***Intelligent Transportation Systems (ITS)***
***Planning Memo #1***
***Best Practices in Other Small to Medium MPOs***

***Introduction:*** This memo is the first in a series of three memos that RVARC staff will prepare for Roanoke Valley Area MPO members concerning Intelligent Transportation Systems (ITS). The three memos will be combined to form a report to fulfill the FY 2003 ITS Planning work program item. More important than simply fulfilling a work program item, it is hoped that these memos will inspire the MPO and its member governments to take an active and leadership oriented role in the Commonwealth's efforts to develop what is termed as an "ITS Architecture" for VDOT's Salem Construction District in the Spring and Summer of 2003. The MPO's role will not be technical in nature; rather, it will be a leadership role in that the MPO will provide organized priorities, and in general, represent its member governments in the entire effort.

Figure A[1]

***Background:*** At the September 26, 2002 MPO meeting, RVARC staff gave an overview presentation of ITS and the MPO's role in the process. That presentation is attached at the end of this document for your reference. In a nutshell, the presentation advanced analogies that help explain ITS and the timeliness of the opportunity the MPO has in fully participating with VDOT and other parties in contributing to the development of the Regional ITS architecture.

The first analogy compares the impact of computers and information technology on private business. Despite recent talk of the "technology bubble" and the "dot.com blowout," few would argue that computers and information technology have not had a profound impact on improving the capacity and productivity of private business in the last three decades. Also, despite the urban myth of the lone technical genius who conquers the world with his/her one of a kind technical mastery, most successes have come from the businesses and industries who have figured out how to:

1.) apply the technology make existing processes more efficient,
2.) to gradually rework existing processes to take advantage of still unused capacity in the new technology and
3.) to develop a new business model to fully leverage the new technology.

It has not necessarily been the most technically gifted leader or manager who has reaped the most success from technology; rather, it has generally been the leader who saw unmet needs and saw that technology could meet, exceed and then transform those needs.

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[1] Image Source: www-nrd.nhtsa.dot.gov/ vrtc/images/its.jpg

Likewise, ITS strategies, which essentially consist of applying computational and communications technologies to increase the efficiency of the overall transportation system, have the potential to benefit regional transportation, economic development, emergency services and other areas that are not always associated with traditional capital improvement (i.e. bricks and mortar) transportation improvements.

The second analogy concerns a perception and image of technology that ITS can bring. Imagine for a moment walking into a business office and seeing a Commodore 64 or a typewriter at every desk. Regardless of how efficient, intelligent or talented the employees are the perception would be that the business is behind the times. Likewise, a region that falls behind on ITS may suffer a similar perception in its economic development marketing efforts geared towards out of town firms (i.e. "This region doesn't even have signal coordination.").

The remainder of this document summarizes two case studies involving other small to medium sized MPOs and their efforts in the ITS arena. It should be helpful to read the case studies through the lens of the two analogies mentioned above. It would also be helpful to reflect on how the MPO as a body could apply or pursue similar leadership initiatives. RVARC staff will keep the MPO informed concerning upcoming opportunities to shape ITS planning; however, it certainly does not hurt to be prepared for the discussion with concepts and priorities. Remember MPO members will not be asked to become technical gurus; however, this is an opportunity for the MPO to exercise strategic leadership.



Figure B[2]

***Case Studies:*** Before we proceed with a summary of the case studies, it is beneficial to clarify a few concepts. "ITS architecture" refers to a general framework, which incorporates technical standards so that ITS systems and products from various private sector vendors can interoperate with each other. A handy analogy is that of a house plan and building codes for a house. As long as basic architecture/ engineering constraints and applicable building codes are met, houses can be surprisingly customizable for the end user. A second analogy builds upon the "computer's impact in business" analogy from the previous section. Before the de facto standards in the computing industry took hold (i.e. Microsoft, Apple etc.) there were a myriad of end user choices (i.e. Atari, Commodore, Radio Shack, IBM, Apple etc.), which may or may not have been able to share data with each other. Eventually industry standards such as rich text format, ASCII and Dbase and others have allowed most applications and data to be interoperable among a variety of programs. However there were several years of headaches for business and individual computer users before this happened. The ITS Architecture at all levels: national, state, and regional is an effort to facilitate the development of standards to avoid similar confusion as in the 1980s-computing scene. With a clear architecture and

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[2] Image Source: www.dotd.state.la.us/press/traffic_cameras/ images/tmc3.jpg

standards private producers will be able to customize solutions, but customers will not be locked into proprietary standards, which limit their freedom.

Throughout the case studies attention will be placed on ways in which the experience of other regions may be of benefit to the MPO, as well as, where other's experiences may not be applicable to this region.



Figure C[3]

### *Case #1 Chittenden County MPO – Burlington Vermont*

The Chittenden County Metropolitan Planning Organization (CCMPO) is the Metropolitan Planning Organization (MPO) for the 18 municipalities of the Chittenden County region (Vermont).  Serving about 145,000 people, the CCMPO is Vermont's only MPO.  As such the Chittenden County MPO receives a larger than average share (a state minimum allocation) of planning funds, it also has the resources of the University of Vermont nearby.

Similar to the RVAMPO, Chittenden County MPO provides an interesting and challenging context for developing an ITS strategy because it contains distinctly urban, suburban, and rural settings within its planning boundaries. Each of these land use areas has a set of characteristic transportation issues that, in turn, can be approached through the application of appropriate ITS market packages. In fact the Chittenden County plan describes the following opportunity:

> "Because of the County's land use mix, there is a fundamental difference between planning for ITS in Chittenden County and that in a large urban area. This difference stems from the fact that *intolerable* congestion, which is the case in regions such as Washington, D.C. or Los Angeles, does not really exist in Chittenden County. **This provides the opportunity to target ITS strategically, without being pressured to identify projects to deal with current congestion problems demanding immediate attention.**
>
> With this opportunity to approach ITS deployment from a proactive rather than a reactive attitude, the strategic plan has been developed with two basic principles in mind:
>
> **(1)  identify economically-feasible early winners for ITS projects; and**
>
> **(2)  build the core infrastructure needed for ITS incrementally using interoperable systems."[4]**

Building on the aforementioned opportunity, the plan developed the following vision statement:

> "Chittenden County envisions an Intelligent Transportation System that deploys cost-effective technologies designed to enhance travel efficiency, accessibility, and safety for all residents and visitors with a reduction in energy use and improvement in the environment. The implementation of ITS technologies within the region will occur in an

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[3] Image Source:  www.caronline.net/images/ ITS_05_5.jpg

[4] The Chittenden County Intelligent Transportation Strategic Deployment Plan 2000, CCMPO, 100 Dorset Street, Suite 22, South Burlington, Vermont 05403 (802) 660-4071 / (802) 660-4079 *Fax* www.ccmpo.org / info@ccmpo.org

incremental manner. ITS technologies will be introduced gradually, and expanded as their costs and benefits are demonstrated and justified for the region."[5]

The CCMPO recognized that not all ITS strategies (Turn-key strategies which are ready for the marketplace are typically called ITS "Market Packages") are suitable for all regions. A package, for example, may not relate to the region's identified problems, or may not address its goals and objectives. A package may also be excluded on financial grounds, if its expected costs are likely to fall beyond the financial capabilities of the region.

In order to account for this the CCMPO developed a four step screening process for ITS market packages. First, ITS market packages were compared to the region's transportation goals and objectives. Second, ITS market packages were mapped to the identified regional transportation problems. The third task then focused on studying the extent to which the different market packages enable other functions, as well as on studying the extent to which the technology required to implement the packages has been proven. Finally, the insights gained from the previous three tasks were combined to select, as well as to prioritize, ITS market packages for the region.

As a first step toward the aforementioned end, the CCMPO developed a combined index to reflect the following two criteria:

1. The degree of responsiveness of the package to the region's goals and objectiveness, as measured by the compliance score ; and

2. The capacity of the package to address the region's problems (as quantified by the number of problems a package address) was developed.

**Combined Index = (Compliance Score X CS Weighting) + (# of Problems Addressed X Problem Weighting)[6]**

Using these criteria the CCMPO screened 26 separate market packages and developed a framework for each package. A sample framework is included below:

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[5] Ibid Page 7
[6] Ibid Pages 17-19

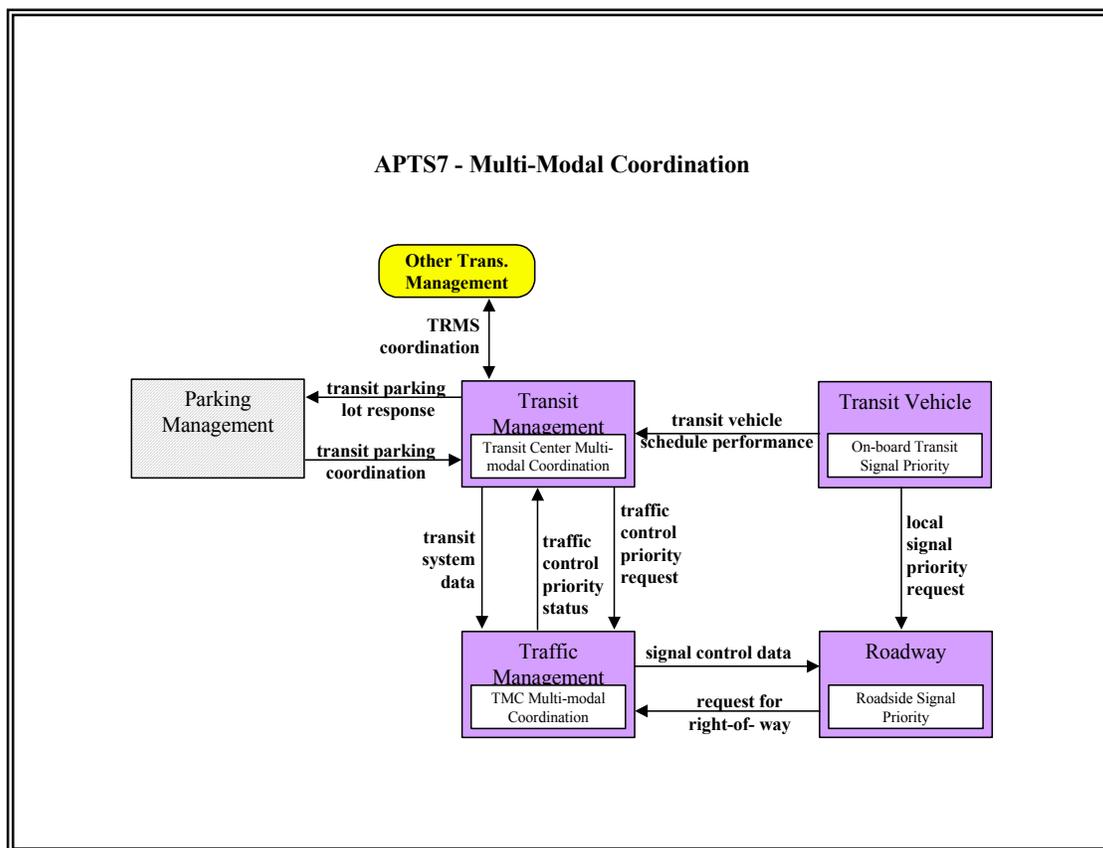**APTS7 - Multi-Modal Coordination**



Figure D[7]

In summary the CCMPO ITS plan identifies, recommends, and prioritizes appropriate ITS strategies for both near-term and long-term implementation. The plan goes beyond describing a regional ITS architecture. It established several indexes to judge ITS market packages' suitability to the region and its goals. It also performs a benefit cost analysis to market packages that made it past the index screens. All in all the CCMPO plan sets the gold standard for small urban area ITS planning. Although, the RVAMPO will not, nor should not, duplicate each element in the CCMPO plan due to our own unique circumstances, there are several good examples in the CCMPO plan that serve as valuable guidance to the RVAMPO.

***Lessons Learned from Case Study #1:*** The area served by the RVAMPO is different from that served by the Chittenden County MPO. However, the first lesson learned from the CCMPO demonstrates the value of involving university researchers in MPO and regional planning. To this end the RVAMPO is off to a good conceptual start, since the MPO recently adopted working goals and objectives for its long-range plan that call for more involvement from Virginia Tech's research community. The first goal of the working goals and objectives is excerpted below:

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[7] Ibid Page 31

**GOAL A: Partner with the New River Valley (NRV) to establish the combined "Roanoke Valley and NRV" as a premier transportation research and innovation region.**

The Blacksburg/Christiansburg area will be inaugurating their own MPO shortly.  There is a golden opportunity for the two MPOs to work together to establish a focus for the larger Roanoke/ New River Valleys in the area of ITS and to leverage and complement intellectual and practical efforts at Virginia Tech.

Another major lesson from the CCMPO is the importance of evaluating ITS market packages on economic as well as operational efficiencies.  The weights of each criterion were incorporated into the indexes and benefit cost analysis of the plan.  One of the major advantages of ITS strategies is to provide for the management and operation of existing transportation architecture in such a way as to receive a greater return on investment (as measured by benefit/cost analysis) compared to traditional physical and/or geometric improvements.  This should have a positive economic effect on the region as the public infrastructure increases in efficiency.

*Case Study #2 Leveraging and Enhancing Existing Resources – Johnson City MPO*

The Johnson City MPO is taking a different approach from the Chittenden County MPO.  The Johnson City approach focuses on partnerships between existing stakeholders (MPO, TDOT, Emergency Services Providers, Economic Development Agencies etc.), education to increase the skill base of participants and stakeholders and budgeting for transportation operations and emergency management centers.  The Johnson City approach focuses on such things as file sharing between the Tennessee Department of Transportation (TDOT) and the MPO, conversion of partner's GIS to a standard format (ArcView), and public information/education through websites and public access cable channels.  This partnership approach is more tactical and opportunity oriented than the CCMPO's methodical strategic deployment plan, although both have their pros and cons.
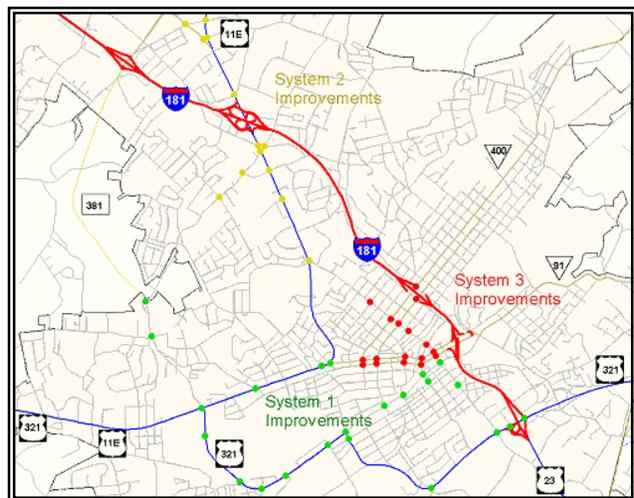


Figure E[8]

In a certain manner the opportunities becoming available to the RVAMPO lend themselves to the partnership approach adopted by the Johnson City MPO.  For instance, VDOT will begin hosting stakeholder meetings concerning the development of the

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[8] Image Source:  http://www.jcmpo.org/images/jcsig.gif

"Salem Construction District Regional ITS Architecture" by the Spring of 2003. RVARC staff recommends that our MPO members actively participate in the development of the Salem District Architecture rather than develop a regional architecture that exclusively applies to the RVAMPO for several reasons.  First of all, the Salem District encompasses both the RVAMPO and the new Blacksburg/Christiansburg MPO.  It would improve the effectiveness of ITS if both MPOs were under the same regional architecture.  Secondly, ITS is not just a planning issue, it is an operations strategy by nature.  A close relationship between the MPO and VDOT will be essential on this issue.  Additionally, it is anticipated that the Salem District will house this region's traffic management center.  Finally, the geographic area covered by the RVAMPO alone is not sufficiently large to warrant a completely separate regional architecture.

*Conclusion:*  A lot of content has been summarized in this planning memo.  RVARC staff hopes that the memo communicated the opportunity and potential ITS has for this region.  Two additional planning memos are scheduled before the end of FY2003, which will focus more on technology and other issues.  If you have any questions about ITS or the MPO's upcoming role, please contact Mark McCaskill at 540-343-4417 or mmccaskill@rvarc.org.  RVARC staff encourages individual MPO members to inquire if they would like to learn more about ITS.