

# STATEMENT OF TECHNOLOGY

## Automated Enforcement Safety Cameras in Cedar Rapids, IA

Under contract with the City, Gatso USA, Inc has installed three types of Automated Enforcement (“ATE”) Cameras in the City of Cedar Rapids. Two are installed at selected intersections and the third on trusses above selected highways within the city limits of Cedar Rapids. Additionally, there is an ATE Camera used in a vehicle so that its location can be mobile (the Mobile Camera). Following is a statement of technology as to each type of ATE Camera.

### A) Intersection Safety Cameras

At selected intersections across the City, Intersection Safety Cameras have been installed. These camera systems capture vehicles violating the red traffic light, speeding, or both. The systems are housed inside double walled stainless steel cabinets mounted to poles typically twelve feet above ground. The cabinets use a triple point locking mechanism for both security and to prevent vandalism. The radar devices are securely affixed to the camera pole twenty-five feet above the roadway. A self test is performed daily to ensure the system is operating properly and a speed accuracy calibration test is performed annually using external test equipment. Radar or in-ground loops are used. If radar, the radar validates the hardware and software parameters and settings every minute even when no vehicle is being detected. If one of the verifications fails, the output of the radar will be set to zero and the signal will not be processed any further. No pictures will be taken. The radar will recover as soon as the verification result is correct. An individual radar device installed over each lane of traffic monitored is used to detect vehicles and also measure speed. If in-ground loops are used, two loops are installed into each lane of traffic monitored. The distance between the loops has been physically measured and entered into the safety camera computer. When a vehicle passes through a lane the metal composition of the vehicle is measured by each loop. The two loops are then compared resulting in many speed measurements. The average of these measurements is the speed displayed in the databar of the second photograph. The status of the traffic signal is monitored via a wired connection from the camera system to the intersection traffic controller cabinet.

#### 1) Intersection Safety Cameras – Red Light Violation

One type of Intersection Safety Camera captures red light violations. For a red light violation to occur, the camera system must receive the proper traffic light sequence of green, yellow, and red from the traffic controller. The vehicle must

travel past the white painted violation line (stopbar) while the traffic light is illuminated red. Vehicles which travel past the violation line on yellow or green will not activate the red light camera.

Two color digital still images will be taken. The first image will display the violating vehicle behind the violation line with the traffic signal illuminated red. The second image will display the vehicle past the violation line and into the intersection with the traffic signal still illuminated red. A supplemental video of the event is also produced.

Automatically created and attached to the still images at the time of violation is a databar. The databar contains all relevant data of the event including date, time, amount of yellow time, amount of red time, speed, and location.

The combined images and databars are encrypted using Advanced Encryption Standard and with the video are transferred via a Virtual Private Network (VPN) for processing.

Processing consists of a human viewing the images and video to determine if a red light violation occurred based on the Business Rules approved by the City. If an event meets the criteria for a violation, the license plate data is electronically sent to the National Law Enforcement Telecommunications Service (Nlets) for name, address, and vehicle information. Upon receipt of the registered owner information another review is made comparing the information to the vehicle in the images. Upon confirmation of a match, the violation event is electronically sent to the Police Dept for an officer to review. The officer will review the event and make the determination if a red light violation occurred. If yes, the violation is printed and mailed. If no, the event is held for a short period of time and then deleted.

## **2) Intersection Safety Cameras – Speed Violation**

The second use for Intersection Safety Camera is for speed. Either in-ground loops or an individual radar device has been installed for each lane of traffic monitored to detect vehicles and measure their speed. If in-ground loops are installed, the metal composition of the vehicle is measured by the in-ground loops resulting in the vehicle speed. If radar is used, a radar beam is emitted across the lane it is monitoring.

For a speed violation to occur, a vehicle must exceed the speed limit configured inside the camera system. This speed limit is determined by the Police Dept and is always several miles above the speed limit posted on signs prior to the intersection.

Two color digital still images will be taken. The first image will display the violating vehicle typically prior to the violation line. For speeding the status of the traffic signal light does not matter. It can be illuminated green, yellow or red. The second image will display the vehicle in the intersection. Automatically created and attached to the still images at the time of violation is a databar. The databar contains all relevant data of the event including date, time, speed, and location.

The combined images and databars are encrypted using Advanced Encryption Standard and with the video are transferred via a Virtual Private Network (VPN) for processing.

Processing consists of a human viewing the images to determine if a speed violation occurred based on the Business Rules approved by the City. If a violation has occurred the license plate data is electronically sent to the National Law Enforcement Telecommunications Service (Nlets) for name, address, and vehicle information. Upon receipt of the registered owner information another review is made comparing the information to the vehicle in the images. If an event meets the criteria for a violation, the violation event is electronically sent to the Police Dept for an officer to review. The officer will review the event and make the determination if a speed violation occurred. If yes, the violation is printed and mailed. If no, the event is held for a short period of time and then deleted.

### **B) Freeway Truss Mounted Cameras – Speed Violation**

At selected freeway trusses along the I-380 highway, Truss Mounted Safety Cameras have been installed. These camera systems capture vehicles speeding. The systems are mounted to the sign trusses typically twenty feet above roadway. A self test is performed daily to ensure the system is operating properly and annually a speed accuracy calibration test is performed using external test equipment. The radar validates the hardware and software parameters and settings every minute even when no vehicle is being detected. If one of the verifications fails, the output of the radar will be set to zero and the signal will not be processed any further. No pictures will be taken. The radar will recover as soon as the verification result is correct.

An individual radar device, camera, and flash unit are installed over each lane of traffic monitored. A radar beam is emitted across the lane it is monitoring.

For a speed violation to occur, a vehicle must exceed the speed limit configured inside the camera system. This speed limit is determined by the Police Dept and is always several miles above the speed limit posted on signs prior to the truss.

Two monochrome digital still images will be taken. The first image will display the violating vehicle a set distance from the camera. The second image will display the vehicle traveled further. Automatically created and attached to the still images at the time of violation is a databar. The databar contains all relevant data of the event including date, time, speed, and location.

The combined images and databars are encrypted using Advanced Encryption Standard and with the video are transferred via a Virtual Private Network (VPN) for processing. Processing consists of a human viewing the images to determine if a speed violation occurred based on the Business Rules approved by the City. If an event meets the criteria for a violation, the license plate data is electronically sent to the National Law Enforcement Telecommunications Service (Nlets) for name, address, and vehicle information. Upon receipt of the registered owner information another review is made comparing the information to the vehicle in the images. Upon confirmation of a match, the violation event is electronically sent to the Police Dept for an officer to review. The officer will review the event and make the determination if a speed violation occurred. If yes, the violation is printed and mailed. If no, the event is held for a short period of time and then deleted.

**B) Mobile Vehicle Camera – Speed Violation**

The City operates a Mobile Safety Camera. This system is installed in a vehicle which is parked along a roadway anywhere in the City. This camera system captures vehicles speeding. An individual radar device, camera, and flash unit are installed in the vehicle. Three plus lanes of traffic can be monitored. A narrow radar beam is emitted across the lanes of traffic being monitored. Each day the vehicle is deployed a tuning fork test is performed on the radar by the deployment officer to ensure the system is operating properly. Annually a speed accuracy calibration test is performed by a NIST traceable independent laboratory.

For a speed violation to occur, a vehicle must exceed the speed limit configured inside the camera system. This speed limit is determined by the Police Dept and is always several miles above the speed limit posted on signs along the roadway.

Two color digital still images will be taken. The first image will display the violating vehicle a set distance from the camera. The second image will display the vehicle has traveled further. Automatically created and attached to the still images at the time of violation is a databar. The databar contains all relevant data of the event including date, time, speed, and location.

The combined images and databars are encrypted using Advanced Encryption Standard and with the video are stored in the system. When the vehicle is returned to the Police

Dept the storage system containing the violation events is removed from the vehicle by the operator and placed in a docking station inside Police Headquarters. Once docked the events are transferred via a Virtual Private Network (VPN) for processing. Processing consists of a human viewing the images to determine if a speed violation occurred based on the Business Rules approved by the City. If an event meets the criteria for a violation, the license plate data is electronically sent to the National Law Enforcement Telecommunications Service (Nlets) for name, address, and vehicle information. Upon receipt of the registered owner information another review is made comparing the information to the vehicle in the images. Upon confirmation of a match, the violation event is electronically sent to the Police Dept for an officer to review. The officer will review the event and make the determination if a speed violation occurred. If yes, the violation is printed and mailed. If no, the event is held for a short period of time and then deleted.

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