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**TxDOT's Houston District's Efforts  
in Combating Congestion and Air  
Pollution**

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 has created a major new program and funding source - Congestion Mitigation and Air Quality Improvement Program (CMAQ) - to combat traffic congestion and transportation-related air pollution problems in the Clean Air Act designated nonattainment areas (including the Houston District) for ozone and carbon monoxide. Toward the goals of reducing traffic congestion and improving air quality, the Houston District of the Texas Department of Transportation (TxDOT), in cooperation with the Houston-Galveston Metropolitan Planning Organization, is participating in several important and innovative programs which are:

- To upgrade fixed time to actuated signals at numerous locations on various highways in the District, so that the signals will respond instantaneously to the real traffic situation, thus facilitating traffic and reducing delays.
- To install computerized transportation management systems on major arterials and freeways, connecting and synchronizing a series of traffic signals so that the signals

(See CMAQ .... Page 6)

**1994 Travel Time and Speed Survey**

Included in this issue of the Fall/Winter 1996 Newsletter is a special report summarizing the Travel Time and Speed Survey conducted cooperatively by H-GRTS and the Texas Transportation Institute. Information on travel time and speed in the Study Area has been monitored and analyzed since 1960 by the Study Office. This report updates previous surveys by assessing mobility trends and serving as a valuable guide for the transportation planners in this area in formulating plans and priorities.

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## TranStar Meeting the Challenge

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Are we ready to commit to the goal of creating such a flexible infrastructure that "No matter how extraordinarily fast our world changes, we will be able to change with it?" This was the challenge that Federico Peña, the U. S. Secretary of Transportation, gave at the opening of the Houston District's TranStar Traffic Management System.

In addition to the challenge, Federico Peña read a greeting and words of praise from President Clinton, "Houston has become a model for the world, not only in technology, but also in cooperation."

All of the attention lavished earlier this year at the opening of TranStar was in celebration of the coordination of four agencies that created this state-of-the-art transportation system. TranStar combines the efforts of the Texas Department of Transportation, the City of Houston, Harris County, and the Metropolitan Transit Authority of Harris County (METRO).

TranStar is a \$13.5 million investment. The 52,000-square foot facility manages traffic control, communications, and telephone switching. It provides office space and a place to issue briefings during emergencies. The public and news media can view operations during special emergency events.

The average driver will hardly notice the  
*(See TranStar.....Page 5)*

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## Application of GIS in H-GRTS

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The Houston-Galveston Regional Transportation Study Office (H-GRTS), and other regional agencies, such as the Houston-Galveston Area Council (H-GAC), and Metropolitan Transit Authority of Harris County have drafted a Memorandum Of Understanding for the following long and short range transportation planning objectives which are to cooperatively:

- Develop, maintain and implement the computer hardware, software and networks necessary to support transportation mapping and planning activities.
- Monitor and analyze historical and current demographic databases necessary for transportation planning and modeling activities.
- Develop travel demand models that incorporate updated modeling practices and theories as well as new travel survey data.
- Complete the conversion of the travel demand analysis software and support from the mainframe environment to the microcomputer/workstation environment.

In order to accomplish these objectives, H-GAC has recently completed work tasks

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## Increase in 1995 Vehicle Registrations

Statistics released by the Budget and Finance Division of the Texas Department of Transportation show that nearly 200,000 (199,708) additional vehicles were introduced to the Texas roadway system, increasing vehicle registrations to 14,660,259 for the State of Texas in 1995. This 1.4 percent gain is the second largest increase in the 1990s. The highest was the 2.1 percent increase occurring in 1993.

It is interesting to note, however, that while Harris County increased by 35,563 registered vehicles (a 1.6% increase) the remaining 7 counties in the H-GRTS region combined for a loss of 3,449 vehicles resulting in a net gain

of 32,114 registrations in the H-GRTS area. This increase represents a 1.0 percent elevation over 1994 registrations, the second largest increase in the 1990s.

The remaining counties in the H-GRTS area increased at a varying rates with declines in registrations for Brazoria (-2.1%), Galveston (-3.3%), and Liberty (-0.5%) counties. This is the second time that three counties have experienced a decline in vehicle registrations since 1991. The smallest positive increase in registered vehicles occurred in Chambers County reporting only 32 additional registrations, the smallest gain in this decade.

Table 1

H-GRTS Vehicle Registrations - All Vehicles by Calendar Year				
County	1994	1995	Change	% Change
Brazoria	183,654	179,835	-3,819	-2.1
Chambers	22,845	22,877	32	0.1
Fort Bend	194,954	197,538	2,584	1.3
Galveston	181,224	175,398	-5,826	-3.2
Harris	2,262,707	2,298,270	35,563	1.6
Liberty	49,874	49,618	-256	-0.5
Montgomery	187,501	190,273	2,772	1.5
Waller	28,547	29,611	1,064	3.7
H-GRTS	3,111,306	3,143,420	32,114	1.0
State of Texas	14,460,551	14,660,259	199,708	1.4

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## The Personality of Travel: Why, Where and How People Move

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According to the 1990 Nationwide Personal Transportation Survey (NPTS) if we are to find a balance between the need to accommodate increasing mobility and the issues of congestion and air quality, we must begin by understanding the trends associated with personal travel in the United States.

Personal travel is based on a complex network of interconnecting economic and social realities resulting in a variety of reasons for traveling (trip purpose). The most frequent and necessary trip people are making is the home-to-work trip. In 1990, labor force participation logged 4,853 annual average vehicle miles of travel (VMT) per household, up 37.1% from 1983. Interestingly, this is the first increase in per household VMT since 1969 when 4,183 average annual miles were driven. One reason for this increase is the entrance of more women into the work force and the increase of women licensed to drive. Since 1969, the index of Annual Miles of Travel per female workers has doubled and has jumped from 100 to 184 for female licensed drivers. The percentage of female driver participation in the United States is now 86%, much higher than the percentages in Great Britain and the Netherlands which are 49% and 65% respectively. The other major purposes for travel are social and recreational which accumulated 4,060 annual average VMT

per household, personal business trips (3,014 annual average VMT per household) and shopping trips (1,743 VMT per household). Unfortunately, the journey-to-work still maintains the lowest vehicle occupancy rate falling from 1.3 persons per vehicle in 1977 to 1.1 in 1990. Factors contributing to this decline include the increased number of vehicles per household ascending from 1.16 (1969) to 1.77 (1990), a 53% increase. Furthermore, the percentage of households without a vehicle dropped from 20.6% in 1969 to 9.2% in 1990, a 33% reduction, while the percentage of households with 3 or more vehicles available quadrupled and the number of household vehicles increased by 128%. It should be noted that the decrease in vehicle occupancy is also influenced by the psychological perception that for many of us this is the only time we have any privacy as we sport the roadways in our sanctuaries of power. Other reasons for the persistence to drive alone are people being pressed for time and working couples being forced to run errands such as taking children to day care or school during the work trip using the freedom and flexibility offered by the automobile. Evidently people do not have the time to invest in car pooling and could not satisfy their total trip needs by participating in car pools or other forms of public transit.

As tradition dictates, the predominate mode of travel for general trip making is the automobile and it is becoming more pervasive as the remaining share of  
*(See Travel .... Page 7)*

## TranStar

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differences here in Houston, but they are substantial. TranStar uses computers and electronics to enhance communication systems especially created for highways, vehicles, and public transportation. Intermodal transfer points by public and private industries make surface travel safer, less congested and more efficient. This is the big payoff ... What the traveling public really experiences!

Houston METRO and the Federal Transit Administration are contributing in excess of \$120 million to computerize more than 1,300 traffic signals on transit streets in the METRO service area by 1999. The Authority has already completed refitting 73 of the 1,300-plus intersections that will go on-line. These efforts are all a part of the Regional Computerized Traffic Signal System.

To keep traffic running safely and smoothly, TranStar uses large changeable message signs in the Houston Metropolitan area. Warnings are flashed on the boards to alert travelers of upcoming delays, accidents or any other important information. The media now uses TranStar to have one source of traffic information...making it more uniform.

There are small square loop detectors embedded in the freeways that will register the flow of traffic. Special tags

have been installed on some vehicles. These efforts monitor whether or not traffic is progressing easily or if there is a problem or congestion. If a problem is detected, there are MAP (Motorist Assistance Patrol) officers that can be sent to assist stranded motorists or to help if there is an accident. Houston already has 14 specially-equipped vans that patrol about 45,000 vehicle miles and assist an average of 2,200 incidents per month.

TranStar -- Our best effort to meet the challenge!

## GIS

*(Continued from Page 2)*

which include the on-going development of and revisions to basemaps and database structures; planning activities such as the development and validation of travel forecasting tools, Geographic Information System— (GIS) implementation; and the administration and maintenance of a UNIX-based ARC/INFO GIS. In addition to using the GIS software applications, H-GRTS and H-GAC will continue to correct and revise Topographical Integrated Geographic Encoding and Referencing System basemaps and the 1990 Census Data. During fiscal year 1996, H-GAC acquired a 2,800 zone HP-UNIX version of EMME/2. The modeling software package will allow the agency's staff to perform urban and regional travel analyses, and other travel demand

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## GIS

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scenarios. The package also provides the planner with an interactive graphic urban and regional transportation planning method, which combines state-of-the-art features for building required data banks. Using the modeled projected traffic volumes from EMME/2 as part of the databases for ARC/INFO will allow graphic comparisons of alternative analysis.

The Texas Department of Transportation and cooperating agencies are conducting a major investment study (MIS) of the Katy Freeway Corridor, a 40-mile stretch from downtown Houston to the Brazos River. The goal of the MIS is to evaluate transportation needs in the Katy Freeway Corridor, and to identify the best alternative for addressing these mobility needs. The new procedures developed to combine EMME/2 and ARC/INFO as an analysis tool can be used to analyze and select the best combination of travel modes for the Katy Corridor.

## CMAQ

*(Continued from Page 1)*

will respond to traffic needs systematically rather than individually.

- To establish the new TranStar Management Center and install the

Intelligent Vehicle Highway System to monitor traffic conditions at their exact time of occurrence. Since traffic conditions are detected immediately, the time delays between the occurrence, detection, and clearance of accidents and mechanical breakdowns will be substantially decreased. Motorists can thereby maintain higher and more constant speeds when they travel.

- To participate in the Alternative Fueled Fleet Vehicle Program, combining the efforts of local, state, and federal agency fleet vehicle owners to comply with the alternative fuel mandates of the Clean Air Act. TxDOT's Houston District operates about 400 compressed natural gas and 80 liquid propane gas vehicles. A percentage of these vehicles were acquired using funds from this program.

- To participate in Regional Commute Alternative, Regional Vanpool, and Ozone Watch Leadership Programs. TxDOT's Houston District in cooperation with the Texas Natural Resource Conservation Commission, the Houston-Galveston Area Council, the Metropolitan Transit Authority of Harris County, other public and private agencies and community leaders in this area is one of the leading partners in the Regional Air Quality Planning Committee and Clean Air Coalition. The Coalition is making every effort to improve air quality through alternative ways of travel, public education, and public relations on ozone awareness.

## Travel

(Continued from Page 4)

alternative modes is declining. Due to the tremendous suburban growth started in the 1960s, more commuters are using their cars to get to work as jobs have moved to the suburbs which accounted for 70% of all new jobs between 1980 and 1990. Suburban to suburban travel also accounted for 44% of the commuter travel making it the largest category. When this exodus of jobs occurs new centers of employment are created which pushes commuters away from public transit. For example, in 1983 the public

transportation share (buses and various forms of railway transportation) of daily person trips was 2.4% declining to 2.0% in 1990. Therefore, during the 1980s car pooling, transit, walking to work, and working at home have become less attractive or practical to the average worker. Refer to Table 1 showing the number of person trips by mode and trip purpose.

Despite all of the changes in the social and economic forces that govern the personal transportation scene, the luxury, practicality or psychological necessity of private mobility will continue to reign supreme.

Table 1

Person Trips by Mode and Purpose 1983 and 1990 NPTS (millions)								
Purpose	Mode						Total	
	Private		Public		Other <sup>1</sup>		1983	1990
	1983	1990	1983	1990	1983	1990	1983	1990
Earning a living	44,560 (87.1%)	49,116 (91.2%)	2,302 (4.5%)	2,100 (3.9%)	4,298 (8.4%)	2,639 (4.9%)	51,160 (100.0%)	53,855 (100.0%)
Family & personal business	70,020 (87.9%)	96,061 (92.6%)	876 (1.1%)	1,006 (1.0%)	8,762 (11.0%)	6,626 (6.4%)	79,658 (100.0%)	103,693 (100.0%)
Civic, educational & religious	14,800 (55.9%)	17,564 (61.9%)	1,244 (4.7%)	1,075 (3.8%)	10,433 (39.4%)	9,736 (34.3%)	26,477 (100.0%)	28,375 (100.0%)
Social & recreational	50,287 (81.2%)	53,348 (86.3%)	991 (1.6%)	742 (1.2%)	10,652 (17.2%)	7,727 (12.5%)	61,930 (100.0%)	61,817 (100.0%)
Other	4,319 (83.7%)	1,483 (81.4%)	41 (0.8%)	35 (1.9%)	800 (15.5%)	304 (16.7%)	5,160 (100.0%)	1,822 (100.0%)
All Purposes	183,986 (82.0%)	217,572 (87.2%)	5,454 (2.4%)	4,958 (2.0%)	34,945 (15.6%)	27,032 (10.8%)	224,385 (100.0%)	249,562 (100.0%)

<sup>1</sup>. Includes trips by bicycle, walking, school bus, taxi, airplane, Amtrak, moped and other modes.

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Regional Transportation Study**

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