DART ITS PROGRAM

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Role of ITS in Transit



• Improve mobility and solve transportation problems

•Create needs requirements or assessment documents

 Align agency business needs with ITS architecture

•Introduce solutions to requirements

Gain funding

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DART ITS Program

- Vehicle business systems on buses, trains and paratransit vehicles
- Customer In-Transit Information
- Traffic signal prioritization system (TSP)
- Fare payment and collection system (Smart Card)





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Vehicle Business systems (VBS)

•VBS on buses, trains and paratransit vehicles

CAD/AVL/GPS systems

 Vehicle logic units and cellular communications capabilities

Automatic Passenger Counter (APC)

Schedule adherence system

■PA/VMB

Radio system





Vehicle Business systems (VBS)



Customer In-Transit Information

Data Sources

Bus Location Schedules Service Interruptions Detours Emergency Notifications Service Change Notices

Events Driven Services Public Notices

Rules of Riding

Advertising Multimedia 3rd party content Social Media <u>PUBLISHER</u> Authenticate Reformat Target Push Out

Delivery Mechanisms

Transit Centers displays Rail Stations displays Vehicle based displays Station VMB (Next Bus/Train) WEB (Next Bus/Train) PDAs (web) Text Messages TWEET (web) RSS (web)

> Geographic targets Subscribers Route-specific



Customer In-Transit Information

Next bus/train arrival predictions





TSP – Project

- Challenges
 - Currently, trains operate every 3.3 minutes in each direction
 - New Green Line, trains to operate every 2 ¹/₂ minutes in each direction
- CBD Traffic Signal System Retimed to Accommodate Increased LRT operation
- Install detection system
- Upgrade traffic signal controllers and interface to detection system
- Accommodate variability in LRT junction operation



City of Dallas Traffic Signals (15 along LRT corridor)







Detection



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DART

ITS/Operations Technology¹⁰

Traffic System Phases

- Phase I Completed August 1,2009
 - Supports LRT headway schedule
 - Provides early green and green extension
 - Installation of train detection
 - Supports countdown timer and basic function report capability

- Phase II October 2010
 - Track trains thru CBD
 - May require moving or adding detectors
 - Will require software development
 - Supports peer to peer communication
 - Supports variable train length
 - Allows all-way pedestrian service
 - Provides full priority options
 - Provides cross street detection and monitoring
 - Ability to cancel priority requests



TSP-Communication Network

TSP Communication Networks: Wireless, Fiber, and Ethernet-over-Twisted Pair



- Ethernet-over-twisted-Pair (Back-up)
- · · CAT6 Cable
- ----- Shielded Communications Cable

TSP Network Island Concept for Phase 1





TSP IR and SENSYS MONITORING



What's Up Gold



Before and After Study Results

 Results must be interpreted by taking into consideration that a new line was added and train traffic increased by 33%



Train Travel Time from Station to Station

- Slight decrease within CBD during AM Peak
- PM peak has even more positive results
- Increase on non-CBD segments due to junction operation and capacity to process trains at Pearl station



Dwell Time

- Dwell time decreased in most of the CBD stations but increased in igodol**City Place and Union stations**
- 2.3 sec average decrease during AM peak and 9.3 sec decrease \bullet during PM peak (using highblock boarding)



Average Dwell Time⁺ at Each Station (AM Period)

+ Dwell time = Departure time - Arrival Time (including wait time)

Non-Stop Train Travel: West End to Pearl Stations

• AM Period shows 20 points improvement in both directions



LOS for Signalized Intersections

- Four representative downtown crossings were selected for evaluation
- Data collection done by video and reduced manually
- With the exception of Houston st., all other intersections maintained or improved their LOS
- Video N/A for Pearl AM period during the Before scenario

	Houston		Griffin		Ervay	Pearl				
	North	South	North	South	North	North	South			
AM Period (7a-9a)										
Before	A	В	А	С	В	n/a	n/a			
After	В	В	А	В	В	В	В			
PM Period (4p – 6p)										
Before	A	В	А	С	С	В	С			
After	В	С	А	В	В	В	В			

Vehicular Travel Time

- Four representative downtown streets were selected for evaluation
- With the exception of Houston st. during the PM period, all other intersections improved
- Retiming of the CBD was critical

	Houston		Griffin		Ervay	Pearl					
	North	South	North	South	North	North	South				
AM Period (7a-9a)											
Before	4.67	2.34	4.93	4.53	5.56	7.76	6.64				
After	4.06	2.23	4.42	4.05	5.32	5.8	5.26				
PM Period (4p – 6p)											
Before	4.28	3.64	5.78	5.81	5.15	6.8	6.35				
After	4.46	3.6 ≈	4.6	3.75	3.97	6.22	5.36				



•TTI Systemtest.avi Simulation