Southeast Florida STOPS Planning Model Overview
Southeast Florida FSUTMS Users Group Meeting
Florida Department of Transportation, District 4
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Introductions

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Agenda

- Overview of STOPs
- Overview of the SEFL STOPs Planning Model
  - Motivation and user interface
  - Input data
  - Post processing user interface
  - Calibration results
- Forecasting for Your Project
- Model Applications
  - Central Broward Transit
  - SR 80

STOPS Overview and Motivations for SEFL STOPs Planning Model
STOPS Overview

- **Simplified Trips On Project Software** - for transit ridership forecasting
  - Developed and maintained by FTA
- Limited implementation of the conventional ‘four-step’ trip-based model
- Uses readily-available inputs such as census, ACS, MPO Population and Employment, GTFS etc.
- Nationally calibrated, with adjustments made for local transit and fixed guideway systems

STOPS’ Purposes

- **Primary Focus** - To provide a simplified method to produce measures for fixed-guideway projects applying for FTA’s Capital Investment Grant (CIG) funding
- Using STOPS beyond its primary purposes...
  - QA/QC ridership forecasts
  - Systems planning
  - Service planning
  - Sizing of stations and mode-of-access facilities
  - Before-After comparisons
STOPS Interface and FTA Resources

FTA provides example application and other resources at https://www.transit.dot.gov/funding/grant-programs/capital-investments/stops-%E2%80%93-documentation-and-software

FTA's website currently has STOPS version 1.50. SEFL STOPS uses version 2.0 beta.

Other Resources

- FTA Planning Staff
  - Check for most recent STOPS versions, data and guidelines
  - Provide technical guidance on STOPS
- FTA's “Forecasting with STOPS” course materials from workshops held in Orlando and Los Angeles (May and June 2016)
  - National Transit Institute will offer this course again in 2017
- FDOT's “Guidebook for Florida STOPS Applications”
  http://www.fsutmsonline.net/index.php/site/comments/guidebook_for_florida_stops_applications/
Resource Requirements

**Hardware**
- 8GB RAM required
- 4- or 8-core processor
- 40-100GB of hard disk storage per project

**Software**
- Windows 7 or later
- ArcMap version 10.1+
- Good text editor
- Good spreadsheet software
- GTFS visualizer

**Personnel/Staff**
- Good understanding of travel forecasting
- Experience with GIS packages
- Familiarity with the transit system and local area

Advantages of Using STOPs

- FTA requires substantially less review time of STOPs ridership forecasts for CIG projects
- STOPs models can typically produce more analyses than regional travel models within the same time
- STOPs has embedded mapping routines that easily display and communicate results

*From FDOT’s workshop on Guidebook for Florida STOPs Application*
Limitations to Using STOPS

- STOPS does not provide a direct interaction with the roadway network
- The GTFS editing process can be cumbersome
- STOPS’ representation of non-work trips is less certain than its representation of work trips
- STOPS is limited in its ability to analyze alternatives beyond its supplied metrics (Example: transit capacity analysis has to be performed offline)
- Future year travel patterns are based on existing patterns and the user-supplied population and employment forecasts (Other variables such as accessibility are not considered)

From FDOT’s workshop on Guidebook for Florida STOPS Application

Additional STOPS 2.x Features

- ACS 2006-2010 data can be used to represent Journey-to-Work (JTW) flows
- Calibration to linked transit trips by purpose (HBW, HBO and NHB) and by market segment (0-car, 1-car, 2-car HHs)
- Boarding/transfer penalty can be changed, which directly impacts the overall transfer rate
- Transit O/D survey can be used to develop “Incremental” STOPS model
- Ability to model ‘special’ markets

Not mentioned in the v1.50 documentation currently on FTA’s website
Motivations

- Why STOPS?
  - Quicker turnaround for ridership forecasting and analysis
  - Provide basis for FTA Capital Investment Grant applications ("New/Small Starts")
  - An independent tool to QA/QC forecasts from SERPM or data-driven models

- Why SEFL STOPS Planning model?
  - Provide a common “ready to go” platform for upcoming transit corridor studies
  - Utilize a common set of reconciled data and assumptions for all corridors
  - Fewer resources needed for corridor calibration/validation, compared to SERPM

SEFL STOPS Planning Model
SEFL STOPS Planning Model

Characteristics

- Developed using STOPS version 2.0 beta (2/19/2016)
- Covers the three SERPM counties Miami-Dade, Broward and Palm Beach
  - A separate Excel user interface let’s users apply the model for one county
- Represents average weekday travel
- Model base/current year: 2015
  - Horizon year: 2040
- STOPS input files already prepared † should be reviewed/updated for individual corridors

The Model You Received

- ~500 MB zipped file

Model Data/Interface

SEFL STOPS Planning model user guide and calibration report supplements FTA's STOPS user guide.
SEFL STOPS Planning Model User Interface

Motivations

u Model runtime for the tri-county region can be up to 4-7 hours

u Most projects will only have localized impacts within a given county/corridor

u Better quality and more detailed data may be available at a county/corridor level

u STOPS ASCII report file not easy to process/analyze

What it Does?

u Automates the preparation of “some” input files for any corridor in the region

u Uses data already collected and reconciled as part of this effort

u Extracts user specified table numbers from the STOPS output report file into Excel

u Prints extracted worksheets to PDF format in batch mode
User Interface and Folder Setup

Initial files should be developed using the interface to save significant setup time.

Excel Macro file containing the user interface

Module 1: Prepare Input files

Module 2: Post Processing of STOPS results

Input Module and Data Assembled
**Input Module: What it Does?**

- Copies all the required input files for a selected geography

- Creates a scenario folder and a default STOPS control file, appropriately edited to reflect the attributes of the geographic region selected

**User Interface: Input Module**

A new folder containing preliminary input data is created using the Scenario Name.

- 1. Location of ArcMap exe file
- 2. Location of Python exe file
- 3. User specified scenario name
- 4. User specified STOPS control file name

Geographic region selection discussed later.
User Interface: Input Module (Contd.)

Wait for the confirmation window for successful completion of Prepare Input Files step.

This step can take up to a minute to complete.

User Interface: Input Module (Contd.)

- Three folders and STOPS control file are copied
Input Module: What is Copied?

- STOPS software files
- Pre-defined districts definition for the tri-county region
- ACS Part I, II and III files, Census block boundary files
- ACS state shape layer; depends on the geographic region selected
- GTFS files; depends on the geographic region selected
- MPO population and employment data
- Auto skim file; depends on the geographic region selected
- STOPS stations shape layer containing the existing fixed guideway stations and bus stops with ridership data; depends on the geographic region selected
- STOPS control file, appropriately edited to reflect the attributes of the geographic region selected

Files copied in the ‘Inputs’ folder
Input Module: What is Copied?

- STOPS software files
- Pre-defined districts definition for the tri-county region
- ACS Part I, II and III files, Census block boundary files
- ACS state shape layer; depends on the geographic region selected
- GTFS files; depends on the geographic region selected
- MPO population and employment data
- Auto skim file; depends on the geographic region selected
- STOPS stations shape layer containing the existing fixed guideway stations and bus stops with ridership data; depends on the geographic region selected
- STOPS control file, appropriately edited to reflect the attributes of the geographic region selected

Input Module: What is Copied?

STOPS Software

- 2.0 Beta Version (2/19/2016)
  - No formal 2.0 documentation from FTA
  - Version used for FTA's STOPS course in May and June
- Use the interface to open STOPS menu
Input Module: What is Copied?

- STOPS software files
- Pre-defined districts definition for the tri-county region
- ACS Part I, II and III files, Census block boundary files
- ACS state shape layer; depends on the geographic region selected
- GTFS files; depends on the geographic region selected
- MPO population and employment data
- Auto skim file; depends on the geographic region selected
- STOPS stations shape layer containing the existing fixed guideway stations and bus stops with ridership data; depends on the geographic region selected
- STOPS control file, appropriately edited to reflect the attributes of the geographic region selected

Users must define districts for their corridor. Use Step 8 of STOPS menu.
Input Module: What is Copied?

- STOPS software files
- Pre-defined districts definition for the tri-county region
- ACS Part I, II and III files, Census block boundary files
- ACS state shape layer; depends on the geographic region selected
- GTFS files; depends on the geographic region selected
- MPO population and employment data
- Auto skim file; depends on the geographic region selected
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- STOPS control file, appropriately edited to reflect the attributes of the geographic region selected

ACS Files

- FTA provided the pre-formatted ACS files for Florida
  - Florida ACS TAZ shapefile
  - Florida Census block shapefile
  - ACS TAZ-level Part I, II and III data; 5-year average 2006-2010 data
- ACS Part III provides JTW flow information
- Basis of ‘trip distribution’ in STOPS
Input Module: What is Copied?

- STOPS software files
- Pre-defined districts definition for the tri-county region
- ACS Part I, II and III files, Census block boundary files
- ACS state shape layer; depends on the geographic region selected
- GTFS files; depends on the geographic region selected
- MPO population and employment data
- Auto skim file; depends on the geographic region selected
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- STOPS control file, appropriately edited to reflect the attributes of the geographic region selected

Input Module: What is Copied?

*GTFS Network*

What’s in the GTFS files?

<table>
<thead>
<tr>
<th>Agency/Systems</th>
<th>Service Pick</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDT</td>
<td>September 2015</td>
<td></td>
</tr>
<tr>
<td>BCT</td>
<td>December 2015</td>
<td></td>
</tr>
<tr>
<td>Palm Tran</td>
<td>December 2013</td>
<td>f1</td>
</tr>
<tr>
<td>Tri-Rail</td>
<td>December 2015</td>
<td>Manually coded full schedule</td>
</tr>
<tr>
<td>Community/City Buses</td>
<td>Not included</td>
<td></td>
</tr>
<tr>
<td>Tri-Rail Shuttles</td>
<td>Not included</td>
<td></td>
</tr>
</tbody>
</table>

Depending on project, it may be necessary to include some city buses & Tri-Rail shuttles.
Input Module: What is Copied?

**GTFS Networks for No Build and Build Scenarios**

- Default *No Build* and *Build networks* are same as the Existing network ‡ users should update these for their project
- Only relevant systems’ GTFS files are copied
- Below are the GTFS folders when ‘All Three Counties’ are selected in the Excel interface

Tri-Rail only modeled when ‘All Three Counties’ is selected as geography.

- Proposed BRTs/LRTs should be coded as RouteType 0.

### GTFS RouteTypes

- 0: Tram, streetcar, LRT, (and BRT for STOPS)  
- 1: Subway, Metro  
- 2: Rail (intercity and long-distance)  
- 3: Bus (short- and long-distance but not BRT in STOPS)  
- 4: Ferry  
- 5: Cable car  
- 6: Gondola or suspended cable car  
- 7: Funicular

---

<table>
<thead>
<tr>
<th>Transit Service</th>
<th>RouteType</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tri-Rail</td>
<td>2</td>
</tr>
<tr>
<td>Metrorail</td>
<td>1</td>
</tr>
<tr>
<td>Metromover</td>
<td>0</td>
</tr>
<tr>
<td>MDT Local/Express Bus</td>
<td>3</td>
</tr>
<tr>
<td>MDT KAT/MAX/Busway</td>
<td>3</td>
</tr>
<tr>
<td>MDT 95X (Golden Glades I-95 Express)</td>
<td>3</td>
</tr>
<tr>
<td>MDT 95E (Inter-County I-95 Express)</td>
<td>3</td>
</tr>
<tr>
<td>BCT Local/Breeze Bus</td>
<td>3</td>
</tr>
<tr>
<td>BCT I-95 and I-595 Express</td>
<td>3</td>
</tr>
<tr>
<td>Palm Tran Bus</td>
<td>3</td>
</tr>
</tbody>
</table>
Input Module: What is Copied?

**GTFS Network / PnRs**

- Mangonia Park Station: 1
- Metrorail Transfer Station: 3
- All Other Stations: 2

**PNRType** | **Catchment Area**
---|---
1 | 25 miles
2 | 10 miles
3 | 6 miles
4 | 3 miles

Project station coding should follow the existing scenario coding patterns.
Input Module: What is Copied?

**GTFS Network / PnRCost**

- Tri-Rail and Metrorail
  - No PnRCost, except at Dadeland North (where it is 0.1 minute)
- All bus lots
  - 5 minutes added PnRCost ± calibration parameter to match the bus PnR trips

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Input Module: What is Copied?

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- GTFS files; depends on the geographic region selected
- MPO population and employment data
- Auto skim file; depends on the geographic region selected
- STOPS stations shape layer containing the existing fixed guideway stations and bus stops with ridership data; depends on the geographic region selected
- STOPS control file, appropriately edited to reflect the attributes of the geographic region selected
Input Module: What isCopied?

**MPO Population/Employment**

- SERPM 7 TAZ structure
- Population and employment data obtained from SERPM 7.061

<table>
<thead>
<tr>
<th>Year</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-ACS CTPP Year</td>
<td>2010 SERPM 7.061</td>
</tr>
<tr>
<td>2015-Current Year</td>
<td>Interpolation of 2010 and 2040 SERPM 7.061 data</td>
</tr>
<tr>
<td>2040-Horizon Year</td>
<td>2040 SERPM 7.061</td>
</tr>
</tbody>
</table>

Reflect SERPM 7.062 (or latest) data, if necessary.

Input Module: What is Copied?

- STOPS software files
- Pre-defined districts definition for the tri-county region
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- GTFS files; depends on the geographic region selected
- MPO population and employment data
- Auto skim file; depends on the geographic region selected
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Input Module: What is Copied?

Auto Skims

- 2010 skims from SERPM 7.061 is used to represent zone-to-zone current and future years peak period auto travel times and distances
- Data includes only the county(ies) selected for modeling

Input Module: What is Copied?

- STOPS software files
- Pre-defined districts definition for the tri-county region
- ACS Part I, II and III files, Census block boundary files
- ACS state shape layer; depends on the geographic region selected
- GTFS files; depends on the geographic region selected
- MPO population and employment data
- Auto skim file; depends on the geographic region selected
- STOPS stations shape layer containing the existing fixed guideway stations and bus stops with ridership data; depends on the geographic region selected
- STOPS control file, appropriately edited to reflect the attributes of the geographic region selected
Input Module: What is Copied?

**STOPS Station Database**

- Database of all rail stations and bus stops
- Station access penalty
  - Tri-Rail walk access: 10 minutes
- Stop level boarding provided for all rail stations, MDT and Palm Tran stops
  - Palm Tran stop-level boardings not used for calibration when ‘All Three Counties’ selected

---

**Input Module: What is Copied?**

**STOPS Station Database Screenshot**
Input Module: What is Copied?

STOPS Station Database - APC Data

<table>
<thead>
<tr>
<th>Availability of stop level data?</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palm Tran</td>
<td>Yes</td>
</tr>
<tr>
<td>BCT</td>
<td>No</td>
</tr>
<tr>
<td>MDT buses</td>
<td>Yes</td>
</tr>
<tr>
<td>Metrorail</td>
<td>Yes</td>
</tr>
<tr>
<td>Metromover</td>
<td>Yes</td>
</tr>
<tr>
<td>Tri-Rail</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Availability of stop level data?

- Palm Tran: Yes, October 2014 and February 2015 APC data
- BCT: No
- MDT buses: Yes, September to November, 3 months 2015 APC data. This data is scaled to the corresponding 3 month average bus ridership obtained from the MDT monthly ridership reports.
- Metrorail: Yes, MDT monthly ridership reports. Average for September to November 2015 is used to be consistent with the APC data for the buses.
- Metromover: Yes
- Tri-Rail: Yes, SFRTA’s monthly operations reports. Average for April-December 2015 is used to be consistent with the reopening of the MIA station in April 2015.

Input Module: What is Copied?

STOPS Station Database - Station Groups

- Key element of STOPS’ local calibration
- SEFL Planning Model groupings
  - 4 groups for Tri-Rail stations
  - 7 groups for Metrorail stations
  - 3 groups for Metromover stations
- Bus stops groupings generally align with districts definition
Input Module: What is Copied?

- STOPS software files
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- ACS Part I, II and III files, Census block boundary files
- ACS state shape layer; depends on the geographic region selected
- GTFS files; depends on the geographic region selected
- MPO population and employment data
- Auto skim file; depends on the geographic region selected
- STOPS stations shape layer containing the existing fixed guideway stations and bus stops with ridership data; depends on the geographic region selected
- STOPS control file, appropriately edited to reflect the attributes of the geographic region selected

Input Module: What is Copied?

**STOPS Control File**

- Set-up parameters
  - Unlinked trip targets (based on geography selected):
    - ‘All Three Counties’: 504,000
    - Miami-Dade Only: 335,000
    - Broward Only: 106,000
    - Palm Beach Only: 39,000
  - Transfer penalty: 5 minutes
  - Visibility factor: 1.0
  - CTPP Calibration Approach: 01-Attraction-only
  - Group Calibration Approach: 09-Full Group Calibration
  - Growth Factor Geography: zone
Post Processing Module

What it Does?

- Extracts selected tables from the STOPS Report file into Excel
  - For easier processing and reporting
- Print Desired Worksheets
  - Can print in batch mode
  - Users should format the tables before printing
User Interface: Post Processing Module

Location of STOPS output report file

Extract/Subscribe desired tables

STOPS report table list

Import
Clear

Extract tables into workbook
Delete the extracted tables from workbook

Print Worksheets

Worksheet list

Import
Clear

Required Files for Post Processing

Samples

- STOPSTablestoExtract.txt
- STOPSTablestoPrint.txt
Calibration Results

Calibration Targets
*Unlinked Trip Target and Stop-level boardings*

- **Region-wide boardings target:** 504,000

<table>
<thead>
<tr>
<th>System / Agency</th>
<th>Average Weekday Unlinked Trips</th>
<th>Year/Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palm Tran</td>
<td>39,000</td>
<td>2014-15/APC</td>
</tr>
<tr>
<td>BCT</td>
<td>118,000 fl</td>
<td>2015/Monthly Reports</td>
</tr>
<tr>
<td>MDT buses</td>
<td>222,000</td>
<td>2015/APC</td>
</tr>
<tr>
<td>Metrorail</td>
<td>76,700</td>
<td>2015/Monthly Reports</td>
</tr>
<tr>
<td>Metromover</td>
<td>34,600</td>
<td>2015/Monthly Reports</td>
</tr>
<tr>
<td>Tri-Rail</td>
<td>13,800</td>
<td>2015/Monthly Reports</td>
</tr>
<tr>
<td><strong>Region-wide</strong></td>
<td><strong>504,000</strong></td>
<td></td>
</tr>
</tbody>
</table>

- **Stop-level ridership data provided for all agencies except BCT**
Calibration

Region-wide Boarding Results

<table>
<thead>
<tr>
<th>Transit Mode</th>
<th>Boardings</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Observed</td>
<td>Estimated</td>
<td>Delta</td>
</tr>
<tr>
<td>Tri-Rail</td>
<td>13,800</td>
<td>14,100</td>
<td>400</td>
</tr>
<tr>
<td>Palm Tran</td>
<td>39,000</td>
<td>41,100</td>
<td>2,100</td>
</tr>
<tr>
<td>BCT Local/Breeze Bus</td>
<td>115,500</td>
<td>123,300</td>
<td>7,800</td>
</tr>
<tr>
<td>BCT I-95 and I-595 Express</td>
<td>2,400</td>
<td>2,200</td>
<td>-200</td>
</tr>
<tr>
<td><strong>BCT Subtotal</strong></td>
<td>117,900</td>
<td>125,400</td>
<td>7,600</td>
</tr>
<tr>
<td>MDT Local/Express Bus</td>
<td>198,700</td>
<td>187,900</td>
<td>-10,700</td>
</tr>
<tr>
<td>MDT KAT/Max</td>
<td>20,200</td>
<td>34,700</td>
<td>14,500</td>
</tr>
<tr>
<td>MDT 95X (Golden Glades I-95 Express)</td>
<td>2,100</td>
<td>5,200</td>
<td>3,100</td>
</tr>
<tr>
<td>MDT 95E (Inter-County I-95 Express)</td>
<td>1,200</td>
<td>1,300</td>
<td>100</td>
</tr>
<tr>
<td>Metromover (Downtown Miami)</td>
<td>34,600</td>
<td>18,500</td>
<td>-16,200</td>
</tr>
<tr>
<td>Metrorail</td>
<td>76,700</td>
<td>72,700</td>
<td>-4,000</td>
</tr>
<tr>
<td><strong>MDT Subtotal</strong></td>
<td>333,500</td>
<td>322,500</td>
<td>-11,000</td>
</tr>
<tr>
<td><strong>Regional Total</strong></td>
<td>504,100</td>
<td>503,200</td>
<td>-900</td>
</tr>
</tbody>
</table>

Calibration

Tri-Rail Boarding Results
Calibration

Metrorail Boarding Results

<table>
<thead>
<tr>
<th>Station</th>
<th>Observed</th>
<th>Estimated</th>
<th>Delta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palmetto</td>
<td>2,000</td>
<td>4,000</td>
<td></td>
</tr>
<tr>
<td>Okeechobee</td>
<td>2,000</td>
<td>4,000</td>
<td></td>
</tr>
<tr>
<td>Hialeah</td>
<td>2,000</td>
<td>4,000</td>
<td></td>
</tr>
<tr>
<td>Tri-Rail transfer</td>
<td>2,000</td>
<td>4,000</td>
<td></td>
</tr>
<tr>
<td>Northside</td>
<td>2,000</td>
<td>4,000</td>
<td></td>
</tr>
<tr>
<td>Dr. MLK Jr. Plaza</td>
<td>2,000</td>
<td>4,000</td>
<td></td>
</tr>
<tr>
<td>Brownsville</td>
<td>2,000</td>
<td>4,000</td>
<td></td>
</tr>
<tr>
<td>Earlington Heights</td>
<td>2,000</td>
<td>4,000</td>
<td></td>
</tr>
<tr>
<td>Allapattah</td>
<td>2,000</td>
<td>4,000</td>
<td></td>
</tr>
<tr>
<td>Santa Clara</td>
<td>2,000</td>
<td>4,000</td>
<td></td>
</tr>
<tr>
<td>Civic Center</td>
<td>2,000</td>
<td>4,000</td>
<td></td>
</tr>
</tbody>
</table>

Calibration

One County vs Three Counties - Metromover

<table>
<thead>
<tr>
<th>Model Run</th>
<th>Observed</th>
<th>Estimated</th>
<th>Delta</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-Counties Model Run</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metromover (Downtown Miami)</td>
<td>34,600</td>
<td>18,500</td>
<td>-16,200</td>
</tr>
<tr>
<td>Miami-Dade Only Model Run</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metromover (Downtown Miami)</td>
<td>34,600</td>
<td>31,000</td>
<td>-3,600</td>
</tr>
</tbody>
</table>

Run the model for Miami-Dade County only

Added fares (as 10 minutes penalty) on all MDT bus stops and Metrorail stations and made Metromover free
Calibration Summary

- Regional STOPS is able to represent the ridership on both the fixed guideway and local bus modes reasonably well
  
  \textit{Limited stop buses and Metromover}

- Splits by purpose and access mode are similar to the observed numbers
  
  \textit{Walk access estimates are slightly over-estimated on Tri-Rail and Metrorail}

- One-county vs three-counties aggregate results are similar
  
  \textit{Ability to further fine tune the calibration at the county level}

Forecasting for Your Project...
Forecasting with STOPS

- Model running ≠ ridership forecasting
- Simplified ≠ Sloppy!! (and Simplified ≠ Sketch, either)
- Uncertainties must be characterized, quantified and communicated to decision makers

From FTA's course on STOPS

Setting up SEFL STOPS for a Project

- Select the geographic region needed for the project
- Prepare basic input files
- Refine corridor districts and stop groups
- Refine corridor calibration
- Define years & visibility factor, if needed
- Perform project forecasts
How to Select Geography

Questions to Ask

- Does the project traverse more than one county?
- Would you expect any meaningful ridership on the project from more than one county?
- Does the underlying corridor bus connect with transit services from other counties, and is this connection expected to have a meaningful impact on the project?
- Do you need Tri-Rail for this analysis?

Select “All Three Counties” option if answer is yes to ANY of the questions

Review of the Input Files

- Verify all the input files to make sure the corridor inputs are correct and up-to-date
- GTFS
  - Make sure that the service coded reflects the current service (for which data is available)
- MPO TAZ population and employment
  - Make sure the current and horizon years data are up-to-date
- Station database
  - Make sure that the stop-level boarding data is correct and generally reflects the existing ridership counts
How to Define Districts

*Good Practices*

- Generally speaking, 16 to 24 districts (STOPS allows up to 50)
- Separate districts for CBD and major activity centers
- Finer districts along the project corridor, and coarser elsewhere
- Station groupings should generally be consistent with districts definition

Further More...

Regionally well-calibrated ≠ well-calibrated for a particular corridor

**Corridor-related calibration refinements**
- Refinement of corridor districts and station/stop groupings
- Corridor local versus limited stop bus boarding splits
- Special generators
- Survey data, most recent service changes
- TAZ cloning etc.

**Alternatives forecasting**
- No Build network
- Build network - project and background bus network changes
- Other requirements - visibility factor adjustments, interim/opening year set up?
### List of Typical Adjustments for Corridors

<table>
<thead>
<tr>
<th>Adjustments</th>
<th>Source</th>
<th>Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>System-wide linked transit trip targets</td>
<td>Recent on-board transit surveys</td>
<td>Better representation of zero-car market, which is a key New/Small Starts metric</td>
</tr>
<tr>
<td>Special market trips</td>
<td>Surveys (e.g., zip code data for university students)</td>
<td>Captures travel patterns outside the conventional CTPP markets; better representation of existing transit travel</td>
</tr>
<tr>
<td>CTPP calibration approach</td>
<td>Recent on-board transit surveys</td>
<td>Subareas expected to change in character will be locked in to the production-end constants calibrated against current conditions</td>
</tr>
<tr>
<td>System-wide transfer rate</td>
<td>Recent on-board transit surveys</td>
<td>Better representation of the percent of transfers</td>
</tr>
<tr>
<td>Define new districts and station groups</td>
<td>User defined</td>
<td>Better representation of ridership at the corridor level</td>
</tr>
<tr>
<td>Refine zonal structure</td>
<td>User defined</td>
<td>Better representation of walk access in the corridor</td>
</tr>
<tr>
<td>Code separate stops for local and limited stop routes</td>
<td>User defined</td>
<td>Ranges from no real impacts to some improvements in the local/limited stop bus ridership split (last resort)</td>
</tr>
<tr>
<td>Add time penalties</td>
<td>User defined</td>
<td>Brute force calibration to match counts (Discuss with FTA)</td>
</tr>
<tr>
<td>Others...</td>
<td>User defined</td>
<td></td>
</tr>
</tbody>
</table>

### Fixed Guideway Visibility Factor

- Setting that approximates the differentiation of fixed-guideway services and regular bus service
- Direct impact on forecasting ridership
- $0.0 \leq VF \leq 1.0$
  - Comes into play when RouteType 0 is defined

---

Guidebook for Florida STOPS Applications
### Potential Ranges of Visibility Factor

<table>
<thead>
<tr>
<th>Transit Mode</th>
<th>Selected Characteristics</th>
<th>Initial Visibility Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRT (<em>Corridor-based</em>)</td>
<td>Peak hour/period exclusive lanes/right-of-way; Defined stations; TSP/QJ for transit vehicles; “Schedule-free service”</td>
<td>0.0-0.2</td>
</tr>
<tr>
<td>BRT (<em>Robust</em>)</td>
<td>‘Corridor-based' BRT characteristics plus All-day exclusive lanes or reliably faster travel times; Separate and consistent branding</td>
<td>0.3-0.5</td>
</tr>
<tr>
<td>Streetcar</td>
<td>Railcar operating in mixed-flow or exclusive lanes plus ‘Corridor-based’ BRT characteristics</td>
<td>0.5-0.75</td>
</tr>
<tr>
<td>LRT/HRT/CRT</td>
<td>Railcar operating in mixed-flow, exclusive lanes or railroad right-of-way</td>
<td>0.6-1.0</td>
</tr>
</tbody>
</table>

*From FDOT’s workshop on Guidebook for Florida STOPs Application*

Visibility factor is mode-specific; not corridor-specific.

---

### STOPs Planning Model Applications

**Central Broward Transit Phase 1 (Broward County)**

**SR 80 (Palm Beach County)**
Central Broward Transit (CBT) Phase 1 Project Overview

- Extension of downtown Ft. Lauderdale WAVE streetcar to Airport and Seaport

SEFL STOPS Planning Model - User Interface

- Broward County
GTFS Editing

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Fixed Guideway</th>
<th>Buses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td>---</td>
<td>BCT Local/Limited Stop; Beach Link; Downtown Loop</td>
</tr>
<tr>
<td>No-Build</td>
<td>WAVE coding</td>
<td>‘Existing’ with Downtown Loop removed</td>
</tr>
<tr>
<td>Build</td>
<td>CBT Extensions coding</td>
<td>‘Existing’ with Downtown Loop removed and Beach Link truncated to Eisenhower Blvd</td>
</tr>
</tbody>
</table>

No-build and build fixed guideway coding and underlying bus changes in GTFS files

Further, I-95/I595 Express buses were removed from the GTFS files

District Definition - User Defined

No-Build and Build station locations were coded in the “station database”
STOPS Parameters

- Current Year: 2015
- Group Calibration Approach: 09 Full Group Calibration
- CTPP Calibration Approach: 02 Production and Attraction
  District
- Fixed Guideway Visibility Factor: 0.5
- Fraction of Transfer Penalty: 0.2

STOPS Planning Model defaults

- Updated to reflect better district-to-district transit flows
- Used in the WAVE study; Results reviewed by FTA
- Calibrated to get the correct unlinked and linked transit trips ratio

STOPS Parameters (Contd.)

- Unlinked Transit Trips: 102,138
  - Includes the ridership on Beach Link and Downtown Loop
- Linked Transit Trips: 66,562

<table>
<thead>
<tr>
<th></th>
<th>HBW</th>
<th>HBO</th>
<th>NHB</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-car HH</td>
<td>14,001</td>
<td>12,320</td>
<td>5,807</td>
<td>32,128</td>
</tr>
<tr>
<td>1-car HH</td>
<td>9,948</td>
<td>8,698</td>
<td>3,757</td>
<td>22,403</td>
</tr>
<tr>
<td>2+-car HH</td>
<td>4,677</td>
<td>5,533</td>
<td>1,821</td>
<td>12,031</td>
</tr>
<tr>
<td>Total</td>
<td>28,626</td>
<td>26,551</td>
<td>11,385</td>
<td>66,562</td>
</tr>
</tbody>
</table>

Ridership magnitude was updated

Obtained from the 2010 BCT on-board survey expanded to 2015 boardings
STOPS Parameters (contd.)

- **Stop Level Data**
  - Includes data collected as part of the WAVE study, including Beach Link and Downtown Loop trolleys
  - Added stop level data collected on US-1 for stops within the WAVE extension corridor

All BCT bus stops added in the station database; Available boarding data added in the station database; Stop grouping matches district definition; BCT bus stops with no ridership data grouped into one group

Comparison with STOPS Planning Model

<table>
<thead>
<tr>
<th></th>
<th>STOPS Planning Model</th>
<th>CBT Corridor Adjusted Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run Time</td>
<td>&lt;1 hour</td>
<td>&lt;1 hour</td>
</tr>
<tr>
<td>Zero-car Linked Transit Trips</td>
<td>39,582</td>
<td>33,134</td>
</tr>
<tr>
<td>All Linked Transit Trips</td>
<td>83,340</td>
<td>68,760</td>
</tr>
<tr>
<td>Transfer Rate</td>
<td>40%</td>
<td>50%</td>
</tr>
</tbody>
</table>
Model Application for SR 80 (West Palm Beach)

SR 80/US 98/Southern Boulevard
Premium Transit Ridership Potential

- FDOT D4 Action Plan
  - Multimodal Improvement
  - Convert to SIS standards
  - 2045 SIS unfunded needs: fixed guideway transit as ultimate improvements
- Evaluate Ridership Potential for the Corridor
The study area falls completely within a single county. Use one county model.

Palm Beach County

Open STOPS Menu
Network Coding - Add Station Locations

Start with Identify Station Locations

Network Coding - Add Station Locations

[Image of Network Coding interface]
Adding Stations & Attributes

Make sure to get lat/long for stations in order to edit GTFS station file.

GTFS File Editing

stops.txt

routes.txt

frequencies.txt

Stop_times.txt

Also, edit trips.txt and calendar.txt

Use STOPS to debug GTFS Files.
STOPS Parameter File

Visibility

District Definition - refined for Validation
Model Execution and Results Review

Summary

- Greatly simplified the initial model setup work
- Very easy to use
- Quick run time (less than one hour)
- Output easy to read/extract with the built-in function
- GTFS editing time consuming
- Care needed on zone definition and validation
Thank you!!!