Operations Technical Service Team

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Operating Signals IS Important!

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Poor Operations

- Increased Crash Frequency
- Increased Travel Times….
- Economic Impacts
- Traffic Diversion to Side Streets
- Citizen Complaints
- Non-Compliance
- Viscous Circle of Congestion

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Better Operations

- Delay would decrease by 15 to 40%
- Travel time would reduce up to 25%
- Emissions would reduce up to 22%
- Fuel use would reduce up to 10%
- B/C ratios up to 40:1

Your Mileage May Vary !

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What does this all mean?

- How do these numbers relate?
  - 30 minute travel time => 7 min saved
  - 20 MPG => 22 MPG
- Do you individually measure these?
- Can drivers recognize these savings?

Public perception is key!

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However……

- We can't make cars disappear
- Traffic volumes will still increase
- We can't fix poor land use decisions
- Our duty to achieve maximum benefit?

No Silver Bullet!
Not a one shot deal!

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So what do we do?

- National Transportation Operations Coalition Traffic Signal Self Assessment
- Leads to others looking for help
- http://www.ite.org/selfassessment
- http://www.ite.org/reportcard/
- Update will be out this summer.

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National Traffic Signal Report Card

- Overall score is low (D-)
- Management & detection scored lowest
- Individual intersections scored highest
- Large systems scored higher than national average

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National Traffic Signal Report Card

- **Why such a low score?**
  - Signals turn green, yellow and red
  - BUT,
  - Not operating as an efficient, well-integrated system
  - Proactive management is limited
  - Limited resources spent ***fighting fires***

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And Now for Something Completely Different

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Adaptive Signal Control Myths

- Silver Bullitt
- Reduce staff requirements
- Is “Set and Forget?
- Will cure oversaturated conditions
- Requires high quality Communications
- Requires high quality Detection
- Not Traffic Responsive Selection of Preset Plans

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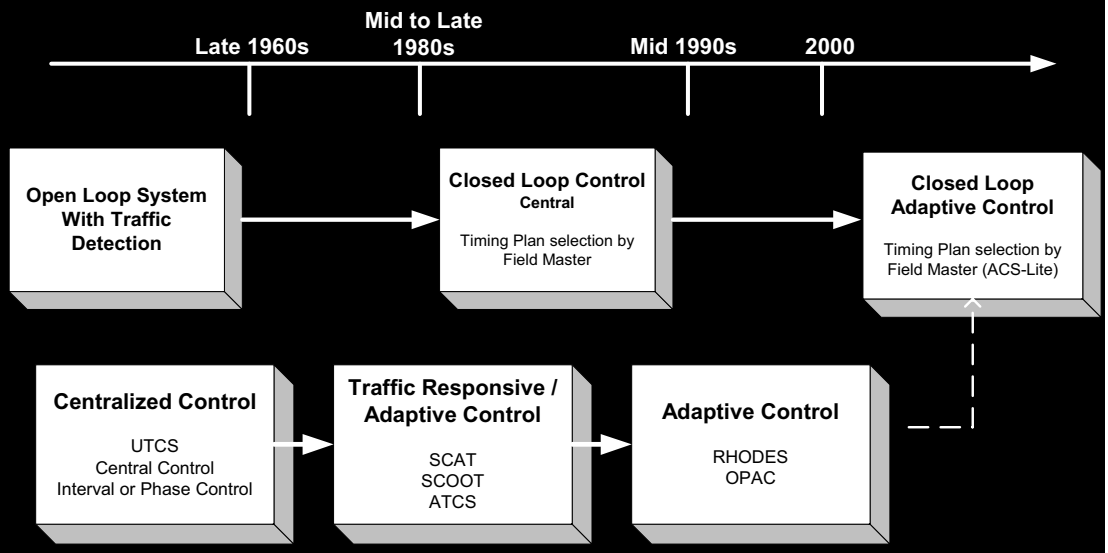
A Bit of History



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Potential Benefits

- Responsive to traffic conditions
  - Reduce traffic delay
  - Delays onset of saturated conditions
- Reduces or eliminates the need to retime traffic signals
  - $1800 – $3500 / intersection
- Improvements over Time Of Day plans
  - Travel time
  - Delay
  - Stops
  - Fuel consumption
- Data collection and archiving

Disadvantages

- High capital cost $$$
- Requires extensive calibration & monitoring
- Requires active maintenance of traffic detectors
- Communications overhead
- More technical staffing

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FHWA Goals for ACS-Lite

- Low cost
- Leverage existing infrastructure
  - Standard US-style actuated controllers and logic (rings, phases, splits, barriers, gap-out/extension, etc.)
  - Typical agency detector layouts
  - Typical communications
  - “Retro-fit” with major US signal system vendors
- Reduce agency expenditure for adaptive control
- Operate without connectivity to a TMC
- Use NTCIP

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Project Team

U.S.Department of Transportation
Federal Highway Administration

SIEMENS

ECONOLITE CONTROL PRODUCTS, INC.

PURDUE UNIVERSITY

EAGLE Traffic Control Systems

THE UNIVERSITY OF ARIZONA. TUCSON ARIZONA

McCain

ITT Industries
Engineered for life

PEEK

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Adaptive Control Software – Lite (Outcome)

- Based on Rhodes
- TOD Plans for base signal timing
- Closed Loops Field Master Based Architecture
  - Target Market
    - 20,000 Systems
    - 200,000 Intersections
- Minimizes Traffic Detection needs

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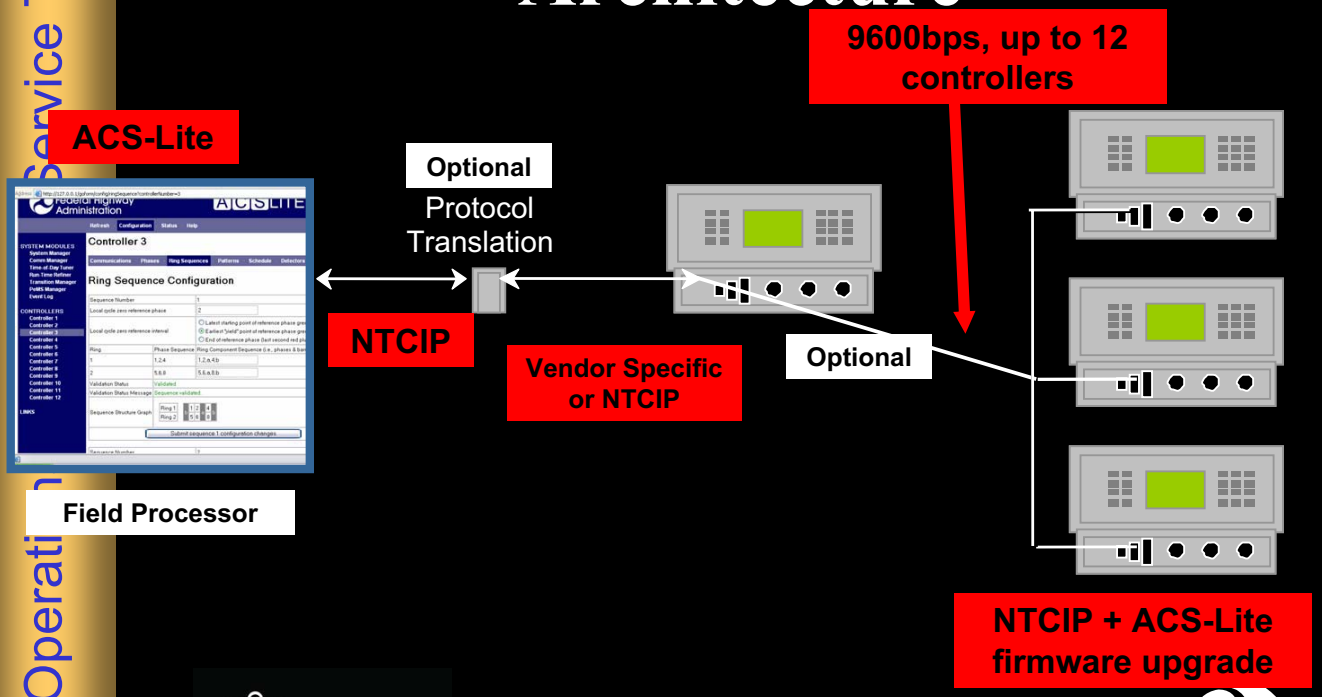
ACS-Lite System Architecture



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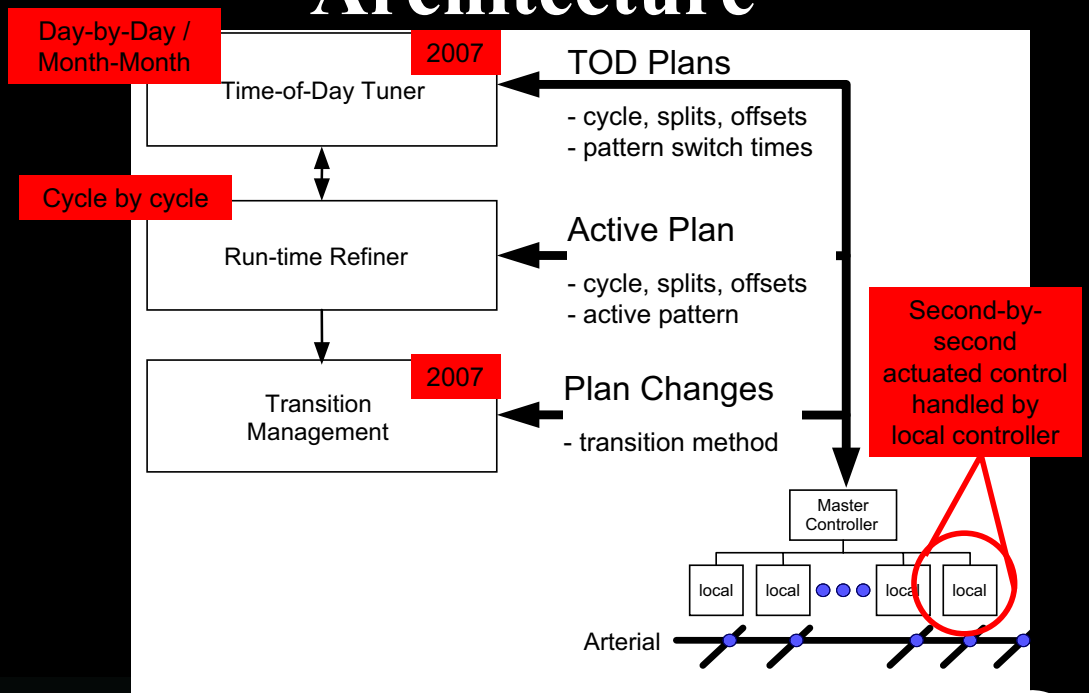
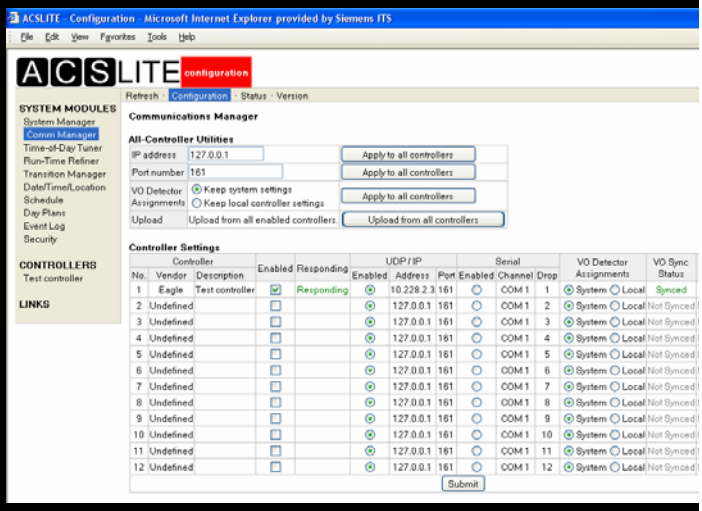
ACS-Lite Algorithms Architecture



Web-based User Interface

- Configuration / Setup
  - Communications
  - Adaptive Settings
  - Links
  - Detectors
  - TOD Schedule
  - Archive data retrieval
- Status
  - Split tuning status
  - Offset tuning status
  - Pattern history
  - Phase timing data
  - Event log
  - Detector status



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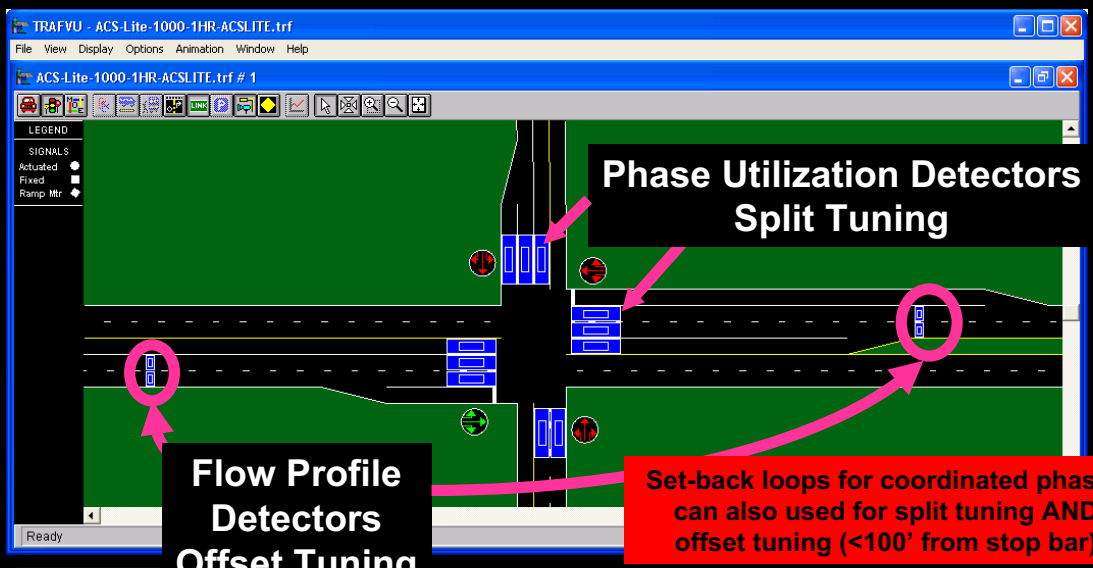
ACS-Lite Detection Layout

Need detectors at stop-bar of coordinated phases for split tuning



Future Enhancements FY 2007

- Time of Day Tuner
  - Long Term Timing Plan Maintenance
  - Time of Day Schedule Switch Points
- Run Time Refiner
  - Cycle length tuning
- Transition Manager
  - "Best Way"

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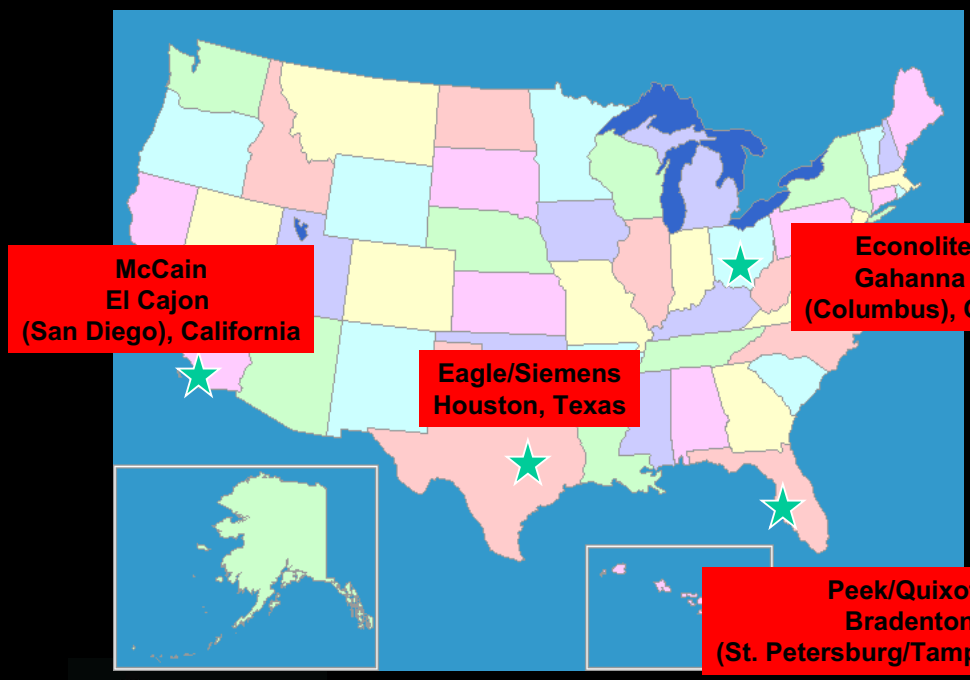
Field trials



Benefits

- Reduces the need for traffic signal retiming
- Reduces
  - Travel Time
  - Delay
  - Fuel consumption
- Low Cost

Summary

- ACS-Lite may represent the next evolution of traffic control
- Designed for Close-Loop-Systems
- Works with 9600bps / IP network communications
- NTCIP compliant controllers with ACS-Lite firmware upgrade
- Controllers
  - Eagle M52/SEPAC, Econolite ASC2, Peek ,3000E
  - McCain 170 233 (special) + Master
- “Web-based configuration & status interface

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NEXT Steps

- Complete El Cajon Test Site
- 5 Early Adopters
- Workshop for evaluating Adaptive Traffic Signal Control Needs
- Support Deployments

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QUESTIONS??

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http://www.ops.fhwa.dot.gov/arterial_mgmt/index.htm

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