



2022 ANNUAL REPORT

PREPARED BY THE TEXAS A&M TRANSPORTATION INSTITUTE
JULY 2022



Established in 1993, Houston TranStar is a formal collaboration among the principal transportation and emergency management agencies in Harris County. It houses multi-agency operations and management of the region's transportation system. The following agencies and operations are co-located at TranStar:

HOUSTON TRANSTAR PARTNER AGENCIES

<p>INTELLIGENT TRANSPORTATION SYSTEMS ITS PLAN REVIEW MOBILITY AND TRAFFIC FLOOD WARNING SYSTEMS</p>		<p>METRO POLICE BUS RAPID TRANSIT LIGHT RAIL SYSTEM REGIONAL BUS SYSTEM HOV/HOT LANE OPERATIONS OFFICE OF EMERGENCY MANAGEMENT</p>	
<p>MOTORIST ASSISTANCE PROGRAM SHERIFF'S INCIDENT MANAGEMENT UNIT (IMU) TRAFFIC & TRANSPORTATION GROUP, OFFICE OF HOMELAND SECURITY & EMERGENCY MANAGEMENT (HCOHSEM)</p>		<p>FREEWAY OPERATIONS MEDIA CONTRACTORS INTELLIGENT TRANSPORTATION SYSTEMS SH 288 TOLLING SUPPORT OPERATIONS TRANSPORTATION MANAGEMENT SYSTEMS</p>	

The Annual Report reviews the Center's performance and summarizes the 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.

The total estimated benefits of TranStar operation in 2022 were \$510.5 million. Travel time savings attributable to TranStar's operation were estimated at more than 14.9 million vehicle-hours. This is worth nearly \$413.9 million in road user cost savings and an additional \$96.6 million (nearly 28 million gallons) in reduced fuel consumption.

Comparing these benefits to the annualized TranStar operating cost estimate of \$26.8 million yields an estimated benefit/cost ratio for Houston TranStar Center operation of 19.0-to-1 for 2022. In other words, for every dollar spent on Houston TranStar's operations, the region realizes a benefit of \$19.00.

Since 1997, Houston TranStar's pivotal role in the transportation of people and goods in the greater Houston region has saved motorists an estimated \$8.1 billion in reduced travel costs.

ABOUT THE HOUSTON TRANSTAR PARTNERSHIP

MISSION

The Houston TranStar consortium provides coordinated, innovative transportation and emergency management services to the region.

VISION

- Maximize safety and mobility by building, operating, and advancing an innovative regional transportation network.
- Save lives and protect property by coordinating large-scale emergency management planning, response, and recovery.
- Inform and educate the public about safety, travel conditions and emergency preparedness and response.

GOALS

- Improve travel safety and reliability.
- Expand and enhance the Traffic Incident Management Program throughout the region.
- Enhance emergency planning, coordination of resources and delivery of information during hazardous events.
- Increase the public's awareness and use of our services.
- Ensure sustainable financial resources for TranStar operations.

TRANSTAR 2022 ACTIVITIES

TranStar member agencies continued ongoing 24/7 transportation system operations and emergency planning and response. Significant agency activities at the Center included the following:

- TranStar partnered with the Harris County Sheriff's Office and the Houston-Galveston Area Council to film segments with local TV news media (KTRK-13, KPRC-2, and FOX-26) about traffic safety, the Motorist Assistance Program, and the Tow-and-Go program.
- TranStar held multiple media interviews as part of preparation for Hurricane Season
- TranStar staff hosted and participated in community events, including the Houston chapter of the Conference of Minority Transportation Officials, the Women's Transportation Club, and the Harris County Mayors' and Councils' Association.
- TranStar welcomed FEMA Administrator, Deanne Criswell who visited the Office of Homeland Security and Emergency Management (OHSEM) to meet with local officials and discuss the impact of FEMA's Hazard Mitigation Program in August.
- TranStar's Executive Director, Dinah Massie, retired in May. She was replaced by Brian Mason in October.
- TranStar partners activated in late October and early November for the World Series and the subsequent celebrations held for the World Champion Houston Astros.
- TranStar partners activated for hard freeze event between December 22-24.
- TranStar hosted 15 on-site media events to keep residents informed on roadway safety, severe weather preparedness, and community health issues such as Mpox.
- TranStar restarted facility tours in April, providing tours to 1,283 visitors, including US Representatives Sam Graves and Randy Weber and their staff.

CITY OF HOUSTON



The City's Transportation and Drainage Operations (TDO) group is responsible for the operations and maintenance of traffic signals and ITS, as well as the design and installation of new infrastructure.

The TDO's Traffic Signal Performance Improvement Program (TSPIP) ensures that 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 signalized intersection every three years for retiming and optimization.

The City of Houston manages:

- 2,500 traffic signals
- 1,450 School Zone Beacons
- 180,000 streetlights
- 1,800 freeway safety lights
- 300+ miles of fiber cable
- 2,000+ wireless devices
- 600 Arterial Bluetooth travel time devices
- 92 Arterial DMS signs
- 115 CCTV Cameras

Major activities conducted by the City in 2022 include:

- Awarding a contract to HDR to conduct needed corridor retiming efforts to nearly 400 pre-timed signalized intersections located in Downtown and Midtown.
- Contracting with Paradigm to install audible push buttons for 50 Downtown intersections around George R. Brown Convention Center and Discovery Green.
- Along with partnering agencies, continuing the process of amending the agreement and scope for the Houston Roadway Flood Warning System (HRFWS) for critical underpasses in the region.
- Awarding a contract to Kimley-Horn to develop an Advance Traffic Management System (ATMS) master plan, Transportation System Management and Operation (TSMO) master plan, and corresponding Concept of Operation (ConOps).

- Testing of communication devices to upgrade the City's wireless communications system to cellular LTE/4 & 5G for traffic signal cabinets and other ITS communications.
- As part of the HITS (Houston Intelligent Transportation Systems) project, integrating the City's DMS signs into the TranStar website. Full activation of all signs expected by end of 2023.
- Activating 36 Midblock Counting Stations along major arterial corridors to provide traffic counts and travel information, which will transmit to the DMS signs and allow traffic personnel to inform the public of any abnormal traffic conditions and incidents in real-time.
- Coordinating with METRO for the implementation and testing of Transit Signal Priority (TSP) for buses along Studemont/Studewood corridor.

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:

- 1,050 Active Traffic Control Signals
- 1,344 School Zone Beacons
- 59 Warning Beacons
- 43 Street Lights
- 8 Changeable Lane Signs
- 210 CCTV Cameras
- 435 Miles of Fiber Optic Cable

Major activities during 2022 included:

- County contract actively deploying wireless communication to all traffic signals that are not currently interconnected via Fiber Optic Cable.
- Harris County continued the coordination and optimization of traffic signal timings as part of its annual program.
- Contracting for replacement of approximately 250 static School Zone signs with solar powered beacons.

HARRIS COUNTY TOLL ROAD AUTHORITY (HCTRA)



The Harris County Toll Road Authority (HCTRA) operates 128 miles of tolled facilities throughout Harris County. In 2022, nearly 1.7 million vehicles a day utilized the system.

HCTRA and Houston TranStar share travel information on its systems with travelers not only to provide information about significant events that impact traffic, but to also display route options and information that can save travelers time.

While not physically located at TranStar, HCTRA's traffic management center monitors the toll road system and serves as the coordination center for its Incident Response Team and law enforcement activities to enhance toll road safety. These operations responded to the following during 2022:

- Addressed 4,908 minor and 1,279 major crashes.
- Handled 23 fatalities on the system.
- Assisted 39,818 stranded vehicles.
- Dispatched 73,171 calls.
- Issued 101,947 citations.
- Posted 6,587 events to the TranStar Map.
- Posted 810 messages to DMS signs.

HARRIS COUNTY OFFICE OF HOMELAND SECURITY AND EMERGENCY MANAGEMENT (HCOHSEM)

The Harris County Office of Homeland Security & Emergency Management (HCOHSEM) plans, coordinates, and implements all emergency management and homeland security related activities for Harris County. HCOHSEM works with federal, state, and local partners during disasters to facilitate quick and effective recovery efforts.

HCOHSEM monitors severe weather, industrial accidents, and other emergencies 24/7. Depending on incident nature, scale, and severity, HCOHSEM activates the Emergency Operations Center (EOC). For large-scale emergencies and events, additional staff and partners will deploy to the EOC to support response and recovery operations.

HCOHSEM serves as the primary communication hub for coordinating emergency public information. During a disaster, HCOHSEM keeps elected officials, stakeholders, emergency management partners, residents, and the media informed through its Regional Joint Information Center (JIC).

To help build resilient communities, HCOHSEM promotes disaster preparedness year-round through regional emergency planning, training, and community outreach programs.

In 2022, HCOHSEM activities included:

- Continued support of the County's response efforts to the COVID-19 pandemic. To date, the pandemic has been the EOC's longest and most complex activation. HCOHSEM coordinated information with partners, processed and stored PPE from the state as well as donation partners, processed COVID-19 resource requests, and promoted COVID-19 key messaging.
- HCOHSEM monitors tropical storm activity and activates the EOC when storms move into or develop in the Gulf of Mexico. With only 14 named storms with two of those intensifying into major hurricanes (neither of which impacted the Houston area), HCOHSEM did not have to activate to the same levels as in previous years.
- HCOHSEM monitored, provided situational awareness, and coordinated response efforts to Mpox (first reported in the County in June) as needed alongside Harris County Public Health.
- Drought conditions and 100+ degree summer temperatures led Harris County Commissioner's Court to issue a burn ban from June 28 to August 23. HCOHSEM coordinated with local, state, and federal partners to provide necessary resources, operational guidance, and situational awareness of incident locations to quickly mitigate hazards. The Harris County Fire Marshal's Office reported more than 900 wildfires during the burn ban.
- HCOHSEM activated the EOC for the 2022 World Series and celebrations of the Astros' win. With more than 40,000 in attendance for games at Minute Maid Park and more than one million people attending the Championship Parade, HCOHSEM monitored for potential threats and informed the public through the Regional JIC.
- HCOHSEM received the 2022 Excellence in Outreach Award at the State Level from *Homeland Security Today Magazine* for its "Olivia the Preparedness Opossum" campaign. Launched in 2020, in partnership with the Texas Wildlife Rehabilitation Coalition, the Campaign educated children on different types of disasters they can face in their lives, and how they can safely prepare for them.

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 1,600 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 freeway management. Systems include:

- Closed-Circuit TV (CCTV) cameras to monitor roadways and provide visuals for responding agencies during incidents.
- Dynamic Message Signs (DMS) to provide traveler information about slowdowns, incidents, and special events.
- Bluetooth devices to estimate system travel times and speeds and identify roadway segments with abnormal traffic.
- Radar to capture traffic volumes and spot speeds.

TxDOT-Houston District manages:

- 861 Fiber-based and Wireless CCTV Cameras
- 268 Dynamic Message Signs (DMS)
- 348 Bluetooth/AVI Travel Time Readers
- 250 Radar Units
- 61 Ramp Meters

TxDOT activities conducted in 2022 included:

- The installation of 51 miles of fiber on SH 99 from SH 146 to I 69 North.
- Installation of 18 new CCTV cameras on SH 99.
- Installation of three DMS signs on SH 99.
- Installation of 18 Radar units on SH 99, two units on US 90.
- Developed connected vehicle Signal Phasing and Timing (SPaT) with wireless communication technology at locations on IH 45 and Hwy 6.

METRO



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

METRO's services include:

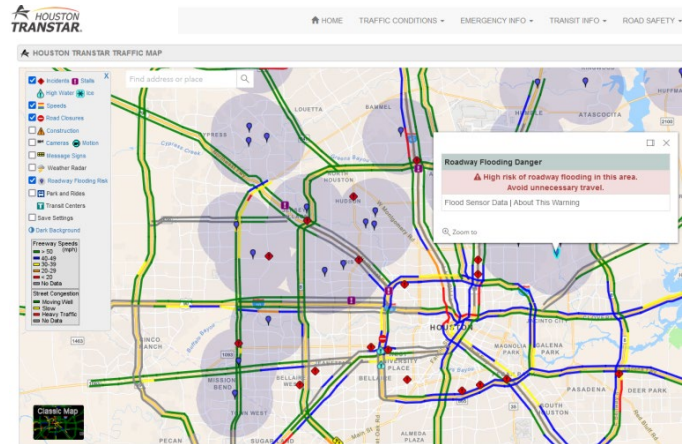
- Service to 15 cities within Harris County
- 105 bus routes
- 27 miles of light-rail and bus-rapid transit
- 4,852,346 average monthly passenger trips

METRO activity highlights for 2022 included:

- METRO, based on CDC and TSA recommendations/ requirements for COVID-19, discontinued employee screening, protective barriers, social distancing, and wearing masks. The METRO Voluntary Vaccine Incentive Program accomplished its goal and was suspended in the latter part of 2022. However, other safeguard programs like the COVID-19 Leave Program and telecommuting were allowed to continue. METRO Bus/Rail Control, MPD, High-Occupancy Vehicle Management System, Transit Incident Management, Marketing, and Emergency Management personnel regularly work onsite to strengthen the TranStar partnership.
- The METRO EOC activated for various regional events, including inclement weather, flooding, the December Freeze, and the World Series. Due to COVID-19, activations remained partially virtual to protect participants.
- METRO adopted its Agency-Wide Climate Action Plan, which outlines steps the Authority will take to transform day-to-day operations and business practices to increase sustainability and resiliency and reduce its carbon footprint. Implementation of goals listed in the plan has already begun. METRO has moved forward with purchasing 20 full-size electric buses and 10 paratransit vans and will soon explore using vehicles powered by hydrogen fuel cell electric technology. METRO's goal is to replace all its buses with zero-emissions vehicles by 2030.

TRAVELER INFORMATION

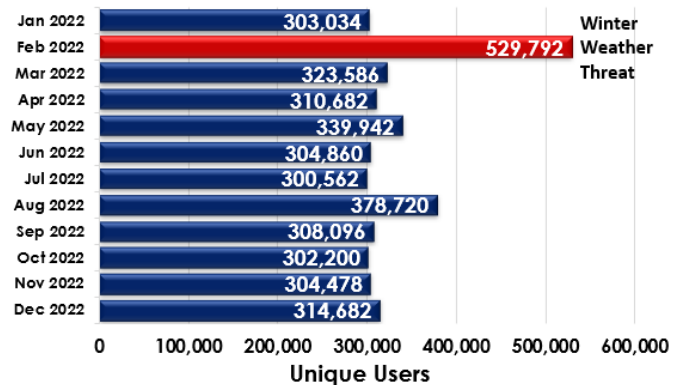
One of the most visible products of Houston TranStar Center operation is traveler information. Local Internet and media outlets use the TranStar CCTV feeds, incident reporting, and travel time reporting systems in their daily traffic functions.



Highlights for TranStar-based traveler information on the TranStar website in 2022 included:

- Began using the NOAA Multi-Radar/Multi-Sensor precipitation data as a source for the roadway flood warning system, which provides data along critical routes without sensor coverage.
- An average of 335,100 monthly unique users.
- Nearly 420 million CCTV views.
- The Houston TranStar Mobile Application was installed on 19,552 devices.

Houston TranStar Website Unique Users, 2022



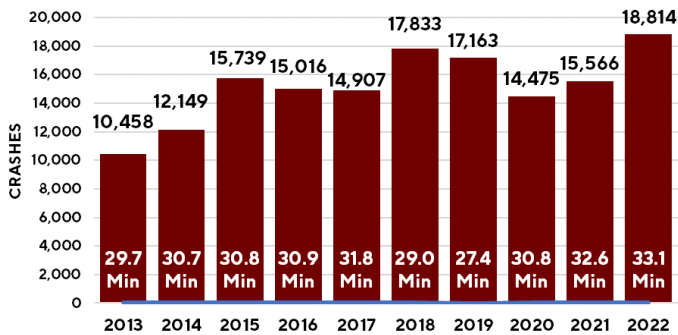
Average monthly unique website users were down 20 percent from 2021. Outside of a threat of freezing temperatures in February, the greater Houston area did not receive any major weather threats in 2022, which tend to increase unique views of the system.

TRAFFIC INCIDENT MANAGEMENT

One of Houston TranStar's multiagency efforts is the detection, response, and clearing of freeway incidents. The facility houses multiple programs involved in the region's traffic incident management activities. Agencies utilize CCTV cameras, DMS signs, and travel time systems to detect, monitor, and notify the public about incidents. TranStar houses the following incident management activities:

- TxDOT staff monitor the freeway system 24/7 for stalls and incidents, notify responder agencies of incidents and track incident progress. TxDOT staff coordinates with the media about major incidents, posts messages on DMS signs, and updates the Houston TranStar traffic map.
- The Tow-and-Go program dispatches tow trucks to stalls and crashes on the freeway system within the City of Houston and Harris County.
- HCSO's Incident Management Unit (IMU) monitors freeways to dispatch MAP units, remotely authorize Tow-and-Go tows for disabled vehicles, and coordinates with other responding agencies for collisions.
- METRO Police monitor the HOV/HOT lanes and provide assistance for an incident.

ANNUAL CRASHES AND CLEARANCE TIMES
(as reported in RIMS)



In 2022, TxDOT staff identified 18,814 crashes, up 20.9% from 2021. TxDOT, in conjunction with TTI, is working on integrating 9-1-1 data into traffic management centers throughout the state, including TranStar, to help improve incident detection in terms of speed and in quantity.

TOW AND GO™

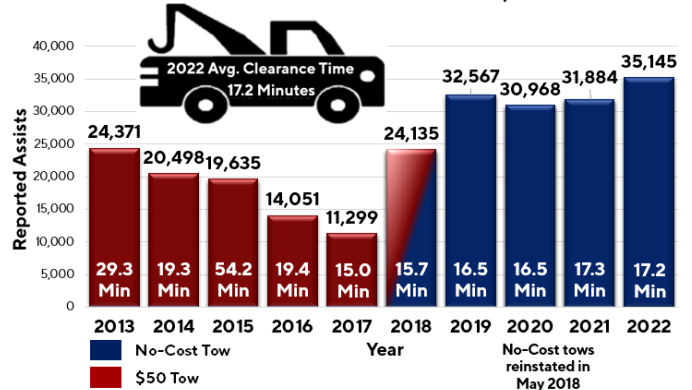


Tow-and-Go, formerly known as SAFEClear, brings quick response to disabled vehicles to

reduce traffic congestion and increase safety. Operating within the majority of Harris County on the freeway system, tow operators remove a vehicle from the freeway to a safe location within a mile of the freeway or to a secured vehicle storage facility for 48 hours, without storage fees, where drivers can arrange to retrieve their vehicles.

The program utilizes qualified, vetted towing companies to rapidly remove disabled vehicles from the freeway to increase patron safety, reduce secondary crashes, and decrease incident-related travel delays. The program is free of charge to motorists thanks to the Houston-Galveston Area Council.

TOW-AND-GO/SAFECLEAR ASSISTS, 2013-2022



In 2022, there were 35,145 Tow-and-Go assists, a 10.2% increase from 2021. Clearance times decreased slightly from 17.3 minutes in 2021 to 17.2 minutes in 2022.

The Tow-and-Go Program is currently in the process of expanding, working to add the cities of Webster and Deer Park to the program. Currently, Tow-and-Go covers approximately 244 centerline miles of freeway.

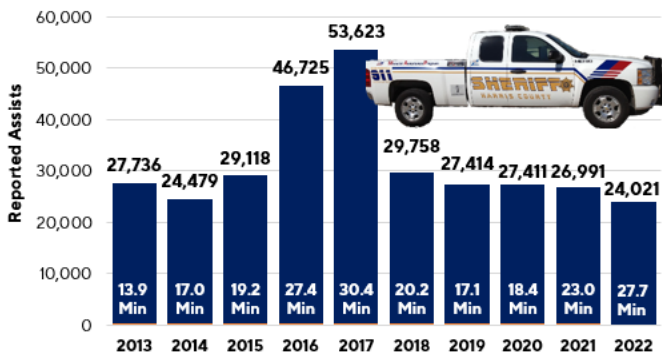
MOTORIST ASSISTANCE PROGRAM (MAP)

The Motorist Assistance Program (MAP) began in 1986. MAP operates 24 hours a day, Monday through Friday, consisting of Harris County Sheriff's Office (HCSO) deputies. Patrons can call 713-CALL-MAP (713-225-5627) to reach a dispatcher. MAP services include:

- Traffic and scene management during incidents.
- 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.

The program costs about \$2.4 million per year, funded through HCSO and the Houston-Galveston Area Council.

MAP PROGRAM ASSISTS BY YEAR



MAP conducted 24,021 assists in 2022, down 11.0% from 2021. In addition to providing services, MAP deputies aid stranded patrons and provide scene and traffic management for freeway crashes. MAP deputies have also provided other assistance including cracking down on fictitious license plates and helping to reunite the subject of a Silver Alert with his family.

TRANSTAR'S REGIONAL BENEFIT

For the past 26 years, this report has estimated operational benefits in terms of freeway motorist delay savings. Determining benefits is treated conservatively because many are not easily quantifiable, and some are intangible.

The evaluation process looks at freeway and toll road traffic estimates and employs national benchmarks and experience to establish Houston TranStar goals for expected benefits. TranStar staff is relied upon to assess performance of the transportation systems in terms of percent attainment of goals.

Annual benefits from TranStar operations were nearly \$510.5 million. The increase in monetary benefits is partially due to higher gas prices, an increase in the value of delay, and a stronger return to pre-COVID traffic levels. Time and fuel savings were:

- 14.9 million fewer vehicle-hours - \$413.9 million
- 28.0 million gallons of fuel saved - \$96.6 million.

Benefit Cost Calculation:

Annual Benefits	\$510,481,000
Annualized Costs	\$26,841,000
Benefit/Cost Ratio	19.0

With an annualized cost estimate of Center operations calculated at \$26.8 million in 2022, the Center recognized a 19.0-to-1 benefit-cost ratio.

Based on USDOT's Bureau of Transportation Statistics, the reduction in fuel consumed resulted in the following estimated emissions reductions compared to the absence of TranStar and its systems:

Hydro-carbons	Carbon Monoxide	Carbon Dioxide	Nitrogen Oxide
722 tons	4,667 tons	248,166 tons	1,050 tons

Houston TranStar Benefit/Cost Ratios 2013-2022

