**Poster Overview**

The Atlanta HOV-to-HOT Corridor Performance Monitoring Project includes data collection and analytical work to support the assessment of the 2011 conversion of the Atlanta, GA I-85 high-occupancy vehicle (HOV) lane into a high-occupancy toll (HOT) lane.

This project includes: 1) development of a new ITS data archive, 2) evaluation of engineering performance of HOV and HOT lanes, 3) quarterly collection of vehicle occupancy (persons/vehicle) and license-plate-based demographic data for use in system performance and impact assessments, and 4) an assessment of traffic diversion to a parallel arterial.

**ITS Analytical Archive**

A new Intelligent Transportation System (ITS) data archive will be used in a variety of system performance assessments: 1) process archived ITS NaviGAtor system data through quality assurance/quality control procedures, 2) develop new imputation techniques to fill in missing or problem vehicle detection system data, 3) create a data repository and analytical data set for use in comprehensive time-series analysis of facility performance, and 4) develop Internet visualization tools to display the archived operations data and historic speed-flow performance for each roadway segment by date and time period. The final system will be used to monitor real-time system performance, assess changes over time, and quantify responses to specific operational policies.

**Georgia Tech Data Repository**

Georgia Tech’s new high-performance server archives real-time ITS volume/speed data at 20-second resolution from detection stations every one-third of a mile along the freeways in the Metro Atlanta area.

- Archival lane-by-lane data is available in:
  - 20-second aggregation (Oct 2007 – Jan 2011)
- Data are archived in near-real-time
- 20-second bins arrive within 2-minutes of observation
- Exogenous variable data elements are also compiled
  - Road construction/lane closure
  - Crash events
  - Special events (sports, conventions, etc.)
  - Sunrise/sunset (ambient light and windshield glare)
  - Localized precipitation

**Online Data Visualization**

The GUI allows selection of performance data by corridor, groups of VDS stations, dates, times, etc.

**Effective Lane Capacity**

Current and future engineering performance (speed-flow) of HOV, HOT, and adjacent general purpose (GP) lanes

- Effective capacity of the HOV lane is <1550 VPH (black)
- Much lower than the adjacent GP lane at ~2200 VPH (red)

- Potential factors affecting HOV lane effective capacity
  - Weaving at approved lane transition zones
  - Illegal lane entry, i.e. crossing double white lines
  - Higher than normal gap maintenance by drivers due to high lane speed differentials and safety concerns
- Video data analysis will be used to quantify and isolate the impacts of weaving and other operational elements on HOV, HOT and GP lane performance
- The team will recommend changes to traffic simulation models to more accurately reflect weaving, gap acceptance, driver aggressiveness, and factors affecting speed-flow of non-barrier-separated HOT lanes

**Atlanta’s ITS System**

The Georgia Department of Transportation ITS system provides some of the most comprehensive freeway monitoring data in the country for traffic flow, speed, and lane occupancy

- 200 facility miles
- 1645 video detection cameras
- 487 closed-circuit TV cameras
- 86 microwave stations
- 140 ramp meters
- 134 variable message signs
- 35 SRTA tolling stations
- 9 SRTA general purpose lane monitors
Vehicle Occupancy Studies
Teams monitor quarterly roadside vehicle occupancy (persons/vehicle) by vehicle class from ramp gore areas and track person-throughput by lane

- Netbooks with keypads are used to record vehicle class and occupancy data for each vehicle in each lane
- Coding scheme reflects monitoring uncertainty when all seats cannot be observed (e.g., tinted windows)
  - 2 → two persons observed, all seats observed
  - 2+ → two persons observed, but not all seats observed
  - The HOV occupancy violation rate is more than 6.5%

Commuter Demographics
- Quarterly license plate images are collected by HD video camcorders (two lanes at a time)
- Custom software is used for entering plate data
- Data processing is labor intensive
- Automated license plate recognition programs have not proven sufficiently accurate and efficient
- Sub-sampling strategies are under development
- Plate data are used to identify the Census Block Groups of registered vehicle owners

Impact on Arterials
The team is evaluating Bluetooth and RFID systems for collecting corridor travel times on parallel routes.

RFID tags will be distributed to 1200 volunteer Buford Highway commuters to monitor arterial corridor performance (pre- and post-HOT lane implementation) and assess changes as a function of HOT lane pricing and other relevant factors.

Summary
The monitoring and effectiveness program will yield detailed I-85 corridor performance data both pre- and post-conversion for the Atlanta’s HOV-to-HOT project:

- Providing a new data repository and graphic user interface to efficiently assess facility performance analysis and monitor HOV-to-HOT conversion impacts
- Developing new imputation and QA/QC techniques for VDS data to ensure reliable/robust data for analysis
- Assessing whether non-barrier separated systems with electronic monitoring reduce illegal weaving
- Assessing the impacts of weaving and lane speed differentials on effective capacity (using empirical data) to improve HOT system design and simulation modeling
- Developing new and improved methods to collect and analyze occupancy and plate-based demographic data
- Providing useful demographics and HOT lane use data for environmental justice assessment, demand elasticity evaluation, and future tolling and revenue studies
- Corridor specific data for localized impact assessment

Planned Activities

- Integrating GDOT and SRTA data to assess changes in travel behavior over time
- Supplemental deployment of RFID tags in the non-customer fleet for research purposes
- Targeted focus groups designed to identify reasons behind observed changes in lane use activity
- Assessment of air quality and environmental justice impacts using corridor-specific demographic and vehicle fleet data