



IH 69 at IH 610 Interchange, Houston, Texas
Photograph Credits: Smiley Pool, Houston Chronicle

HOUSTON TRANSTAR **2016 ANNUAL REPORT**



This document is the 20th annual report for the Houston TranStar Transportation Management and Emergency Operations Center. This annual report 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.

Houston TranStar (TranStar) is a formal partnership among the principal transportation and emergency management agencies in Harris County, including the following collaborators:

- Texas Department of Transportation (TxDOT), including:
 - 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), including:
 - Bus System,
 - Light Rail System,
 - Police, and
 - Office of Emergency Management.
- Harris County, including:
 - Traffic & Transportation Group,
 - Sheriff's Office, and
 - Office of Homeland Security & Emergency Management.
- The City of Houston, including
 - ITS & Safety,
 - ITS Plan Review, and
 - Mobility and Traffic.

Established in 1993, Houston TranStar houses multi-agency operations and management of the region's transportation system, and has evolved into a primary resource from which multiple state, county and local agencies respond to incidents and emergencies in Harris County and beyond.

The mission of Houston TranStar's collaborative effort is 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.

Houston TranStar plays a pivotal role in the travel of people and goods in the greater Houston region, with an estimated savings to motorists of more than \$5.4 billion in reduced travel costs since 1997.

In 2016, the travel time savings attributable to TranStar's operation was estimated at more than 17.4 million vehicle-hours. This is worth more than \$392 million in road user cost savings and an additional \$65 million (or more than 32 million gallons) in reduced fuel consumption. The total estimated benefits of TranStar operation in 2016 were more than \$457 million.

Comparing the annualized TranStar operating cost estimate of \$30.9 million to the estimated annual benefit of \$457.8 million yields an estimated benefit/cost ratio for Houston TranStar center operation of 14.8 for 2016. In other words, for every dollar spent on Houston TranStar's operations, the region realizes a benefit of \$14.80.

Houston TranStar 2016 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:

- Throughout the year, Houston TranStar partner agencies conducted meetings and exercises in preparation for and during Super Bowl LI, played in February 2017 at NRG Stadium.
- In April, Houston TranStar celebrated its 20th Anniversary. Elected officials and other representatives from all four agency partners participated in a media and public event.

- In April, all collaborating agencies activated for the NCAA Final Four event at NRG Stadium.
- In late April, partner agencies activated in response to Harris County flooding. Some 240 billion gallons of water fell, causing widespread flooding in north and northwest parts of the county. In May, “Memorial Day” rains again inundated parts of Harris County and the Greater Houston region. Roadway flooding lasted through July in some locations.
- In September, TranStar Agency partners began discussions on requirements for a mobile app for traveler information.
- TranStar hosted TxDOT’s Statewide ITS meeting on December 14-16.
- Throughout the year, 619 individuals from the Greater Houston area received training in incident management techniques at TranStar.

in the region. TxDOT’s mission is to deliver a safe, reliable and integrated transportation system to enable movement of people and goods. Since the 1980’s, TxDOT’s Computerized Traffic Management System (CTMS) has been in continuous deployment on Houston-area freeways, covering about 1,550 bi-directional miles in the urban areas of the Houston District and extending outward to cover evacuation routes on IH 10, IH 45, US 290 and other key roadways across the state. This system enables TxDOT to promote a safer system through aggressive incident monitoring and management, and a more reliable system through providing effective traveler information.

Major components of the CTMS include:

- 1,029 Closed Circuit Television Cameras (CCTV),
- 265 Dynamic Message Signs (DMS),
- 61 Freeway entrance ramp flow signals,
- Travel time monitoring using the Automatic Vehicle Identification (AVI) system and Anonymous Wireless Address Matching (AWAM) system, and
- Radar speed and volume sensors.

Agency Activities in 2016

The following sections summarize each partner agency’s activity.

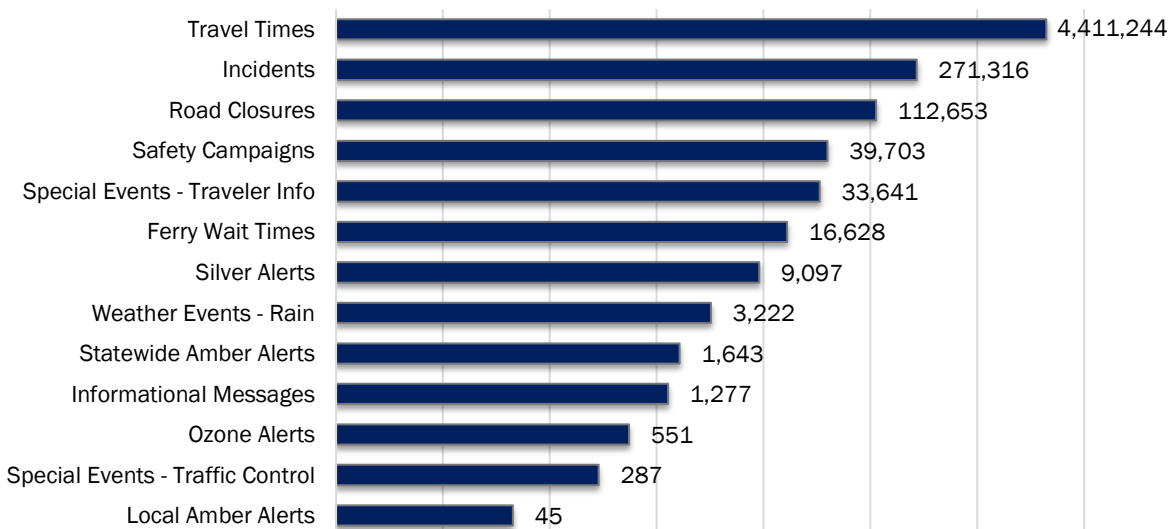


Texas Department of Transportation

TxDOT is responsible for traffic management of

freeways and state-maintained arterial highways

2016 Dynamic Message Sign Message Volume



Safety enhancing systems deployed include queue warning, over-height truck detection and truck rollover warning systems.

TranStar's traveler information systems are the cornerstone of the partner agencies' traffic management function and its ability to respond to and manage incidents. TxDOT operates and maintains this system for the TranStar consortium.

Information is provided to motorists by three primary means: roadside DMSs, the Internet (by desktop, mobile Internet and social media) and through local broadcast media.

The 310 system-wide permanent roadside DMSs (274 TxDOT-operated and 36 HCTRA-operated) provide information on traffic incidents and planned construction, giving location, travel direction and nature of the incident or activity.

More than 490,000 operator-activated messages and more than 4.4 million automated messages were displayed on DMSs in 2016. The number of operator-activated and automated messages increased 11% over 2015.

In May, TxDOT conducted the first of several stakeholder meetings for the IH 69 Active Traffic Management concept of operations development.

In October, the Blueridge Transportation Group began work on a concessionaire relationship with TxDOT to widen SH 288. This includes presence at TranStar to conduct operations and maintenance on the facility.

In September, TxDOT officially renamed all ITS equipment on US-59 to IH 69 to reflect the facility's designation as an Interstate Highway.



City of Houston

The City of Houston Traffic Operations Branch directs the design and installation of new traffic signals, operates and manages the city's signal system and signal

communications infrastructure. The City maintains and operates more than 2,450 signalized intersections.

The City of Houston manages:

- 2,450 traffic signals
- 1,600 school flashers
- 180,000 streetlights
- 1,800 freeway safety lights

The Public Works and Engineering Department'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.

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

Metropolitan
Transit Authority
of Harris County



METRO programs at Houston TranStar include METRO bus and METRO Rail dispatch, METRO Police Communication Section operations, High Occupancy Vehicle management systems, METRO's newly instituted social media program, the Office of Emergency Management and traffic incident management programs.

METRO's services include:

- Service to 15 cities in, and major portions, of unincorporated Harris County
- 7,051,721 average monthly system passenger trips
- 1,236 active buses
- 22 miles of light-rail on three lines
- 76 light-rail vehicles

METRO activity highlights for 2016 included conducting updated National Incident Management Systems (NIMS) and Incident Command System (ICS) training, activations for several special events (including the Final Four and multiple severe weather events) and continued operation of the High Occupancy Toll (HOT) Lanes in the Houston region.

Harris County Traffic Management



The Harris County Public Infrastructure Department's Traffic Maintenance Group operates and maintains the County's traffic signal infrastructure, which includes the fiber optic interconnect communications network. Major initiatives during 2016 included:

- Continued support for the Ship Channel Security District,
- Progressed on a public safety LTE-based communications system for Harris County use and multiagency support/connection,
- Continued work on Washburn Tunnel camera deployment for incident management, and
- Worked with TxDOT to implement CENTRACS traffic control software to monitor and manage traffic signal network.

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



With almost 4.3 million residents, Harris County is the most populous county in Texas and the third most populous county in the U.S.

Under the direction of Harris County Judge Ed Emmett, HCOHSEM is ready to activate its Emergency Operations Center (EOC) for any natural or man-made disaster. In the past, the EOC has activated for emergencies including

weather events, health-related events, hazardous materials, industrial accidents and wildfires. In 2016, HCOHSEM activated and staffed the EOC 10 times, eight of which were for weather events, including significant flooding events in April and May.

Partner agencies include the Harris County Sheriff's Office, Harris County Fire Marshal's Office, Federal Bureau of Investigation, U.S. Department of Homeland Security, U.S. Coast Guard, Federal Communications Commission, State of Texas, the local Fusion Center, and countless first responder organizations and other local, state, national and international partners.

In February, HCOHSEM received two awards at the annual Emergency Management Association of Texas Symposium in San Marcos.

In June, HCOHSEM held the annual Hurricane Season Media Day on June 1. Judge Ed Emmett hosted Houston Mayor Sylvester Turner, the National Weather Service and local television meteorologists for the annual Meteorologists Luncheon on June 2, to discuss the hurricane season forecast.

Harris County Sheriff's Office (HCSO)

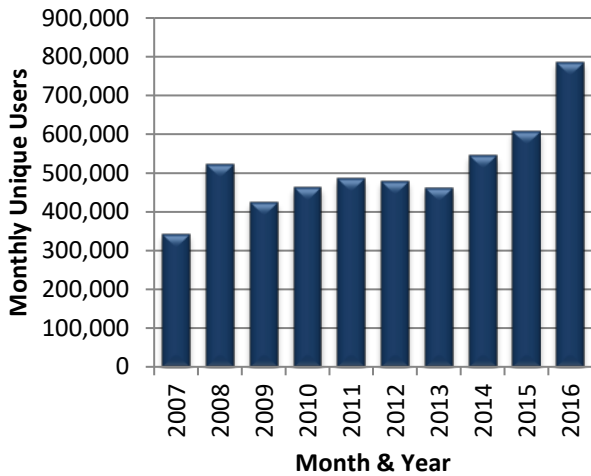


HCSO began 24/7 traffic monitoring activities in January at TranStar. Responsibilities include monitoring the freeway system for incidents, conducting remote scene assessment, authorizing tows for the City of Houston's SAFEClear program and dispatching MAP deputies.

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. Also, traffic service organizations are housed in the Control Room of Houston TranStar.

Total Monthly www.houstontranstar.org Unique Users 2007-2016



Operational highlights for the TranStar Website in 2016 included:

- Unique users up 29.3% over 2015 (785,700 per month),
- Traffic alerts up 4% to 11,800 subscribers,
- Data feed accesses (hits) steady at 23.3M accesses, and
- TranStar Homepage views flat at 2.2M views.

The 29.3% increase in monthly unique users was notable in 2016. The April floods triggered a month of more than one million unique users, a portion of whom were carried through the rest of the year.

Incident Management

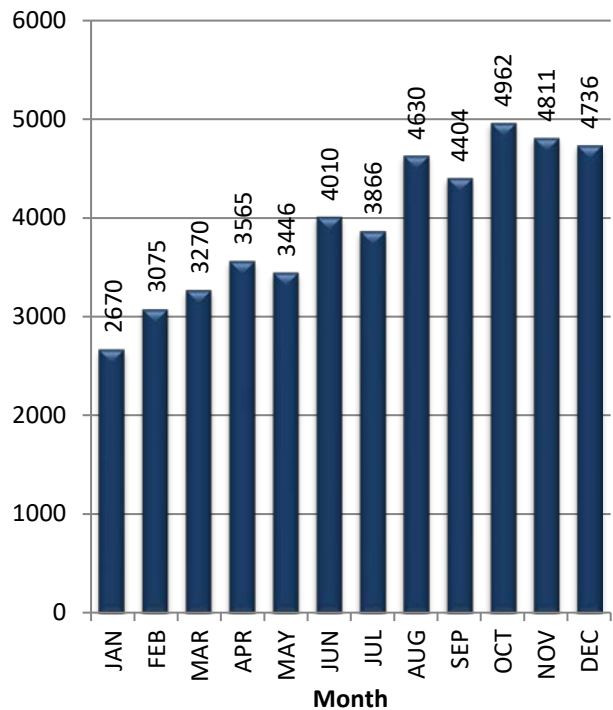
There were 44,375 incidents entered into the Regional Incident Management System (RIMS) in 2016, a 7.4% decrease compared to 2015.

The average incident (excluding high-water related incidents) cleared in 31.5 minutes in 2016, up from 29.1 minutes in 2015. The number of average daily incident hours increased from 72.2 to 99.9 hours, again driven by the increase of agency floor staff, more aggressive reporting of stalls and other minor incidents and the unusually long high-water incidents in April, May and June.

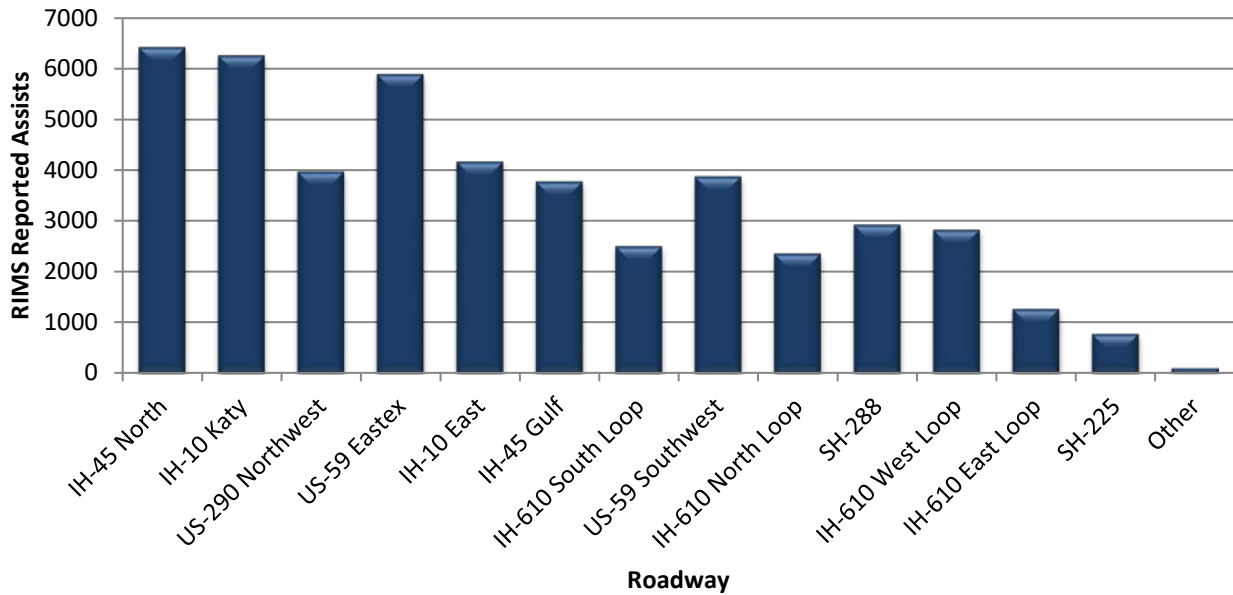
Motorist Assistance Program (MAP)

The Motorist Assistance Program (MAP) began in 1986 with two vans operating eight hours a day to provide courtesy patrol services. The program has expanded significantly, now operating 16 hours a day on all major freeways, Monday through Friday.

MAP Assists by Month, 2016 (RIMS Entry Only)



MAP Assists by Roadway, 2016



There were 47,445 MAP assists in 2016, an increase of more than 56% from 2015. The increase was due to a program staffing increase.

SAFEClear

SAFEClear, the City of Houston’s rapid clearance program, brings quick response to disabled vehicles to reduce traffic congestion and secondary crashes in the freeway queue. There were 27,448 SAFEClear assists in 2016, an increase of 22.2% from 2015. In 2016, the average time from tow authorization to clearance was 50 minutes, about the same clearance time as 2015.

Benefits

Estimates of Houston TranStar’s quantifiable benefits, such as the cost of motorist delay savings (in time and dollars), fuel savings (in gallons and dollars), and emissions reductions (in tons of emissions) are presented in this section. Determining benefits is treated conservatively because many are not easily quantifiable and some are intangible. For the past 20 years, this report has

used an approach which estimates the operational benefits in terms of freeway motorist delay savings.

Traffic delays on the freeway mainline system were estimated using the TxDOT travel time monitoring system and traffic volumes from the TxDOT annual volume-roadway inventory files and from HCTRA on the toll road system. The evaluation procedure uses national benchmarks and experience to establish Houston TranStar goals for expected benefits. The expertise of Houston TranStar staff is relied upon to estimate performance of the transportation systems in terms of percent attainment of the goals.

The estimated costs of congestion in the Houston TranStar-monitored region were calculated to be just under \$1.057 billion in 2016. Annual benefits in the reduction of travel time due to TranStar operations were estimated to be more than 17.4 million vehicle-hours with an estimated monetary

Benefit Cost Calculation:	
Annual Benefits	\$457,802,000
Annualized Costs	\$30,915,000
Benefit/Cost Ratio	14.8

benefit of about \$392 million. The saving in travel time is equivalent to reducing fuel consumption more than 32 million gallons, which results in an additional savings of about \$65 million to motorists. The total 2016 motorists' savings in delay and fuel cost was in excess of \$457 million. The annualized cost estimate of center operation was \$30.9 million in 2016.

A reduction in the amount of fuel consumed would also result in reduced mobile source exhaust emissions.

Based on USDOT Bureau of Transportation Statistics, the reduction of 32.6 million gallons of fuel is equivalent to an estimated reduction of 842 tons of hydrocarbons; 5449 tons of carbon monoxide; 288,537 tons of carbon dioxide, and 1,226 tons of nitrogen oxide.

Since 1997 (when benefits were first assessed), Houston TranStar has saved Houston area motorists more than \$5.4 billion in reduced traveler delay and fuel costs.

Houston TranStar Benefit/Cost Ratios 2007-2016

