MARYLAND STATE POLICE
PROJECT ADVANCE
SUBMISSION ENTRY FOR THE
2001 HERMAN GOLDSTEIN AWARD

01-37

Maryland State Police
Commercial Vehicle Enforcement Division

Project ADVANCE
(Aggressive Driving Video And Non-Contact Enforcement)

Submission Entry for the

2001
Herman Goldstein Award
For
Excellence in Problem-Oriented Policing

March 2001

Goldstein Award

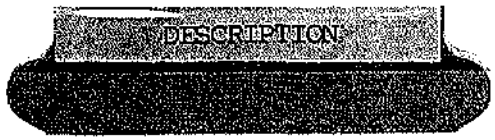
Summary:Project ADVANCE (Aggressive Driving Video And Non-Contact Enforcement)

Maryland was on pace to lose 880 lives in traffic collisions by the end of 1995, as the state's highway fatality rate climbed 34 percent above that of 1994. Trying to reduce Maryland's rising highway fatality rate, Maryland State Police Superintendent Colonel, David B. Mitchell ordered an unprecedented statewide aggressive driving campaign to rid the state's roadway of unsafe driving.

The Maryland State Police began a highway safety initiative called Project ADVANCE to target aggressive drivers through use of advanced enforcement technologies. The goals of the project was to create and implement an enforcement tool that will: Target aggressive driving such as speeding, following too closely, unsafe Iand changes, and other reckless driving actions; Create an omnipresence (general deterrence) of traffic enforcement on Maryland roadways; Reduce the frequency and severity of motor vehicle crashes and fatalities and serious injuries which result from these crashes and to conduct a public information and educational campaign which will promote public and private acceptance of our traffic safety goals and objectives. Project ADVANCE is an operational element of the statewide aggressive driver campaign.

The Project ADVANCE system that was developed is a unique, innovative, computerized technology that incorporates speed and aggressive driving detection capabilities with still photography and video images of a vehicle driving aggressively and violating traffic laws. It is a self-contained mobile technology system. The ADVANCE system contains a laser device that detects speed and distance, a video camera, a still camera, and an interactive computer system that is all contained in one vehicle and operated by one trooper. The unit detects a traffic violator, records the moving image and photographs the vehicle to include the rear license plate. If the violating vehicle is a commercial vehicle, the laser device has the ability to measure the vehicle and internally adjust its calculations to capture a picture of the Department of Transportation (DOT) identifying number on the side of the vehicle. This data is logged into the computer and later viewed by the operator for a violation notice to be mailed to the violator.

Conventional enforcement actions by patrol troopers often contribute to traffic congestion, when the motoring public slow due the roadside police activities involved in the traffic stop. The process of stopping the violator can often add to the dangers on the roadway due to congestion. The ADVANCE system was designed to assist enforcement officers to detect aggressive driving actions without contact with the violator. The ADVANCE system can enhance the safety of motorist traveling on the roadways and help in our effort to reduce highway congestion.


DESCRIPTION

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Description: Project ADVANCE (Aggressive Driving Video And Non-Contact Enforcement)

Aggressive driving is defined by the state police as the concurrent commission of two or more of the following traffic violations: speeding, following too closely changing lanes unsafely and failing to grant the right of way. The aggressive driver operates a vehicle with total disregard for the safety of others on the highway.

Traffic in certain sections of the Capital Beltway exceeds 200,000 vehicles per day. More than 1,500 police-reported crashes occur on the Maryland portion of the Capital Beltway each year, which is almost five per day. Almost half of the crashes are rear-end collisions, caused by motorist following too closely, speeding and failing to pay attention. Traffic crashes on the Capital Beltway increase as rush hour congestion increases. As traffic volume increases, the general deterrence effect from the presence of police patrols declines as many motorists realize it is less likely they will be detected and apprehended for aggressive driving behavior. Pursuing and stopping aggressive drivers on a highly traveled, multi-laned highway is complex and unsafe for police officers and citizens. Police stopping violators along the highway can often contribute to additional traffic congestion and other high traffic roadways in Maryland.

A Capital Beltway Safety Team (CBST) was established to explore potential remedies. The team consisted of members from the Maryland State Police, Maryland State Highway Administration, Federal Highway Administration, National Highway Traffic

Safety Administration, Virginia Department of Transportation, Virginia State Police, Washington Council of Governments, community organizations and the local area police departments. Under the direction of the Capital Beltway Safety Team a number of studies were conducted to better understand how and why beltway fatal accidents were occurring and as compared to fatal crashes on the other U.S. beltways. Generally some of the findings of these studies were: Crashes on the Beltway coincide with rush hour congestion peaks, which are between 7:00 to 9:00 am and 3:00 to 7:00 pm; Rear end collisions comprise the largest percent of accidents on the Beltway, many are found to be caused by following too closely, driver inattention, and differential speeds; The Capital Beltway tends to have more rear end crashes than other U.S. beltways; About one-fifth of all Capital Beltway crashes occur on Friday, more crashes occur in November and December than any other month; In serious injury and fatal crashes, tractor-trailers were involved in 15 percent of the Beltway crashes; Drivers perceive congestion to be the number one problem on the Capital Beltway and drivers of both cars and trucks rank dangerous driving as the second most contributor to crashes, the dangerous driving behavior that most concerns motorists are speeding (faster than the flow of traffic), excessive lane changing (crossing multiple lanes and cutting off people), and driver inattention (car phones, reading, etc.). This resulted in aggressive driving being identified.

Aggressive driving leads to accidents, and the congestion caused by accidents accounts for more than 60 percent of backups on the Capital Beltway and similar highway in Maryland. Traffic crashes on the beltway coincide with rush hour congestion peaks,

"Enforcing speed limits and increasing truck inspections on high volume roadways is difficult at best and virtually impossible without adequate personnel and the appropriate tools. Effective enforcement requires trade-offs. For instance, the presence of enforcement during peak travel periods can cause congestion that results from rubbernecking. Effective enforcement also is directly dependent on adequate penalties for violations of traffic laws" This quotation from the Capital Beltway Safety Team Report emphasizes the unique challenges in maintaining effective speed control on the Capital Beltway, a thoroughfare with average daily traffic counts as high as 200,000 vehicles per day. The same holds true on other roadways in Maryland with similar traffic problems.

Aggressive driving behavior continues to challenge law enforcement agencies to explore new and more effective means of traffic enforcement for improving safety on Maryland roadways. The Maryland State Police continue to explore and utilize a number of creative tactics to tar et this unsafe driving through increase enforcement patrols,
g
specialized assignments and initiatives. The more creative the initiative is, generally the more effective the results. The more effective tactics have utilized extremely unconventional traffic enforcement means. The purpose of these patrols is to increase the level of general deterrence and in turn reduce excessive travel speeds. Colonel Mitchell, Superintendent Maryland State Police is extremely receptive to suggestions for creative enforcement ideas that will help make Maryland roadways safer.

Conventional patrol tactics are found to be of limited effectiveness in reaching a significant number of violators necessary to instill the perception of risk of being apprehended for unsafe driving actions. Arid, it is this lack of perception of risk that has in part led to a growing disregard for traffic laws on Maryland roadways and particularly on the Capital Beltway. As Troopers have continued traffic patrol on the Capital Beltway, the very process of pursuing and stopping traffic violators on this type of hi[g]hway has become complex, difficult and a potentially unsafe action. Police pursuits of vehicles traveling at high speeds in dense traffic are of greater risk than in two or four land roadways in lower traffic volumes. Police patrols must generally travel 15-20 miles per hour faster than the pursued vehicle to apprehend the violator. To stop the vehicle, Troopers frequently direct the driver to pull across other lanes of heavy traffic onto the inner or outer shoulder areas. This maneuver creates a greater risk when the violator's vehicle is a large truck or bus. Additionally, in some locations of the beltway, there are no shoulder areas for stopping violators and these factors severely limit the ability of traffic patrols to take enforcement action.

Colonel David B. Mitchell ordered an unprecedented statewide campaign to rid the state's roadways of unsafe drivers. As a result Maryland's aggressive drivers were placed on Maryland's "Most Wanted List." This coincided with the launch of Maryland's Aggressive Driving campaign. Maryland State Police requested the public's assistance in identifying aggressive driving on Maryland's roadways and encourage the motoring public to report violators directly by dialing #77 via their cellular telephones.

This is a free call for cellular telephone subscribers and the caller will be connected to the state police barrack in their current driving area.

As Maryland's fatality figures declined (with 880 in 1995, 615 recorded in 1996, 609 recorded in 1997) the Maryland State Police not only maintained its strict and selective enforcement against aggressive drivers, but also searched for more innovative and efficient enforcement techniques.

More than two years of planning and development by a team of state and federal officials that include the Maryland State Police, Maryland State Highway Administration, Federal Motor Carrier Safety Administration, National Highway Traffic Safety Administration, and civilian engineers from Aberdeen Test Center have resulted in the production of Project ADVANCE, the most sophisticated, self-contained, and mobile aggressive driving enforcement technology in the country. In 1997, prior to the media campaign for Project ADVANCE, Daniel Consultants Inc. (DCI) surveyed a random number of motoring public in Maryland to assist us in determining the publics view on the driving problems on highly congested roadways. The results of the survey determined that the public would accept law enforcement technology to target the problems, because most felt that conventional means were not effective enough. 54% of regular automobile drivers and 58% of commercial drivers characterized aggressive driving on the Capital Beltway as a major problem and reported that the aggressive driving pattern most often observed was multiple lane changes. 89% of regular automobile drivers and 90% of commercial drivers reported observing these driving patterns. In addition the second

most often aggressive driving pattern observed was speeding. 86% of regular automobile drivers and 83% of commercial drivers reported observed speeding vehicles. The survey also revealed that 91% of regular automobile drivers and 92% of commercial drivers believe law enforcement agencies should consider use of more effective measures to control aggressive driving and would consider the use of video cameras as an acceptable alternatives by 81% for regular automobile drivers and 91% for commercial drivers. The survey revealed that the majority of the motoring public, 80% regular drivers and 73% of commercial drivers, were not aware of any enforcement programs aimed at aggressive drivers and most, 36% regular drivers and 36% of commercial drivers rated the law enforcement effectiveness on the beltway as not effective (see exhibit #1)

The Project ADVANCE, prototype system was implemented on the Capital Beltway in November of 1997 and was funded by a grant from the Federal Motor Carrier Safety Administration (FMCSA).

Project ADVANCE is a unique, innovative, computerized technology that incorporates speed and aggressive driving detection capabilities with still photography and video images of a vehicle driving aggressively and violating traffic laws. It is important to note that video cameras have been used by the Maryland State Police as an enforcement support tool and have been successfully used in certain situations to augment police officer's testimony in both traffic and criminal cases.

"We must continue to look for new ways to deal with increased congestion and emerging traffic problems that threaten the safety of the motoring public," said Maryland State Police Superintendent Colonel Mitchell. "Project ADVANCE represents a new and innovative way to enforce traffic laws and protect the public on a highway with a high volume of traffic."

The Project ADVANCE unit will be used on the Capital Beltway and other similar Maryland roadways to increase enforcement while not adding to congestion and increasing officer safety. The unit utilizes a laser-measuring device that detects speed and distance, a video camera, a still camera, and an interactive computer system, which is all, contained in one vehicle and operated by one Trooper

The ADVANCE system uses a laser-type measuring device (LIDAR) to determine the speed and range of an approaching vehicle. The LIDAR and a video camera are aimed out through the rear window of the Project ADVANCE platform, a marked State Police Ford Bronco. The speed is compared to an operator-selected threshold and, if the vehicle speed exceeds the threshold, the system takes a snapshot of the approaching vehicle and subsequently records a motion video of the approaching vehicle. The range and speed are used to estimate the time it will take for the target vehicle to reach the device (AutoSense) that will trigger the side view and rear view camera.

When the vehicle reaches the AutoSense, the system determines whether the vehicle is in the same lane and traveling near the same speed as the vehicle picked up by the LIDAR.

If so, the updated speed is used to time the acquisition of images by the side view and rear view cameras. If the vehicle fails to arrive near the predicted time, the system will ti me out and resume searching fore a new target. The AutoSense also estimates the length of the vehicle. Vehicles over 20 feet in length are categorized as commercial vehicles. The side view camera is used to capture the Department of Transportation (DOT) registration number of these vehicles. Vehicles shorter than this are assumed to be passenger vehicles and the rear view camera is used to record images of the Iicense plate.

The operator is able to manually activate the cameras to record any unsafe driving actions that are observed. This manual method is called Manual Over-Ride (MOR). The operator is also able to view live video from any camera by selecting the appropriate switch on the front of the video monitor. Recorded video is displayed on the computer monitor and selected via software. Manual Over-Ride feature of the ADVANCE system can be used to capture a wide range of violations, such as Following too Closely, Passing in a No Passing Zone, Unsafe Lane Changes and has also been used to capture vehicles violating the High Occupancy Vehicle (HOV) laws that direct that only vehicle occupied by a certain number people can travel in certain lanes at certain times.

The system also has the capability of recording traffic statistical information as speed distributions (Histograms) of vehicles in the flow of traffic. This date allows the operator to estimate the average speed of traffic. (See exhibit #2)

Data is saved on a removable disk and subsequently used to generate violation reports that can be analyzed or mailed to the owner of the vehicle. The vehicle owner will then receive a warning letter accompanied with pictures showing the violating vehicle and listing the traffic violation (See exhibit #3). Citations will not be issued by mail through the use of Project ADVANCE. However, citations will be issued when police stopping teams are used in connection with Project ADVANCE.

Processing of the imaging evidence occurs in an office setting with a determination of the enforcement action based on current traffic laws. Warning letters are sent to vehicle owners, or in the case of commercial motor vehicles to the motor carrier/owner of these vehicles. Carrier information is extracted from the Federal Motor Carrier Safety Administration's Motor Carrier Management Information System. Accompanying the warning letter is information on the hazards of speeding and an explanation of the new strategies being used to detect and enforce speeding and other traffic violations (See exhibit #4). A record is maintained of violations detected during the project and the capability of identifying repeat infractions will be developed and in the case of repeat violations for commercial motor vehicle carriers, a compliance review of preventive maintenance audit will be conducted of the motor carrier in cooperation with the FMCSAIOMC.

The purpose of Project ADVANCE includes monitoring aggressive driving on Maryland roadways by applying the advance technologies and countermeasures developed by the system; develop polices and procedures to determine appropriate enforcement actions

recorded by the system and evaluate the project to determine the efficiency of the new enforcement strategy on the roadways through the detection of unsafe driving actions.

Project ADVANCE offers a number of advantages. It is not only mobile and easily operated by only one trooper, but it also:

- Addresses aggressive driving concerns without diverting existing resources from other police activities;
- Reduces the risk to troopers by reducing the need for stopping teams on dangerous Interstates like the Capital Beltway;
- Reduces traffic congestion by reducing roadside traffic stops which can contribute to congestion;
- Provides a record of the violation in both still and video photography and;
- Provides a record of the traffic speed distribution during deployment.

During 1997 a media campaign has been conducted to inform the Beltway users, the public, commercial motor vehicle industry, and others, of the dangers of speeding, and aggressive driving and to make drivers aware that the ADVANCE system would be utilized to target aggressive drivers. Additionally, when the system is on use on the Capital Beltway, drivers are informed of the fact that we are using advanced technologies enforcement strategies. Surveys were conducted by Daniels Consultant Inc., (DCI) in April and May 1998, following the media campaign to assess motorist perception of our enforcement strategies through Project ADVANCE. Project ADVANCE conducted an

"Impact on Motorist Awareness and Traffic Safety" study in October 1998. The results.of these studies revealed that 70% of motorists characterized aggressive driving as a problem and less than 50% thought that law enforcement was effective against aggressive driving. 91% of motorist thought that more effective enforcement means were needed. The media campaign had been effective because now 54 % of motorist were aware of the enforcement programs targeting aggressive driving as opposed to the 19% aware of the programs before the media campaign (see exhibit #5).

During April 2000 the results of the driver reaction to warning notices study had been completed. It revealed that 89% of regular automobile drivers and 71% of commercial vehicle drivers advised that they would be more cautious after receiving a warning notice by Project ADVANCE. 32% of all drivers surveyed advised that receiving a notice from Project ADVANCE made them think about their aggressive driving behavior, 84% of regular automobile drivers said they'd drive more safely, and 35% of these violators indicated that receiving the notices seemed to have a positive influence on the violators' friends and family. 31% of commercial vehicle owners that receive notices indicated that they tend to issue disciplinary warnings to their drivers. DCI concluded that notices seemed to directly and indirectly influence people's driving behavior in a positive manner and they seem to support the Project, which is a good sign for public relations and outreach. It also concluded that Project ADVANCE is particularly effective for commercial motor vehicles (See exhibit #6).

An analysis was conducted in January through March 2000, comparing the productivity of the ADVANCE system against conventional enforcement. The results of the study were finalized in August 2000. The following data was used:
75 days of data was collected for the patrol method (conventional enforcement) resulted in 150 citations being issued. 72 days of data was collected for the ADVANCE method resulted in 789 warnings being issued. DCI issued the qualitative assessment of the advantages and disadvantages of the ADVANCE system. The advantages as seen by DCI are that the ADVANCE system enhances trooper and public safety, reduces traffic interruption caused by "rubbernecking", detection of violators in heavy traffic is increased and the use of the ADVANCE system has the capability of influencing the driving behavior of a large population. The disadvantages of the system are that the troopers presence on the road is reduced which reduces opportunities for contact enforcement, reduces opportunities to deter aggressive drivers and reduces peoples perception of road traffic safety and personal security. Daniels Consultant Inc., conclude that the ADVANCE system can enhance the productivity of traffic enforcement activities, the ADVANCE system can increase safety benefits for troopers and the traveling public. DCI advise that economic considerations should be considered in conjunction with other qualitative benefits and they suggest that the ADVANCE system should supplement rather than supplant traditional enforcement practices (See exhibit #7).

Based on the results of the evaluation, recommendations have been made to expand the project to develop a more advanced technology system for traffic enforcement.

Recommendations have been made to purchase additional equipment for possible strategic assignment to Maryland State Police installations for deployment.

Although the entire Department of Maryland State Police was tasked to reduce accidents and make the roadways safer through targeting aggressive driving and all unsafe driving actions, the Project ADVANCE system is operated under the direction of the Commercial Vehicle Enforcement Division (CUED). With the support and direction of the command staff there are two Troopers involved in the project on a full time basis. In addition to utilizing the ADVANCE system on the Capital Beltway and roadways throughout Maryland, the operators participate in the public information and education campaign to inform the public of the hazards of aggressive driving and to inform them of the enforcement technologies being utilized by the Maryland State Police by Project ADVANCE. Demonstrations, presentations and interviews to media are a major priority for the ADVANCE project because educating the public of the hazards of unsafe driving is an important tool to helping to make the roadways safe for the public through widespread distribution of promotional materials given to the public.

Project ADVANCE is utilized in many areas of law enforcement in the Maryland State Police. The ADVANCE system has been utilized to target aggressive drivers driving in High Occupancy Vehicle Ianes in violation of the Transportation Article. It was requested by one of the Barrack Commanders to address motorist complaints of the problem. It was requested to review traffic traveling on a ramp in another county, by the

Barrack Commander to address the problem of numerous accidents that were occurring there. Project ADVANCE assisted 2 Barrack areas to target speeding motorcycles, termed "Road Rockets" and also assisted another Barrack target vehicles passing in a no passing zone, as a result of numerous accidents.

Project ADVANCE continues to be funded by the Federal Highway Administration, Office of Motor Carrier. They have committed their continued support for Project ADVANCE, because the system has had such a positive impact on the public and on their perception of how the Maryland State Police can not only use but also have the insight to invent highly advanced law enforcement technologies to rid the roadways in Maryland of unsafe driving.

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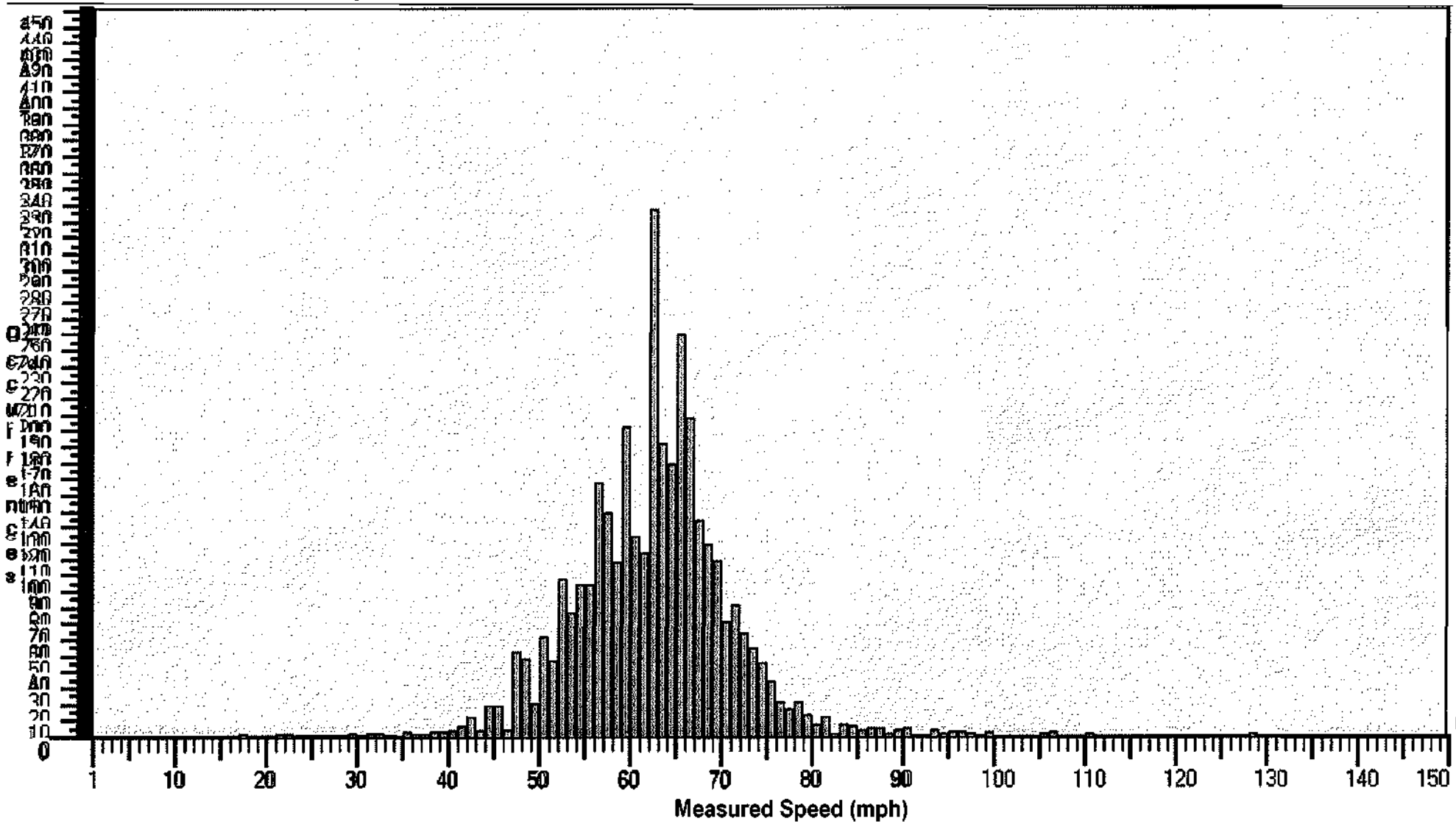
EXHIBIT 42

Tra pee intro Lt ion Dunn dent: 047



Location: N/B 1-95 @ MD RT 43

Deployment Date/Time: 2120/01 from 9:40:37 AM to 12:31:04 PM

Officer ID: 0035

Total Vehicles Measured: 3471

Total Vehicles Exceeding Speed Limit: 2805

Median Speed: 62

85th Percentile Speed: 69

LIDAR Max Ranges (lt):

Lane 1: 800

Lane 2: 1200

Autosense Max Ranges (ft):

Lane 1: 20

Lane 2: 30


EXHIBIT 45