

VIDEO APPLICATIONS

Number 1

Deception Pass Bridge Origin & Destination Study

A recent project to determine the origin, destination, and travel patterns of persons traveling both north and south on the Deception Pass Bridge was completed in May of 1998. This survey was done under the direction of the Skagit/Island Co. RTPO.

License plate data was collected from vehicles traveling on the bridge from 6:00AM to 6:00PM on April 21, 1998. This data was processed through the Department of Licensing for

the state of Washington and mail addressees of the travelers were obtained.

Over 4000 questionnaires were sent out by first class mail. Within one month we received over 1600 responses, an amazing response rate of over 40%. A great deal of interest was evidenced by all of the users with many succinct comments on the traffic conditions associated with the bridge.

The significant input from local users of the bridge will impact the future design of the highway.

ATD Northwest Awarded Rail Grade Crossing Study

Our team headed by the Transpo Group of Bellevue Washington was recently awarded a contract issued by WSDOT to evaluate the installation of minimal median dividers for traffic control at rail grade crossings. ATD will install cameras and recorders at three grade crossing sites in the Puget Sound area.

Monitoring will be done on a demand basis or in a time-lapse mode. One system will look at rural conditions, the second at a suburban site and the third will be situated in a heavily traveled urban location. The video tapes will be used to evaluate the traffic flow for 60 days before the median strips are installed and again for several months

"We received over 40% response on traffic questionnaires mailed out to travelers on the Deception Pass Bridge"



44 High Speed Video Cameras used on HOV Efficiency Study

Operating on a sub-contract issued by Bellomo McGee Incorporated, ATD Northwest installed 44 color high speed video cameras at six sites along a 30 mile section of the I-95/I-395 corridor south of Washington D.C.

The object of the study was to determine the traffic flow between each site and evaluate the efficiency of the HOV lanes as compared to the main line lanes throughout the morning and evening peak traffic periods.

We also wanted to determine exactly where the crossover between the main line traffic and the HOV traffic occurred.

It was desired to establish the minimum and maximum travel times as well as the average travel time for each section of the highway in both the HOV lanes and the mainline lanes.

All the goals of the VDOT were met. A detailed analysis of the traffic flow will be provided by BMI and a comprehensive plan to improve the management of the corridor will result from this study.

PATH SYSTEMS

Dual camera "PATH" systems have recently been purchased by Lakeland City in Florida, Arlington County in Virginia and the City of Lynnwood in Washington State.

The response from users across the country has been outstanding. Systems are being used for bicycle studies, pedestrian movements, loop calibration and analysis, body style classification, parking lot studies, and many other unique applications.

You asked for it!

Our CV-98 systems now have the capability for extra long lenses as well as the standard wide-angle lens configuration. This new option allows the user to view close-up pictures from vehicles operating a block away from the installation.

ATD NORTHWEST

18080 NE 68TH STREET, SUITE A-150, REDMOND, WA 98052
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Number 2

Bus Bulb Study Provides Before & After Comparison

The City of Seattle recently completed a study to compare the movement of pedestrians, transit riders, vehicles, and busses before new bus bulbs were installed along a maximum use arterial in the downtown university district.

A single camera path system was installed at each end of the block to observe the activity on the street from both directions. The cameras were operated in the time-lapse mode for a period of twenty-four hours. The video tapes and the batteries were exchanged so that

recordings could be made on three separate week days. There was sufficient illumination from street lights to record color images for the full time span.

The comparison of the before and after tapes showed a definite increase in the mobility of both pedestrian and transit passenger traffic as well as an improvement in the vehicular traffic pattern on the street. This pilot program will result in improvements of traffic in the University District.

ATD Northwest Completes O&D Study for I-580 Corridor

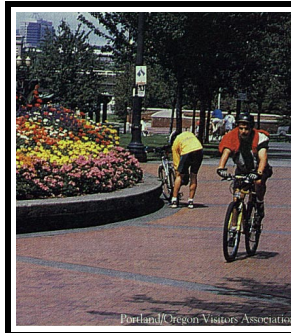
ATD Northwest operating on a sub-contract from KPMG recently completed an all day origination & destination study for CALTRANS Rail Division. License plate recordings were made of vehicular traffic on the I-580 corridor at the North Flynn Road Overcrossing in central California.

The object of the project was to sample the users of the highway with respect to attitudes concerning the expansion of the AMTRAK rail

service from the bay area into the interior valleys. The use of a license plate survey covering four lanes of traffic and thousands of drivers gives a substantial sample of potential riders for a new train service.

Questionnaires were mailed out to over ten thousand owners and the response was over 25%. Answers to the questions will enable CALTRANS personnel to establish the timing of expanded service into Modesto, Stockton and the interior corridor.

"Video Surveillance provides the capability for accurate assesment of bicycle movements over a long term period."



University of Minnesota and MDOT conduct extensive bi-cycle surveys

The Civil Engineering Department of the University of Minnesota in association with the Minnesota DOT is conducting an extensive analysis of bicycle traffic throughout the summer at locations across the State.

The object of the study is to track the movement of bicyclists on streets and bike ways throughout the University and city areas. Four "PATH" video camera systems are being used extensively to monitor bicycle interaction with vehicles and pedestrians. The portable cameras are mounted on existing structures, poles or in stand-alone configurations. They are operated in the twenty-four hour time-lapse mode of recording to observe activities at street intersections and bicycle paths.

In addition, the cameras are moved to various locations to observe bicycle parking areas. In particular, we can see unauthorized persons at the parking racks and determine if security is a problem at each specific location.

The bicycle travel patterns are entered into computer spread sheets, tabulated, and produced as graphs and charts to better understand the effects of bicycles traveling on the streets and parkways of the metropolitan area.

PATH SYSTEMS

"PATH" systems have recently been purchased by Virginia DOT, Camrose, Alberta, Canada, and the Nevada Department of Transportation.

The response from users across the country continues to be outstanding. Systems are being used for bicycle studies, pedestrian movements, loop calibration and analysis, body style classification, parking lot studies, and may other unique applications.

You asked for it! Our CV-98 systems now have the capability for remote monitoring via phone lines from any place in the country. You can monitor any site in the 24 hour time lapse mode at a central location or even in your

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Number 3

Highway Construction Traffic Temper Calming

Caltrans having had considerable success in obtaining driver cooperation on the closing of the Central Expressway in San Francisco is using the same technique to mitigate driver concerns on other construction projects.

By using license plate studies, the the department has access to the actual users of a specific freeway that is going to undergo construction. Addresses obtained from the survey are used to send informational brochures regarding upcoming lane closures as to time, date and

purpose. Drivers are urged to take alternate routes during these construction periods as well as to reschedule their travel to adjust to the construction activity.

Information obtained from returned brochures helps to understand driver reaction to the closures and to formulate print media, radio and television public relations scripts concerning the freeway closures. Focus groups are used to better understand public concerns regarding timing, safety and duration of the lane closures. Good Information is received.

Accurate Measurement of Traffic Generators

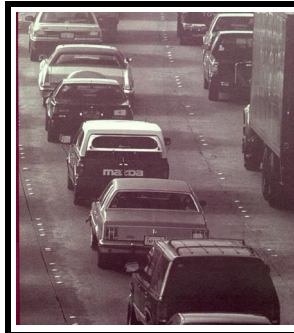
ATD Northwest operating on a sub-contract from Hexagon, Inc. recently completed an all day license plate study for Caltrans of vehicular traffic impacting a specific freeway interchange.

The object of the project was to sample the users of the highway with respect to traffic origin from specific traffic generators in the area. Video cameras were placed at the entrances and exit points for

several large office complexes to determine how many people in these facilities use the interchange ramps at various times during the day.

Matching of license plates from various study points can determine the access time from each building to the various freeway segments as well as the queue delay in each access lane and the total number of vehicles traveling in each direction from the interchange.

"Accurate classification of vehicles traveling at speeds in excess of sixty miles per hour on multi-lane freeways is a demanding and difficult task at best."



MAG Uses Color Video for Vehicle Classification on Phoenix Freeways

ATD Northwest operating on a sub-contract from Traffic Research Analysis Inc. recently completed a comprehensive and detailed study of the body style of vehicles traveling on the Phoenix Freeway Network for the Maricopa Association of Governments.

Accurate classification of vehicles traveling at speeds in excess of sixty miles per hour on multi-lane freeways is a demanding and difficult task at best.

In order to accomplish this task, six of our "PATH" color video recording systems were mounted on luminaire poles at strategic locations along each freeway segment. The video recorders were placed in the 24 hour time-lapse recording mode and the traffic was recorded around the clock for a period of twenty-two hours. Existing lighting was sufficient for day and night recordings. Each day the PATH units were moved to new locations in the early morning hours until thirty different sites were covered.

Each freeway segment was monitored for frequency and type of vehicle travelling in each lane. A final report was generated with charts and graphics detailing the body style evaluation.

PATH SYSTEMS

"PATH" portable pole mounted video systems have recently been purchased by Florida International University and the cities of Portland, OR & Renton, WA.

The response from users across the country continues to be outstanding. Systems are being used for grade crossing studies, pedestrian movements, loop calibration and analysis, body style classification, parking lot studies, and many other unique applications.

You asked for it!

We have edited together segments from various video traffic applications around the world and have arranged for a number of copies to be made.

Please Fax your request to 425-558-9413 or E-Mail us at atd@atdnw.com and we will send a copy of this color VHS video tape to you.

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Number 4

Parsons Brinkerhoff International uses video to monitor traffic circles in Istanbul, Turkey

How does one analyze, differentiate, count and classify traffic entering and leaving a traffic circle with six input/output channels? The traditional method is to put lots of people at these entrances and exits and try to keep an accurate record of all the vehicles. Wait a minute, what about all the pedestrians? We have to count them too! The Ankara office of Parsons Brinckerhoff International in association with RIA Corp recently imported twelve single camera PATH systems to survey various traffic circles in the city of Istanbul, Turkey. Some cameras were

placed upon tall power poles and others were placed upon commercial high-rise structures in order to observe the traffic circles from a great height. The wide angle views allowed traffic engineers to count and classify all of the vehicles passing through the interchange. They could observe the queue build up at each signalized section of the roadway and determine the signal timing adjustment required to accommodate the maximum level of service throughout the day. Video surveillance provided answers that simply were not available in any other way of collecting traffic data.

Added passenger amenities make new buses more attractive to commuters

The incorporation of fold down passenger desks and individual reading lights on commuter busses provide the capability of a mini office during the commute. There is space for a lap-top computer or writing pad, a drink

receptacle and an indentation for pens or pencils.

There is also a rack at the front of the bus which includes a sample of the current weekly magazines along with copies of the daily U.S. paper.

"You can hit the miniature dome with a base ball bat and it still keeps producing sharp color pictures!"

PATH SYSTEMS

The city of Overland, Kansas recently purchased a single camera PATH system with 16:1 zoom lens for temporary intersection surveillance.

NEW.....

ATD Northwest is now supplying two new fixed focal length wide angle cameras for use with their PATH multi camera surveillance units. Up to four cameras may be mounted on a single pole.



Our outdoor environmental "bullet" camera is only 1" in diameter by about 3" long and provides a very slim silhouette. It is so small that it remains unobtrusive to drivers or pedestrians



ATD's extremely rugged "Hurricane" camera was designed to survive blowing branches and debris even under the most stringent storm conditions. You can hit the miniature dome with a base ball bat and it still keeps producing sharp color pictures!

AC Transit Conducts O & D Study on Oakland Bay Bridge

ATD Northwest obtained a contract from AC Transit to record license plates of all the westbound commuter traffic during the rush hour period on all five lanes of the San Francisco/ Oakland Bay Bridge. The information obtained will allow AC Transit to accomplish an improved marketing campaign for specific commuters who could use the transit busses.

West Virginia Throughput Study

ATD Northwest, operating on a sub-contract from Parsons Brinckerhoff, is conducting a throughput study on a ten mile stretch of highway between Morristown and Charles Town, West Virginia. This study is to determine how many vehicles are using this stretch of road as a throughput channel. We also want to determine how many vehicles turn out of the channel or return to their entrance point. License plate matching will determine vehicular activity in the corridor.

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VIDEO APPLICATIONS

Number 5

“From the data, it appears that 25% of the present users of the freeway already qualify for travel in a two-person HOV lane. “



Seven Major O&D Studies conducted for the State of Virginia

Highway 101 Vehicle Occupancy Study for Hexagon

A recent project to determine the potential users of two or three person HOV lanes was conducted on a restricted two lane section of the Hwy 101 Freeway south of the City of San Jose.

Hexagon Corporation of San Jose, CA commissioned ATD to perform a traffic analysis of all of the cars traveling in a northbound direction from 7:30AM to 9:30AM and in a southbound direction from 4:30PM to 6:30PM. In all, there were over 13,000 vehicles tabu-

lated with 78% having one person in the front seat , 21% with 2 people in the front seat and a little less than 1% with 3 people in the front seat. Those vehicles with three people were mostly pick-up trucks.

From the data, it appears that 25% of the present users of the freeway already qualify for travel in a two-person HOV lane.

This study will act as a baseline for future HOV studies on the highway when expansion of the lanes is completed.

ATD Northwest Awarded Modesto Trailer Contract

ATD Northwest recently received a contract to build two portable DC powered traffic safety trailers for the city of Modesto, California. These vehicles will be used to observe traffic conditions on a twenty-four hour basis at intersections, highway locations, and during special events around the city.

The trailers are supplied with all recommended safety features including running lights, flashers and safety striping.

A remote controlled pan & tilt color camera with a 16:1 zoom lens is provided on top of a 33 foot extension tower. A coaxial spotlight is supplied with the camera for night time observations.

PATH SYSTEMS You asked for it!

Remote Camera Control

Our CV-99 systems now are supplied with 16:1 optical zoom lenses with the added capability for electronic zoom extension. Remote control is provided for all camera options as well as remote control of zoom and focus functions. These new cameras supplied at no additional cost allow the user to view close-up pictures of vehicles operating a block away from the camera installation.

AC Power Installations.

We now provide an option for an AC to DC converter to power the systems when AC power is available at the pole site. These devices provide long term power when the systems are to be installed for several months at one location. They are often used in grade crossing observations.

Operating on a joint venture with Bellomo McGee Incorporated, ATD Northwest installed hundreds of color high speed video cameras at seven locations throughout the State of Virginia during the fall of 1999.

We recorded license plate data with time/date/and location information at each site. The object of these studies was to determine the traffic flow between entry and exit points in a cordon around a local area. We wanted to know the total traffic volume from site to site. It was desired to establish the minimum and maximum travel times as well as the average travel time for each element of the matrix .

Matching all of the entry and exit points becomes a huge data handling opportunity. It requires a massive storage capability and special processing programs.

All of the goals of the VDOT are being met. A detailed analysis of the traffic flow will be provided by BMI and a comprehensive plan to improve traffic management for each individual city will result from this study.

VIDEO APPLICATIONS

Number 6

CALIFORNIA TRUCK SURVEY Statewide 24HR Classification

Caltrans has authorized the collection of truck classification data at approximately 100 sites across the state. Video cameras will be installed to observe the truck traffic at weigh and measure stations from San Diego to the northern border. The cameras will operate on a continuous basis over a twenty-four hour period.

A wide angle picture of each vehicle will be observed. Data will be recorded as to the number of axels on each vehicle and the type of

classification for the vehicle.

In addition to the video portion of the survey, personnel will be stationed at each site to interview and record comments from many of the drivers stopping at the site.

A comprehensive view of the intrastate truck traffic will result and a new model will be generated to analyze future large vehicle movements. The classification and comment data will form the year 2000 basis for the model and will be updated from time to time to calibrate the model.

O&D Study Conducted for Amtrak & CALTRANS on 101

Amtrak in association with the CALTRANS Rail Division authorized a thirty two hour study of the Highway 101 freeway at Gilroy, California to determine potential riders for the Amtrak trains traveling on the North-South portion of the coast route.

Cameras were placed on an overpass which recorded the license plates of vehicles

traveling on the freeway in the southbound direction on both a week day and a weekend day. The license plate information was entered and processed to obtain addresses so that a comprehensive questionnaire could be sent to freeway users. Their response provides planning information as to future scheduling of trains for the corridor.

"Video cameras will be installed to observe the truck traffic at weigh and measure stations from San Diego to the northern border."



ODOT Conducts Right-of-way Study

Region 4 of the Oregon Department of Transportation operating out of Bend, Oregon is responsible for land use functions within the area.

In particular, the huge amount of activity found at some of the truck stops requires accurate assessment of the State's right-of-way usage.

Biggs, Oregon is one of those stops that handles a continuous flow of big rigs mixed with a number of passenger vehicles. Several facilities have been established to handle fuel and food for this heavy traffic.

Although specific conditions have been set up for right-of-way access to these facilities, the owners of the property and the vehicle operators sometimes modify these conditions to accommodate a de-facto arrangement that seems to satisfy the current needs of the traffic but may set up safety concerns.

Before exercising enforcement options, the DOT wanted to have an accurate assessment of the traffic flow over a full week. A number of PATH cameras were installed to obtain around the clock data of all traffic movement in the area. The video tapes will be used to obtain owner cooperation to correct the traffic safety situation.

PATH SYSTEMS

RED LIGHT STUDIES

ATD Northwest is helping cities to place their automated red-light enforcement systems at the most effective locations.

MISSISSIPPI

The Mississippi Department of Transportation recently purchased six dual camera PATH Systems and six single camera PATH Systems for use in Grade Crossing Analysis throughout the State. These Systems will be installed for long term analysis with local AC power being supplied at the pole location. The object of the study is to accurately determine what changes can be made in grade crossing approaches to improve safety and encourage drivers to obey train signals.

AUSTIN, TEXAS

The Austin Department of Public Works purchased a Dual Camera PATH System for bicycle traffic analysis. This unit will be used to determine the interaction of bicycles with pedestrians and vehicles on local city streets.

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Number 7

Double Duty, Low Cost Highway Monitoring for Evacuation Study

Many State DOT'S employ loops, piazo sensors or magnetic sensors to estimate traffic flow on interstate or arterial highways. Typical remote installations involve the use of solar power panels to charge the batteries that run the counter devices. Information from all the lanes on both sides of the highway is collected at a local monitoring station which is housed in a weather-proof cabinet installed at the side of the road. A modem is provided which connects to a standard analog POTS telephone line installed to this remote site.

These remote sites may be polled from a central monitoring station. A report is generated which indicates if the traffic is moving normally at each remote site.

Unfortunately, when the sensor indicates that the traffic is not moving normally the operator cannot tell if the results are do to the fact that there are no vehicles on the highway, the vehicles are all motionless, or if the sensor is malfunctioning.

In locations which face

weather conditions severe enough to cause public evacuation of an area, the missing information is critical.

Low cost video cameras installed at highway counting stations will provide accurate information concerning the condition of the highway traffic during evacuation.

At several locations in Florida, ATDNW recently installed digital video systems which transmit useable color video images to a central control station over the same PSTN standard phone lines that are used to poll the traffic sensors. Thus, the condition of the traffic on the highway may be verified at any time through the use of a visible image and the data can be forwarded to emergency management personnel. It is possible to call up an image from each site from any receiving station located in the U.S.

FDOT is one of the forward thinking transportation agencies in the country willing to try new solutions to old problems. This project certainly is an innovative approach to emergency management.

"Low cost video cameras installed at highway counting stations will provide accurate information concerning the condition of the highway traffic during evacuation"



San Joaquin Valley Origin & Destination Study

Systan Corporation in cooperation with ATD Northwest has received a contract to conduct an origin and destination study to determine the make up of commuters traveling on the 580 Freeway between the Bay Area and the San Joaquin Valley. Cameras will be placed at the North Flynn Road over-crossing to record the license plates of vehicles traveling in a westbound direction during the peak morning hours.

Portland Transit Safety Study

ATD Northwest is supplying Dual Camera Path Video Systems in order to conduct transit safety studies for TRIMET, the transit operating company in Portland, Oregon. Cameras are deployed so as to observe all of the pedestrian activity located at various rail crossings throughout the system. The object of the study is to determine pedestrian activity before safety measures are instigated and later to determine if the safety measures installed were adequate or effective.

PATH SYSTEMS

CALTRANS District 11 has recently purchased two PATH single camera color video systems for highway monitoring purposes in the Southern California Area.

In response to customer requests, ATD Northwest is now producing a PATH pole mounted video system with four miniature weatherproof wide-angle color cameras. Each camera is displayed in one quadrant of the picture. This unit is particularly valuable when trying to observe a 360 degree view at a parking lot or a construction yard.

The CV/99-MKIV four camera system priced at \$7,995 costs the same as a CV/99-MKII unit which includes two color cameras each employing a 16:1 optical zoom lens. Cameras can be interchanged between the two different systems.

Our trailer mounted color camera systems now employ an integrated color camera with a 30:1 optical zoom lens. The environmental pan-tilt system mounted on a 33 foot ruggedized tower is streamlined to withstand wind velocities over 70 miles per hour.

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