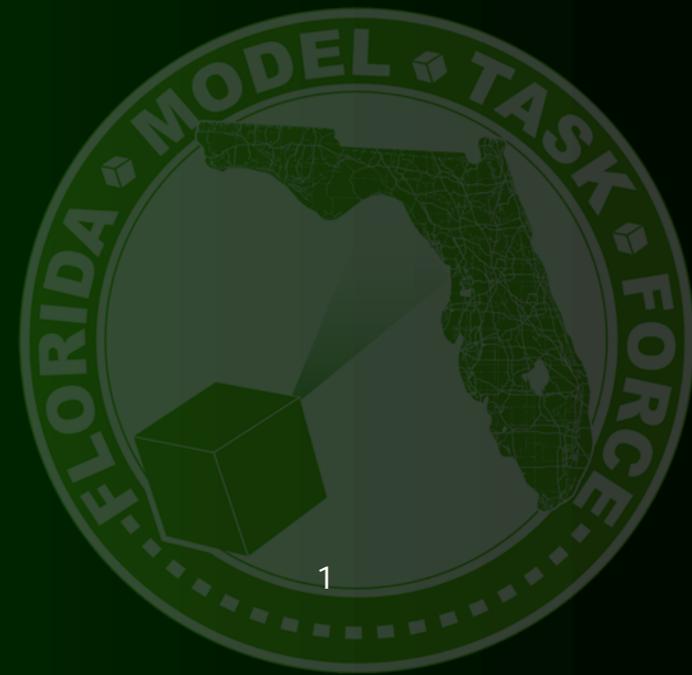


# Trip Distribution Review and Recommendations

*presented to*  
MTF Model Advancement Committee

*presented by*  
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# Purpose

- Review trip distribution procedures
- Changes and improvements
- Few changes in procedures since the mainframe days



# Previous FSUTMS Work Specific to Trip Distribution

- *Model Update Phase II – Task C , (Comsis, 1981)*
- *New FSUTMS Framework (AECOM, 2008)*
- *Refinement Of FSUTMS Trip Distribution Methodology*  
*(Florida International University, 2004)*

# Recommendations

- Use Cube's Distribution program to produce floating point trip tables.
- Make subarea balancing an optional part of FSUTMS.
- Adjust trip purposes.
- Separate E-I-I-E purposes.
- K-factors only with extreme caution and clear reasons.

## Recommendations (continued)

- Use updated travel times skims as dictated by the individual model.
- Doubly constrained model for HBW, but test singly constrained for other purposes.
- Larger areas should consider stratifying HBW trip by income.
- Continue use of the Gravity Model, but continue research on destination choice models.



## Model Structure and Implementation

The recommendation for software is to use Cube's standard gravity model DISTRIBUTION program to produce floating point trip tables. In all but the most unusual cases, DISTRIBUTION will provide the features needed by FSUTMS models. Inputs to the model will be production and attraction files, highway skims, and friction factors.



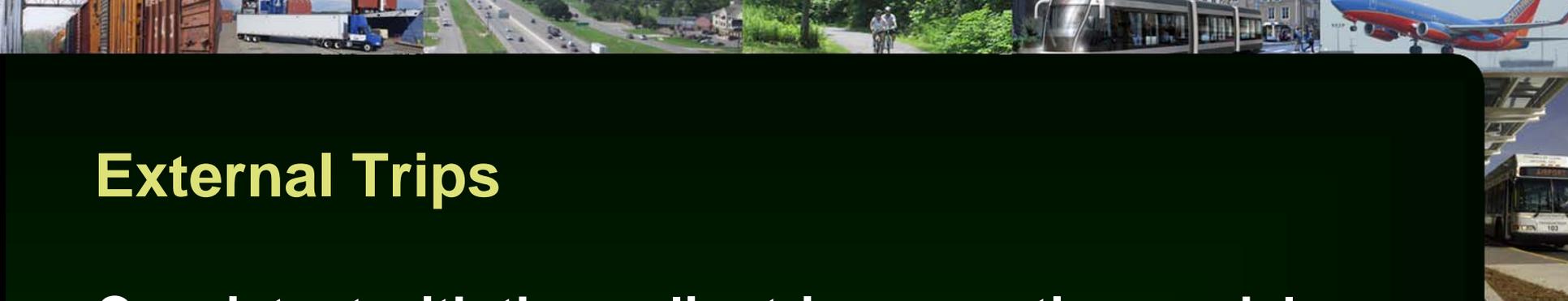
## Subarea Balancing

**This issue impacts both trip generation and trip distribution. Consistent with the trip generation report, it is recommended that subarea balancing should be applied very carefully, only when it is needed, and only when a clear reason can be identified. Nevertheless, subarea balancing should be available in the standard FSUTMS framework.**



# Trip Purposes

- Home-based work (HBW), in larger urbanized areas stratified by income.
- HBSH (shopping).
- HBSR (social-recreational).
- Home-based school, with possible stratifications by public/private, and by grade school, middle school, high school, and university consistent with local conditions. Furthermore, using student assignment districts to assign public school trips should be considered.
- Nonwork Airport.
- HBO (other).
- NHBW (nonhome-based work-oriented).
- NHBO (nonhome-based other).
- Commercial vehicles.
- Medium and heavy trucks.



## External Trips

Consistent with the earlier trip generation model memo, it is recommended that the external-internal (E-I) and external-external (E-E) trip purposes should be retained in FSUTMS. A gravity model should be used to distribute E-I trips. A Fratar model should continue to be used to distribute E-E trips. As discussed in the earlier report on trip generation, consideration should be given to implementing procedures used in the NERPM and Alachua County models whereby external trips are categorized by auto occupancy and truck category based on roadside travel surveys to enhance the modeling of managed lanes.



## Use of K-Factors

The recommendation for K-factors is to continue the current FSUTMS practice of using K-factors only when there is a clear reason for doing so, related to trip distribution patterns, and only after all other reasonable modeling options have been considered or exhausted. K-factors can be implemented, where necessary, as an alternative to other approaches used in Florida such as subarea balancing and coding of travel time penalties.



## Definition of Skims for Trip Distribution

- It is recommended that most FSUTMS models continue the practice of using updated highway travel time impedances for trip distribution.
- Time value of tolls.
- Congested skims for large areas.
- Special needs for HOT lanes.



# Balancing Attractions – Singly or Doubly Constrained

- **Non-work trip purposes modelers should consider the use of a singly-constrained gravity model that is not iterated to force convergence on attractions, or to run only a few iterations (perhaps five or less).**
- **Additional testing of the singly-constrained approach needed.**



## Stratification by Income Level

- **Consistent with the earlier trip generation model memo, the recommendation is that models in larger urbanized areas should consider segmenting the HBW trip purpose by income level. While this could effectively double the run times for HBW distribution, used of singly-constrained approaches for other trip purposes could potentially offset this difference. In all likelihood, a single set of friction factors would be used for low- and high-income households unless a statistically valid survey sample is available for lower income households.**



## Destination Choice Models

The recommendation is that while continued research on destination choice models is in order, gravity models should continue to be used, but with income stratification for the larger models. Continued research on destination choice should consider disaggregate approaches, unlike previous studies in Florida. Case studies of other models around the U.S. should also be included to better understand the rationale used in selecting this approach.