The SIGNAL

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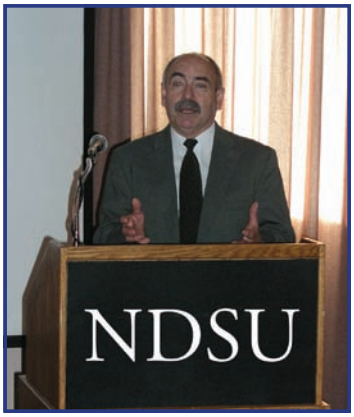
U.S. Highway Official Outlines Intelligent Transportation Programs



Mike Freitas, U.S. DOT

An official of the U.S. Department of Transportation's Intelligent Transportation System (ITS) Joint Program Office spoke in September during a seminar hosted by ATAC. The seminar, part of the UGPTI distinguished speakers program which invites a prominent speaker to campus, was attended by NDSU faculty, students, and state and local transportation agency staff.

(Official continued on p.2)

North Dakota Traffic Operations Roundtable

Working towards supporting traffic engineers across North Dakota and the region, ATAC established North Dakota's Traffic Operations Roundtable. The roundtable will allow peers to share ideas and experiences, and guide ATAC's traffic operations activities. The roundtable idea was warmly received among various traffic engineers at the state and local levels who received ATAC's initial invitation. Those recipients were also asked to provide additional names for possible participants, apprise the mission of the roundtable, and provide possible activities/topics for consideration.

(Roundtable continued on p.3)

ATAC Updates

The past six months have been both challenging and rewarding. The greatest challenge perhaps stems from funding uncertainty as our local, state, and federal transportation partners continue to await reauthorization of the transportation bill. Nonetheless, we are very excited about several new initiatives which have taken off at ATAC.

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This newsletter is published by the Advanced Traffic Analysis Center to provide information about its research and services.

(Official cont.)

In its 20-year history, ITS has been deployed by both the public and private sector, notes Michael Freitas, Manager, Integrated Corridor Management Systems Initiative at the ITS Joint Program Office. More than 50 operations centers provide traffic management for urban areas across the country. About 25 percent of vehicles in city transit programs have automatic vehicle location technology. Technology is used in the clearance, credentialing and inspection of commercial vehicles and in toll collection, General Motors' OnStar system, traveler information websites, and state and metropolitan 511 travel information systems.

Freitas is a civil engineer with more than 30 years of experience at the Federal Highway Administration. He oversees the portions of the U.S. DOT ITS program dealing with advanced traffic management, traveler information and the Rural ITS Program. He is also currently serving as the day-to-day manager of the ITS Joint Program Office in support of the acting director.

Freitas says ITS activity under the current transportation bill focused on research, development and deployment. "We wrote the rule requiring regional architecture," he said. "We have hundreds of plans in place. Proof of success will be in the implementation." Funding for ITS deployment in the federal transportation bill from 1998 to 2003 was $679 million with another $603 million for ITS research and development.

He says the U.S. DOT has restructured its ITS program to include fewer, larger, short-term, high-payoff initiatives. "Our expectation is that these initiatives will be multi-modal in nature, engage the private sector, have a clear public sector role and be results oriented," he said. "Cross-cutting efforts that support the overall goals of the ITS program will continue."

Major initiatives of the restructured program include:

- Integrated vehicle-based safety systems. The program will accelerate the introduction and commercialization of vehicle-based safety systems to assist drivers and reduce the number and severity of crashes.

- Cooperative intersection collision avoidance systems. "We need to get the systems in the cars and on the roadside at least talking to one another," Freitas says. The goal is to deploy systems at 15 percent of the most hazardous signalized intersections with in-vehicle support in 50 percent of vehicles by 2015.

- Next-Generation 911. New Internet-based technology is being investigated. Video is being integrated so that public safety departments know what kind of equipment to dispatch to incidents. Wireless 911 service is growing in urban areas, but not in rural areas.

- Mobility services for all Americans. Through research, technology use and coalition building, the department will increase mobility and accessibility while achieving more efficient use of federal transportation funding.

- Integrated corridor management systems. Freitas says a model system will be developed that uses ITS for better detection of traffic congestion and then integrated to divert traffic to alternate routes and adjust signals to cope with the added traffic. ITS on the highways also need to be better integrated with transit systems.

- Nationwide surface transportation weather observation system. Currently the system is geared to airports with weather observations at altitudes of 3 feet and up. "Highway departments have weather stations where they've historically had problems, but they're not statistically located and not integrated into forecasting models," he said.

- Emergency transportation operations. ITS applications will be implemented to improve emergency response to major incidents. The results should be shorter duration of incidents, reduced impact and more rapid restoration of normal travel conditions.

- Universal freight manifest. The transportation system will be made more efficient, productive and secure through use of a common electronic freight manifest that allows access to shipment information by all supply chain partners.

- Vehicle infrastructure integration. Nationwide deployment of an integrated communications infrastructure on roadways and vehicles.

"ITS is becoming increasingly visible to the profession and to the public," Freitas noted. "The U.S. ITS program is well-positioned for the next generation of issues and applications."

(Roundtable cont.)

Fifteen participants from FHWA, Bismarck, Grand Forks, Minot, Fargo, NDDOT, and ATAC attended a kickoff meeting held in Fargo in January. The participants expressed that the roundtable is a good idea for providing a knowledge base to share ideas and experiences. At the meeting, Jeff Rodacker (City of Minot) and Jane Berger (NDDOT) accepted Chair and Vice Chair positions for the group.

Several action items were identified during the kickoff meeting, which include contacting additional cities/ agencies to participate in the group, creating information dissemination methods for the group, and identifying high priority issues/topics for the group to address. The roundtable will meet twice a year, with a spring meeting in Fargo in conjunction with the American Traffic Safety Services Association annual meeting and a fall meeting at another location.

Currently, the roundtable group consists of 23 members from nine cities, FHWA ND Division, NDDOT, and MnDOT. The next meeting for the group is planned for September in Minot, North Dakota.

North Dakota Traffic Operations Roundtable Kickoff Meeting, January 2005, North Dakota State University

(L. to R.) Mark Berg, Bismarck; Jeff Rodacker, Minot; Lyle Landstrom, NDDOT, Fargo; Shawn Birst, ATAC; Darrell Francis, Minot; Jeremy Gorden, Fargo; April Walker, Fargo; Ayman Smadi, ATAC; Jane Berger, NDDOT, Bismarck; Steve Busek, FHWA, Bismarck; Blaine Johanneson, NDDOT, Bismarck; Dan Jonasson, Grand Forks; Al Covlin, NDDOT, Bismarck; Khaled Shouman, ATAC.

(Updates cont.)

First, on the national picture, is the delay in Congress in approving a new transportation bill, which has created havoc among transportation agencies operating on continuing resolutions. We, in turn, are directly affected by these uncertainties since our funding comes from a variety of federal, state, and local sources. The good news is that most observers agree that transportation funding levels in the new transportation bill will significantly exceed current TEA21 levels. More importantly, the new bill is expected to increase funding for Intelligent Transportation Systems (ITS).

The federal ITS program has been somewhat revised with the announcement of the U.S. Department of Transportation's core ITS initiatives. Vehicle Infrastructure Integration is one of these exciting initiatives currently being explored at ATAC.

There has been a renewed focus on perhaps the simplest of traffic management tools, the traffic signal. The National Traffic Signal Report Card is the product of an extensive self-assessment effort on traffic signal operations. Results from the survey indicate a generally low score. Traffic signal detection and proactive management received the lowest scores.

With strong support from the North Dakota Department of Transportation (NDDOT) and the North Dakota Metropolitan Planning Organizations (MPOs), we were able to develop a new ATAC work plan for the period covering October 1, 2004 through March 31, 2006. Major activities developed in the work plan include:

1. Developing Regional ITS Architecture for the NDDOT (statewide), as well as Bismarck-Mandan MPO, Fargo-Moorhead Council of Governments, and the Grand Forks-East Grand Forks MPO.

2. Developing training on the completed regional ITS architectures for all relevant state, county, MPO, and local agencies.

3. Creating a comprehensive ITS Communications Plan to allow the integration of ITS equipment, emphasizing innovative alternatives, especially in rural settings, with little or no access to traditional communications infrastructure.

4. Supporting the development of statewide guidelines for DMS and developing a software tool that automates these guidelines and message composition.

5. Supporting inter-jurisdictional traffic signal operations in North Dakota.

6. Supporting multi-state traveler information as part of the North/West Passage Corridor.

Last December, we embarked on a new initiative by forming North Dakota's Traffic Operations Roundtable. The roundtable currently consists of 23 members from the NDDOT, MnDOT, FHWA ND Division, and the cities of Bismarck, Dickinson, Fargo, Grand Forks, Mandan, Minot, West Fargo, and Williston. The roundtable will allow traffic operations peers to share ideas, identify critical issues, provide experiences, and guide ATAC's traffic operations activities. We hope to expand this effort into a national focal point for addressing traffic operations needs in the smaller cities through partnerships with the FHWA and national transportation organizations, such as the Institute of Transportation Engineers, the Transportation Research Board, and the Association of Metropolitan Planning Organizations. See article on page 1 for more information on the roundtable.

Regional ITS architectures in all four regions covered by the FHWA's Architecture Conformity Rule are now fully operational. ATAC worked diligently to develop ITS architectures that fit the unique needs of the state and its metropolitan areas while meeting the federal requirements and doing it all ahead of the federally imposed deadline. See the related article on page 6.

Those of you who visit the www.atacenter.org web page will notice some major changes. Through this ongoing process of updating the web page, we hope to provide you with better organization for the various program areas and better access to our research reports.

ATAC is well-positioned to address the many issues facing our state, metropolitan, and local partners. We also believe that through these strong partnerships in the state, we have built enough expertise to reach out to other rural and small urban communities. By doing so, we hope to establish a national dialogue for effectively addressing mobility needs in these communities through better planning, enhanced operations, and deployment of ITS.

VMS Composer

The use of Variable Message Signs (VMS) is increasing nationwide due to the rapid deployment of Intelligent Transportation Systems (ITS) technologies in order to improve traffic flow and enhance safety. Several types of signs may be categorized under VMS, including Dynamic Message Signs (DMS) and Changeable Message Signs (CMS). VMS are among the most common methods of communicating relevant information to the travelers while en-route. Recently, VMS have been used for supporting security applications, such as the Amber Alert System. Since this technology is fairly new with rising popularity, nationwide VMS standards have not been thoroughly completed. Individual states have developed their own sets of guidelines to govern the use of their VMS.

Developing consistent nationwide VMS operational standards is very important to ensure effective traffic control and management. Drivers should be able to understand traffic control and relevant information as they travel from state to state.

ATAC worked with the North Dakota Department of Transportation on developing guidelines for VMS use in North Dakota. In order to facilitate the use of these guidelines, ATAC developed the VMS Composer, an interactive software tool for supporting the process of generating a message to display on a VMS while following state standards. The guidelines and software were based on Federal Highway Administration's portable changeable message sign guidelines, the Manual on Uniform Traffic Control Devices, and NDDOT guidelines.

VMS Composer was implemented in Windows operating environment and takes advantage of graphical interfaces to enhance user friendliness. The two main functions for the VMS Composer: 1) ensure that a message is warranted based on agency standards, and 2) if a message is warranted, the application will walk a user through the steps to create a message. The message is formatted to fit the display specifications and ensures that agency-specific guidelines, such as acceptable abbreviations and phase timings, are followed. The software application has a modular design that will allow customization of the set of agency rules, as well as the VMS specifications, making it agency and VMS type independent.

This software will allow the NDDOT and other states to simplify the process of warranting VMS messages and, when warranted, create a proper message to display. The software may be used as a simple training tool for agency staff, especially occasional users of VMS during emergency situations. Additionally, VMS Composer may be modified to allow inter-jurisdictional control of VMS while satisfying all pertinent requirements for each jurisdiction.

The VMS composer can be adapted to other states' guidelines. For more information contact Ayman Smadi at ayman@atacenter.org.

North Dakota Statewide ITS Plan Completed

The North Dakota Statewide ITS Plan is the product of a multi-year effort undertaken by the North Dakota Department of Transportation (NDDOT) to guide ITS deployment in North Dakota. ATAC facilitated the plan development, including obtaining input on critical transportation issues, identifying ITS solutions, developing ITS projects for deployment, and preparing a final report. The NDDOT leadership provided support for the plan development and encouraged participation among NDDOT staff. Given the scale of the geographic area included in the plan, extensive work went into identifying existing systems, assessing needs, developing ITS projects, and suggesting locations for deployment

The pace of ITS deployment in North Dakota has picked up significantly over the last couple of years. Several reasons contributed to that growth, including major construction activity, positive experiences with early ITS traveler information projects, an increased focus on customer service, and the need to meet increased demands with limited staff. It is clear that the NDDOT has made tremendous progress in the areas of traveler information to improve mobility and enhance safety. North Dakota's 511 system, which frequently receives positive feedback from users, is perhaps the launching pad for 511 systems in the United States.

For the future, the NDDOT is looking at enhancing traveler information services to travelers by covering more areas and providing timely and accurate information through a variety of outlets (Dynamic Message Signs, Internet, and Kiosks). The NDDOT is also looking at automated bridge treatment (anti-icing) systems that would detect problems and instantly remedy those conditions without operator intervention. One of these systems will be installed on the Red River Bridge in Fargo this summer, thanks in part to a partnership between the NDDOT and the Minnesota DOT. ATAC was involved in planning for and supporting the design of this system, which also includes video monitoring cameras on both sides of the river.

The Statewide ITS Plan final report is available for download from www.atacenter.org.

MPO Directors Meeting: Year in Review

The annual meeting for ATAC's Metropolitan Transportation Support Program steering committee was held in January in Bismarck. The steering committee consists of representatives from metropolitan planning organizations (MPOs) in Bismarck, Fargo, Grand Forks, as well as the NDDOT, and the FHWA ND Division. The committee provides guidance to the program by identifying priorities, planning funding support, and assisting ATAC in developing annual work plans to serve various agency needs. The steering committee meets twice a year at a location and date acceptable to participants.

The meeting reviewed last year's modeling activities, financial reports, upcoming modeling activities, federal requirements, and planned model improvements. ATAC has been working with each MPO to develop a plan for improving current travel demand models, which make the basis for transportation and land-use decisions. Augmenting local travel and traffic data were among the top priorities for model improvements. The group expressed their satisfaction with the services provided by ATAC and their strong support for the program.

The Metropolitan Transportation Planning Support Program is in its fourth year. The main emphasis of this program is on enhancing travel demand models for North Dakota metropolitan areas. The targeted enhancements aim at providing robust modeling systems that can effectively support the transportation decision making process with responsive and accurate answers, while minimizing resource requirements. The program facilitates greater institutional cooperation by providing a neutral source for modeling expertise and advice. It also provides training opportunities on developing and improving transportation planning models, including innovative practices in data collection and representation, use of GIS, and new modeling software.

North Dakota Achieves ITS Architecture Conformity with ATAC Help

The best intelligent transportation systems (ITS) are the ones you don't notice. Traffic signal timings automatically adjust to regulate traffic flow, electronic signs advise motorists of hazards and alternate routes. Computer and telephone systems keep drivers abreast of travel conditions along their intended routes. The systems use sensors, computers, and communication technologies to keep traffic flowing smoothly and efficiently.

Sometimes, these systems are not so seamless. As travelers move from one jurisdiction to another, for example from rural highways to city routes or across state lines, information flow can be interrupted or inconsistent. For interstate travelers, this means having to obtain information on their route from a variety of sources that may not necessarily be coordinated or integrated. Inter-agency coordination is also paramount, as can be illustrated in the case of highway incidents which involve transportation, law enforcement, and emergency management agencies. Accurate and timely information exchange among these agencies is critical for enhancing the safety of motorists and reducing the impacts of incidents.

To avoid those situations, the Federal Highway Administration is requiring transportation planning regions nationwide to develop ITS architecture – a plan and vision for ITS implementation and use. The regional ITS architecture serves as a roadmap guiding future ITS planning, detailing system requirements, coordinating agency roles and integrating functions across jurisdictional lines. Regions that do not comply will no longer receive federal highway funding for ITS projects.

ATAC helped the Grand Forks-East Grand Forks Metropolitan Planning Organization, the Bismarck-Mandan Metropolitan Planning Organization, the Fargo-Moorhead Metropolitan Council of Governments, and the North Dakota Department of Transportation develop architectures to meet the FHWA requirements. The work which began in late 2003 is now complete.

ATAC was able to pool resources from North Dakota's MPOs and the NDDOT for developing the four regional architectures. The FHWA ND Division assisted ATAC and provided support for training to regional stakeholders and reviewing the completed architecture. This not only ensured consistency across the state, but also resulted in a streamlined process which produced the regional architectures ahead of the April 7, 2005 federal deadline.

Steve Busek, FHWA's Safety and ITS Engineer for North Dakota, gave high marks to ATAC for its work with those groups. "ATAC did a good job of identifying those groups and making the process accessible to the groups that wanted to contribute. That stakeholder involvement is a key component in the architecture," he says.

"The beauty of having ATAC involved was the coordination of all these planning organizations and the interrelationship with the NDDOT," notes Bob Bright, executive director of the Fargo-Moorhead Metropolitan Council of Governments. "As a result we're not all on different tangents; we are all on the same page. The implications of that are large in the long-term."

Bright says ATAC was a logical choice for the work. "They have built up the skills for this in their staff and they have consistency over time. The long-term benefits of our relationship with ATAC are worth us making the investment with them."

ATAC Develops Traffic Technology

With the continued surges in traffic levels, especially in urban areas, more and more traffic engineers are taking advantage of modeling tools to help optimize system operations. Traffic simulation software models are among the most powerful tools that can analyze complex traffic scenarios, evaluate alternatives, and estimate impacts of traffic control strategies. However, for some of the more advanced traffic signal control applications, traffic simulation software may not be able to adequately model traffic control system hardware behavior. In other words, the software logic approximates the functions of the traffic signal controller.

A solution to this problem is to use an actual traffic signal controller as part of the simulation, a process known as hardware-in-the-loop simulation. The Federal Highway Administration led development work for a hardware-in-the-loop platform for its CORSIM traffic simulation model in the mid to late 1990s. As a result, a controller interface device (CID) was developed at the University of Idaho. Using the CID, emulated traffic signal control logic is replaced by actual traffic controller hardware in the simulation model. This ensures accurate results from the simulation and enables the use of controller-specific functions not available in traffic software simulation models.

ATAC has been developing a CID that would improve existing technologies and work in conjunction with the VISSIM traffic simulation model. The effort which began in 2001 as a senior design project for electrical engineering students is now complete. Throughout the development, ATAC researchers and students strived to control product cost and improve performance. Therefore, the focus was on using off-the-shelf technology in building the CID.

The Controller Interface Software (CIDserv) resides and runs on the CID itself and responds to the traffic controller. It logs frames that the controller sends out over its SDLC channel. It then formulates a response based on information from the VISSIM Interface Software module. This will keep the controller out of "flash mode" and keeps the detector and signal states synchronized between the simulation and controller. This software can be upgraded over the Internet using FTP software built into the program. The CID uses standard SDLC communications with the controller and Ethernet for Internet connectivity with the simulation software. That makes ATAC's CID unique since it can be networked through the Internet. Therefore, a simulation project can use resources (CID-controller combinations) from several locations throughout the world, creating a virtual traffic lab.

ATAC has built and tested four CID prototypes which are being used on various research projects. Although marketing of the CID has not officially begun, it is currently available for other agencies or companies to purchase or use. Except for equipment ordering lead time, the CID may be assembled and tested in a matter of hours. For more information about the CID please visit www.atacenter.org/programs/ops/2000_014.php.

Andrew Paulsen with ATAC's Controller Interface Device (CID).

Busek Links DOT, ATAC With FHWA


Steve Busek

We all like to think we're safe drivers, but when Steve Busek travels North Dakota, he pays particular attention to how safe and easy it is to travel the state. As the Federal Highway Administration's Safety and ITS Engineer for North Dakota, that's his job.

His work also brings him in close contact with ATAC and its staff. In most cases, Busek says, FHWA ITS Integration Program funding destined for ATAC goes to the NDDOT first. "It's just financially simpler to move funds into the DOT first and then ATAC becomes a sub-grantee," he says. "At the state level, we're given the responsibility to work with grantees and sub-grantees to develop project proposals and work plans to meet the intent of the ITS Program."

The job of ultimately accepting or rejecting those projects rests with FHWA officials in Washington, D.C. "If everything's OK, they turn around and issue funding authority, then we work out the ITS project agreement with the DOT and help the DOT develop a contract with ATAC." Once that's done, Busek provides oversight for FHWA-funded ITS projects in North Dakota. "We work cooperatively with the DOT, but they provide a little more hands-on oversight on a month-to-month basis. We can be brought in and consulted with if there are any issues or questions that come up."

Busek oversaw ATAC's development of ITS architectures for the State of North Dakota and three MPOs in the state. The architectures were in place for all four agencies well before the April deadline. "Now the challenge is to actually use them and make that a meaningful process. ATAC's role will be to make sure staff understand their architecture and look at it critically and adjust it. It will be equally as big a job to use and maintain the architectures. ATAC staff, as the ones who know the architectures best, will have a major role in that."

Busek and the FHWA are also involved in a statewide traffic operations roundtable coordinated by ATAC. Traffic engineers and traffic operations staff from around the state will meet to share ideas and approaches to minimize congestion and improve safety. "That's going to be a tremendous opportunity," Busek notes.

Finally, ATAC is working with the DOT and the FHWA to study the use of ITS in work zones to improve safety. "ATAC has really stepped up to the plate. To make that happen, we'll really be relying on the resources of ATAC. The staff members know the technical side and the people side of things and have the ability to put that together," Busek says.

Busek is a Bismarck native and a 1975 graduate of the North Dakota State University civil engineering program. He joined the FHWA immediately after college and completed training in Colorado, Texas and Florida. He also worked in Florida and Wisconsin as an area engineer with FHWA before returning to Bismarck in 1984.

Of course, Busek's responsibilities are much broader than interaction with ATAC. Busek notes that his agency provides major funding to the state – about $200 million annually. Most of that funding moves through the NDDOT and its sub-grantees. "Our job is to provide some degree of oversight of Federal-aid Highway funds that come to North Dakota," Busek says. Recent projects include:

- Upgrading all signalized intersections in the state to include green and red LED displays.
- Adding rumble strips to the shoulders of all state highways handling more than 2,000 vehicles a day and with shoulders wider than four feet.
- Upgrading guardrails with turned down guardrail end treatments.
- Implemented streamlined procedures to address rail grade-crossing closure incentive projects.
- Implemented the statewide 511 driver information system and then enhanced the system by adding automated speech recognition and integrating it with Amber Alert message delivery.

A second major role of the FHWA is to provide technical support to agencies in the state. "That support is primarily to the DOT, but also to counties and cities. In terms of technical support, I'm the point of contact in the safety, traffic operations and ITS areas to assess what our partners need and try to satisfy those needs."

FHWA's third primary role is technology transfer. "It's our effort to build the professional capacity of folks, to make sure everyone on the job has the tools they need in a higher technological world." Busek says he looks for opportunities to find and observe best practices in surrounding states. "I've organized and led scanning trips involving many of our traffic engineers and other staff

(Busek continued on p.9)

(Busek continued)

in North Dakota to observe new and innovative technologies in Denver, Duluth, Minneapolis and elsewhere to look at how things are done and bring those ideas back here."

Another approach is to bring in training opportunities for transportation professionals in the state. That's an area where ATAC has been involved. Recent examples include sessions on ITS standards.

Busek says there are several issues related to highway safety and ITS that will need continuing attention in North Dakota. He says the state needs to maintain strong safety design standards in its preventive maintenance programs. The state also needs to continue to build expertise and understanding of ITS at state and local levels. "Finally, we need to actively promote safety engineering issues as a key component of integrated safety in the state's strategic planning process," Busek says.

Keeping Up With Growth

Bismarck-Mandan

As the Bismarck-Mandan area continues to experience significant growth, there are increasing demands for modeling analysis to support this growth. In addition, the existing regional travel demand model must be updated to account for the growth and corresponding changes to the transportation network.

ATAC worked with the Bismarck-Mandan Metropolitan Planning Organization (MPO) and their consultant, Ulteig Engineers, for developing the MPO's long-range transportation plan to improve how the current model treats additional traffic generated by new development. Concerns were raised due to unusually high north-south traffic volumes forecasted by the model initially, especially along State Street in Bismarck.

ATAC devised several strategies for addressing the high forecasted traffic volumes as an alternative to a full model revamp. One of these strategies consisted of increasing the level of resolution of the future transportation network by supplementing the network with additional elements. The results of the analysis clearly showed the success of this strategy as the previously high north-south traffic volumes were distributed on more routes. Therefore, initial concerns blamed on potential model shortcomings were alleviated without having to conduct a timely and costly model overhaul.

ATAC is currently assisting the Bismarck-Mandan MPO with the U.S. 83 corridor analysis in Bismarck. Several revised development plans, including major shopping centers, are being considered. ATAC is looking at future traffic projections from new development under various transportation network configurations. This work is expected to be completed late this summer.

Moorhead

To help minimize growing pains, the City of Moorhead is in the process of updating their growth plan. The city is expecting approximately 4,000 acres to be developed over the next 25-50 years with the majority of the development consisting of residential housing. This plan addresses a wide range of issues associated with development including utilization of existing infrastructures, establishment of parks and open spaces, and storm water facilities. The plan also serves as a guide for future development and helps to maintain the community's goals and quality of life. ATAC assisted the Fargo-Moorhead Council of Governments and the City of Moorhead in estimating future traffic forecasts. The metropolitan travel demand model was used to estimate potential traffic generated from the 4,000 acre development. These forecasts help in understanding the implications of the development to the roadway network.

Grand Forks/East Grand Forks

The Grand Forks/East Grand Forks Metropolitan Planning Organization (GF/EGF MPO) is embarking on a new long-range transportation plan. The GF/EGF MPO saw this as an opportunity to examine the current metropolitan travel demand and identify potential model updates.

The current model uses the TRANPLAN (TRANsportation PLANning) software, one of the basic components of Citilabs software suite. The new model will be upgraded to a more powerful software platform utilizing Citilabs TP+ (Transportation Planning Plus), a transportation planning package that provides a high level of functionality and flexibility.

ATAC will work closely with the GF/EGF MPO on implementing other model enhancements, including examining trip generation rates and implementing new traffic analysis zone structures. After the model has been updated, ATAC will conduct a thorough calibration for the 2005 base year. At that time, the model will be used to support scenario analysis for the long-range transportation plan.

New Traffic Detection Equipment

Accurate traffic data are essential for good planning, design, and operations. However, data collection is often expensive and difficult to conduct. Several technologies have been used to improve traffic data collection, including loops, video, tubes, and others. ATAC has been using a mobile Traffic Data Collection System with Autoscope® video processing technology for supporting special traffic data collection needs. However, the use of video requires extensive calibration and is sometimes affected by environmental (such as wind) and traffic conditions.

ATAC recently acquired five Wavetronix SmartSensors® to supplement the existing Traffic Data Collection System (TDCS). The SmartSensor® is a non-intrusive traffic data collection device which uses digital wave radar to collect vehicle volume, speed, occupancy, and classification.

Radar detection technologies provide many benefits for data collection. The SmartSensor® is a continuous-wave radar which is not affected by wind, lighting, temperature, and other environmental conditions. Also, the digital wave radar technology is not as susceptible to vehicle occlusion, a major problem with video-based systems. Occlusion occurs when a detector does not have line-of-sight to a vehicle which is hidden behind another vehicle or barrier. Another unique feature of the SmartSensor® is its self-calibrating capability. The SmartSensor® is able to identify lanes by observing traffic, thereby minimizing the field set-up time.

The SmartSensor® works by slicing a narrow cross-section of the roadway (up to 8 lanes) with concentrated radio waves and collecting data on the vehicles that pass through the detection area. If an object is in the path of the radio waves, then it will reflect some of the electromagnetic energy back to the detector. Vehicle speed can also be obtained by the detector by measuring the change in frequency of the radio waves returned from moving vehicles – otherwise known as the Doppler Principle.

The SmartSensor® is configured through a computer interface, and stores the traffic data internally. It is powered by a 12-volt battery, which allows for extended deployment time. The SmartSensor® has a 200 ft range, with recommended mounting heights of 12 to 30 feet. It is a relatively lightweight device, which allows for a simple pole-mount installation.

ATAC will be using the SmartSensors® for data collection purposes, and for evaluation and comparison with other detection technologies. This spring ATAC will begin field testing and analysis of the new detectors, as well as designing a portable mounting system for the units.

STAFF NOTES

Mary Marquart exclusively focuses on ATAC

Mary Marquart, administrative assistant to ATAC, now dedicates 100% of her time to ATAC activities. Previously, Mary provided part-time help to the TEL8 program at the UGPTI. Mary handles all of the administrative functions for ATAC, including budgeting, accounting, communications, and program support. This move could not have come at a better time given the increasing growth in contract awards at ATAC.

Jason Baker Joins ATAC

Jason Baker joined ATAC in May 2005 as an associate research fellow. He began work with ATAC in 2002 as an undergraduate research assistant. Jason's main responsibilities will be in the areas of traffic operations and ITS. He has conducted research on advanced traffic data collection technologies, including video, radar, tubes, and others. Jason has been responsible for maintaining and operating ATAC's Traffic Data Collection System, as well as providing training to local and state transportation agency staff on the use of the system. Jason received his bachelor's degree in civil engineering from North Dakota State University in 2003 and is currently pursuing a master's degree in the area of transportation.

Doug Benson Assists in North Dakota ITS Communications Plan

Doug Benson, a long-time researcher with the UGPTI, joined ATAC in October 2004 to assist in researching communication options for ITS in North Dakota. He is assisting in the development of North Dakota's Statewide ITS Communications Plan to identify communication alternatives in support of ITS deployment and developing ITS communications standards and implementation strategies. Doug previously served as the Executive Director of TEL8, a six-state video conference network, managed the development of a short-line and regional-railroad database system and has helped develop several computer programming systems.

Graduate Students

Diomo Motuba

Diomo joined ATAC as a graduate research assistant in 2004. He earned his B.S. degree in botany from the University of Buea in Cameroon and is finishing his M.S. thesis in Agribusiness and Applied Economics at NDSU. Diomo is assisting with ATAC's Metropolitan Transportation Planning Support program. His research interests include GPS-based travel data collection and urban freight demand estimation. Diomo currently is pursuing a Ph.D in Transportation Logistics at NDSU.

Mohammad Nasser

Mohammad joined ATAC the fall of 2004 as a graduate research assistant. Mohammad was the top student in his graduating class at the University of Jordan, where he obtained a bachelor's degree in civil engineering. Due to his scholastic achievements, he was awarded a scholarship through a partnership between the University of Jordan and ATAC. Mohammad has been working with ATAC's Metropolitan Transportation Planning Support program. He is currently pursuing a M.S. degree in civil engineering at NDSU.

ATAC Sponsors ITE Student Chapter Trip

The ITE Student Chapter at NDSU organized a field trip for its members to spend two days in the Twin Cities of Minneapolis and St. Paul. Sixteen students participated in the trip which included site visits to the following locations:

- MnDOT Regional Transportation Management Center
- Hiawatha Light Rail
- Minneapolis/St. Paul International Airport
- Benshoof and Associates
- Army Corps of Engineers Locks and Dams
- North Central Section of Institute of Transportation Engineers

The students experienced technical demonstrations, rode the light rail trains, observed the lock and dam system on the Mississippi River, and had a lunch discussion with consulting engineering firms about issues in the transportation field. Funding for the trip was provided in part by ATAC.