



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	
INTELLIGENT TRANSPORTATION SYSTEMS (ITS) ITS PLAN REVIEW MOBILITY & TRAFFIC FLOOD WARNING SYSTEMS	 FREeway OPERATIONS INTELLIGENT TRANSPORTATION SYSTEMS MEDIA CONTRACTORS TRANSPORTATION MANAGEMENT SYSTEMS
MOTORIST ASSISTANCE PROGRAM INCIDENT MANAGEMENT UNIT TRAFFIC & TRANSPORTATION HARRIS COUNTY TOLL ROAD AUTHORITY OFFICE OF HOMELAND SECURITY & EMERGENCY MANAGEMENT	  METRO POLICE BUS RAPID TRANSIT LIGHT RAIL SYSTEM REGIONAL BUS SYSTEM OFFICE OF EMERGENCY MANGEMENT

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.

In 2021, the travel time savings attributable to TranStar's operation were estimated at more than 11.4 million vehicle-hours. This is worth over \$296 million in road user cost savings and an additional \$58 million (over 21 million gallons) in reduced fuel consumption. While this represents a considerable increase from 2020, the results also reflect that traffic has yet to return to pre-COVID levels.

The total estimated benefits of TranStar operation in 2021 were \$354.4 million. Comparing these benefits to the annualized TranStar operating cost estimate of \$25.4 million yields an estimated benefit/cost ratio for Houston TranStar center operation of 13.9-to-1 for 2021. In other words, for every dollar spent on Houston TranStar's operations, the region realizes a benefit of \$13.90.

Since 1997, Houston TranStar's pivotal role in the transportation of people and goods in the greater Houston region has saved motorists an estimated \$7.6 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 2021 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:

- Houston TranStar celebrated its 25 Year Anniversary in April.
- TranStar activated its Emergency Operations Centers with internal partners in response to Winter Storm Uri from February 12 – 26.
- Houston TranStar welcomed President Joe Biden to TranStar, where he toured the Emergency Operations Center and discussed Winter Storm Uri disaster response efforts with our Harris County Office of Emergency Management partners, Governor Greg Abbott, Harris County Judge Lina Hidalgo, Houston Mayor Sylvester Turner, and other elected officials.
- Houston TranStar created a Strategic Planning Group to plan for the future of TranStar.
- Houston TranStar held a COVID-19 Vaccination Event for staff and their loved ones for those who wished to get vaccinated.
- TranStar concluded its "Talk Traffic to Me" series that helped increase the public's awareness of TranStar and its services by featuring local celebrity guest hosts and government partners.
- TranStar kicked off the "It's Only a White Line" Campaign strategies, promoting safe driving near incident responders, which included publishing of its first social media ads.
- TranStar activated its Emergency Operations Centers with internal partners in response to Hurricane Nicholas from September 13 – 14.
- TranStar met with multiple partner agencies to discuss school beacons and innovation projects.
- TranStar hosted more than 30 on-site media events to keep residents informed on Harris County's environmental protection efforts, Winter Storm Uri, COVID-19, Hurricane Nicholas, driver safety campaigns and more.
- Houston TranStar hosted 12 small tours in 2021, as COVID-19 protocols continued. TranStar welcomed a few VIP guests including the TSA Regional Manager.

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:

- 2,490 traffic signals
- 1,400 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 2021 include:

- Upgrading the City's wireless communications system to cellular LTE/4 & 5G for signal and other ITS communications is continuing. The City's ITS section is in process of testing several devices to select the device that offers the best results.
- In the process of amending the agreement and the scope for the Houston Roadway Flood Warning System (HRFWS) for critical underpasses in the region.
- Deployed Adaptive Traffic Control Systems (ATCS) along Bay Area Blvd. and JFK Blvd. corridors to optimize real-time signal timing based on actual traffic demand.
- In the final stages of integration of the City's Advanced Traffic Management System, which includes an upgraded traffic management central software, installation of additional CCTV

cameras, Arterial DMS, enhanced vehicle detection, and permanent count stations, which will allow quicker detection and response to abnormal traffic conditions and incidents and the ability to share real-time public announcements with the traveling public.

- Coordinating with METRO for the design and implementation of the Bus Rapid Transit (BRT) in Downtown Houston and the University line. The goal is to improve public transportation in the Houston area.
- In the final phases of the implementation process of a Connected School Beacon System, which allows for remote programming and efficient monitoring of the existing school zone beacons and relay information to the traveling public.

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:

- 1,033 Active Traffic Control Signals
- 807 School Zone Beacons
- 46 Warning Beacons
- 32 Street Lights
- 10 Dynamic Message Signs
- 16 Changeable Lane Signs
- 135 CCTV Cameras
- 435 Miles of Fiber Optic Cable

Major activities during 2021 included:

- The County implemented the replacement of LEDs at all traffic signals and is still in progress.
- The County awarded a contract for adding wireless communication to all traffic signals that are not currently interconnected.
- Harris County continued the coordination and optimization of traffic signal timings as part of its annual program.

HARRIS COUNTY TOLL ROAD AUTHORITY (HCTRA)



The Harris County Toll Road Authority (HCTRA) operates 128 miles of tolled facilities throughout Harris County. In 2021, nearly 1.6 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 2021:

- Addressed 4,161 minor and 882 major crashes
- Handled 16 fatalities on the system
- Assisted 39,099 stranded vehicles
- Dispatched 54,046 calls
- Issued 68,922 citations
- Posted 6,890 events to the TranStar Map
- Posted 1,664 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.

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

In 2021, HCOHSEM activities included:

- In response to Winter Storm Uri, the EOC activated from February 14-26, working with 295 staff from more than 30 different agencies to respond to this event. The storm impacted critical services such as schools, hospitals, first responders and transportation and resulted in a total of 43 fatalities in Harris County
- HCOHSEM's Winter Freeze Emergency Response Team coordinated, established, and managed 10 warming center sites throughout Harris County. It distributed water, meals ready to eat (MREs), personal protective equipment (PPE), blankets, hand sanitizer, sanitizing wipes, face shields, masks, and gloves to those facilities.
- In response to the Winter Storm Uri, President Joe Biden, Governor Greg Abbott, and other elected officials visited HCOHSEM on February 26 to discuss federal, state, and local response efforts.
- HCOHSEM continued to support the County's response to the COVID-19 pandemic, coordinating distribution of vaccines as well as continued testing. Staff coordinated information with partners, processing and storing PPE from the state as well as donation partners, processing COVID-19 resource requests, and promoting COVID-19 key messaging.
- Despite an active Atlantic Hurricane Season, the Houston area was minimally threatened in 2021. HCOHSEM did not have to activate to the same levels as in past years. The EOC did activate for Hurricane Nicholas in September, which ultimately resulted in minimal impact and damage throughout the county.
- In October, HCOHSEM developed the Ready Harris Alert System (RHAS) site, which provides access to alerts, warnings, and preparedness information to persons who are deaf, blind, hard-of-hearing, deaf-blind, or low-vision through a new one-stop-website.

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:

- 843 Fiber-based and Wireless CCTV Cameras
- 201 Dynamic Message Signs (DMS)
- 335 Bluetooth/AVI Travel Time Readers
- 221 Radar Units
- 61 Ramp Meters

TxDOT activities conducted in 2021 included:

- Installed 7.2 miles of fiber on SH 249.
- Installed 13 new CCTV cameras on SH 249.
- Installed 2 DMS signs on SH 249.
- Installed 5 Radar sites on SH 249.
- Upgraded 4 DMS signs on IH 10 West and IH 610 South.
- Developed connected vehicle Signal Phasing and Timing (SPaT) with wireless communication technology at two locations on FM1960.
- Completed the flood warning expansion to Beaumont, monitoring an additional 77 rainfall sensors.

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:

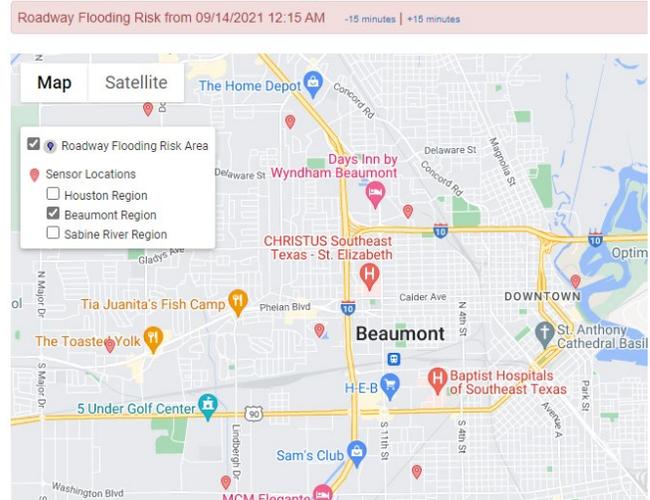
- Service to 15 cities within Harris County
- 1,246 active buses on 114 routes
- 22 miles of light-rail on three lines
- 6,512,979 average monthly passenger trips

METRO activity highlights for 2021 included:

- Throughout 2021, METRO adhered to CDC and TSA recommendations/requirements for the response to the global COVID19 pandemic with employee screening, protective barriers in buses, social distancing, and by enforcing the wearing of masks on the transit system.
- The METRO EOC activated along-side County and City partners for various regional events in 2021; however, due to COVID19 these activations were in a partial and virtual capacity to protect all participants.
- For Winter Storm Uri, METRO's Emergency Management Officer and key Bus Transportation staff manned Houston TranStar for the entirety of the event. To assist the community, METRO transported multiple citizens to warming shelters, provided generator fuel to a senior care facility, assisted Houston Police & Fire with warming buses, and made emergency trips for METROLift paratransit clients.

TRAVELER INFORMATION

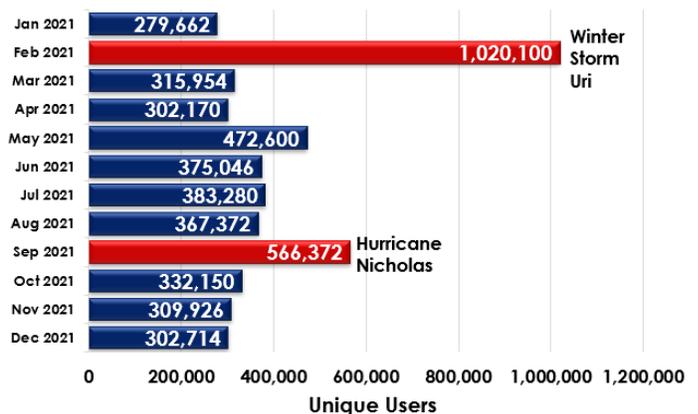
One of the most visible products of Houston TranStar Center operation is traveler information. Local Internet and media outlets use the TranStar CCTV feeds, incident reporting, and travel time reporting systems in their daily traffic functions.



Highlights for TranStar-based traveler information on the TranStar website in 2021 included:

- Expansion of the Roadway Flooding Risk Website to the Beaumont area
- An average of 418,900 monthly unique users
- Nearly 294 million CCTV views
- The Houston TranStar Mobile Application was installed on 23,831 devices

Houston TranStar Website Unique Users, 2021



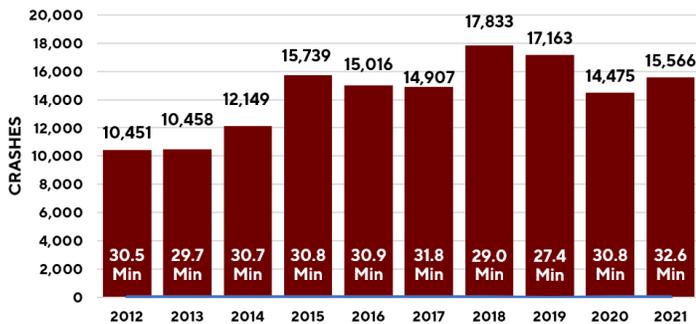
Average monthly unique website users increased only 8.3 percent over 2020. Winter Storm Uri resulted in a spike of unique users. However, the overall number of monthly unique users is still 40 percent below 2019 figures, most likely due to many workers still operating remotely from home.

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 2021, TxDOT staff identified 15,566 crashes, up 7.5% from 2020. Average clearance times increased from 30.8 minutes in 2020 to 32.6 minutes in 2021.

TOW AND GO™

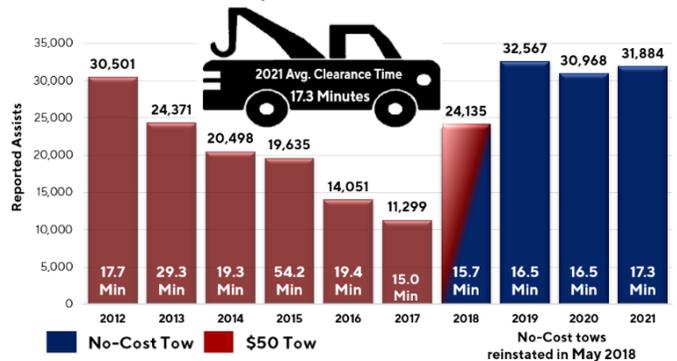


Tow and Go, formerly known as SAFEClear, brings quick response to disabled vehicles to

reduce traffic congestion and increase safety. Operating within the City of Houston and most of Harris County, 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 make arrangements 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 thanks to the Houston-Galveston Area Council.

TOW-AND-GO/SAFECLEAR ASSISTS, 2012-2021



In 2021, there were 31,884 Tow and Go assists, a 3.0% increase from 2020. Clearance times increased from 16.5 minutes in 2020 to 17.3 minutes in 2021. In 2021, to cover increased costs in operations, the Tow-and-Go program increased reimbursements to towing contractors for no-cost tows to \$70 per tow.

To help protect Tow and Go workers, as well as other incident responders, Houston TranStar launched the **It's Only a White Line** campaign, which brings attention to the dangers tow operators and other responders face while responding to disabled vehicles on the freeways.

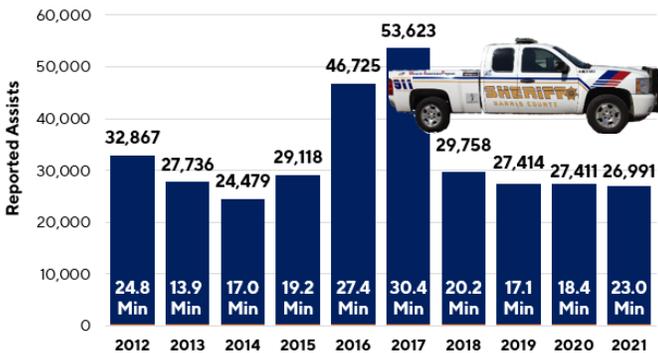
MOTORIST ASSISTANCE PROGRAM (MAP)

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 26,991 assists in 2021, down 1.5% from 2020. While MAP deputies continue to aid stranded patrons, the return of free towing by the Tow-and-Go program reduces the need for those services. MAP deputies have, in turn, increased their role in providing scene and traffic management for freeway crashes.

TRANSTAR'S REGIONAL BENEFIT

For the past 25 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.

Traffic delays on freeway mainlanes were estimated using TxDOT's travel time monitoring system, traffic volumes from TxDOT's roadway inventory files and HCTRA's 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 assess performance of the transportation systems in terms of percent attainment of goals.

Annual benefits due to TranStar operations were nearly \$354.3 million, which included:

- 11.4 million fewer vehicle-hours - \$296.5 million
- 21.3 million gallons of fuel saved - \$57.8 million

Benefit Cost Calculation:

Annual Benefits	\$354,351,000
Annualized Costs	\$25,448,000
Benefit/Cost Ratio	13.9

With an annualized cost estimate of Center operations calculated at \$25.4 million in 2021, the Center recognized a 13.9-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
551 tons	3,562 tons	188,645 tons	802 tons

Houston TranStar Benefit/Cost Ratios 2012-2021

