

Broward Boulevard Transit Corridor Workshop

February 5, 2010

9:00 AM – 12:30 PM

FDOT District IV Auditorium

Transit Signal Priority Presentation



Transit Signal Priority (TSP)

- Gives preference to transit vehicles at signalized intersections
 - A little extra green time (Green Extension)
 - A little less red time (Early Green/Red Truncation)
 - Changing/rotating phase sequence
 - Insertion of transit only phase



TSP Benefits

- Transit
 - Improved travel times & reliability (schedule adherence)
 - Reduced delay
 - Improved person throughput (person vs. vehicle)
- Non-Transit Traffic
 - Improved signal timings in transit direction
 - Minimal impact (delay) on intersecting streets
- Sustainability
 - Improved air quality by encouraging modal shift
 - Reduced fuel consumption
 - Improved transit efficiency (reduction in buses & labor required)



Preemption vs. Priority

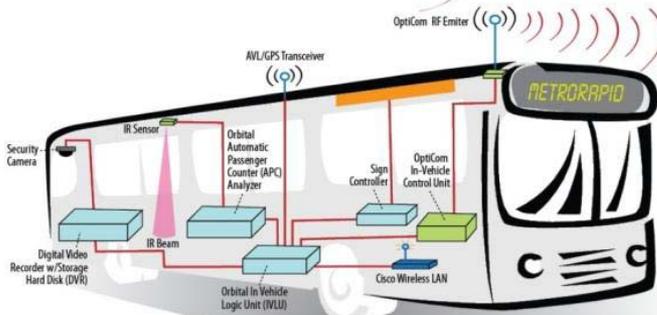
- Preemption – interrupts normal signal operations for a special event (approaching train or emergency vehicle)
 - Takes signal system out of coordination
 - Disrupts traffic flow for that cycle & following cycles
- Priority – modifies normal signal operations to better accommodate transit vehicles
 - Maintains signal system coordination



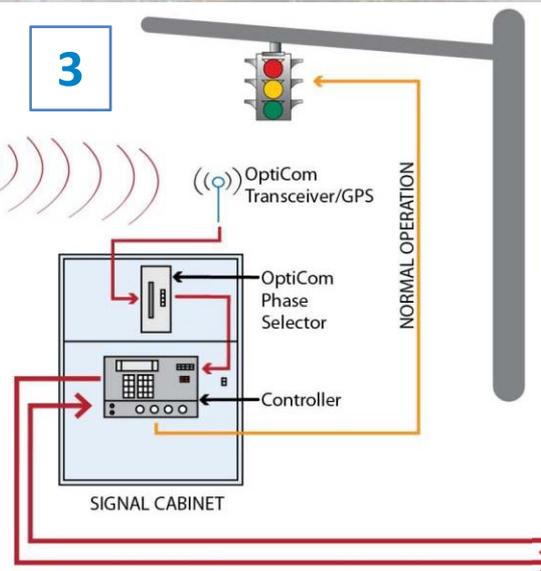
TSP Components

1. Vehicle Detection/Location (AVL)
2. Priority Request Generator
3. Priority Request Server (priority parameters)
4. TSP System Management

1-2



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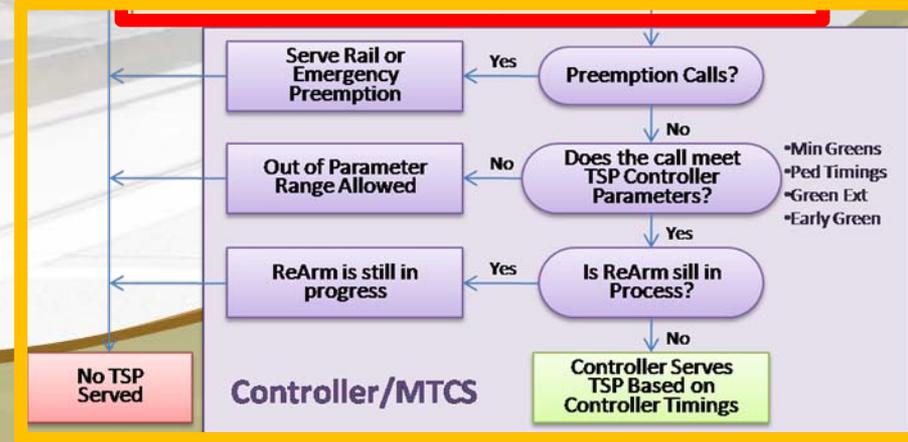
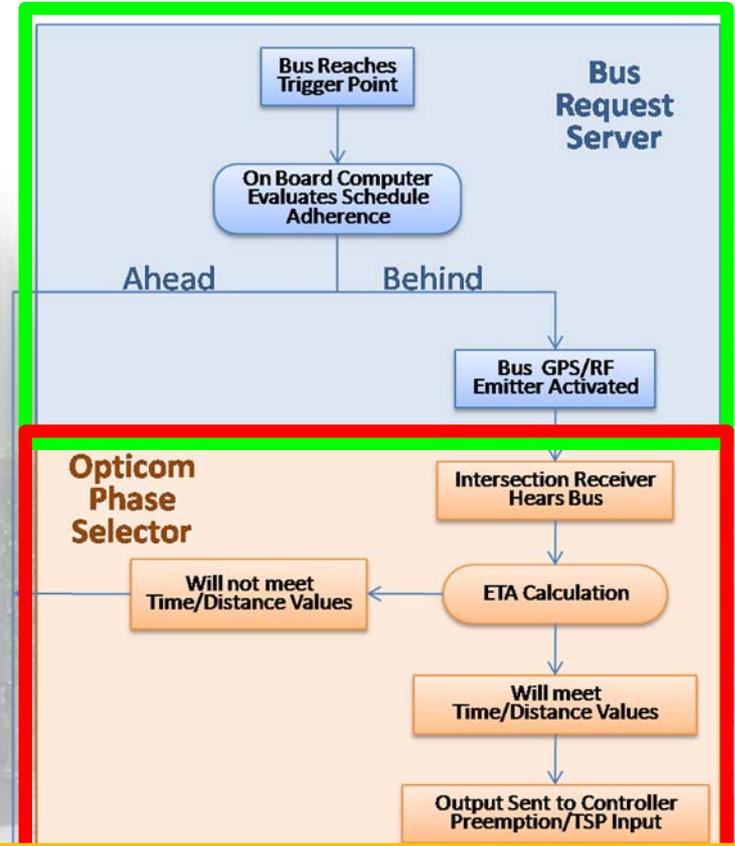
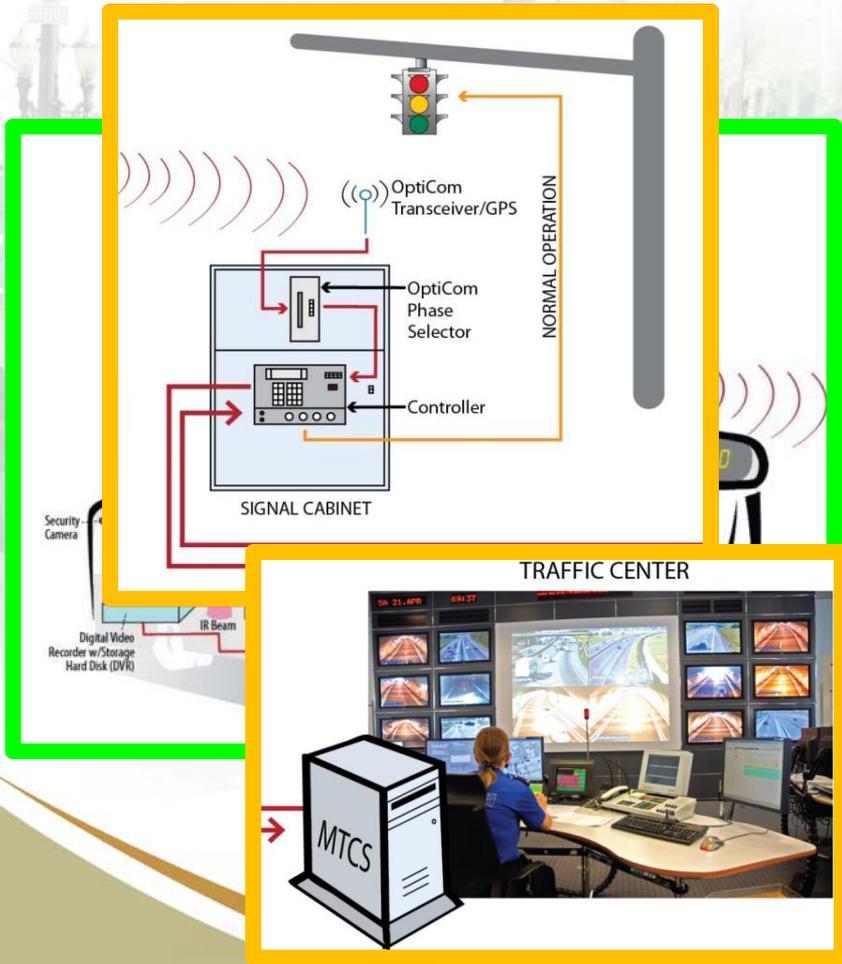


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TRAFFIC CENTER



Serving TSP Requests



Early Green

- Bus arrives while signal is red
- Green time of preceding phases shortened

Normal Signal Sequence



WALK 5 FDW 10

6 sec

Early Green



WALK 5 FDW 10

TSP Call



Green Extension

- Bus arrives when signal is “about” to turn red
- Green time extended
- Much bigger advantage – bus avoids an entire red phase

Normal Signal Sequence



WALK 5 FDW 10

7 sec

Green Extension



WALK 5 FDW 10



Example TSP Parameters

- Max Green Time % Reduction
 - Up to 20% without reducing beyond minimum green
 - Cross Street Left, Cross Street Thru, Concurrent Left Phases
- Max Green Extension – sum of truncations, all conflicting phases
- TSP Lock Out (Re-Arm)
 - Prevents multiple consecutive TSP requests being served
 - Major (Minor) intersections: 2-3 (1-2) cycles or 5 (2-3)min
 - Off-peak: no TSP lockout
- Conditional vs. Unconditional Priority
- BRT only vs. all buses



HART TSP Simulation Summary

PM-Peak Hour		2013
		TSP
Possible TSP Events	(#/hr)	323
Total TSP Events	(#/hr)	126
	% of Possible	39%
Early Green Events	(#/hr)	86
	% of Total TSP Events	68%
Green Extension Events	(#/hr)	40
	% of Total TSP Events	32%
Average Duration	(seconds)	5



Typical TSP Results

- 8-12% reduction in transit travel time
- Only minor impacts to overall intersection operations
- Seattle, WA (Route 7, Downtown area, 2.1 mi)
 - 8% reduction in travel time
 - 34% less transit delay at intersections
 - 24% fewer transit stops at intersections



Typical TSP Results

- Chicago PACE
 - Avg 15% reduction in running time
 - Reduced 1 weekday bus; maintained same frequency
- Jacksonville, FL (Atlantic Blvd, 4 mi test)
 - 7% reduction in running time (PM peak hour)



Bus Equipment

- GPS Receiver and Radio Unit
- Vehicle Control Unit
- Radio/GPS Antenna
- Cost ~ \$4,000



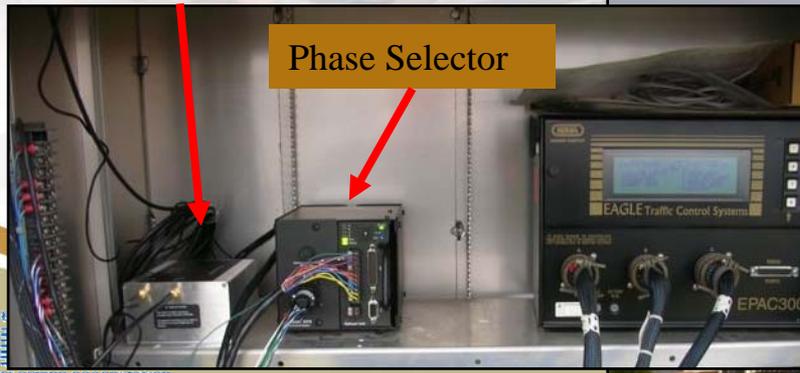
Signal Controller Equipment

- Naztec ATMS.NOW Software
- Receiver & Phase Selector (~ \$9,000)
- Naztec Signal Controller Firmware Update

Cabinet mount (*preferred*)



GPS/Radio Antenna
cable routed up to
top of cabinet



Pole mount

Broward Blvd TSP Status

- Upgrading traffic control system – Naztec ATMS.NOW
- ATMS Phase 1 project (2010)
 - Activate fiber on Broward Blvd
 - Opticom traffic controller equipment
- Many buses already equipped; rest will be outfitted by end of year
- KHA – TSP study; includes before/after & establishing conditions/parameters
- Broward Co BOCC needs to establish policy for TSP priorities, objectives, directives



QUESTIONS?

