



HOUSTON TRANSTAR
2017 ANNUAL REPORT





Established in 1993, Houston TranStar is a formal partnership among the principal transportation and emergency management agencies in Harris County. It houses multi-agency operations and management of the region's transportation system, including the following partners and their operations:

- Texas Department of Transportation (TxDOT)
 - Freeway Operations,
 - Intelligent Transportation Systems (ITS) Design and Special Projects,
 - Media Contractors,
 - SH 288 Tolling Support Operations and
 - Transportation Management Systems.
- Metropolitan Transit Authority of Harris County (METRO)
 - Regional Bus System,
 - Light Rail System,
 - METRO Police and
 - Office of Emergency Management.
- Harris County
 - Traffic & Transportation Group,
 - Sheriff's Office and
 - Office of Homeland Security & Emergency Management.
- The City of Houston
 - ITS & Safety,
 - ITS Plan Review and
 - Mobility and Traffic.

This partnership has evolved into a primary resource from which multiple state, county and local agencies respond to incidents and emergencies in Harris County and beyond. Houston TranStar's collaborative effort seeks to provide highly effective transportation and emergency management services through the combined use of the partners' collective resources to maximize safety and mobility to the public.

This 21st Annual Report for Houston TranStar reviews the center's performance and summarizes the estimated return on investment as quantified by the estimated benefit/cost ratio. It also includes conservative estimates of the impact of center operation on regional mobility (travel time, speed and delay), customer satisfaction and energy and environmental benefits.

In 2017, the travel time savings attributable to TranStar's operation was estimated at nearly 21.6 million vehicle-hours. This is worth nearly \$497 million in road user cost savings and an additional \$91 million (more than 40 million gallons) in reduced fuel consumption. The total estimated benefits of TranStar operation in 2017 were more than \$588 million. Comparing these benefits to the annualized TranStar operating cost estimate of \$30.1 million yields an estimated benefit/cost ratio for Houston TranStar center operation of 19.5 for 2017. In other words, for every dollar spent on Houston TranStar's operations, the region realizes a benefit of \$19.50.

Since 1997, Houston TranStar's pivotal role in the transportation of people and goods in the greater Houston region saved motorists an estimated \$6 billion in reduced travel costs.

Houston TranStar 2017 Activities

TranStar partner agencies continued ongoing 24-7 transportation system operations and emergency planning and response. Significant agency activities at the center included the following:

- In February, all collaborating agencies activated for Super Bowl LI at NRG Stadium.
- The partner agencies developed a new interlocal agreement for the continued operation of Houston TranStar.
- TranStar partners, in conjunction with the Texas A&M Transportation Institute, released the Houston TranStar mobile application for iOS and Android devices.
- In August, all partner agencies activated for Hurricane Harvey
- In November, all collaborating agencies activated for the World Series at Minute Maid Park.
- The center hosted delegations from Mongolia, China, South Korea, Argentina, Peru and the Dominican Republic and gave tours to 2,072 visitors.

In addition, after nearly 20 years at Houston TranStar, Executive Director Jack Whaley retired in November. The Partnership wishes to acknowledge Mr. Whaley's efforts in making Houston TranStar a world-class traffic and emergency management center.

Harris County Office of Homeland Security & Emergency Management (HCOHSEM)

The Harris County Office of Homeland Security & Emergency Management (HCOHSEM) is responsible for the planning, coordination and implementation of all emergency management and homeland security related activities for Harris County. It works before, during and after emergencies to minimize impacts to its communities. HCOHSEM also works year-round to promote disaster preparedness and resilience through regional emergency planning, training and community outreach efforts.

HCOHSEM's operation at Houston TranStar enables responders to monitor the transportation network during a large-scale emergency. This provides for logistical coordination of resources based on traffic conditions, as well as evacuation management.



HCOHSEM has a set of critical functions that enhance preparedness and facilitate response in an emergency:

- Coordinates with federal, state, local, public and private-sector partners to facilitate quick and effective recovery efforts for large-scale emergencies.
- Keeps elected officials, stakeholders, emergency management partners, residents and the media informed before, during and after the event.
- Coordinates the county's response to requests for emergency disaster assistance from neighboring jurisdictions

- Conducts regional emergency planning, training and community outreach programs to maintain preparedness for a disaster.
- Continuously monitors severe weather, terrorism alerts and other developing situations.
- Responds to industrial incidents to support facilities and provide timely information to protect the impacted community.



HCOHSEM experienced many challenges and accomplishments in 2017:

- HCOHSEM was activated 24 times, including 10 weather-related events.
- With more than 150,000 visitors attending the game and related events, HCOHSEM activated January 27 - February 6 to monitor Super Bowl LI and related activities at NRG Stadium.
- HCOHSEM went to Level 1 activation (Maximum Readiness) August 23 - September 26 to address Hurricane Harvey and its aftermath. With nearly 50 inches of rain, resulting in 36 deaths and 180,000 homes flooded, HCOHSEM worked with 55 federal, state and local agencies to inform the public, assist those impacted by flooding and coordinate efforts to address the destruction caused by the storm.
- HCOHSEM was activated to monitor the Major League Baseball American League Championship Series and the World Series, as the Houston Astros achieved their first championship.
- HCOHSEM responded to nine industrial-related incidents including chemical plant releases and collisions involving the transport of harmful materials.

City of Houston



The City of Houston's Transportation & Drainage Operations (TDO) directs design and installation of new traffic signals and operates and manages the city's signal system and signal communications infrastructure. The city maintains and operates more than 2,450 signalized intersections.

The TDO's Traffic Signal Performance Improvement Program (TSPiP) is a coordinated effort to ensure the city's traffic signals are using the most up-to-date traffic data, while taking advantage of the most recent technologies to produce new customized signal timings. TSPiP's revolving program is scheduled to revisit each major corridor every four years for retiming.

The City of Houston manages:

- 2,490 traffic signals
- 1,600 school flashers
- 180,000 streetlights
- 1,800 freeway safety lights

In addition to providing the program management for TSPiP, the TDO develops signal optimization plans for the corridors. About 800 traffic signals are evaluated and optimized yearly.

Major activities conducted by the city in 2017 include:

- Deployment of Bluetooth technology at more than 600 intersections to capture real-time travel times and speeds on arterials, which is now provided on the Houston TranStar website.
- Development of an Advanced Traffic Management System, which will include CCTV cameras, dynamic message signs (DMSs), vehicle detection and permanent count stations, which will allow quicker detection and response to abnormal traffic conditions and incidents and share real-time information with the traveling public.
- An expansion of the City's fiber network to improve center-to-center communications between public works facilities

METRO



Houston TranStar houses several METRO's operations

including bus and METRORail dispatch, METRO Police Communication Section operations, High-Occupancy Vehicle management systems, METRO's new social media program, the Office of Emergency Management and traffic incident management programs.

METRO activity highlights for 2017 included:

METRO's services include:

- Service to 15 cities within Harris County
- 1,236 active buses on 116 routes
- 22 miles of light-rail on three lines
- 6,442,688 average monthly passenger trips

- Activated emergency operations eight times for special events including Super Bowl LI and Hurricane Harvey
- Provided transportation assistance during Hurricane Harvey for citizens in the region
- Added public outreach staff on the Houston TranStar operations floor to facilitate communications about transit and traffic issues to METRO patrons

Harris County Traffic Management

The Harris County Public Infrastructure Department's Traffic Maintenance Group operates and maintains the County's traffic signal infrastructure, including the fiber optic communications network.



Harris County manages:

- 955 traffic signals
- 130 CCTV Cameras
- 250 miles of fiber optics

Major activities during 2017 included:

- Integration of fiber optic cable on several corridors throughout Harris County into the TranStar Video Network
- Procurement of a new centralized signal software system
- Provided additional fiber connectivity to the Port of Houston to allow for enhanced port security.

TxDOT-Houston District



TxDOT is responsible for traffic management on freeways and state-maintained roads in the region. Since the 1980's, TxDOT's Computerized Traffic Management System (CTMS) has grown to nearly 1,550 bi-directional miles in the urban areas of the Houston District and evacuation routes on IH-10, IH-45 and US 290.

CTMS consists of multiple technologies to enhance monitoring of the transportation system, allow faster detection of slowdowns and incidents, and improve management of the freeway system. Systems include:

- Closed-Circuit TV (CCTV) cameras to monitor the system and provide remote visuals for responding agencies during incidents
- Dynamic Message Signs (DMS) to provide traveler information about slowdowns, incidents and special events
- Bluetooth and Automatic Vehicle Identification (AVI) devices to capture system travel times and speeds and identify roadway segments with abnormal traffic.

TxDOT-Houston District manages:

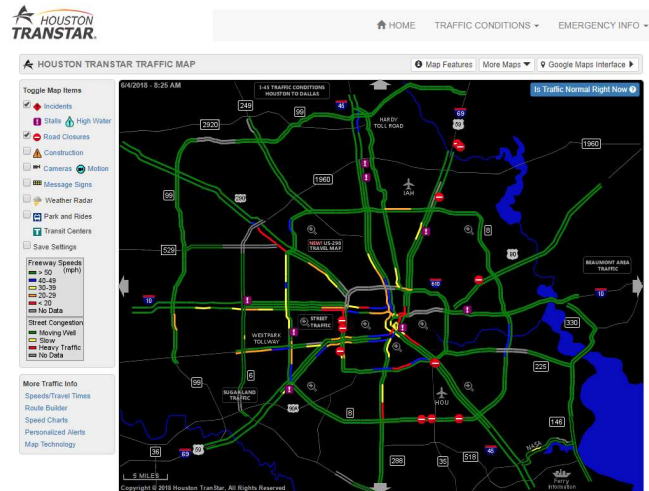
- 761 CCTV Cameras
- 196 DMS
- 361 Bluetooth/AVI Travel Time Readers
- 217 Radar Units
- 61 Ramp Meters
- 17 Wrong Way Driver Detection Devices

Major activities conducted by TxDOT in 2017 included:

- Upgraded CCTV cameras
- Implemented centralized connectivity to 339 traffic signals
- Upgraded fiber networks on portions of IH 45, SH 225 and on US 90
- Posted nearly 24 million DMS messages displaying travel times, incidents, Amber/Silver Alerts and special event information
- Began deployment of a Smart Work Zone on the Interstate 10 widening project in Waller County
- Installed 17 Wrong Way Detection systems
- Installation of truck rollover speed signs at 17 interchange approaches

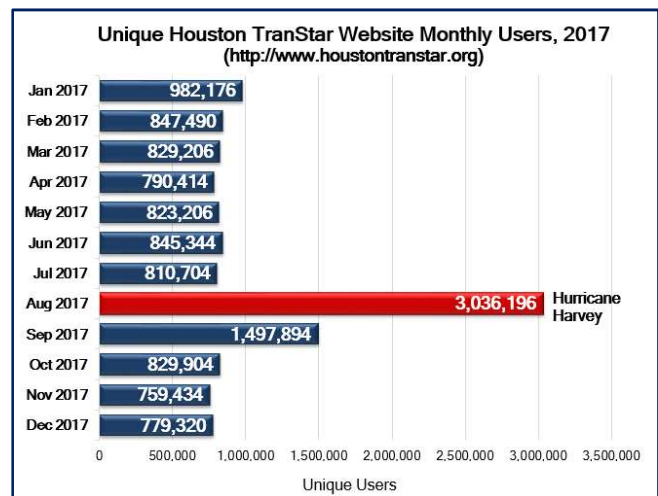
Traveler Information

One of the most visible products of Houston TranStar center operation is traveler information. Local Internet and media outlets use the TranStar CCTV feeds, Internet-based incident reporting and travel time reporting systems in their daily traffic functions.



Highlights for the TranStar Website in 2017 included:

- An average of 1,069,300 monthly unique users
- More than 3 million unique users during Hurricane Harvey
- 294 million CCTV views (82.7 million during Harvey)
- Release of the Houston TranStar Mobile Application

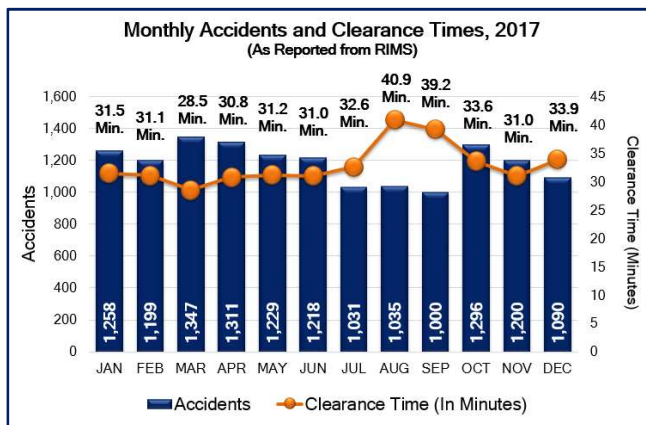


Average monthly unique users of the website increased 36.1 percent from 2016. Hurricane Harvey contributed to more than 3 million unique users in August. With multiple options available for information on traffic conditions, Houston TranStar remains a critical source for traffic information for the Greater Houston area.

Traffic Incident Management

Detection, response and clearing freeway incidents are essential functions of Houston TranStar. The facility houses multiple programs involved in the region's traffic incident management activities. The systems managed through Houston TranStar, including CCTV cameras, DMS signs and travel time detectors, play an important role in identifying incidents and notifying responders and the general public. The following organizations play key roles in addressing incidents to promote quick clearance:

- TxDOT staff monitor the freeway system 24/7 for stalls and incidents using CCTV and speed detection systems, notifying responder agencies of incidents and tracking progress. TxDOT staff coordinates with the media about major incidents, posts messages on DMSs and updates the Houston TranStar traffic map.
- The SAFEClear program dispatches tow trucks to stalls and crashes on the freeway system within the City of Houston.
- HCSO's Incident Management Unit (IMU) monitors the freeway to dispatch MAP units, provide remote authorization of SAFEClear tows for disabled vehicles and coordinate with other responding agencies for collisions.
- METRO Police monitors the HOV lanes and provides assistance for an incident.
- The Blueridge Transportation Group (BTG), the operator of SH 288, monitors the freeway for incidents and coordinates response.



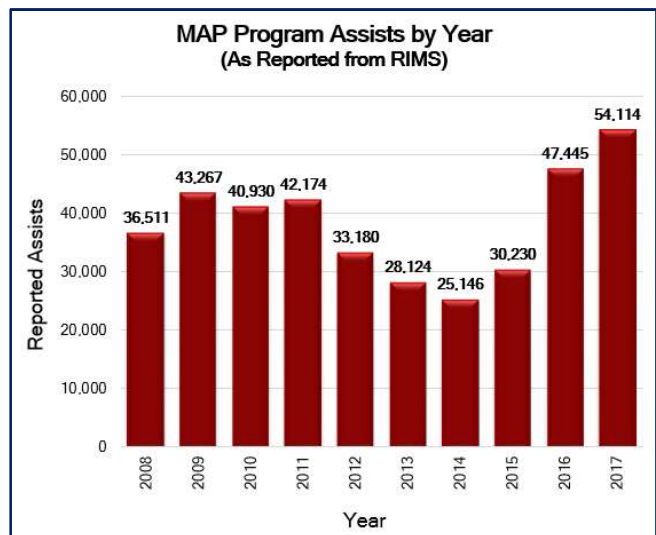
In 2017, TxDOT staff identified 14,214 crashes, down 1.1 percent from 2016. Average clearance times increased slightly from 31.5 minutes in 2016 to 32.7 minutes in 2017. Increased clearance times during and following Hurricane Harvey contributed to the overall increase.

Motorist Assistance Program (MAP)



The Harris County Motorist Assistance Program (MAP) began in 1986. MAP operates from 6am to 10pm Monday through Friday and consists of 18 Harris County Sheriff's Office (HCSO) deputies operating in two shifts. Patrons call 713-CALL-MAP (713-225-5627) to reach a dispatcher. MAP services include:

- Changing a flat tire.
- Supplying fuel, water and/or air.
- Jump starting vehicles.
- Assisting with minor engine repair.
- Removing stranded vehicles from the roadway.
- Transporting motorists to a safe location.
- Traffic control during incidents



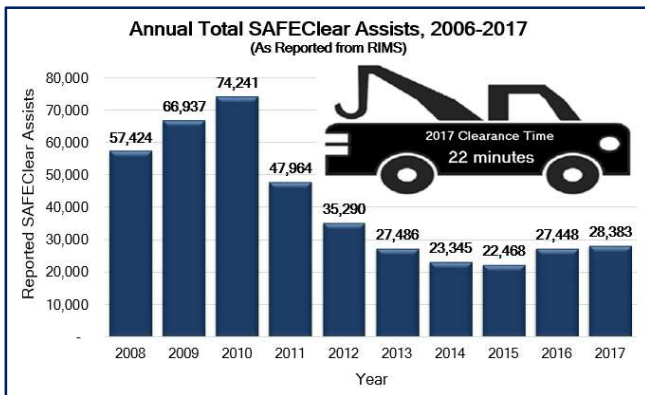
MAP conducted 54,114 assists in 2017, up 14.1 percent from 2016. In addition to aiding stranded patrons, MAP deputies have increased their role in providing scene management for freeway crashes. The program costs approximately \$2.4 million per year, funded through HCSO and the Houston-Galveston Area Council (H-GAC).

SAFEClear Program

SAFEClear, the City of Houston's rapid clearance program, brings quick response to disabled vehicles to reduce traffic congestion and increase safety. Tow operators remove the vehicle to a safe location within a mile of the freeway or to a vehicle storage facility for 48 hours, without storage fees, where patrons can make arrangements to address their vehicles.



The program utilizes qualified and vetted towing companies to rapidly remove disabled vehicles from the freeway to increase patron safety, reduce secondary crashes and decrease incident-related travel delays.



There were 28,383 SAFEClear assists in 2017, a 3.4% increase from 2016. In 2017, the average time from incident detection to clearance was 22 minutes, down from 39 minutes in 2016.

Currently, the SAFEClear Program requires stranded patrons to pay tow operators \$60 for disabled, non-crashed vehicles on the shoulder and \$159 when in a moving lane of traffic. However, in 2018 the City of Houston, with funding from H-GAC and TxDOT, will provide removals from the freeway at no charge to the stranded patron.

TranStar's Benefit to the Region

For the past 21 years, this report has used an approach which estimates operational benefits in terms of freeway motorist delay savings. Determining benefits is treated conservatively because many are not easily quantifiable and some are intangible.

Traffic delays on freeway mainlanes were estimated using TxDOT's travel time monitoring system, traffic volumes from TxDOT's roadway inventory files and from HCTRA on the toll road system. The evaluation process employs national benchmarks and experience to establish Houston TranStar goals for expected benefits. TranStar staff is relied upon to estimate performance of the transportation systems in terms of percent attainment of goals.

Annual benefits due to TranStar operations were \$588 million, which included:

- 21.6 million fewer vehicle-hours - \$496.7 million
- 40.4 million gallons of fuel saved - \$91.3 million

Benefit Cost Calculation:

Annual Benefits	\$588,040,000
Annualized Costs	\$30,104,000
Benefit/Cost Ratio	19.5

With an annualized cost estimate of center operation calculated at \$30.1 million in 2017, the center recognized a 19.5-to-1 benefit-cost ratio.

Based on USDOT's Bureau of Transportation Statistics, the reduction in fuel consumed resulted in the following estimated emission reductions:

Hydro-carbons	Carbon Monoxide	Carbon Dioxide	Nitrogen Oxide
846 tons	9,294 tons	357,136 tons	1,527 tons

