

Practical Considerations for an ACS-Lite Pilot Project in New Jersey



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Agenda

- NJDOT's Adaptive Signal Timing Initiative
- Development of the Practical Considerations
 - Overview of ACS-Lite
 - Lessons Learned
 - Evaluative Criteria for Identifying Candidate Corridors
- Where the Practical Considerations Have Led NJDOT's ACS-Lite Pilot Program



NJDOT's Adaptive Signal Timing Initiative

Through the Bureau of Traffic Engineering & Investigations (TEI) under Signal Optimization Contracts

3 Regions →
3 Consultants →
3 Pilot Projects

NJDOT
Regions

North

Central

South



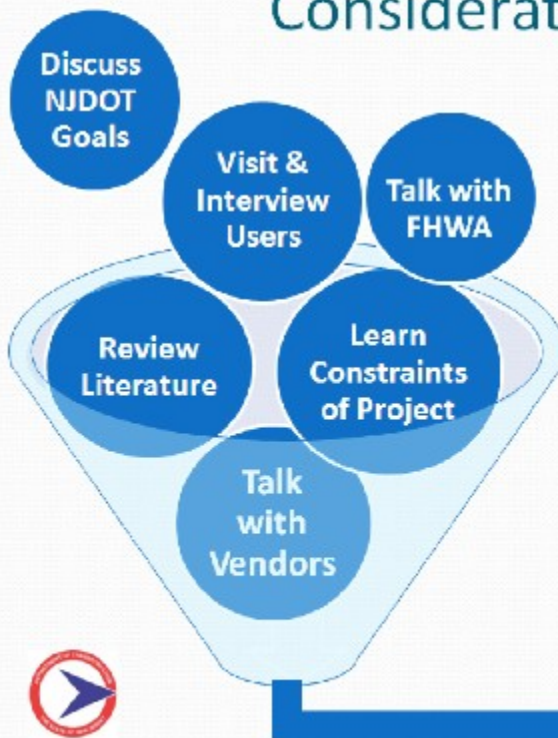
Objective of Pilot Projects

Provide NJDOT the opportunity to evaluate multiple adaptive signal control systems for improving traffic flow on NJ closed loop arterials which are not centrally controlled.

The results will inform NJDOT's future use of adaptive signal control technologies for managing congestion and reducing the frequency of traditional signal timing optimization efforts.



Developing the Practical Considerations



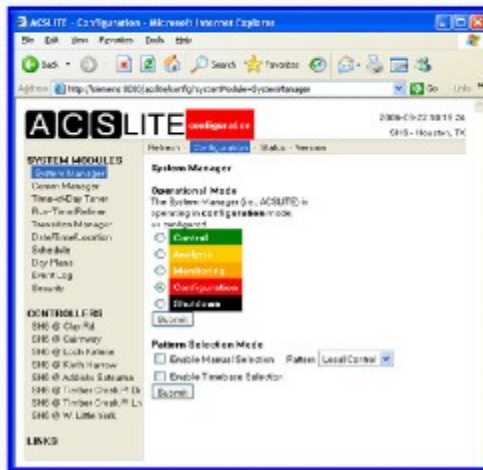
Implementation Strategies



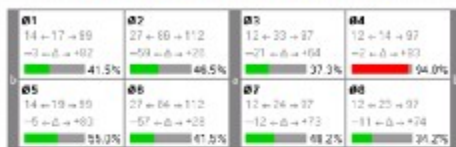
- Technical Knowledge
- Lessons Learned
- Evaluative Criteria for Corridor Selection



Major Features of ACS-Lite



Screen Shots from ACS Lite User Manual



- Browser-based interface (except Econolite moving toward direct access through Centrac)
- Optimize splits by balancing v/c ratios
- Optimizes offsets, but not cycle length
- Takes data over several cycles then implements changes incrementally
- ACS-Lite processor in field or remote
- Archives data



ACS-Lite History

Algorithm Development

1990's - 2000's

- Sponsored by FHWA
- Originals included OPAC and RHODES
- Those (and others on market such as SCOOT and SCATS) were more complex than needed for most applications so developed ACS-Lite

Demonstration Projects

2005 - 2007

- ACS-Lite core software by FHWA/Siemens
- One corridor with each vendor: Eagle, Econolite, McCain, and Peek

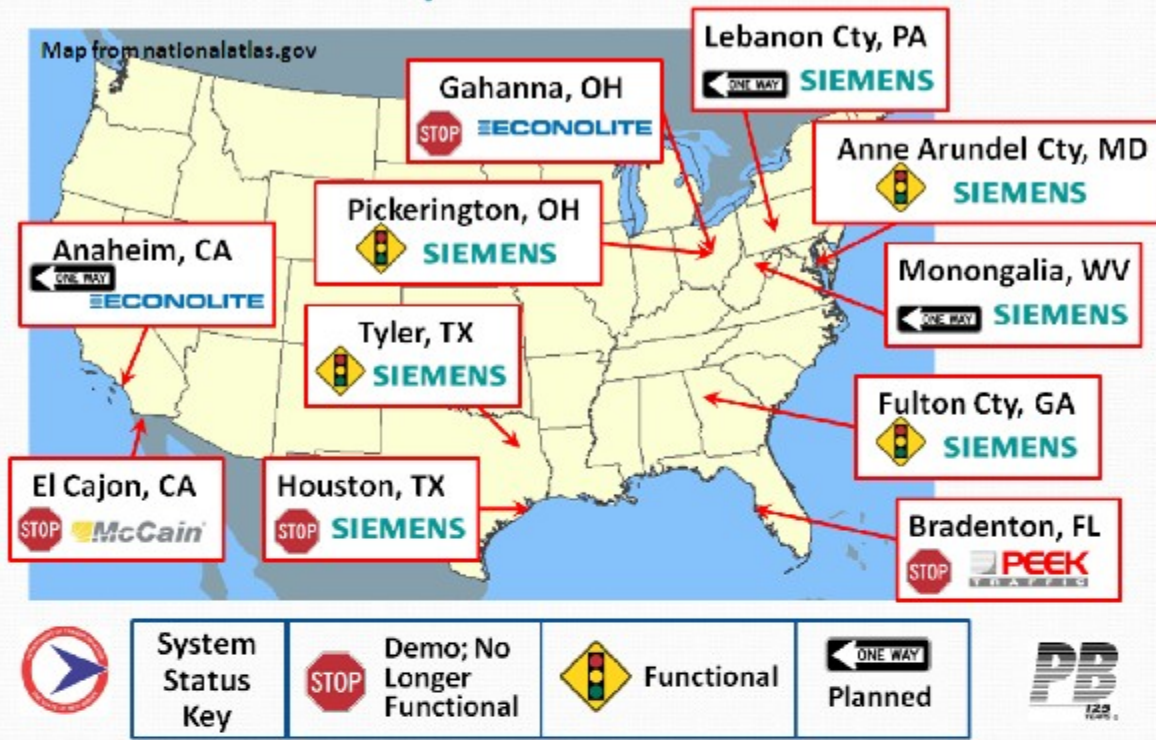
Current Implementations

2007 ->

- Four as of early 2011
- 2010 FHWA Every Day Counts program emphasizes adaptive signal control technologies

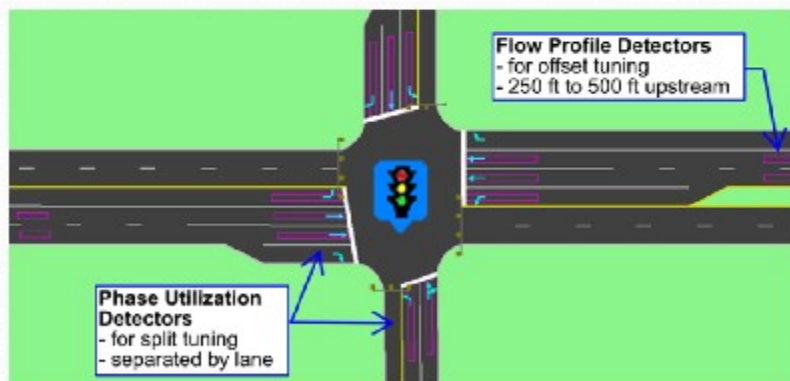


ACS-Lite Implementations



Infrastructure Requirements

- Compatible Controller Hardware and Firmware
- Communication Among Controllers
- Detection



Vendor	ECONOLITE	McGain	PEEK	SIEMENS
Controller Models	ASC2 and ASC3	170E with BiTran 233 Firmware	3000E; ATC-1000 planned	M50 and 2070 w/SEPAC NTCIP Firmware



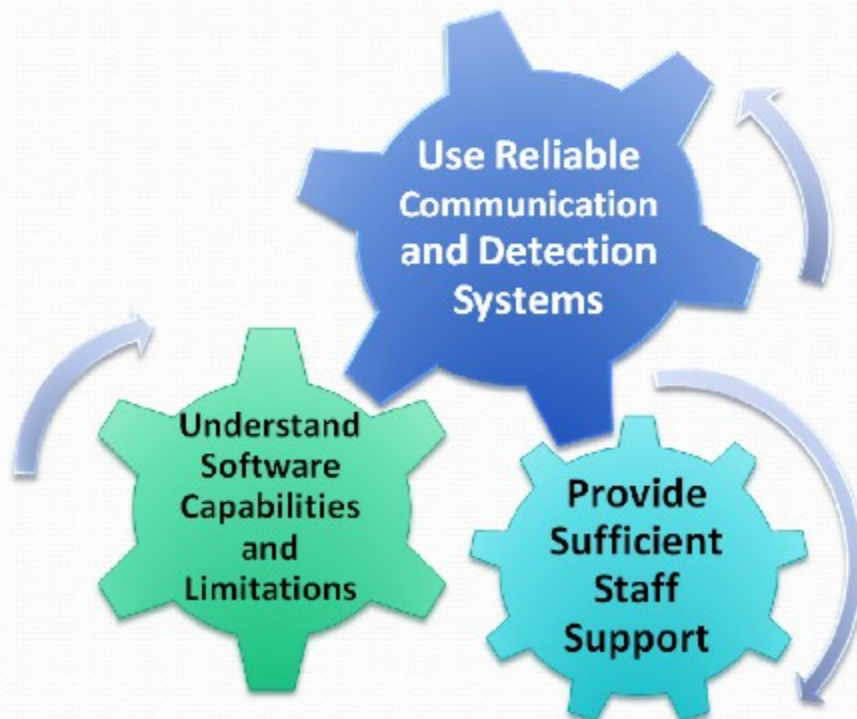
Cabinets fill up!



ACS-Lite equipped cabinet in Anne Arundel County, MD



Lessoned Learned Themes



Lessoned Learned, 1 of 3

- Many users cited problems with communications and detection as undermining the functionality of adaptive software



- ACS-Lite processor can be in field or remote



Lessoned Learned, 2 of 3



- Adaptive signal control technologies are not a silver bullet!
- For some systems, including ACS-Lite, recently optimized base timings are important
- Very short intense peaks need special consideration
- Base timings need flexibility
- A tremendous amount of data is collected for off-line use



Lessoned Learned, 3 of 3

- Both engineering and maintenance support are necessary
- Staff need adequate training and time to learn the system
- Configuration time and effort is necessary – consider several weeks of observation mode before going live

“Adaptive Traffic Control ≠ No Traffic Engineer”

– Kirk Houser, former Tyler, Texas, Traffic Engineer on ACS Lite

Provide Sufficient Staff Support



Evaluative Criteria for Corridor Selection

Most Critical Selection Criterion

Variation in traffic volumes which is not predictable
(not just special events, but also daily changes in peak hour onsets, seasonal traffic, weather, land development, and construction)

Additional Criteria to Help to Select Corridors where ACS-Lite Can Reach Full Potential

- Good Base Timing Plan with Flexibility in Signal Timing Parameters
- Not Predominantly Oversaturated
- Highly Directional Traffic
- Unpredictable Variations in Demand More than a Few Minutes Long
- Presence of other ITS devices



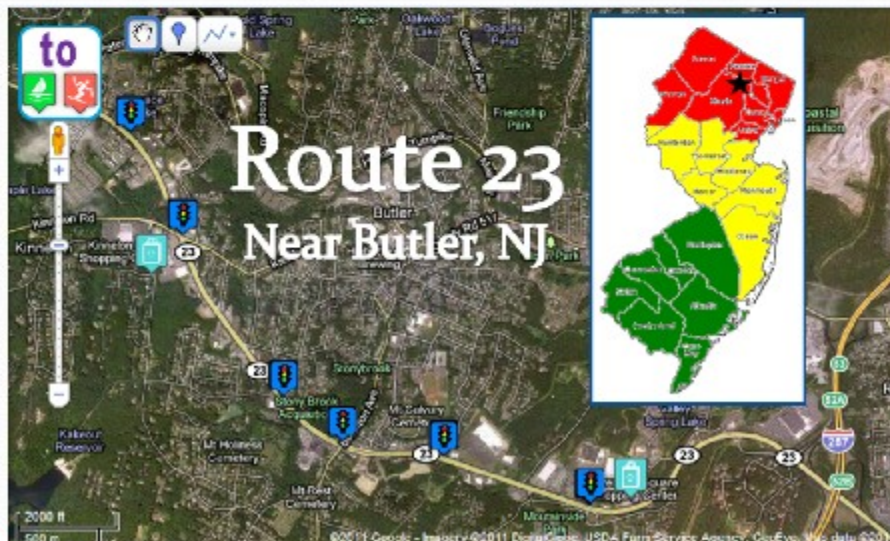
Evaluative Criteria for Corridor Selection

Pilot-specific Criteria Based on Project Constraints

- Existing networking among signals or inexpensive to add (such as clear line-of-site between intersections for wireless networking).
- Not currently in a centrally-controlled system.
- Controllers are compatible with adaptive software and communications network (or at least cabinets can accommodate such equipment.)
- Existing detection and ease of expansion.
- Corridor sufficient length to assess ACS Lite performance, yet within budget.



Where the Practical Considerations Have Led the NJDOT ACS-Lite Pilot



Questions?

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