start measuring the end result for the customer, a lot of the necessary preceding processes will tend to sort themselves out. Communicating at the operational level - in real time, in the short-term, and after the fact, could also help performance both currently and next time.

Kevin Heanue said he was skeptical on performance measures. OMB has not provided solid direction on moving the federal government to a performance-based approach, and we were not ready to push the metropolitan planning process over to a performance-based approach.

Bill Millar said performance measures are important, but we've got to know why we are using them, who our audience is, how often they need to be collected, and who should collect them. Tom Horan stressed the need to connect system performance to the customer, and information to the customer.

Incentives for Change

Tom Larson posed the challenge of how best to provide incentives and how to make use of success models. Dr. Christine Johnson asked that participants provide ideas for what the Federal government could do to leverage success. Hank Dittmar suggested thinking about how to encourage innovation, encourage collaboration, do training, increase the prestige of operations, and move young people into the area. Transportation might be unique with so many different layers of government and public and private partners providing services. Therefore, there is a need for protocols for cooperation, and evolving skills that allow people to cooperate with one another. There are lots of models and we ought to be rewarding the positive interactions of institutions and leaders.

Arlee Reno suggested jump starting with professional and financial incentives. Franchising also has been used as a method in other fields of creating a public/private partnership with a revenue stream and a customer focus.

Rick Schuman said that it was amazing that a small amount of financial incentives could make a lot of problems go away. Damian Kulash suggested using a pot of ITS funds for rapid, flexible backing of champions, winners, and movers. The major elements of incentives were identified as creating the right perspective, providing financial incentives, developing incentives for new skill sets, incentives for developing partnerships, and preparing functional requirements and standards.

- The Right Perspective - Bill Millar stressed the concept of managing the whole system, and creating public awareness of managing the whole system. Richard Lobron stressed the need for operations planning being integrated with other activities within a mode and also across modes, and with a perspective of the overall impacts on the communities.
- Financial Incentives - Many participants suggested financial incentives as a way to foster innovation in both technology and institutions. Larry Dahms said there was a particular need in the ITS area for these incentives because ITS is labor-intensive. He suggested financial incentives be spread around, and oriented to build upon what we learn. Jim Robinson suggested funding for institutional coordination, for operations planning, and for developing functional requirements. He asked that competition for funds not be used, as we wish to have adjacent cities working with each other, not competing. He suggested exempting operations planning and systems deployment from existing federal aid rules, and establishing accelerated procedures for pooled fund systems. Current federal aid programs can be used for ITS, but there need to be extra funds for operations planning, coordination, and functional requirements, because all the money is now committed to other things.
- New Skill Sets - Nancy Connery suggested that new skill sets were necessary and that agencies who have brought in added perspectives have been successful with the public. Bill Millar suggested that training and curricula also need to be emphasized. Dick Weaver suggested that education of children about the issues in operations was

important, as well as educating the young professionals in operations. Arlee Reno suggested career paths and career incentives for those oriented to operations. Professor Joseph Sussman suggested overall professional capacity building and effective education for the organization.

Richard Lobron suggested boiling operations planning down to the basics, which is managing assets. Larry Dahms said that the role for systems engineers is in understanding the ITS architecture as an overlay, and managing the system operators. Jim Taylor said that he Civil Engineers could do the kinds of things we are talking about.

- Partnerships - Several participants suggested public/private partnerships and a strong private role. Richard Lobron said that regional interaction with private vendors was also potentially useful in generating revenues for the bottom line.
- Functional Standards and Requirements - Several participants suggested the need for functional standards and functional requirements.

Building Positively on History

Larry Dahms described the history of the evolving planning process as having a modeling emphasis in the beginning, but that successes in institutional coordination and in operations had been achieved over time. Kevin Heanue said that MPOs from the beginning helped to balance the state-dominant role. An attempt was made to administer the TOPICS program through the planning process starting in 1968, but the planning process did not adapt fast enough then and the local traffic engineers remained responsible. The Interstate withdrawal and substitution provisions, starting in 1973, and the multimodal decision-making which has evolved, have also strengthened the roles of the MPOs. Now ITS may have to compete in the MPO arena. MPOs are quite varied across the country, with a majority existing only to administer federal requirements. Some have said that land use to an MPO is like touching the third rail on a subway. We should stick with MPOs and foster their ability to get into operations.

Dennis Judycki added that there should be a sense of urgency about bringing about integration of operations. If the leaders lead, others may follow quickly. ITE surveyed traffic engineers a couple of years back and over 50 percent did not think they would be involved in ITS deployment in the next five years. We can't have a situation in which ITS is merely added to the checklist of items to include in the planning process. Bill Millar stressed the need for integrated operations of the entire system, not just

individual modes. MPOs may not be the right form for integrated operations planning to take place, but will have an important role.

Eva Lerner Lam suggested that we have a very solid framework in the U.S., which should evolve rather than being throw out. Involving users is a potential key to bringing about further positive evolution. The audience that needs to be addressed is very narrow. A focus on lightning rod types of things, tied to financial incentives, can bring about the right evolution without throwing the baby out with the bathwater. Steve Lockwood said that it was a notable success that people in the past focused on inventing missions and institutions, and there was experimentation and professionalization, and that this could be achieved again.

The Federal Role

Dr. Christine Johnson asked each participant to identify three points of leverage which the Federal government could apply with high payoff. Participants agreed upon the importance of a federal role as a supplier of financial incentives, although there was disagreement as to whether financial incentives should be spread around or made competitive (as with the current Model Deployment Initiative or MDI). There was also general agreement on a federal role as a “coach,” rather than as a prescriber of practice. Another well supported suggestion was for a federal role in helping to foster experimentation and to publicize successful experiences.

Steve Lockwood suggested that the federal role could be to establish a set of institutional operational tests, so areas could be encouraged to demonstrate institutional progress by some measures of cooperation, or of communication, or of performance. He suggested that the federal government or others could analyze what successful agencies (MTS, TranStar, Minnesota, Virginia) really do. Dennis Judycki said that many of the model deployments, the showcases, have been institutional, so we would not be too far off from much of what is going on now from an institutional basis. Steve Lockwood noted that the MDI deployments followed different models, ranging from private sector-driven to state-driven to local government/MPO-driven.

Dr. Christine Johnson suggested that maybe if the region got together, all of the players at an operations level, and show that they are together, that might be the appropriate time for the Federal government to come in with money.

Howard Kraye suggested that the Federal government help to define the customer sets, and the goals for those customers, and identify how far the successful programs like TranStar's and Larry Dahms' were able to move these sets of customers, and have benchmarks. Bob Kochanowski suggested that the Federal government stay away from national performance standards.

Financial incentives were cited by participants as an effective way of bringing about organizational change, operational actions, and experimentation. There was disagreement about whether funds should be given out on a competitive basis or alternatively, spread around. There was general agreement that special funding for operations and ITS was desirable, since simply making those areas eligible for funding from other sources amplified the problem that funding for non-operations was currently inadequate.

Rick Schuman noted that "a lot of problems magically go away, with just a little bit of money being dangled as a carrot. In Phoenix.. . people are getting together to develop regional solutions.. . that will dramatically alter the way transportation is delivered in the region of Phoenix, and they are doing this for a seven million dollar grant."

Nancy Conner-y suggested that the private sector spends most of their time examining the customer market, which relates to their bottom line. She suggested that performance measures which really relate to the public be identified by agencies. Richard Lobron said he emphasized produce development as the key issue.

Dr. Christine Johnson said the cost of getting customer data has been pretty horrendous, but putting information into the traveler's hands provides for a pretty regular feedback measure. Bill Millar said if we had a more customer driven system, performance measures would be easier to develop. Professor Sussman stressed that system-wide performance measures focused on customers are fundamental.

David McCormick suggested that research and development and training needs to be a vital continuing part of FHWA's efforts, because technology is changing so fast, and no one State DOT is going to keep up with it.

Conclusion: Bridging the Gaps Between the Mission and Institutional Structure

Larry Dahrns said that the Federal government would not fashion or choose institutions. The MTC has been main-streaming ITS and anyone who really wants to, can also do so. In terms of institutions, we should start with the states, who must connect with all partners, then the transit agencies, who also connect with many partners plus have an operating mentality, and then the MPO. Tom Deen said that transit agencies need emphasis because they already are regional and operations-oriented. Bill Millar said that a new management entity was needed.

Tom Larson summarized the need for the Federal government to promote models that work. Dr. Christine Johnson summarized that this was the cutting edge of a subject, which described the need to demonstrate the value of various operations. The concept of a regional transportation operator is not ripe for prime time, but is an interesting notion. The role of the Federal government as coach, and a strengthened customer orientation are valuable suggestions. The Federal government needs to provide financial incentives, but there is no one single model.