WELCOME

Thanks for taking the time to learn more about TBEST – Transit Boardings Estimation and Simulation Tool

**Target Audience** – technical professionals and decision-makers involved in transit service planning or transit market analysis who want to learn more about TBEST applications

**Objective** - familiarize the audience with core TBEST applications and functionality
TBEST TEAM

Rodney Bunner and Ashok Kumar
ServiceEdge Solutions (Tampa and Los Angeles)
Role: TBEST Maintenance, Technical Support, Training

Steve Polzin and Xuehao Chu
Center for Urban Transportation Research (CUTR), Univ. of South Florida (Tampa)
Role: TBEST Strategy, Research-based Methodologies, TBEST Website

FDOT Project Manager: Chris Wiglesworth
Florida Department of Transportation (Tallahassee)
Role: Public Sponsorship and Program Guidance

HART COA/TDP PROJECT – TBEST CASE STUDY

- Major Transit Development Plan (TDP) update for fiscal years 2018 through 2027
- Joint development of TDP and COA offer unique insights for the efforts to inform one another
- Prepare transformative service operational assessment as an input to TDP Strategic Plan
- Balance Public Needs, Demand, New Technologies and Cost Feasibility
- TBEST specified by HART for TDP and COA analysis
HART COA/TDP PROJECT

Developed HART TBEST Transit System to support diverse study components including:
- Line by Line Analysis
- Public Involvement
- Title VI Evaluation
- Market Assessment
- Jurisdictional Assessment
- Ridership Estimation
- Walk Access Impacts

TBEST HART TRANSIT SYSTEM – SYSTEM INPUT

Define HART Service Area and Operating Conditions to be utilized in TBEST Analysis and Reporting
1. System Service Area
2. Service Extent by County (allowing for future system expansion)
3. Operational and Policy Settings
   - Title VI Policy (Walk Distance, Disparate Impact)
   - Operating Costs (Per Hour and/or Per Mile)
   - Average In-Service Layover Time
   - Fare Structure
4. Socio-Economic Growth (MPO)
TBEST HART TRANSIT SYSTEM – SE DATA INPUT

Socio-Economic Data assembled from FDOT-provided TBEST Florida state-wide data including:

Demographic
- Census 2010 and 2015 American Community Survey (5-Year)

Employment
- 2014 InfoUSA Address-Based

Parcel Land Use
- 2015 Florida Department of Revenue Parcel Data
  *Trip generation by land use type

TBEST BASE TRANSIT NETWORK – GTFS IMPORT

TBEST Base Network imported from 2016 HART operational GTFS
- Aggregates IVTT, service span, trips into time periods (AM & PM Peak, Off Peak, Night, Sat, Sun)
- Maintains GTFS route pattern structure
- Network segmented at time points
- Integrated connecting routes from regional transit providers (PSTA and PCPT)
TBEST BASE TRANSIT NETWORK – STOP RIDERSHIP

Integrated Stop-Level Observed Ridership for COA

- TBEST supplemental GTFS file specification
- Scripted output from HART APC data system
- Data post processed for TBEST format
- Includes boardings and alightings
- Specific to GTFS route, pattern and stop
- Ridership averaged to TBEST time period
- Populates to TBEST scenario network during GTFS import

TBEST BASE TRANSIT NETWORK – FINALIZATION

Finalized HART base network within TBEST:

- Fare (by Route Type and Mode)
- Transfer Station Locations
- Special Generators
- Amenities
- Route-Level Ridership (Validation)
- Entered Socio-Economic Growth Rates

Validated the TBEST System to 2016 Service:

- Creates route-level adjustment factors
- Updates the socio-economic data to base year
TBEST COA SUPPORT – LINE BY LINE ANALYSIS

TBEST - COA Workflow Support Tool
- Delineated HART route service by jurisdiction for Line by Line Analysis
- Evaluated service-levels and performance within jurisdictions

Utilized TBEST stop-level ridership compile pattern/stop boardings and alightings by line, segment and jurisdiction
- Line and segment level performance evaluations with population/employment
- Developed max load and load ratios per line and compared to HART KPI’s (TBEST Loaded Network)
Public Involvement
Travel Time Heat Maps to Major Transit Hubs

TBEST SCENARIO ALTERNATIVES DEVELOPMENT

- **Constructed HART Alternative Scenarios:**
  - 2018 COA Network (Frequent Network)
  - 2027 Funded Network (Frequent + Targeted Express + Hyperlink)
  - 2027 Needs Network (Frequent + Regional + Hyperlink + South County)
- Add/Edit/Remove Routes, Patterns, Segments and Stops
- Modify Service Span, Headway, Travel Times
- Combination of TBEST Network Editor and imported Remix GTFS
  - HART and TOA planners would sketch routes in Remix -> Alternative GTFS Files
  - Utilize TBEST GTFS Import Tool to integrate Remix GTFS
  - Not entirely seamless conflation of Remix to TBEST network
TBEST SCENARIO ALTERNATIVES DEVELOPMENT

HART TBEST RIDERSHIP ESTIMATION

TBEST Ridership Estimation Model responds to:
- service-level adjustments
- route re-structuring
- fare changes
- transfers
- walk markets
- destination markets

Modeled Networks
- 2018 COA Network
- 2027 Funded Network
- 2027 Needs Network

System, Route Type and Line-Level Comparison with Base performance

TBEST Scenario Summary Tool – new report filters based on HART TDP summarization methods

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<th>Local Routes</th>
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HART TDP Weekday Ridership and Growth Rates (2018–2027 Needs)
Title VI Disparate Analysis – System Evaluation

Title VI Disparate Analysis
Route Comparison
Market Assessment

- Walk Access to Transit by distance (½, ¼, and ⅓ miles)
- Evaluated HyperLink zone Markets
- Utilized growth and coverage to estimate HyperLink riders in 2027

TBEST ACCESSIBILITY MEASURES

2018 High Frequency Routes

Access To Transit - HART 2018 - 15 Min Headway

- Pedestrian: 55,794 (8.6% of service area)
- Household: 23,267 (6.7% of service area)
- Jobs: 77,469 (7.5% of service area)
- Income: $43,696 (Average: $80,000)

Input Settings
- Analysis Name: HART 2018 - 15 Min Headway
- Input Settings
  - Time Period: AM Peak
  - Service Filter: All Routes
  - Trip Mode: All Modes
  - Walk Access Area: 100 sq. mi.

Map Legend:
- Pedestrian
- Household
- Jobs
- Income
- Average Income

Total Area: 100 sq. mi.
TBEST ACCESSIBILITY MEASURES

2027 Funded High Frequency Routes

Access To Transit - HART 2027 - Funded 15 Min Headway

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2027 Needs High Frequency Routes

Access To Transit - HART 2027 Needs - 15 Min Headway

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HART COA/TDP STUDY - RESULTS

Project Outcomes
- TBEST streamlined transit analysis and reporting to save time and money
- Fulfilled FDOT TDP ridership estimation requirements
- Detailed COA assessment formed the base of the TDP strategic plan
- Communicated complex analysis results to HART staff, HART Board, county officials, and the general public
- Fulfilled multiple elements of the COA and TDP data and analytical requirements
- Integration with other systems and software including APC data and Remix GTFS files
- TBEST software improvements based on study components furnished to all TBEST users

Future TBEST Improvements and Activities
- Operational GTFS Export from TBEST
- Park-n-Ride Model Structure
- FDOT-sponsored Florida seminar training in 2018

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