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FAST-TRAC - Success In Any Lane
by Jack Gravat

You've come a long way baby:

Imagine an 89-percent drop in the number of accidents at your most dangerous intersections; a 100 percent decrease in the number of serious injuries at those same intersections, and 40-plus hours a year trimmed from the average commute time.

That's what FAST-TRAC, which stands for Faster and Safer Travel through Traffic Routing and Advance Controls, has done for Oakland County, Michigan.

FAST-TRAC is a computer-controlled and video-imaging-monitored traffic signal system coupled with infrared-based traffic information technology. It is one of the earliest FHWA-sponsored Operational Field Tests (OFT) combining an Advanced Traffic Management System (ATMS) with an Advanced Traffic Information System (ATIS).

It is also arguably the first OFT to demonstrate the value of applying advanced technology to seemingly unsolvable traffic problems made worse by insurmountable budget shortages.

FAST-TRAC does legitimately lay claim to being the first adaptive traffic control system in the U.S., the first SCATS application in the western hemisphere, the first to use video image processing with SCATS, the first beacon-based dynamic route guidance system in the western hemisphere, and the first in the U.S. to use infrared beacons to communicate traffic data. It was also the first to form an international partnership to bring ITS technology to the U.S. and the first local government entity to initiate and manage an ITS project of this scope and magnitude.

And who would have ever guessed that the relatively small City of Troy in Oakland County, just North of Detroit's bustling automotive industry, would become the focal point for the early deployment of this overwhelmingly successful Intelligent Transportation System (ITS)?

That is until you consider that FAST-TRAC now also manages traffic-flow on a high-growth segment of the I-75 corridor that includes the Oakland Technology Park with the new, 3.5 million square foot Chrysler Technology Center, two outdoor music theaters, Oakland University, a regional mall, the Pontiac Silverdome, and the Palace of Auburn Hills home to the Detroit Pistons.

Although FAST-TRAC wasn't officially activated until June of 1992, its beginning can be traced back to 1977 when the Road Commission for Oakland County (RCOC) began looking for ways to improve traffic safety in the county.



The commission first used technology to solve its growing traffic problems when it installed an eight-phase, computer-controlled traffic signal at the county's most accident-prone intersection. Remarkably, this reduced accidents at that intersection by more than 30-percent and virtually eliminated serious injuries at the same time during the first year.

Heartened by this early success, county traffic engineers installed the new technology at other high-risk intersections with similar results. While traffic flow efficiency through the intersections suffered somewhat because the new traffic lights were not linked, RCOC officials decided that the dramatic decrease in accidents was an acceptable trade-off.

The real effort that resulted in FAST-TRAC however, didn't get rolling though until 1985 when RCOC members met with officials from the county's 61 city, township, and village governments. These meetings were spurred by an unexpected influx of some 70,000 new residents into the county and a concurrent change in traffic patterns that threatened the county's already overburdened roads, its environment, and the quality of life.

An RCOC panel questioned the local government officials at length about the growth they anticipated for their respective communities over the next ten years and compared those projected needs with its existing capabilities.

This analysis, part of RCOC's strategic planning process, determined that it would take a total \$1.1 billion for county-wide traffic improvements and that fully \$604 million of that amount would be needed just to increase road capacity.

A tough, unflinching look at the economic facts told the commission that its expected revenues over the next ten years would fall far short of that staggering amount needed and that realistically it would take at least 70 years to meet all of the projected traffic and road improvements using traditional approaches.

The commission realized that it couldn't "build its **way** out of its traffic problems." What was needed, they reasoned, was a significant paradigm shift.

By the time the commission began a second round of strategic planning in 1987, it was ready to more fully embrace the emerging ITS. technology as the means to improve its traffic situation although it did not see it as a panacea.

In 1988, the RCOC asked Oakland County's Board of Commissioners for \$100 million for a comprehensive traffic improvement program. This \$100 million figure included \$2 million to install a new, more sophisticated traffic control system in the more densely populated southeastern section of the county.

By 1989, RCOC members were ready to begin developing the system that ultimately became FAST-TRAC and went on an intensive hunt for a new technology to replace the inductive loop detectors originally proposed. Inductive loop detectors had proven unreliable from the beginning, maintenance required extended traffic lane shutdowns, and they could not be repaired or replaced at all during Michigan's long winters.

Road commission officials chose the Autoscope digital video-imaging system as an acceptable alternative to the loop detectors because they concluded that it could also be used in other traffic management applications.

Autoscope uses digital video cameras to detect vehicles and transmit traffic information to FAST-TRAC's traffic management system. This component of FAST-TRAC is also able to recognize traffic incidents and provide input to speed and vehicle classification studies.

RCOC officials next sought a modern traffic management system and found one developed by Australia's Road and Traffic Authority. Dubbed SCATS, for Sydney Coordinated Adaptive Traffic System, it provides the exact computer-based real-time traffic control they wanted. It monitors traffic flow and adjusts signal timing in response to changes.

In 1990, the county board turned down RCOC's \$100 million request that included \$98 million for road construction and \$2 million for the proposed ITS project. The commission then decided to seek federal aid and submitted a proposal to FHWA.

While FHWA applauded RCOC's plan, it denied its request for government funding to support the project.

RCOC Director of Planning and Development and current FAST-TRAC Director James C. Barbaresso came up with the idea to broaden the project's scope to include traveler information in order to attract federal funding. "We should include motorist information systems in our proposal," he wrote in early 1990.

He was right and-in July of that year road commission members met with engineers from Germany's Siemens Automotive company and ultimately opted to link its Ali-Scout route guidance system with Autoscope and SCATS.

Ali-Scout is an ATIS based on Siemens Automotive's Euro-Scout System. It uses a system of roadside infrared beacons, vehicles equipped with on-board computers, and a central computer that contains route guidance and traveler data in its memory banks. The infrared beacons provide the communications link between the computer-equipped vehicles and the central computer housed in FAST-TRAC's Traffic Operation Center that allows the exchange of traffic and route guidance information between the two.

Former RCOC Managing Director John L. Grubba, Oakland County Consultant James Haugen, and Siemens Automotive Executive Ronald Knockeart, agreeing that adding an ATIS capability to the emerging FAST-TRAC program was absolutely essential to attract federal support, went to see Michigan Congressman Bob Carr (D-Mich.) who sat on the Transportation Subcommittee of the House Appropriations Committee.

Carr supported the project and encouraged the Grubba, Haugen, and Knockeart to formalize their proposal and send it to FHWA for reconsideration. He advised them though that a significant contribution from local and private sources would be necessary if they hoped to sway the agency's decision.

Undaunted, Grubba **agreed** and went back to the Board of Commissioners and convinced them that the \$2 million requested two years before would be "seed" money for something much greater. The board approved the appropriation, Siemens committed another \$1 million to install ALI-Scout and FAST-TRAC was born. To date, the federal government has obligated \$55.5 million of the project's estimated \$100 million cost and is expected to provide another \$15 million before its completed.

By June of 1992, the first 28 intersections in Troy were equipped with SCATS and Autoscope and Siemens had begun installing Ali-Scout beacons. When RCOC officials activated the system for the first time, a malfunctioning detector caused a two-mile backup on one of Troy's busiest roads.

The incident attracted national new coverage but what the media failed to report was that RCOC traffic engineers were able to detect the snafu, correct it, and clear up the jam all within 30 minutes and all from the new traffic management center.

To date, some 200 intersections in Troy and other Oakland County municipalities are now under SCATS and Autoscope control and another 120 are expected to be fitted out by December of this year, according to DOT's latest annual ITS projects directory.

Meanwhile, 40 Ali-Scout beacons have been installed and tested and another 60 are scheduled to be installed by next December.

By extending FAST-TRAC to include I-75 and other major arteries, the RCOC is working with MDOT and its other partners to integrate freeway operations with municipal street control systems and create a single, seamless road system throughout the county.

Future FAST-TRAC partnership plans call for developing a county-wide intermodal transportation information management system designed to share transportation information with police and emergency agencies, commercial vehicle operators, transit authorities, and travelers.

More than 70 percent of those Oakland County residents responding to a recently conducted survey know about FAST-TRAC and say that it directly benefits them.

Almost 80 percent of those queried were aware of FAST-TRAC's leading protected left turn feature, considered to be the primary cause for the significant drop in accidents and serious injuries at equipped intersections, and more than 80 percent of that number approved of the feature.

While FAST-TRAC enjoys wide public awareness, the study shows some mixed users' acceptance based on their perceptions of the system. Thirty-six percent said that traffic flow was smoother, 31 percent felt that it made left turns easier, and 10 percent said that it reduced accidents.

Fifty-five percent of those surveyed believe that the system make traffic flow more slowly or has no effect on at all, 39 percent say that they have to stop more often at intersections, 40 percent believes FAST-TRAC has no effect on the number of accidents, and 58 percent believes that it does nothing to reduce pollution.

Respondents ranked improving traffic flow and reducing congestion, reducing accidents, reducing air pollution, and conserving energy in overall descending order of importance.

RCOC has launched an aggressive public relations program to offset these mixed perceptions. The PR plan calls for informing the media and the public through op/Ed pieces in local and regional newspapers, press tours and news conferences, speaking engagements by commission officials, presentations to city, town, and village councils throughout the county, distribution of brochures and other handouts, and a series of public forums designed to get user feed-back.

Commission members also network with other public officials and private sector executives to gain support and improve understanding and acceptance of FAST-TRAC.

Quoting a recent U.S. DOT study, project managers say that FAST-TRAC could save as many as 2,200 lives, prevent 84,000 injuries, and save taxpayers as much as \$4.2 billion by the year 2010 if it is aggressively deployed.

The FAST-TRAC partnership now includes: the U.S. Congress, the RCOC, MDOT, Oakland County, FHWA, Siemens Automotive, Rockwell International, Image Sensing System, AWA Traffic Systems-America, TCI Cable Systems, GM, Ford, Chrysler, Nissan, SMART, the cities of Troy, Rochester Hills, Auburn Hills, South Lyon, and Pontiac, the University of Michigan, and the Roads and Traffic Authority of New South Wales, Australia.

Also see the following articles and publications for more details on the Fast-Trac project:

1. Overview of the Fast-Trac IVHS Program: Early Results and Future Plans by Bair, Brent O.; Barbaresso, James C.; Lamparski, Beata J. In: Proceedings of the First World Congress on ATT & IVHS, November 30 - December 3, 1994, Paris, France.

Abstract: FAST-TRAC is the largest publicly and privately financed IVHS program in the United States. Initiated by the Road Commission for Oakland County, Michigan in 1990, the program involves the integration of advanced traffic management systems and advanced traveler information systems. Early results indicate that vehicular delay has been reduced, serious accidents have decreased, and operational efficiency has been enhanced. The success of the FAST-TRAC program is directly related to the commitment of the program partners and the technical performance of the systems installed;

2. FAST-TRAC ATIS/ATMS Integration Specification and Architecture by Bauer, Thomas J.; Barbaresso, James; Busch, Dr. Fritz; Haugen, James. In: Proceedings of the First World Congress on ATT & IVHS, November 30 - December 3, 1994, Paris,, France.

Abstract: FAST-TRAC is an ongoing operational field-test program in Oakland County, Michigan, which features the use of the Ali-Scout AT1 System and the SCATS ATM System. Since the inception of IVHS, questions have been raised regarding the integration possibilities of the two systems.

How does one link such systems? Are synergistic benefits possible from the linkage? Phase I of the FAST-TRAC integration effort is currently underway. This paper will report on early results from the Phase I integration feasibility study.

These two articles are available from: ARTECH HOUSE PUBLISHERS
685 Canton Street, Norwood, MA 02062 U.S.A. Tel: (617) 769-9750;
Toll Free: 800-225-9977, Ext.4002; FAX:(617)769-6334;
E-Mail:artech@world.std.com

3. Grubba, John L. and Barbaresso, James C. IVHS on the FAST-TRAC, In IVHS Review, Summer 1994, ITS AMERICA, 400 Virginia Ave. Suite 800, Washington, DC 20024; Phone: 1-800-374-8472; Fax:.202-484-3483

Abstract: Traffic congestion and safety problems in Oakland County, Michigan inspired local officials to incorporate IVHS among more traditional strategies for improving mobility and traffic safety. The challenges faced by the Road Commission for Oakland County as it pursued its

mobility and safety objectives were ominous, but the Road Commission has demonstrated that local governments are capable of successfully managing large IVHS programs.

A "bottom-up" approach is needed for the successful deployment of IVHS technologies in the United States. The national IVHS program must include greater local government input and a means of funding IVHS deployment at the local level. Such a paradigm shift is needed to put IVHS on the "fast-track" in the United States.

For additional information regarding the FAST-TRW program, contact RCOC's Jim Barbaresso at 810/645-2000, FHWA Region Five's Martin Monahan at 708/283-3549, or FHWA's Michigan Division's Morris Hoevel at 517/377-1880.