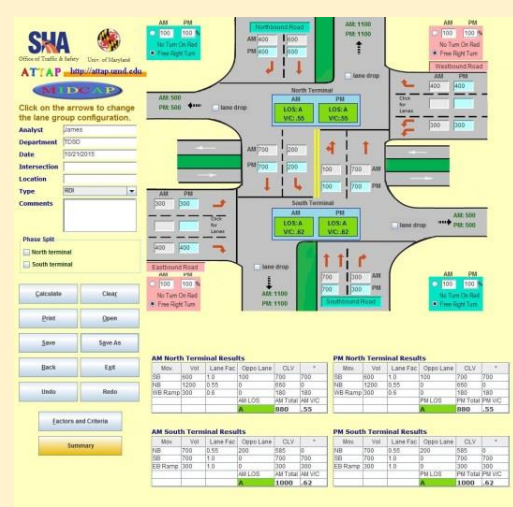


MIDCAP Software update

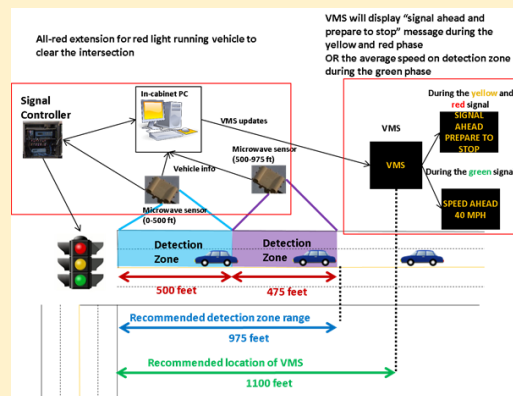
- Conduct a capacity/queuing analysis for signalized intersections and interchanges
- Enhance the CLV analysis method and queuing method of the MSHA
- Compute the volume-to-capacity ratio, level of service, and estimated max. queue length
- ✓ **3-leg, 4-leg, full CFI, T-CFI, asymmetric CFI, and symmetric CFI, Regular Diamond Interchange, Diverging Diamond Interchange, and Single Point Urban Interchange**
- ✓ **Lane configurations, right turn restrictions (no-turn-on-red, free right turn, and overlap right turn), and signal plans**
- **Clover leaf interchange (near completion)**
- **Short left turn bay impact on capacity (underway)**
- **Adjusted lane use factor for lane drop (underway)**

<http://attap.umd.edu/2015/09/29/918/>



Integrated Dilemma Zone Protection System

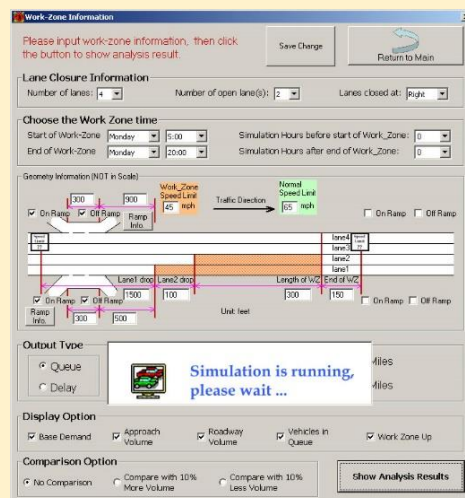
- Provides additional clearance time to red-light-running drivers
- Provides information to drivers approaching an intersection, such as advance warning sign and speed advisory message.
- ✓ **The base system has been Deployed at US 40 @ Red Toad Road**
- ✓ **Simulation analysis for all-red extension algorithm, and Speed harmonization under a pre-time signal**
- **US40 @ Western MD Parkway, MD213 @ Locust Point Rd (in design process)**
- **Speed harmonization with actuated signal control (underway)**
- **Field deployment and data collection (underway)**



LCAP Software update- for local arterials

- Develops an advanced model for estimating arterial work-zone capacities
- Provides guidelines for work zone design, methodologies for capacity estimation, traffic impact analysis, cost/benefit evaluation, lane-closure penalty assessment
- The Basic version will provides a tool for users to estimate the delay and queue caused by work-zones
- ✓ **Classify types of the arterial work zone based on their configurations and figures.**
- ✓ **Develop initial models for estimating queue lengths in arterial work zones.**
- **Verify the initial queue length models with microsimulation**

<http://attap.umd.edu/2015/09/29/lane-closure-analysis-program/>

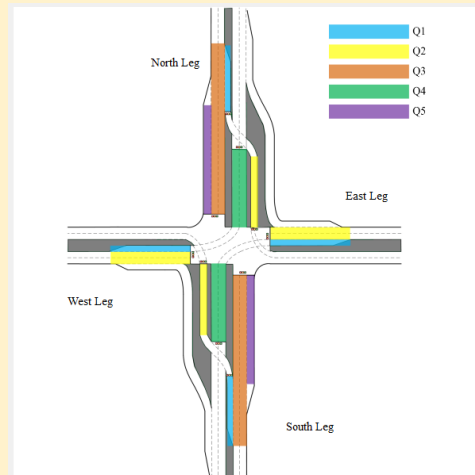




MUID Software update

- Performs capacity/queuing analysis and signal optimization for continuous flow intersection (CFI), diverging diamond interchange (DDI), and superstreet intersection
 - ✓ **Evaluation and signal optimization modules for CFI, DDI and superstreet**
 - **Signal optimization module for superstreet with no-turn-on-red from major roads (on going)**
 - **Incorporate the developed models into the software (on going)**

<http://attap.umd.edu/2015/09/29/maryland-unconventional-intersection-design-muid/>



New ATTAP Website

- Design a new website to show ATTAP projects, SHA reports, thesis, dissertations, and application tools. The new website will be on a more secure server.
 - ✓ **Created a server in the Linux system**
 - ✓ **Built a website with WordPress**
 - ✓ **Uploaded all presentations, papers and reports**
 - ✓ **Created pages to show the research highlights**



Lane use factor estimations for intersections with lane drop

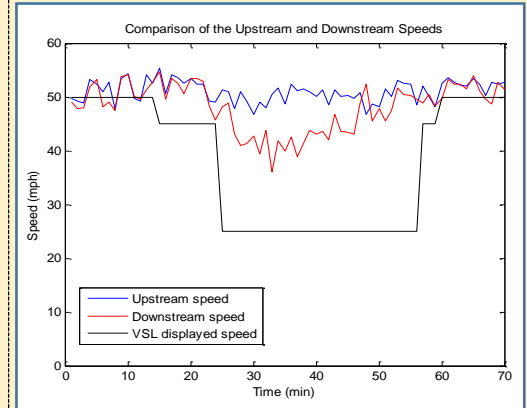
- Investigate the impact of various lane-drop designs on the lane-use distributions under different geometric conditions.
 - ✓ **Conducted field video data collection (160 hours) for intersections with different types of lane drops at 30 intersections.**
 - ✓ **Computed the LUFs for each interval and provided necessary statistical analysis**
 - ✓ **Incorporate the calibrated LUFs in the MIDCAP software**

<http://attap.umd.edu/2015/09/28/lane-use-factor-estimation-for-intersections-with-lane-drop/>

Types	Suggested LUF value	Typical LUF value
2 through → 1 (exclusive)	Total volume Less than 600 vph	0.62
	Total volume More than 600 vph	0.58
3 through → 2	0.43	0.40
2 left → 1	Total volume Less than 300 vph	0.60
	Total volume More than 300 vph	0.56
2 through "form a single lane"	0.55	0.55
2 left "form a single lane"	Total volume Less than 250 vph	0.55
	Total volume More than 250 vph	0.60

Modeling the Timing-varying Compliance Rate to Variable Speed Limit Signs

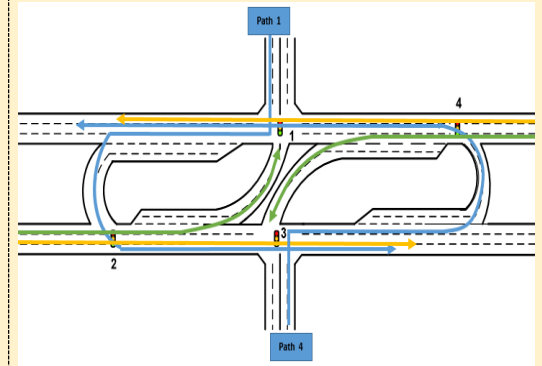
- This research aims to propose a statistical model to formulate the time-varying compliance rate, based on the field data collected on US 100 during the VSL demonstration period.
 - ✓ **Conducted analysis of VSL field operational data**
 - ✓ **Computed the compliance rate**
 - ✓ **Identify the potential variables which effect the compliance rate**
 - **Propose a quantitative method to model the time-varying compliance rate (near completion) under various congestion level**
 - **Investigate the impact of compliance rate on the effectiveness of VSL**



Superstreet research projects

Interval-based Planning Models for Evaluating the Geometric Features of Signalized Superstreet

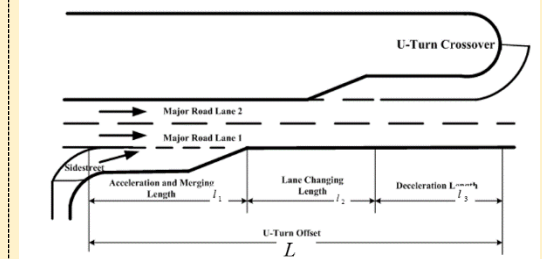
- A convenient planning method that allows users to reliably estimate the queue size and its variation on each critical link in a Superstreet, based on the given signal plan and observed volume fluctuations. Has been simulated with field data from Maryland.
 - ✓ **Extensive simulations of queue spillback effect on delay**
 - ✓ **Developed interval-based queue models to evaluate the geometric design**
 - ✓ **Validation based on simulation results**



Two-phased optimization model for Signalized Superstreet

- This study proposes a two-stage signal optimization model to set the optimized green splits and offset for each sub intersections while strictly preventing the potential queue spillbacks at the same time.
 - ✓ **Stage 1: optimization of green splits and cycle length; Stage 2: Optimize offsets while constraint on minor road waiting time**
 - **Compare results between the proposed model and other prevailing signal design methods (underway)**
 - **Simulation-based validations (underway)**

Critical Components for U-turn



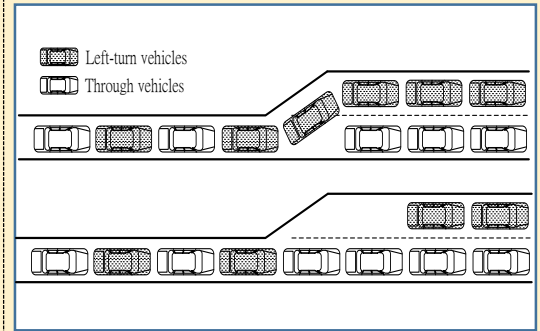
Planning Model to Determine the Minimum U-turn Offset at an Un-signalized Superstreet

- Realizing all standards fall short on the design of Un-signalized Superstreet, this study has proposed an applicable design model to determine the minimum required U-turn offset length for such a design given its traffic demand pattern.
 - ✓ **Decompose U-turn offset into three components**
 - ✓ **Development of stochastic models to predict the minimum required length for each component**
 - ✓ **Conducted simulation-based validation which analyzes the frequency and character of vehicle-to-vehicle collisions.**



Capacity under short left-turn bay conditions

- This study provides three mutually exclusive cases to address the vehicle arrival patterns and the resulting blockage/spillover probabilities.
 - ✓ **Model development for spillover/blockage probabilities considering bay length and traffic demands**
 - ✓ **Field data collection on MD-193 Eastbound and Rhode Island Ave.**
 - ✓ **Evaluation of the model-generated left-turn blockage probability with that from the calibrated simulator.**
- **Preparing a brief presentation file for SHA review before implementing in MIDCAP**
- **Designing the interface for MIDCAP software**
- **Upon approval by SHA, the left-turn capacity reduction will be programmed in the MIDCAP software**



Decision/Deployment Support Tool for Variable Speed Control under Recurrent Congestion

- This study has developed a comprehensive decision/deployment support tool for the application of Variable Speed Limit (VSL) and VSL with ramp metering (VSLRM) control in recurrently congested environments. It will help practitioners determine which sites will benefit most from VSL or VSLRM.
- This research has the potential to assist traffic engineers in planning of VSL and VSLRM controls, thus enhancing the methods for allocating limited resources for mobility and safety improvements on highways plagued by recurrent congestion.
 - ✓ **Design of 3 modules: Decision, Benefits, Deployment guidelines, developed from simulated experiments calibrated with field data**
 - ✓ **Analysis of tool on several sites taken from MD Mobility Report**

