

Traffic Speed Detection Wireless Phone Network-Based System

Makor has developed a system ([US patent 7,801,512](#)) for automatic real time traffic speed detection method and system based on wireless phone network capable of detecting a precise speed of the moving vehicle, comparing the received speed with the speed limit for the certain segment of road, determining if the vehicle is moving over the maximal speed limit and generating speeding violation ticket to the owner of the vehicle. This system utilizes a cell phone network in which the location data obtained from moving vehicles is collected continuously and input into the system. This eliminates the need for developing a dedicated mobile wireless information gathering fleet and other high cost devices requiring large capital investments and considerable work force. The need to this automatic method arises from the fact that traffic violation enforcement typically has been and is an increasingly costly and labor-intensive. Over the years, devices have been introduced to improve the detection, documentation, and prosecution of traffic violations. Recently, a number of unmanned camera-based and radar-based systems for detection and documentation of speeding have been installed. These systems will produce visual images of the speeding offense, those images to be processed later by police personnel, producing speeding tickers, which are mailed to the registered owner of the vehicle. However, all the devices and processes still require police personnel attention to process each traffic violation.

Police personnel' efforts are not only time-consuming but it is also expensive. Additionally, an improved quality and quantity of speeding detections will provide governmental agencies with an ability to generate more speeding violation tickets; hence more money will be obtained by those agencies.

The system uses wireless networks as the sole means to provide precise location information. Technologically, this may be achieved by measuring the distances the signals traveling between a moving wireless phone and a fixed set of base stations, and the times these signals take to travel. This information may then be applied to mathematical and statistical methods to solve the resulting equations. signals obtained from vehicular-based cellular phones provide speed information on moving vehicles, are input into a Moving Vehicle Speed Detection system, and they are stored into the system database to provide speed information that is stored in the form of records.

Another database is used in our system which contains the detailed speed limit data corresponding to all roads sections of the digital map database.

Records obtained from database of speed measurements and database of speed limits for certain section of road then used together to compare actual speed data detected from a certain vehicle traveling along certain road section against the maximal speed limits for that road section

Privacy Protection Issues: We understand the needs of privacy of mobile phone users and, therefore, we will receive all the location information anonymously, (without user's name) for statistical and real-time analysis only.

Main Devices for Measuring Vehicle Speed & Problems Using Them

Electronic Speedometer

It is one of the major devices used by enforcement agents to detect speeding offenses. The device photographs the vehicle at a speed exceeding the speed prescribed by law. It produces an image that includes the vehicle's image, location, and other details provided by the officer, such as: personal details of the officer, place of enforcement, speed limit and more.

The police use two main police cameras to detect speeding offences - F6 and F6A.

1. F6: this device is positioned inside or outside the police car on a tripod. The camera photographs all vehicles traveling at speeds exceeding the speed entered as a maximal speed into the camera.

2. F6A-type cameras are mounted on pillars throughout the country. The camera photographs all vehicles traveling at speeds exceeding the speed entered as a maximal speed into the camera. The speeding ticket (report) will be sent to the driver's home. Often on many pillars, real cameras are not installed but dummy cameras to deter drivers.

In order for the device to be acceptable in court, a number of conditions must be checked:

1. Check if the photos were submitted properly.
2. Whether other vehicles were filmed in parallel with the vehicle.
3. Has a public employee certificate been submitted regarding the quality of the device?
4. Was the policemen operating the device trained properly?
5. Whether periodic tests of the device have been performed.

Laser Speedometer

The laser meter measures the speed of the vehicle by sending a laser beam (pulse) toward the vehicle.

When a police officer measures a speed of movement of the vehicle using this device, the officer is required to maintain eye contact between him and the vehicle until the vehicle is stopped. Also, according to the current practice, it is determined that the manually operated laser device measurement will be valid only for vehicles up to a distance of 300 m.

The ruling established guidelines on the burden of proving the claim based on the results of the laser beam device to prove the excessive speed:

- a. The device was in good working condition.
- b. The device was operated by a trained police officer.
- c. The device is properly operated by the operator and under conditions ensuring that the device measures the speed correctly.
- d. At night inspection - the vehicle measured must be at least 300 m from the policemen.
- e. Whether periodic tests of the device have been performed.

The "BEE" Device

This is a BEE speedometer device (radar in motion) for speed enforcement while on the move.

The device detects speeding offenses through the "Doppler" effect, both in stationary and in motion. The vehicle committed the speeding offense will be stopped at the scene and speeding ticket will be handled to the driver at the scene.

The BEE device panel is installed inside the police car above the watch panel. On the blackboard is an illustration of the car and arrows around it indicating the direction of operation of the BEE. The panel shows the measured vehicle speed and the police car speed. The policeman in the police car can compare the speed of the mobile in the watch panel with the speed in the panel of the BEE device.

The device is equipped with two antennas that allow measuring the speed of vehicles moving on the road in all directions. The device allows measuring the speed of vehicles when the policing vehicle is stationary or when the policing vehicle is in the move.

The BEE device can be used when the police car is in three different situations:

1. When the police car is static.
2. When the car is in motion with the direction of travel of the measured vehicle.
3. When the car is in motion against the direction of travel of the measured vehicle.

A driver caught by the BEE device may be able to challenge the mode of operation of the device and the skills of the operator, inter alia by examining the route of travel of the captured vehicle, factors that may disrupt the operation of the device, eye contact between the policeman and the measured vehicle and the like.

In order for the device to be acceptable in court, a number of conditions must be checked:

1. Was there another vehicle in the direction of your trip near your vehicle?
2. How many seconds passed from the time the policeman stopped you to another vehicle?
3. Were there any high voltage lines, transformers or other objects emitting electromagnetic radiation?
4. Did the police officer make a U-turn and lose eye contact with your car?
5. Are there any paths or roads parallel to the road you traveled on?.