Gettysburg Area Traffic Signal Enhancement and Intelligent Transportation Systems Deployment

PPA

Pennsylvania Planning Association 2007 Annual Conference

Mark Metil, Gannett Fleming

PENNDOT

COUNTY OF ADAMS

HISTORIC GETTYSBURG

STRABAN TOWNSHIP

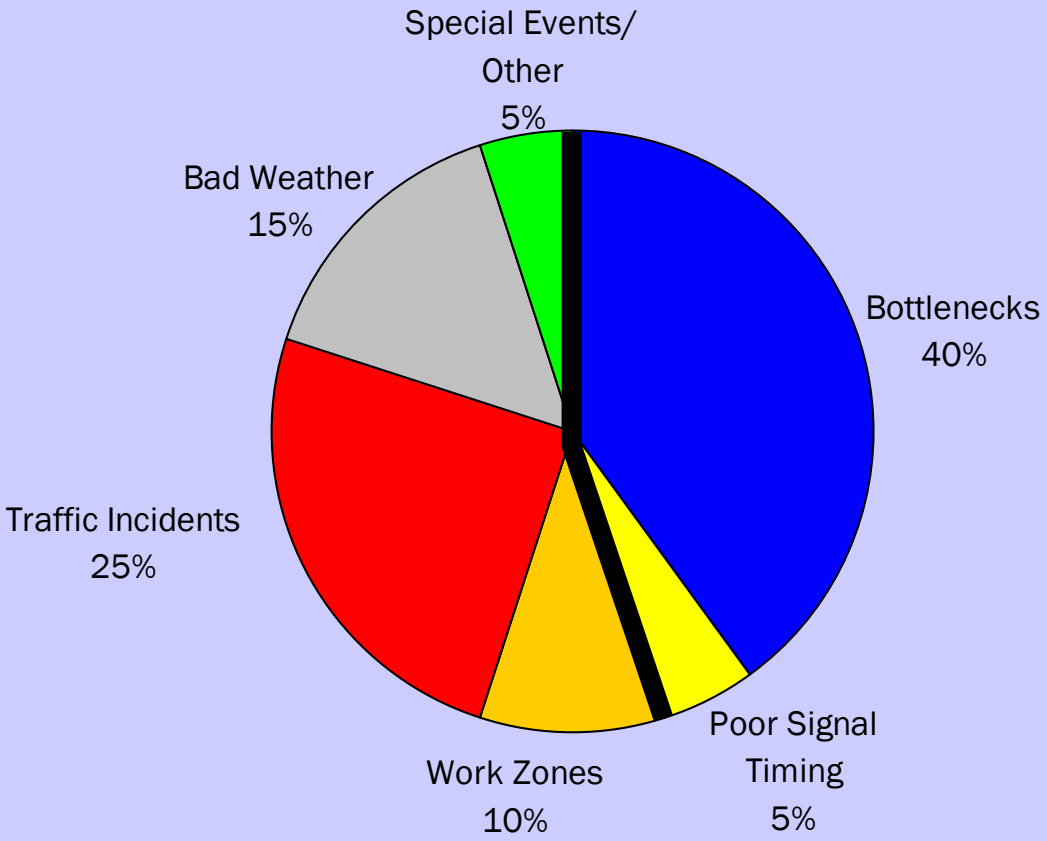
FHWA

Gannett Fleming

Agenda

- The Big Picture
- Background
- Project History/Goals
- System Elements
- Lessons Learned
- Schedule and Costs
- Benefits
- Other PennDOT Initiatives

The Big Picture

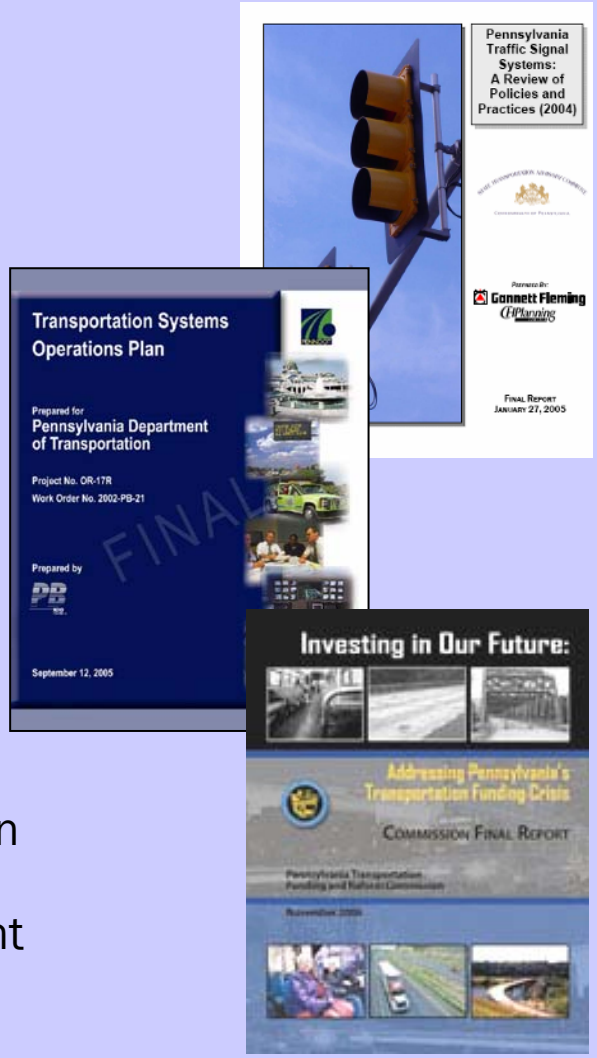


FHWA Report, "Traffic Congestion and Reliability: Linking Solutions to Problems", July 2004.

- 45 percent recurring
- 55 percent non-recurring
- Think beyond recurring congestion
- Think about operational solutions including a combination of
  - ITS elements
  - Signal systems
  - Interagency coordination

The Big Picture

- Pennsylvania Traffic Signal Systems: A Review of Policies and Practices
  - Shared responsibility
  - Corridor and regional operations
  - Revise policy and procedures
- Transportation Systems Operations Plan (TSOP)
  - Statewide direction for transportation operations
  - TSOP 08: Implementation of TAC Recommendations
  - In early development of Statewide Traffic Signal Asset Management System (TSAMS)
  - Integrated Corridor Management (ICM) pilot efforts
  - Multi-jurisdictional traffic signal operations
- Governor's Transportation Funding and Reform Commission
  - Modernizing 66% of all traffic signals (13,000) over ten years
  - Installing real-time traffic information and management systems in major urban areas in ten years



Gettysburg Area
Traffic Signal Enhancement and
Intelligent Transportation Systems Deployment

PENNDOT · County of Adams · Historic Gettysburg · Straban Township · FHWA · Gannett Fleming

Background

- Historic significance
  - Five buildings from the battle of 1863 remain on Lincoln Square
  - Lincoln Square has between 2,000 and 4,200 vehicles during peak hours
- Increasing local demands
  - Adams County is home to about 102,000 people
  - One of three fastest growing counties in state with nearly 20% growth per decade
  - Development activity on SR 30
- Significant tourist demands
  - 1.5 million people visit the area annually resulting in seasonal traffic demands
  - SR 30 volumes ADTs range from 16,000 to 23,000
- Various modes
  - Higher than expected truck demands
  - Motorcycle activity during summer season
  - 11,000 pedestrians crossing study intersections in tourist season

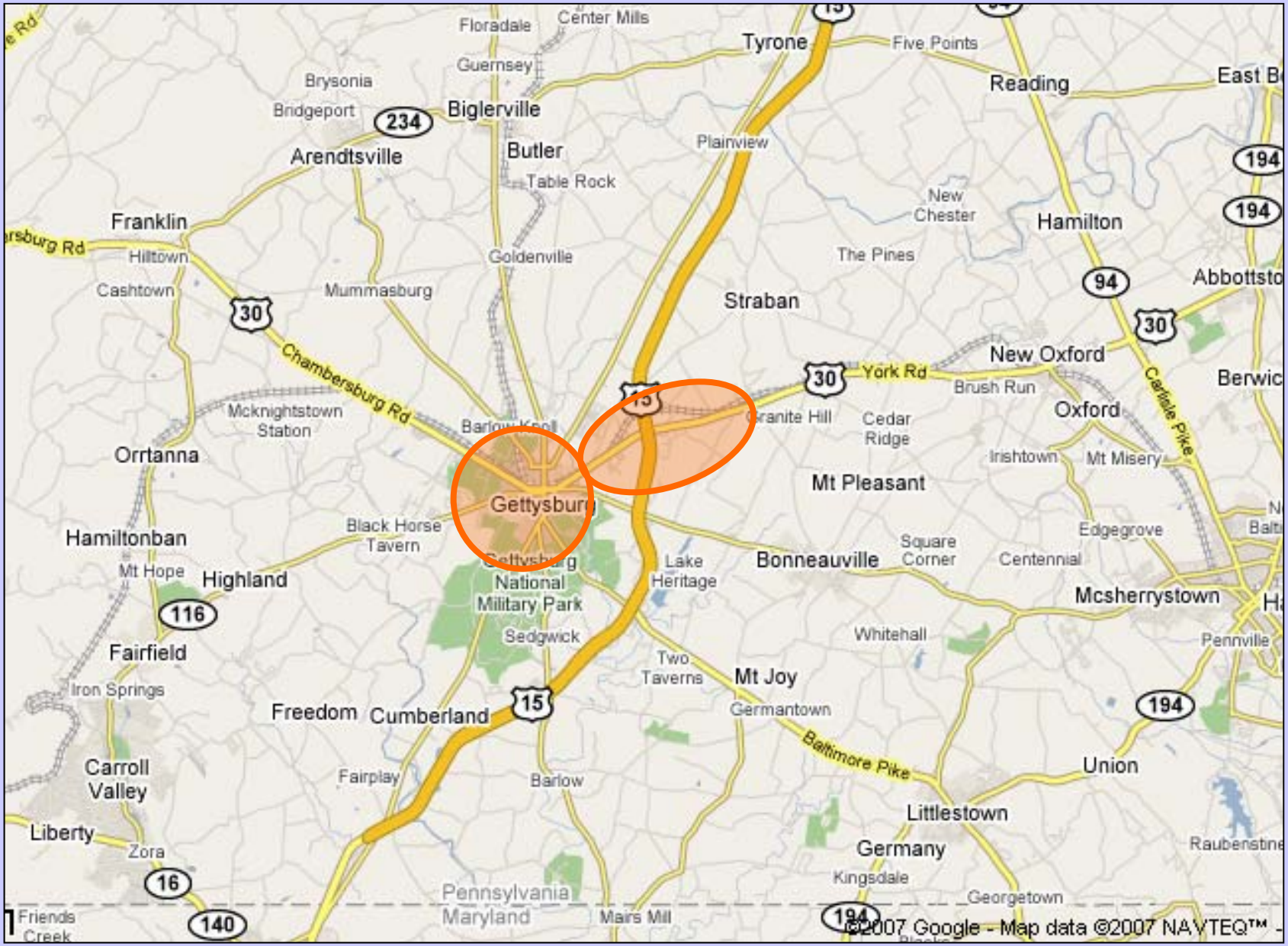
Gettysburg Area
Traffic Signal Enhancement and
Intelligent Transportation Systems Deployment

PENNDOT
COUNTY OF ADAMS
HISTORIC GETTYSBURG
STRABAN TOWNSHIP
FHWA
Gannett Fleming

Project History/Goals

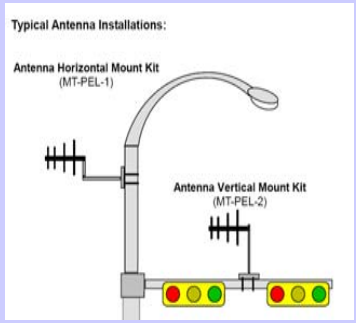
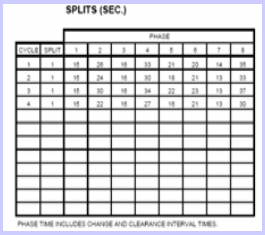
- In 1998, 13 traffic signals within the Borough were updated and a closed-loop signal system was developed
- In 2001, Adams County Comprehensive Road Improvement Study (CRIS)
  - Identified traffic signal enhancements and coordination within and surrounding the Borough of Gettysburg as a top priority
  - Promoted the use of Intelligent Transportation Systems (ITS) to improve safety and mobility
- In 2004, an ITS Earmark was obligated for project deployment

Project History/Goals



Project History/Goals

- Reduce congestion and travel times
- Improve emergency response
- Enhance pedestrian safety
- Preserve the historic infrastructure

System Elements	Considerations
Multi-Jurisdictional Signal System (MJSS) 	26 signals Gettysburg and Straban signals integrated PennDOT operational oversight & control, if needed MJSS agreement to be established that covers signal operations, stakeholder coordination and consideration of development FHWA study concluded MJSS can reduce delay by 8 to 25 percent
New Signal Installations	4 new signals and 2 signals upgraded
Interconnection Upgrades 	Hardwire considered, but utility attachment fees were cost prohibitive Install/ upgrade interconnection of 7 signals along SR 30 in Straban Township Interconnect new signals 900 MHz wireless radio interconnect for low bandwidth, but long range
Operational Upgrades 	New timing plans for all intersections Special events timing plan Other phasing adjustments to address congestion and pedestrian mobility
Lincoln Square Metering	Use neighboring signals to “meter” traffic into Lincoln Square during congested conditions

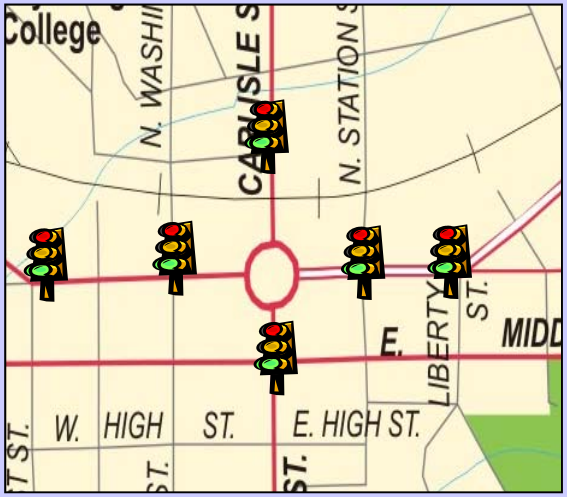
System Elements

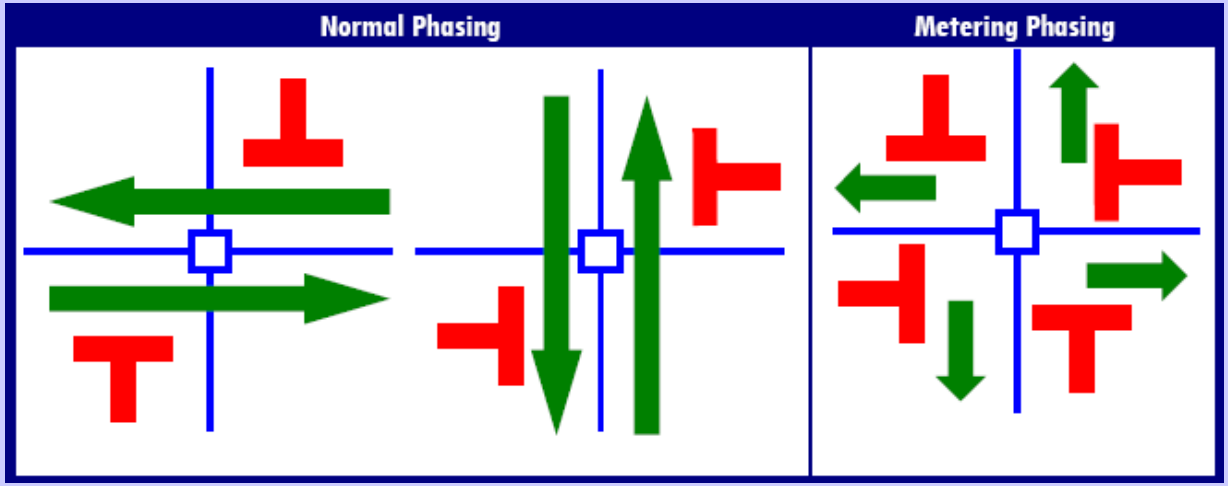
- Metering of Lincoln Square
  - <u>No signals on the Square</u> – the goal is to preserve the historic infrastructure
  - **Phase 1** - Better consider Square delays including parking and pedestrian activity in east-west and north-south progression
    - ✓ Nearly 1.5 minutes of delay due to Lincoln Square EB and WB
    - ✓ Nearly 1.1 minutes of delay due to Lincoln Square NB and SB

System Elements

Metering of Lincoln Square

- **Phase 2** - Utilize video detection on Square and signalized intersections approaching the Square to monitor traffic volumes/speeds and to adjust timings to limit Lincoln Square congestion
  - ✓ Video detection on Square required mounting on Hotel
    - 5.8 GHz wireless radio for shorter range, higher bandwidth and less interference from Hotel to street
    - Holiday detection scheme due to Christmas tree in Lincoln Square

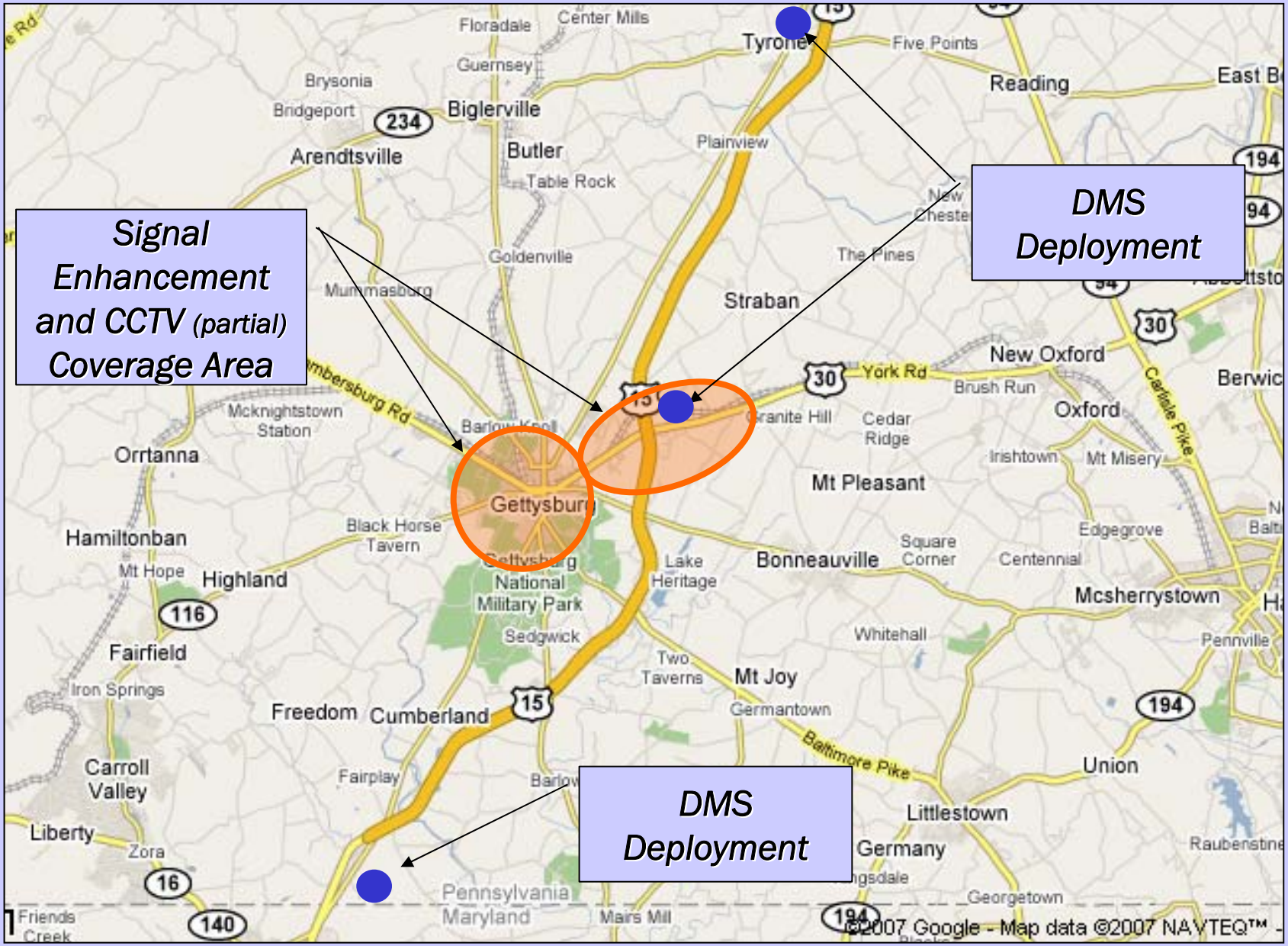




System Elements	Considerations
Emergency Preemption Systems 	26 intersections Considered GPS-based systems, but cost was a considering factor FHWA study found that emergency preemption systems reduced response times by 16 to 23 percent
Light Emitting Diode (LED) Signals 	26 intersections Longer life than incandescent bulbs and gradual burnout LED's result in up to 40 percent energy savings
Countdown Pedestrian Indications 	17 intersections with high pedestrian activity Improved pedestrian awareness of available time to cross LED technology
Illuminated Pedestrian Crosswalks 	4 mid-block locations with high pedestrian activity ▪ One replacement system that was damaged Pedestrian push buttons ▪ Considered pedestrian detection, but pedestrian paths are not well defined Includes tactile curb ramps

System Elements	Considerations
CCTV 	Installed at 4 locations including US 15 & SR 30 interchange Coordinated with proposed US 15 and SR 30 interchange project Coordinated design specifications with Harrisburg ITS Deployment 768K Frame Relay (point-to-point) selected to maximize bandwidth and limit communications costs (approx $200/month)
DMS 	Installed at 3 locations: US 15 NB, US 15 SB & SR 30 WB Center-mount Smaller DMS utilized on SR 30 due to limited R/W and potential overhang issues – 1st arterial DMS Coordinated design specifications with Harrisburg ITS Deployment Dial-up to be utilized due to low bandwidth needs (<$40/month)
District 8-0 TMC (part of Harrisburg Area ITS Deployment) 	Needed to coordinate with ongoing ITS Deployment project in Harrisburg Area Includes (nearly completed) District 8-0 TMC 19 DMS 40 CCTV 11 HAR and 21 HAR signs

System Elements



Lessons Learned

Institutional

- Involve/ update stakeholders
  - ✓ Involve municipal signal "owners"
  - ✓ Involve other stakeholders: EMAs, NPS, business, etc
- Start discussion regarding agreements early and involve legal
  - ✓ Hotel attachment agreement
    - Hotel very cooperative
  - ✓ Hotel/Shentel utility service agreement
    - Hotel and Shentel very cooperative
  - ✓ Multi-jurisdictional signal system agreement
    - Limited examples in PA
    - Defines signal system operations/ maintenance, stakeholder coordination and consideration of development
- Continue to reach out to utilities
  - ✓ Some utilities are slow to react to a "small" project
- Coordinate with "moving targets"
  - ✓ Development projects
  - ✓ US 15 and SR 30 interchange
  - ✓ Harrisburg ITS Deployment

Lessons Learned

Design

- Consider benefits and costs of using various technologies
- "Right-size" communications
  - ✓ Balance reliability and bandwidth versus costs
- Consider new technologies
  - ✓ Considered ACS Lite, but will not be included in this project. It may be considered in the future.
    - Cross-arterial progression is still being addressed
    - Multi-sonics controllers are not fully compatible
    - The system would require more detection
    - Unknown operations and maintenance
  - ✓ Considered GPS-based emergency vehicle pre-emption, but that was cost prohibitive.

Lessons Learned

Design

- Use tools available
  - ✓ District 8-0's Incident Management van was used to evaluate CCTV locations
  - ✓ 15 of the signals had "new" controllers
- Verify reliability of wireless communications
  - ✓ Conduct a radio path study
- Be prepared to improvise

Schedule and Costs

- Cost – $2.3 million
- Final Design – 100% complete
- Construction
  - Letting in Fall 2007
  - Construction completed by Summer 2008
- Post-Construction
  - Evaluation of benefits

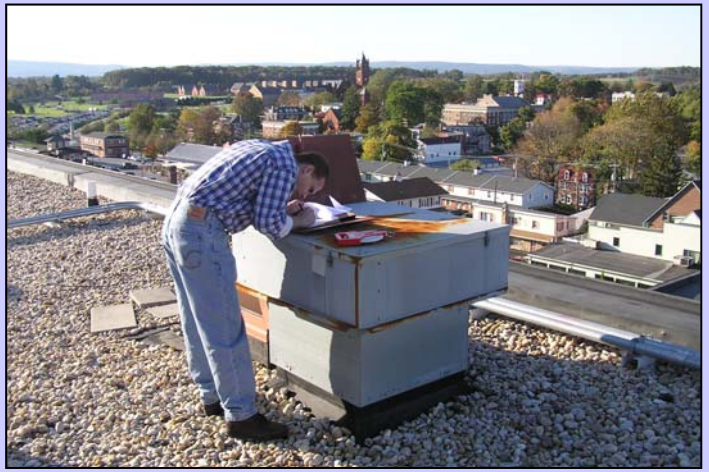
Benefits

- *This project does not include revolutionary technological approaches, but does illustrate an example of "transportation operations"*

  - *Technologies and institutional arrangements*
  - *Maximizing transportation system efficiency and improving safety*
  - *Addressing recurring and non-recurring demands*
  - *Considering freeway/arterial solutions*
  - *Improving interagency communication and overcoming institutional barriers*
  - *"Right-sizing" technologies (including communications) to maximize resources*
  - *Working outside of our normal "engineering boundaries"*

Anticipated Benefits

- Reduce Congestion
- Improve Emergency Response
- Improve Safety
- Reduce Energy Consumption
- Preserve Infrastructure



Other PennDOT Initiatives

Congested Corridor Improvement Program (CCIP)

- Resulted from PennDOT's strategic planning process – Moving Pennsylvania Forward Update
- Consistent with PennPlan and Pennsylvania's Highway Congestion Management Strategic Plan
- Projects result from nominations by planning partners
- Focus is on immediate- and short-term improvements
- Goal is a 20 percent reduction in peak hour travel time through:
  - ✓ Minor signing and pavement marking improvements
  - ✓ Signal timing modifications
  - ✓ Minor intermodal enhancements
  - ✓ Minor geometric improvements

Other PennDOT Initiatives

Traffic Signal Enhancement Initiative (TSEI)

- Initiative to address congestion along key corridors throughout the Commonwealth
- "Partner with municipalities to identify traffic signals that need to be retimed, upgraded, or better integrated into an overall congestion management strategy"
- Goal is reduction in travel time and delay through:
  - ✓Traffic signal timing and phasing modifications
  - ✓Traffic signal system implementation/upgrades
  - ✓Traffic signal equipment upgrades
- PennDOT Districts nominate key corridors

Questions and Comments

Gettysburg Area
Traffic Signal Enhancement and
Intelligent Transportation Systems Deployment

PENNDOT
COUNTY OF ADAMS
HISTORIC GETTYSBURG
STRABAN TOWNSHIP
FHWA
Gannett Fleming