



HOUSTON TRANSTAR 2014 ANNUAL REPORT



This document is the 18th annual report for the Houston TranStar Transportation Management and Emergency Operations Center. This annual report provides a review of the performance of the center 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 is a formal partnership among the principal transportation and emergency management agencies in Harris County, including:

- Texas Department of Transportation (TxDOT);
- Metropolitan Transit Authority of Harris County (METRO);
- Harris County, including:
 - Traffic & Transportation Group,
 - Harris County Toll Road Authority, and
 - Office of Homeland Security & Emergency Management; and
- The City of Houston.

Established in 1993, Houston TranStar provides for 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. It is the mission of Houston TranStar and its partner agencies 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 nearly \$4.4 billion in reduced travel costs since 1997.

In 2014, the reduction of travel time attributable to Houston TranStar operation was estimated to be over 18.6 million vehicle-hours. This level of delay savings has a corresponding value of over \$409 million in road user cost savings and an additional \$112 million (or more than 34 million gallons) in reduced fuel consumption. The total estimated benefits of Center operation in 2014 were over \$522 million.

Comparing the annualized TranStar operating cost estimate of \$32.2 million to the estimated annual benefit of \$522.0 million yields an estimated benefit/cost ratio for Houston TranStar center operation of 16.2 for 2014.

Houston TranStar 2014 Activities

In 2014, the TranStar Partner Agencies continued ongoing, 24-7, transportation system operations and emergency planning and response. In addition to hosting more than 1,300 visitors during the year, significant agency activities at the center in 2014 included:

- Building expansion efforts continued through 2014, with the new third floor completed in December. This allowed for the Harris County Office of Homeland Security and Emergency Management (HCOHSEM) staff being centrally located for the first time.
- Emergency activation for two icy weather events in January;
- Harris County lead efforts to inspect vehicles and car seats at no-charge at two events, with more than 100 vehicles serviced;
- Numerous visits and tours with elected state and local representatives and staff members, and international visitors;
- Harris County began dispatch for the Motorist Assistance Program (MAP), taking over for TxDOT operators;
- TxDOT continued to make significant progress in ITS equipment deployments and upgrades, including dynamic message signs, cameras, and conversion of travel time monitoring systems from toll tag to Bluetooth-based technology;

- TxDOT deployed truck rollover warning systems on area freeway direct connectors intended to improve truck safety;
- Harris County activated their Changeable Lane Assignment System (CLAS) deployments at two arterial intersections;
- Significant fiber optic network connections were made, particularly with Harris County and TxDOT systems, to provide additional communications network redundancy;
- The City of Houston was awarded a USDOT TIGER Grant for deployment of ITS systems on city arterials. Elements will include signal detection, dynamic message signs, count stations and additional WiMAX communication;
- TranStar and HCOHSEM were activated for a tanker/barge collision in the Houston Ship Channel to support Galveston OEM and the U.S. Coast Guard;
- On June 2, 2014, HCOHSEM and TranStar welcomed news media for Hurricane Season Kickoff Day, and also opened the new Emergency Operations Center at TranStar.

Agency Activities

The following sections summarize each partner agency's activity during 2014. This includes various measures of performance of the center and programs operated from Houston TranStar.

Texas Department of Transportation

The Texas Department of Transportation (TxDOT) is responsible for traffic management of freeways and state-maintained arterial highways in the region.

Since the 1980's, TxDOT's Computerized Traffic Management System (CTMS) has been in continuous deployment on Houston area freeways, covering about 890 directional miles in the urban areas of the Houston District and extending further outward. TxDOT also has continuous travel time monitoring in-place on 197 miles of IH 45 between The Woodlands



and Interstate 20 in Dallas for traveler information and hurricane evacuation route monitoring.

Major components of the CTMS include cameras, dynamic message signs (DMS), freeway entrance ramp flow signals, travel time monitoring using the Automatic Vehicle Identification (AVI) system and AWAM (Anonymous Wireless Address Matching) system, and related communications and central facility computer systems.

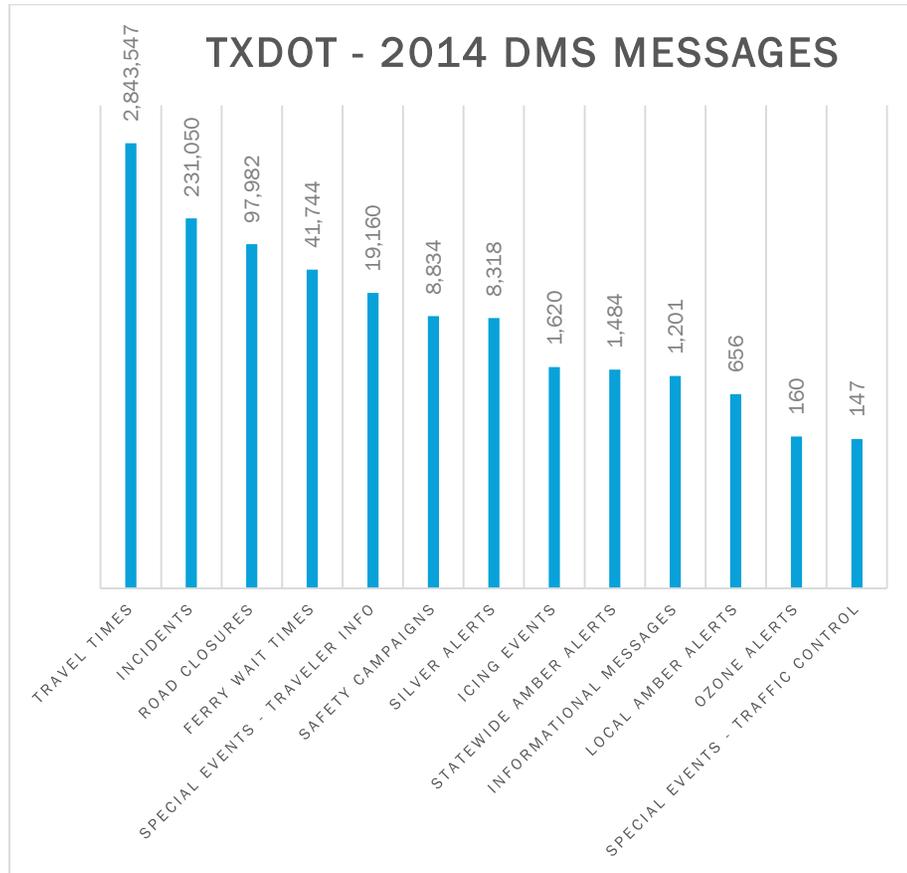
TranStar's traveler information systems are the cornerstone of the partner agencies' traffic management function and its ability to respond to and manage incidents. TxDOT operates and maintains this system for the TranStar consortium.

Information is provided to motorists by three primary means: DMS, the Internet (by both desktop and mobile Internet formats), and the local media.

The 224 permanent roadside DMSs provide information on traffic incidents and planned construction, giving location, travel direction, and nature of the incident or activity. The system is also used to display current travel times; weather alerts; Amber (missing child), Silver (missing elderly or disabled persons), and Blue (law enforcement-related) Alerts; and traffic safety messages.

Some of the significant activities of TxDOT at TranStar in 2014 included:

- Integrated 17 CCTV and 8 DMS on Grand Parkway Segment E;
- Deployed 9 truck rollover systems on freeway connectors;
- Converted significant parts of the travel time system to AWAM (Bluetooth) and installed a Wi-Fi based travel time system on the Galveston-Bolivar ferry;
- Performed 30 DMS and 157 CCTV retrofits



There were more than 412,000 operator activated messages and over 3.2 million automated messages displayed on DMSs in 2014. The total number of operator-activated and automated messages increased 22% over 2013 levels.

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 over sees operations and development of the traffic signal



communications infrastructure. Houston has more than 2,450 signalized intersections maintained and operated by the city.

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 is responsible for developing signal optimization plans for the selected zones. The Traffic Operations Branch's role in this process consists of field data collection, timing plan design, and signal timing implementation. Approximately 800 traffic signals are evaluated and optimized each year.

Metropolitan Transit Authority of Harris County

The Metropolitan Transit Authority of Harris County provides bus and light rail transit services as its core function but is also involved in other transportation and law enforcement functions. METRO programs operated from Houston TranStar include METRO bus and METROrail dispatch, METRO Police Communication Section operations, traffic signalization systems, HOV management systems, SAFEClear and incident management programs.

The City of Houston manages:

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



METRO activity highlights for 2014 included METRO Motorist Assistance Program (MAP) 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 (TMG) is responsible for the operation and maintenance of the County's traffic signal infrastructure, which includes the fiber optic interconnect communications network. Major initiatives during 2014 included:



- Conversion of Westpark Toll Road from ATM to Ethernet IP and several other network upgrades and modifications;
- Continued support for Ship Channel Security District;
- Continued work on Washburn Tunnel camera deployment for incident management;
- Activated CLAS at Kuykendahl Road at Louetta Road and North Eldridge Parkway at West Little York Road in Precinct 4.

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

With almost 4.3 million residents, Harris County is the most populous county in the State of Texas and the third most populous county in the United States.

While the proximity to the Gulf of Mexico makes Harris County vulnerable to hurricanes, it has seen its share of other incidents. The Harris County Office of Homeland Security & Emergency Management (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 that have included weather events, health related events, hazardous materials, industrial accidents and wildfires. HCOHSEM serves as a liaison to local, county, state, federal and military agencies and departments. In total, HCOHSEM activated the EOC 10 times in 2014.



Homeland Security

The HCOHSEM collaborates with local, state and federal partners to prevent, protect against, respond to and recover from natural and man-made disasters, health emergencies and terrorism. 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 as well as other local, state, national and international partners.



Emergency Operations Center, Houston TranStar (HCOHSEM)

Emergency Operations Center (EOC)

HCOHSEM activates its Emergency Operations Center (EOC) for a wide range of emergencies or special events. The EOC is where emergency partners coordinate response efforts, make decisions, locate and deploy resources, and gather and disseminate information. In 2014, the new

EOC opened at Houston TranStar, with new center of 26,000 square foot and 11,000 square feet of remodeled space. Renovations at TranStar added a 3,360 square foot conference space that is converted to support EOC activities when needed.

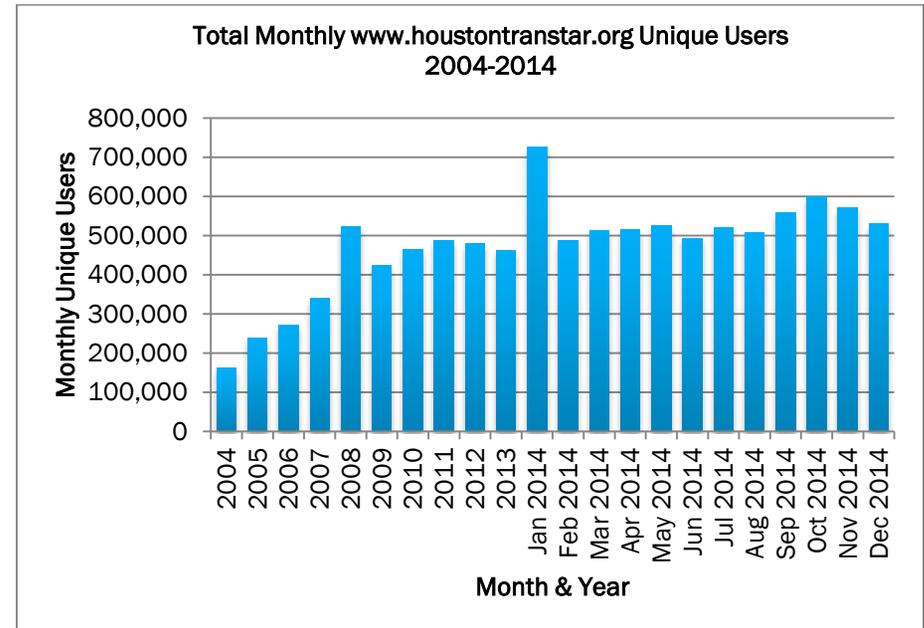
EOC Tours - In 2014, more than 900 visitors toured the Harris County EOC and TranStar, including almost 100 dignitaries from Australia, China, Dubai, Ghana, Thailand and Turkey.

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 capabilities, and travel time reporting systems in their daily traffic reporting functions. In addition, traffic service organizations are housed on the operations floor of Houston TranStar.

Operational highlights for the TranStar Website in 2014 included:

- Total accesses up 19.1% over 2013 levels (to 140.4M);
- Unique users up 18.2% over 2013 (545,000 per month);
- Traffic alert subscribers up 6% to 10,940 subscribers;
- Construction information page views up 92% to 617,000;
- DMS information page views steady at 7.7M;
- CCTV page views up 18.9% over 2013 at 121.9M views;
- TranStar Homepage views up 53% over 2013 at 2.3M views.

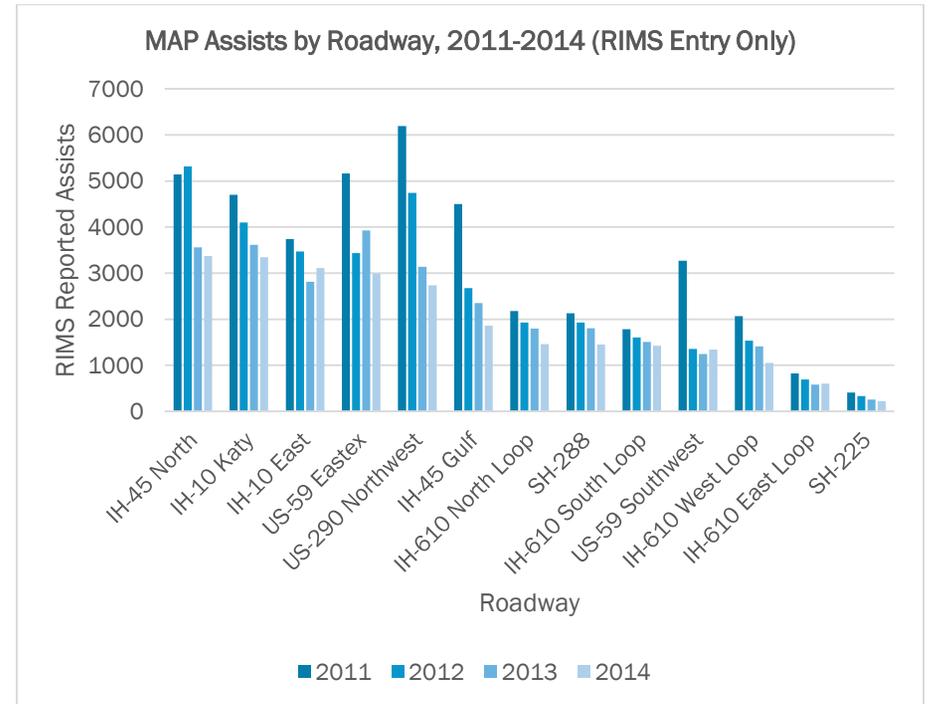
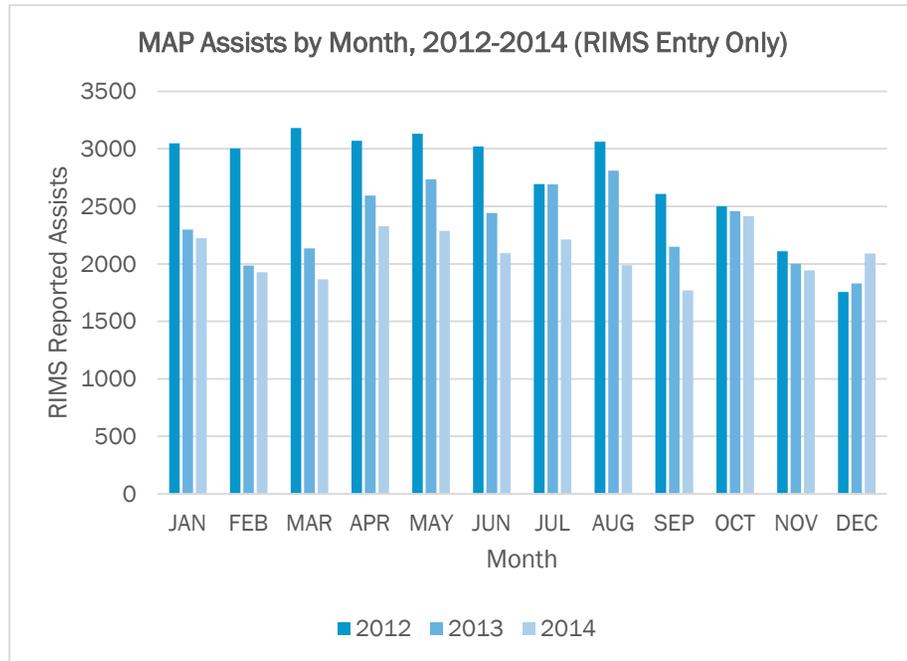


Incident Management

Motorist Assistance Patrol (MAP)

The Motorist Assistance Program (MAP) continues to be one of the most visible services operated by the Houston TranStar agency partnership. MAP began in 1986 with two vans operating eight hours per day. The program has expanded significantly since, operating 16 hours per day on all major freeways, Monday through Friday.

There were 25,146 RIMS-reported assists handled by MAP in 2014, a decrease of about 11% from 2013. The decrease was likely due to staffing reductions in the program. The RIMS-reported MAP assists are for Harris County Deputy MAP activity only. TxDOT operators previously provided dispatch service to the MAP program, but that function has been moved to the Harris County Sheriff’s Office.



SAFEClear

SAFEClear, the City of Houston’s rapid clearance program, was instituted in 2005. SAFEClear is intended to bring quick response to disabled vehicles to reduce the occurrence of secondary crashes in the freeway queue. There were 23,345 RIMS reported SAFEClear assists in 2014; a decrease of 15% from 2013 levels. In 2014, the average time from tow authorization to clearance was 45.6 minutes, down 6% from 2013.

Benefits

Estimates of those benefits which are quantifiable, 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 the benefits of Houston TranStar is treated

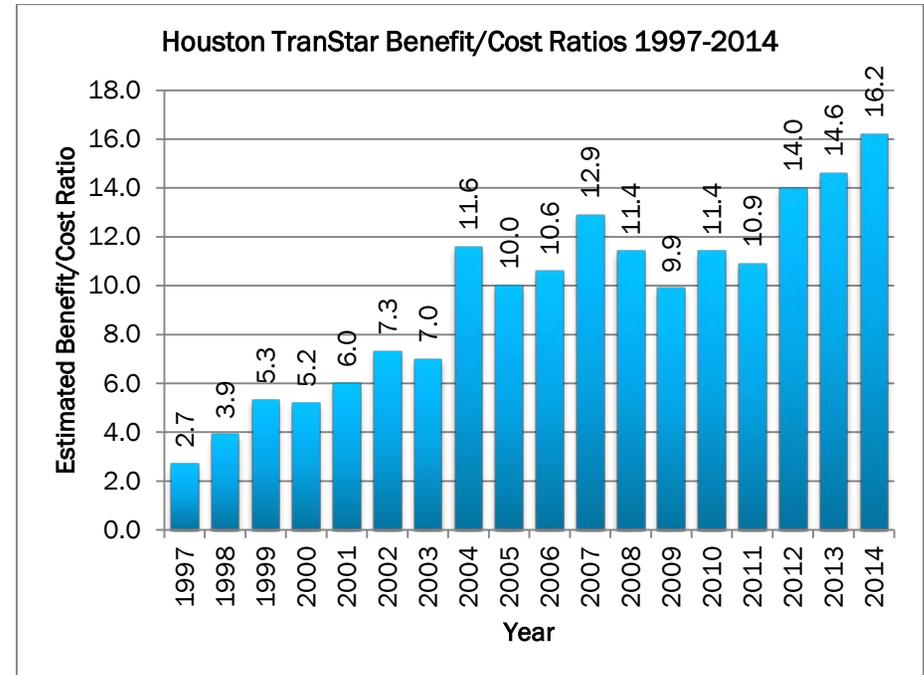
conservatively because many benefits are not easily quantifiable and some are intangible. For the past 18 years, this report has used an approach which estimates the operational benefits in terms of freeway motorist delay savings.

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 procedure for evaluation uses national benchmarks and experience to establish Houston TranStar quantitative 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 \$1.072 billion in 2014. Annual benefits in the reduction of travel time were estimated to be more than 18.6 million vehicle-hours with an estimated monetary benefit of over \$409.1 million. The saving in travel time is equivalent to reducing fuel consumption more than 34.9 million gallons, which results in an additional savings of about \$112.9 million. Thus, the total 2014 motorists' savings was in excess of \$522 million. The annualized cost estimate of center operation was \$32.2 million in 2014.

Since 1997 (when benefits were first estimated), Houston TranStar has saved Houston area motorists over \$4.4 billion in reduced traveler delay and fuel costs.

An estimated reduction in the amount of fuel consumed would also result in a reduction of mobile source exhaust emissions. Based on USDOT Bureau of Transportation Statistics, the reduction of 34.9 million gallons of fuel is equivalent to an estimated reduction of 755 tons of hydrocarbons; 4,883 tons of carbon monoxide; 308,958 tons of carbon dioxide, and 1,099 tons of nitrogen oxides.



Benefit Cost Calculation:

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|--------------------|---------------|
| Annual Benefits | \$522,030,000 |
| Annualized Costs | \$32,213,000 |
| Benefit/Cost Ratio | 16.2 |