Integrated Dynamic Transit Operations (IDTO) Prototype Development - a USDOT Connected Vehicle Research project

Transit ITS Best Practices Workshop
Connecting the Dots: Leveraging the Union of Current and Future Technologies

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Advancing MSAA into Connected Vehicle Environment
Connected Vehicle Program Structure

Applications
- Safety
  - V2V
  - V2I
- Mobility
  - Real-time Data Capture
  - Dynamic Mobility Apps
- Environment
  - AERIS
  - Road Weather Apps

Technology
- International Harmonization of Standards & Architecture
- Human Factors
- Systems Engineering
- Certification
- Test Environments

Policy
- Deployment Scenarios
- Financing & Investment Models
- Operations & Governance
- Institutional Issues
Transit Connected Vehicle for Mobility

Applications
- V2V
- V2I

Safety
- Real-time Data Capture
- Dynamic Mobility Apps

Mobility
- AERIS
- Road Weather Apps

Environment

International Harmonization of Standards & Architecture
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Technology

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Data Environments and Application “Bundles”
Integrated dynamic transit operations that facilitate passenger connection protection, provide dynamic scheduling, dispatching, and routing of transit vehicles, and facilitate dynamic ridesharing
T-CONNECT (aka Connection Protection) serves to improve the experience for a transit traveler by increasing the likelihood of making successful transfers, particularly when these transfers are multi-modal or multi-agency.

T-DISP (Dynamic Transit Operations) provides benefits to both the traveler and the transportation provider. For the traveler, T-DISP provides an ability to access real-time information about available travel options, including costs and predicted time, in order to best manage their commute. For an agency, T-DISP extends demand / response services to support dynamic routing and scheduling, and even add/remove vehicles from service, based on traffic conditions, vehicle capacity, ridership and origin-destination, among other factors.

D-RIDE takes the concept of traditional pre-planned ridesharing (i.e., carpooling) and brings it into the 21st century. It does this by leveraging the positioning, messaging, and computing capabilities of today’s smartphones, and advancing an application that will let drivers and travelers, in near real-time, exchange information about needs or in case of a driver, available space.
One Integrated Vision of IDTO
IDTO Research and Development Path
IDTO Prototype Development and Testing Sites

- Prototype Development Lead: Battelle (prime)
- Impacts Assessment Lead: Volpe
- 1st Location: Columbus, Ohio
- 2nd Location: Orlando, Florida
Partners

Transit Agency Partners
- COTA
- CABS
- TaxiCABS

Industry Partners
- zimride
- Capital Transportation

Orlando Partners
- LYNX
- FLEXBUS
- zimride

Battelle
The Business of Innovation

Transit Laboratory
Approach
- Leverage CAD/AVL system interfaces that already exist or can easily be exposed, i.e. GTFS and GTFS-realtime.
- Build on existing open-source trip-planner software as a backbone for the IDTO Application Prototype System
- Provide IDTO application for the traveler that can be used on smartphone, tablet or traditional web-browser
- Use smartphone as low-cost solution for small or private transit operators to provide automatic vehicle location (AVL) as well as serve as mobile data terminal (MDT).
Conceptualization of IDTO System

IDTO Prototype System of Interest

Traveler UI

Driver UI

Integrated Prototype Middleware

Fixed-Route/Fixed-Schedule Provider

Demand/Response Provider

Rideshare Provider

RDE
IDTO Prototype Design

Presentation Layer
- Traveler Portal
- Web Service API
- Administration Portal

Logic Layer
- Trip Routing Engine
- Route and Schedule Manager
- Account Management
- Data Logging

Data Layer
- Transit Vehicle Status/Position
- Routes and Schedules
- Traveler Info
- Trip Info
Sample User Interface for Mobile User
IDTO Research Timeline

- ConOps and System Requirements – completed, mid 2012
- Test Readiness – completed, October 2012
- Prototype Development and Impacts Assessment Procurement - completed, April 2013
- Prototype Requirements and Architecture – completed. Sept 2013
- Prototype Development and Demonstrations, 2013-2014
- Evaluation Results, expected Fall 2014
Comments and Thoughts.....

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