



Applied Technology and Traffic Analysis Program (ATTAP)

Welcome to ATTAP

To effectively contend with increasing statewide traffic congestion and to best use diminishing resources for potential improvement, the *Office of Traffic and Safety* (OOTS) in the *Maryland State Highway Administration* (MDSHA) and the *Department of Civil and Environmental Engineering at the University of Maryland* has jointly initiated the *Applied Technology and Traffic Analysis Program (ATTAP)*. ATTAP intends to serve as a vehicle that will enable OOTS to take full advantage of *state-of-the-art developments* in information sciences, applied technologies, and traffic analysis. It will also function as a *resource data-bank* that inventories available software as well as field data for traffic system evaluation.



Program Manager

Gang-Len Chang, Professor
University of Maryland
Email: gang@umd.edu

Sae'd Rahwanji, Assistant Division Chief
Maryland State Highway Administration
Email: srahwanji@sha.state.md.us

Minseok Kim, ATTAP Team Leader
Maryland State Highway Administration

Program Advisor

Gregory Johnson, State Highway Administrator
David Coyne, Deputy Administrator
Cedric Ward, Director
Eric Tabacek, Deputy Director
Michael Zezeski, Director
Allison Hardt, Deputy Director
Steve Rochon, Chief

MDSHA





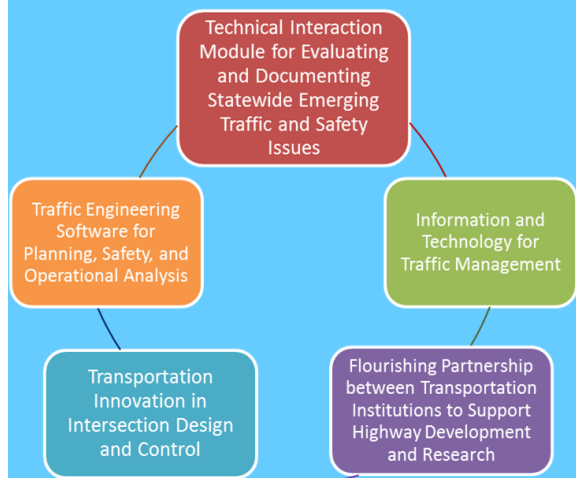
Office of Traffic & Safety
State Highway Administration



Traffic Safety &
Operations Laboratory



The ATTAP program's primary mission.



ATTAP Team Members and Staffs

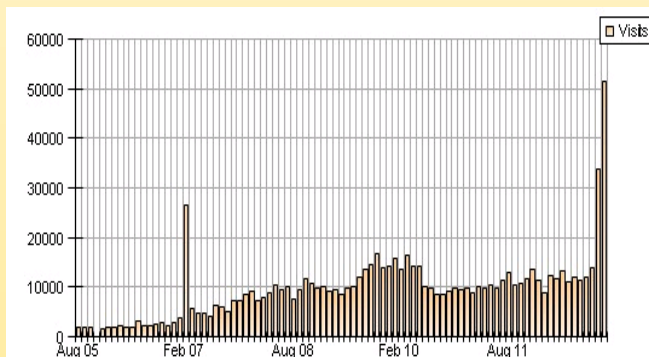
Gang-Len Chang (Univ. of Maryland)
Mark L. Franz (Univ. of Maryland)
Sung Yoon Park (Univ. of Maryland)
Hyeonmi Kim (Univ. of Maryland)
Yang (Carl) Lu (Univ. of Maryland)
Chien-Lun Lan (Univ. of Maryland)
Yao Cheng (Univ. of Maryland)
Liu Xu (Univ. of Maryland)
Minsu Won (Univ. of Maryland)
Nan Zou (Shandong Univ. in China)
Yue Liu (Univ. of Wisconsin Milwaukee)
Xianfeng Yang (San Diego State Univ.)
Woon Kim (MTA)
Sae'd Rahwanji (SHA)
Cedric Ward (SHA)
Eric Tabacek (SHA)
Errol Stoute (SHA)
Minseok Kim (SHA)
Mohamed Kaddoumi (SHA)
Solomon Bekele (SHA)
Ruihua Tao (SHA)
Allison Hardt (SHA)

Goals and Benefits

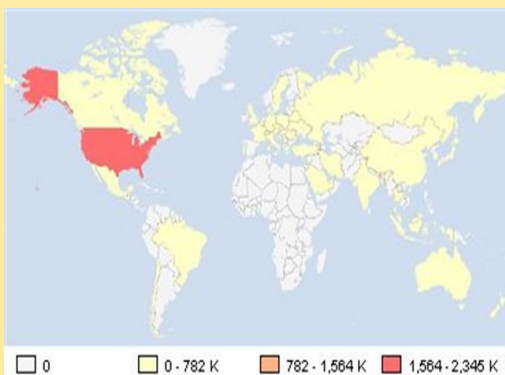
- Work in partnership between OOTS and Department of Civil and Environmental Engineering at the University of Maryland;
- ♦ Conducting in-depth evaluation of new technologies in traffic flow management and safety analysis;
- Develop and evaluate state-of-the-art traffic engineering analysis tools and technologies;
- ♦ Identifying technical areas for University of Maryland students to gain practical knowledge of traffic engineering;
- ♦ Coordinating technical activities and seminars on emerging traffic issues between agencies at the federal, state, and local level, as well as in the private sector;
- Provide onsite support for traffic engineering analysis and applied operations to the Traffic Development and Support Division/Office of Traffic and Safety-Maryland State Highway Administration; and
- Develop and maintain an internet based traffic engineering innovation and information resource site.

ATTAP Exposure:

National & International Influence



Year	Visitors
2005	7,564
2006	27,862
2007	89,862
2008	112,529
2009	142,375
2010	138,667
2011	130,094
2012	202,643



- Since 2008, ATTAP has over 100,000 annual visitors.
- ATTAP has visitors from over 90 countries.



Office of Traffic & Safety
State Highway Administration



Traffic Safety &
Operations Laboratory



Research Areas

- Traffic control and operations
- Traffic simulation modeling
- Travel time estimation and prediction system
- Real-time traffic monitoring and emergency evacuation
- Traffic safety analysis and evaluation
- Intelligent transportation systems
- Innovative highway geometric design and simulation

Software Development

- Real-Time Traffic Monitoring System
- Region Wide Evacuation and Traffic Monitoring System for I-95, I-495, Washington D.C., I-270, Baltimore City
- Maryland Capacity Analysis Program
- Maryland Unconventional Intersection Design
- Lane Closure Analysis Program...



<http://attap.umd.edu/uaid.php>

ATTAP Works Projects

Intersection Control

- ◇ Dilemma zone protection project on MD 40 @ Red Toad Rd.
- ◇ Robust optimization model for bus priority under arterial progression

Intersection Design

- ◇ At grade (MUT, Superstreet, CFI, Roundabout,...)
- ◇ Grade separated (DDI, SPUI, Echelon, CTO,...)
- ◇ Maryland Unconventional Intersection Design (MUID)

Traffic Analysis/Simulation

- ◇ Computation of intersection saturation flow rate and capacity for MD
- ◇ I-95, I-695, I-270, I-495, Washington D.C. traffic simulator
- ◇ Integrated system method for implementing road pricing scheme
- ◇ Ocean City hurricane evacuation simulator
- ◇ Automated real-time travel time estimation and prediction system for both arterial and freeway
- ◇ Maryland Capacity Analysis Program (MDCAP)

Traffic Management

- ◇ Variable speed limit (VSL) control in recurrently congested highway
- ◇ Region wide traffic monitoring system (Ocean City)
- ◇ Off-ramp control
- ◇ National capital region evacuation and traffic monitoring system
- ◇ Emergency evacuation

Traffic Safety

- ◇ Effects of automated speed enforcement in Maryland work zones
- ◇ Crash analysis and emergency response

Work-Zone Operations

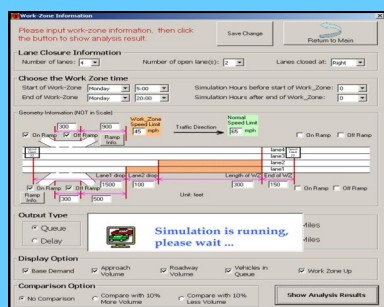
- ◇ Variable speed limit control during freeway lane closures
- ◇ Dynamic late merge system
- ◇ Lane-based signal merge control system for highway work zone
- ◇ Estimating maximum capacity in work zone areas
- ◇ Lane Closure Analysis Program (LCAP)

Publications

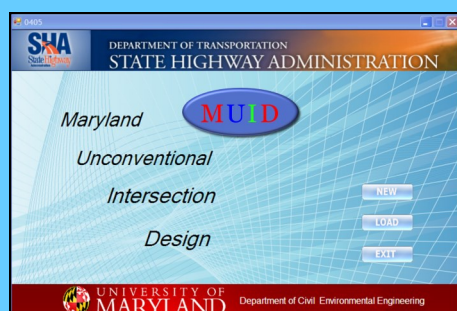
- ◆ Recent Technical Reports
 1. An Integrated Computer System for Analysis, Selection and Evaluation of Unconventional Intersections
 2. Enhancement of Freeway Incident Traffic Management and Resulting Benefits
 3. Applying ITS Technologies to Contend with Highway Congestion”

* All other technical reports are available at the ATTAP website
- ◆ Journal/Conference Papers

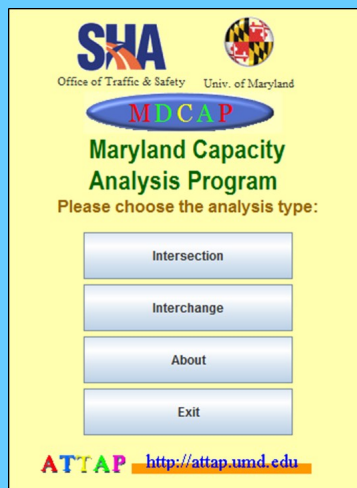
All journal, conference, and publication papers are available at the ATTAP website



LCAP



MUID



MDCAP



I-695 Traffic Simulator

Recent Traffic Analysis Tools

LCAP

The Lane Closure Analysis Program (LCAP) is developed for the Maryland State Highway Administration by the University of Maryland. This study intends to develop an advanced model for estimating work-zone capacities and to produce an integrated and user-friendly computer program for SHA engineers/staff to analyze a variety of work-zone associated issues. Topics include guidelines for work zone design, methodologies for capacity estimation, traffic impact analysis, cost/benefit evaluation, lane-closure penalty assessment, as well as incentive/disincentive estimates for various implementation plans.

MUID

The Maryland Unconventional Intersection Design (MUID) project aims at developing a planning evaluation tool for unconventional designs. Through employing unique geometric designs, unconventional intersections can alleviate urban congestion with less right-of-way and financial cost compared with conventional grade-separated solutions. Based on in-depth analysis of different types of unconventional designs, statistical models are developed to analyze the delay and queue of the design. Further, the overall framework is implemented by a computer program named the Maryland Unconventional Design Tool.

MDCAP

Maryland Capacity Analysis Program (MDCAP) is designed to conduct capacity analysis for signalized intersection(s) and interchanges based on the critical lane volume method. This tool automatically generates v/c ratio and LOS for intersections and interchanges. This tool is designed to aid traffic engineers in intersection and interchange analysis.

I-695 Traffic simulator

The proposed simulator system contains the following principal components: (1) an intelligent system interface for input, output, and potential applications; (2) a GIS database for key information related to all network geometric features, driver characteristics, and traffic volume distributions; (3) a microscopic simulation database to model traffic behavior and the daily evolution of traffic patterns; and (4) a knowledge-based expert system module to project the durations of detected incidents. The completed I-695 traffic simulator will be part of the Traffic Simulator System sponsored by SHA, which can be used independently by traffic engineers for the Baltimore region or integrated with other existing simulators (e.g., I-495, I-270) to analyze the region wide traffic conditions between the Washington, D.C. and Baltimore metropolitan areas.