Surveillance Impact Report

Automated Red Light and No Turn Enforcement Cameras Municipal Transportation Agency

As required by San Francisco Administrative Code, Section 19B, departments must submit a Surveillance Impact Report for each surveillance technology to the Committee on Information Technology ("COIT") and the Board of Supervisors.

The Surveillance Impact Report details the benefits, costs, and potential impacts associated with the Department's use of Automated Red Light and No Turn Enforcement Cameras (hereinafter referred to as "surveillance technology").

PURPOSE OF THE TECHNOLOGY

The Department's mission is to connect San Francisco through a safe, equitable, and sustainable transportation system.

The surveillance technology supports the Department's mission and provides important operational value in the following ways:

The Department's Automated Enforcement Program (Program) is authorized under California Vehicle Code section 21455.5. The Department began operation of the Program in 1996 to reduce the number of collisions, property damage, physical injuries, and deaths caused by red light running. San Francisco was one of the first cities in the United States to implement a program to enforce laws prohibiting red light running using automated cameras at street intersections. The Automated Enforcement Program is managed by the Department, with support from the San Francisco Police Department, the Superior Court of San Francisco, and the San Francisco City Attorney's Office. The Program uses a network of automated cameras to enforce illegal red light running and illegal turns and is part of the department's Vision Zero commitment to eliminate traffic fatalities. Decisions for the placement of automated enforcement cameras are based on public safety with priority given to the intersections in the City with the highest collision totals. The Department tries to implement all other traffic safety measures first before considering an automated enforcement installation at an intersection. The Department's combined automated enforcement, engineering, and education efforts have resulted in a 66% citywide drop in injury collisions resulting from red light running between 1997 and 2022.

The Department shall use the surveillance technology only for the following authorized purposes:

Authorized Use(s):

1. *To cite and prosecute red light violations.*
2. *To cite and prosecute illegal turn violations.*

Surveillance Oversight Review Dates
PSAB Review: 11/07/2024
COIT Review: TBD (list all dates at COIT, and write "Recommended: MM/DD/202X" for rec date)
Board of Supervisors Approval: TBD

3. *To perform engineering analysis from associated data such as vehicle counts, vehicle speeds and violation numbers.*

Examples of use case 3, engineering analysis, include:

- *Confirm that our yellow light durations are set appropriately to avoid BOTH rear end collisions and unjust red light camera violations. Key metrics in this analysis are the speed of the vehicle being cited, whether it's accelerating or decelerating through the intersection, and how long the signal has been re when cited.*
- *Confirm the appropriateness and effectiveness of traffic signal coordination at managing traffic speeds. For example, a properly coordinated signal will also reduce red light camera violations, while a poorly coordinated one could encourage some motorists to "race" toward a green light that's about to change.*

Surveillance technology may be deployed in the following locations, based on use case:

Cameras currently enforce 19 approaches at the 13 intersections listed below, all of which enforce red light violations, except for the intersection at Market Street and Octavia Boulevard, which enforces a posted NO RIGHT TURN regulation facing eastbound Market Street. The direction of traffic (approach) enforced at each intersection is indicated in parentheses. In 2022, the Department increased the scope of the contract by eight approaches (listed below), which are currently under design. Once construction is completed, cameras will enforce a total of 27 approaches at 21 intersections.

Currently enforced locations:

1. 6th St at Bryant St (eastbound, southbound)
2. 19th Ave at Sloat Blvd (northbound, southbound)
3. Fell St at Masonic Ave (westbound)
4. Hayes St at Polk St (southbound, westbound)
5. Market St at Octavia Blvd (eastbound illegal right turns)
6. Oak St at Octavia Blvd (eastbound, northbound, eastbound right turn lanes)
7. Park Presidio Blvd at Lake St (southbound)
8. So. Van Ness Ave at 14th St (northbound)
9. 4th St at Harrison St (southbound, westbound)
10. 6th St at Folsom St (southbound)
11. 8th St at Folsom St (southbound)
12. Divisadero St at Bush St (northbound)
13. Van Ness Ave at Broadway (southbound left turn lanes)

Future expansion locations (currently in design):

1. Divisadero St at Oak St (southbound)
2. Franklin St at Lombard St (northbound)
3. Geary Blvd at Gough St (eastbound)
4. Golden Gate Ave at Franklin St (eastbound)
5. Gough St at Oak St (southbound)
6. Harrison St at 6th St (westbound)
7. Masonic Ave at Fell St (northbound)
8. Presidio Ave at Pine St (northbound)

It is possible that additional intersections may be added in the future.

Description of Technology

The City's Automated Enforcement Program has been in operation since 1996. The Department installed Automated Enforcement systems at intersections with chronic red light running and illegal turn problems that endanger pedestrian, bicycle and vehicular traffic. These systems enforce traffic law by photographing the license plates and drivers of those vehicles that run red lights or make illegal turns and issuing citations to alleged violators by mail.

In 2019 the Department upgraded the Automated Enforcement System with state-of-the-art digital cameras and radar vehicle detection. The system equipment is owned, operated, and maintained by Verra Mobility (Contractor) and leased to the Department. The Contractor also provides program administration, violation review prior to SFPD approval, processing, citation printing and mailing, tree trimming, and construction design services.

Below is a description of how the technology works to detect and capture red light and illegal turn violations (events), followed by a description of how captured events are reviewed and approved to be issued and mailed as citations to alleged violators. (Note that the vehicle detection technology used to detect illegal turns is slightly different than the vehicle detection used for red light enforcement.)

The system captures photos of the license plate and the vehicle driver in accordance with state law. In California, red light running, and illegal turns are moving violations that result in points on a driver's DMV record. As such, a photo of the driver's face is necessary to identify the driver and establish responsibility for the moving violation.

Equipment and Photographs:

The camera control unit manages each component of the Automated Enforcement system. The system utilizes two or more high-speed digital cameras paired with illuminating strobes and a High Definition (HD) video camera to capture clear photos and video in all weather conditions. The camera control unit monitors a 3D traffic radar aimed at the roadway and tracks the position, speed, and direction of each vehicle passing through its field of view. Additionally, the camera control unit attaches to the

traffic controller to monitor the color of each light phase as they change. To protect the system from tampering, a locked metal housing secures the complete system.

The system only activates into enforcement mode when the light phase cycles in sequence from yellow to red. Drivers who enter the intersection when the light phase is green or yellow and are in the intersection as the light turns yellow or red are not photographed. The design of this system only catches those violators who enter the intersection after the traffic signal phase has turned red.

When the traffic signal phase has turned red and the 3D traffic radar detects a vehicle entering the intersection, the system captures three digital photographs and a short video clip of the event. The system takes two photos of the rear and one photo of the front of the violating vehicle using two separate cameras. Placing one digital camera behind the violation point clearly shows the position of the vehicle relative to the violation point and the color of the traffic signal phase both before and after the vehicle enters the intersection. Placing an additional digital camera across the intersection photographs the front of the vehicle and captures a clear image of the driver. Each digital image appends the violation data, including date/time/lane/redlight time/etc., to that image. This violation data appears at the top of each image in the black data bar. Placing a high-resolution digital camera and HD video camera behind the violation point shows the vehicle and traffic signal phase prior to the vehicle entering and exiting the intersection.

To enforce illegal right turns made from Eastbound Market Street at Octavia Boulevard, the Department installed an Automated Enforcement System that operates similar to the red light system described above, although instead of using radar for detection, the system utilizes a video stream to detect and capture evidence of vehicles making a right-hand turn. Vehicles going straight through the intersection will not activate the system. When the system detects a vehicle entering the intersection and making an illegal turn, the system captures three digital photographs and a short video clip of the event.

Violation Processing:

Once events are loaded into a Violation Processing System (VPS), the Contractor's trained technicians administratively review and categorize each event based on the Department's approved Business Rules Questionnaire (BRQ). For events meeting the requirements of a potential violation in the BRQ, the VPS obtains the name, address, and identifying information of the registered owner from the California Department of Motor Vehicles or the analogous agency of another state or country, based upon the license plate of the photographed vehicle. Once this information is obtained, a San Francisco Police Officer reviews, signs and issues the citation containing four images of the violation. The four images show: two full rear views of the violating vehicle, a close-up of the license plate, and a close-up of the driver. The close-up of the license plate and the close-up of the driver are cropped and enlarged versions of other images. The system then sends the signed citation (Notice to Appear) to the alleged violator by mail.

Third-Party Vendor Access to Data

All data collected or processed by the surveillance technology will be handled or stored by an outside provider or third-party vendor on an ongoing basis. Specifically, data is currently handled by Verra Mobility, the Department's existing contractor.

IMPACT ASSESSMENT

The impact assessment addresses the conditions for surveillance technology approval, as outlined by the Standards of Approval in San Francisco Administrative Code, Section 19B:

1. The benefits of the surveillance technology outweigh the costs.
2. The Department's Policy safeguards civil liberties and civil rights.
3. The uses and deployments of the surveillance technology are not based upon discriminatory or viewpoint-based factors and do not have a disparate impact on any community or Protected Class.

The Department's use of the surveillance technology is intended to support and benefit the residents of San Francisco while minimizing and mitigating all costs and potential civil rights and liberties impacts of residents.

A. Benefits

The Department's use of the surveillance technology has the following benefits for the residents of the City and County of San Francisco:

	Benefit	Description
☐	Education	
☐	Community Development	
☒	Health	Decreases the risk of traffic collisions resulting in serious injuries/fatalities by reducing red light running and illegal turns.
☒	Environment	Improves street conditions for all users of the transportation network by enforcing traffic laws.
☒	Criminal Justice	Enforces red lights and illegal turns without bias and removes the potential of escalation during in-person traffic enforcement.
☐	Jobs	

☐	Housing	
☒	Public Safety	The reduction in red light running and illegal turns makes intersections safer for pedestrians, bicyclists, and other vehicles.

B. Civil Rights Impacts and Safeguards

The Department has considered the potential impacts and has identified the technical, administrative, and physical protections as mitigating measures:

- **Dignity Loss**. Administrative safeguards make this impact (e.g., embarrassment and emotional distress) highly unlikely because the surveillance technology is used for the strictly limited purposes of identifying illegal red light running and illegal turns, and the resulting images and violation data are not disclosed to the public. If it is determined that a captured event is not a violation, the event is rejected, the images are destroyed, and no personal information is pulled from the DMV. In addition, for violations that do become issued citations, any images of passengers are cropped or blurred out of the violation photos to protect their privacy.
- **Discrimination**: Administrative safeguards make this impact (i.e., unfair or unethical differential treatment of individuals or denial of civil right) highly unlikely because the Program applies equally to all vehicles travelling through intersections where the technology is deployed. Additionally, technology was deployed at intersections with the highest rate of crashes due to red light running. This technology removes the possibility of bias when a police officer is required to stop and detain a driver who runs a red light.
- **Economic Loss:** Administrative safeguards make this impact (i.e., identity theft/ misidentification) minimal because the resulting images and violation data are not disclosed to the public. Additionally, each image is checked against a DMV-furnished photograph of the vehicle's registered owner to ensure there is a match. If a citation is issued, the person receiving a citation has the right to due process and to argue their case in Court. If the person receiving a citation was not the driver, there are administrative processes to dismiss or transfer liability.
- **Loss of Autonomy:** Administrative safeguards make this impact (i.e., loss of control over decisions on how personal information is used or processed) highly unlikely because the Program is used only to identify vehicles for purpose of illegal red light running and illegal turns on red. A subpoena or search warrant signed by a judge is required to release camera images and/or owner/driver information to law enforcement investigating an unrelated crime.
- **Loss of Liberty:** Technical safeguards make this impact (i.e., improper exposure to arrest or detainment due to incomplete or inaccurate data) highly unlikely because system equipment is tested for accuracy, inspected, and maintained on a regular schedule. Additionally, each image

is checked against a DMV-furnished photograph of the vehicle's registered owner to ensure there is a match.

- **Physical Harm**: Technical safeguards make this impact (e.g., physical harm or death) extremely unlikely because this technology removes the potential of escalation during an in-person police traffic stop that could lead to injury or death.
- **Loss of Trust:** Technical safeguards make this impact (e.g., breach of implicit or explicit expectations or agreements about the processing of data, or failure to meet subjects' expectation of privacy for information collected) extremely unlikely because Department limits access to the data to only authorized users. By State law, camera images and registered owner/driver information cannot be used for any other purpose other than citing and prosecuting red light and illegal turn violations. Camera images and registered owner/driver information cannot be disclosed to anyone other than the defendant receiving the citation, unless the department is served with a search warrant or subpoena signed by a judge.

The administrative safeguards are:

- Trained contractor staff administratively review and categorize each event based on the Department's approved Business Rules Questionnaire (BRQ). For events meeting the requirements of a potential violation in the BRQ, the registered owner's information is pulled from the DMV database based on the license plate of the photographed vehicle. Once this information is obtained, a San Francisco Police Officer reviews, signs and issues the citation.
- Images (photos and videos) of events captured by the cameras that do not result in citations are destroyed within 15 business days of determining the event does not meet the City's Business Rules, or the SFPD's rejection of the event.
- Per state law (CVC 21455.5), camera images and registered owner/driver information cannot be used for any other purpose other than citing and prosecuting red light and illegal turn violations. Camera images and registered owner/driver information cannot be disclosed to anyone other than the defendant receiving the citation, unless the department is served with a search warrant or subpoena signed by a judge.
- If the registered owner of a vehicle was not the driver at the time of the violation, there are processes in place to address that. There is a transfer of liability process for the registered owner to identify the actual driver and transfer the citation to that person. There is a secondary review process if the registered owner cannot identify who was driving. If the vehicle was stolen, the registered owner can provide a police report to have the citation dismissed.
- Anyone receiving a citation has the right to due process and to argue their case in Court.

The technical safeguards are:

- Per the Contract Agreement, Contractor is required to encrypt all System-generated data prior to electronic transmission via broadband communication. To encrypt such data, Contractor is

required to use a secure, tamperproof encryption system; and Contractor is required to encrypt data using, at minimum, the triple-DES encryption algorithm.

- A secure login/password is required to access Contractor's software. Only trained authorized staff have access.
- The system only enters enforcement mode when the light phase cycles in sequence from yellow to red. Drivers who enter the intersection when the light phase is green or yellow and are in the intersection as the light turns yellow or red are not photographed. The design of the system only catches those violators who enter the intersection after the traffic signal phase has turned red.
- A digital high-resolution front-facing camera is used to take a clear photograph of the driver to ensure proper identification of the person responsible for the moving violation.
- The rear-facing HD camera and HD video camera show the color of the traffic signal before and after the vehicle enters the intersection, which confirms if a violation did occur.
- The continuous video camera footage records over itself after 30 days and is not saved (apart from the short violation video clip that is saved as evidence with each citation).
- The system equipment is tested, inspected, and maintained on a regular schedule. Twice a day, the system runs an automated testing sequence. Once a week, technicians remotely inspect and test all system equipment and the functionality of the system as a whole. Once a month, a field technician physically inspects and cleans/maintains the system equipment in person at each intersection. The system alerts Contractor technical staff of any malfunctions, who have 24/7 remote access to assess and address any malfunctions.

The physical safeguards are:

- Equipment is placed high up on poles and secured in locked metal housing to protect them from tampering.
- Signs are posted at camera-enforced intersections to warn motorists.

C. Fiscal Analysis of Costs and Benefits

The Department's use of the surveillance technology yields the following business and operations benefits:

	Benefit	Description
☒	Financial Savings	Cameras are more cost-efficient than having police officers posted at intersections 24 hours a day, 7 days a week.
☒	Time Savings	Cameras save time that police officers can spend on other priorities.
☐	Staff Safety	

☒	Data Quality	Associated data collected by the system such as vehicle counts, vehicle speeds and violation numbers can be used for engineering analysis by the Department to assess traffic patterns, traffic safety, and the effectiveness of automated cameras at reducing red light running and illegal turns.
☐	Other	

The fiscal cost, such as initial purchase, personnel and other ongoing costs, include:

Number of Budgeted FTE (new & existing) & Classification	1823 (0.2 FTE), 1824 (0.4 FTE), 5207 (0.1 FTE), 9504 (0.4 FTE) at MTA, 1.0 FTE Q004 Police Officer III at SFPD	
	Annual Cost	***One-Time Cost***
Total Salary & Fringe	$420,000.00	$0.00
Software	$0.00	$0.00
Hardware/Equipment	$0.00	$0.00
Professional Services	$800,000 to 1,100,000.00	$0.00
Training	$0.00	$0.00
Other	$0.00	$2,800,000.00
Total Cost	$1,220,000 to $1,520,000.00	$2,800,000.00

The Department funds its use and maintenance of the surveillance technology through:

General Fund.

COMPARISON TO OTHER JURISDICTIONS

The surveillance technology is currently utilized by other governmental entities for similar purposes.

Other government entities have used the surveillance technology in the following way: The first red light camera program was implemented in 1992 in New York City. San Francisco installed its first red light cameras in 1996. Other major U.S. cities with red light safety cameras include Chicago, Denver, New Orleans, New York City, Philadelphia, Seattle and Washington, D.C. In 2023, 337 U.S. communities operated red light safety camera programs, including 33 in California. In the Bay Area, the following cities have red light camera programs: Daly City, Fremont, Millbrae, Napa, San Jose, and San Leandro (IIHS, 2024).

The effectiveness of the surveillance technology while used by government entities is determined to be the following: From the Insurance Institute for Highway Safety (IIHS) website (https://www.iihs.org/topics/red-light-running): Red light safety cameras have been shown to reduce both red light violations and crashes. A series of IIHS studies in different communities found that red light violations are reduced significantly with cameras. Institute studies in Oxnard, California, and Fairfax, Virginia, reported reductions in red light violation rates of about 40% after the introduction of red light safety cameras (Retting et al., 1999; Retting et al., 1999). In addition to the decrease in red light running at camera-equipped sites, the effect carried over to nearby signalized intersections not equipped with cameras. A more recent IIHS study in Arlington, Va., also found significant reductions in red light violations at camera intersections one year after ticketing began (McCartt & Hu, 2014). These reductions were greater the more time had passed since the light turned red, when violations are more likely to result in crashes. Violations occurring at least a half second after the light turned red were 39% less likely than would have been expected without cameras. Violations occurring at least 1 second after were 48% less likely, and the odds of a violation occurring at least 1.5 seconds into the red phase fell 86%. When it comes to crash reductions, an IIHS study comparing large cities with red light safety cameras to those without found the devices reduced the fatal red light running crash rate by 21% and the rate of all types of fatal crashes at signalized intersections by 14% (Hu & Cicchino, 2017). Previous research in Oxnard, California, found significant citywide crash reductions followed the introduction of red light safety cameras, and injury crashes at intersections with traffic signals were reduced by 29% (Retting & Kyrychenko, 2002). Front-into-side collisions -- the crash type most closely associated with red light running -- at these intersections declined by 32% overall, and front-into-side crashes involving injuries fell 68%. The Cochrane Collaboration, an international public health organization, reviewed 10 controlled before-after studies of red light safety camera effectiveness (Aeron-Thomas & Hess, 2005). Based on the most rigorous studies, there was an estimated 13%-29% reduction in all types of injury crashes and a 24% reduction in right-angle injury crashes. When camera programs are discontinued, crash rates go up. An IIHS study compared large cities that turned off red light safety cameras with those with continuous camera programs. In 14 cities that shut down their programs during 2010-14, the fatal red light running crash rate was 30% higher than would have been expected if they had left the cameras on. The rate of fatal crashes at signalized intersections was 16% higher (Hu & Cicchino, 2017). A study in Houston, which turned off red light

safety cameras in 2011, found that the camera deactivation was associated with a 23% increase in right-angle red light running crashes at the intersections that previously had cameras (Ko et al., 2017).

The adverse effects of the surveillance technology while it has been used by other government entities are:

	Effect	Description
☐	Unanticipated Costs	
☐	Failures	
☐	Civil Rights and/or Civil Liberties Abuses	
☒	Other	Some studies have reported that while red light safety cameras reduce front-into-side collisions and overall injury crashes, they can increase rear-end crashes. However, such crashes tend to be much less severe than front-into-side crashes, so the net effect is positive. A study sponsored by the Federal Highway Administration evaluated red light safety camera programs in seven cities (Council et al., 2005). It found that, overall, right-angle crashes decreased by 25% while rear-end collisions increased by 15%. Results showed a positive aggregate economic benefit of more than $18.5 million in the seven communities. The authors concluded that the economic costs from the increase in rear-end crashes were more than offset by the economic benefits from the decrease in right-angle crashes targeted by cameras. Not all studies have reported increases in rear-end crashes. The review by the Cochrane Collaboration did not find a statistically significant change in rear-end injury crashes (Aeron-Thomas & Hess, 2005).