ATTACHMENT “A” SCOPE

TRANSPORTATION MODEL APPLICATIONS FOR

SYSTEMS TRANSPORTATION MODELING

#### TASK WORK ORDER NUMBER XX

Transportation Model Applications for Systems Transportation Modeling

**FY 2012-13 –Managed Lane Modeling Phase II**

Contract No.: C8Z16, DOT Financial ID No.: **xxxxxx-x-xx-xx**

DEPARTMENT TASK MANAGER: Vladimir Majano

TOTAL MAXIMUM LIMITING AMOUNT: **$XX,XXX**

Description of Services

### Introduction:

Phase 2 of the Managed lanes toll modeling task will develop a prototype toll choice model within the mode choice model, and integrate that step with the assignment-based toll model developed in Phase 1. A toll choice structure will be added within the existing FSUTMS prototype mode choice model which was developed as a part of the transit model update project. Independent variables to the toll utilities will include toll, distance (used for auto operating cost), time and parking cost – consistent with those variables used for other non-toll auto utilities. It is anticipated that toll nests will be placed below the drive-alone and 2 and 3+ auto occupancy choices. HOV choices can also be included in this structure. A second very important part of the task will be to design the feedback of time and cost variables from the phase 1 assignments to inform the mode choice toll utilities. Together the mode choice and feedback structure will form a complete and flexible system that can be used to estimate both toll choice as a mode and toll facility choice as a path choice.

#### Task 1: Development of Prototype Mode Choice Model with Toll Paying Alternatives

This task enhances the current FSUTMS mode choice model to enable toll-paying and non-toll-paying choices for passenger car demand, currently representing drive-alone and 2 and 3+ auto occupancy vehicle trips. The model design will allow for the choice dimensions to be further extended to include choice to use HOV facilities.

##### Subtask 1: Design Toll Choice Utility Equations and Nested Logit Model Structure

It is anticipated that the toll choice nest will be placed below the drive-alone and 2 and 3+ auto occupancy choices. Logit model utility equations for this model structure will be designed to combine origin to destination specific variables such as travel time, travel distance, and toll cost. Appropriate coefficients for the combination of variables in the utility equations will also be specified.

##### Subtask 2: Code the New Logit Model Structure and Utility Equations into the Current Standard Mode Choice Model Scripts

Update the current model scripts to apply the utility equations and revised nested logit model formulation. Develop reporting procedure in the code to verify that information flows correctly between model components.

##### Subtask 3: Test the Mode Choice Toll Model for Functionality and Sensitivity

Apply the new mode choice model to the Orlando test bed. Code a managed lane facility as a test scenario capable of producing data required by the mode choice model. Run the Phase 1 traffic assignment model to produce matrices of time, distance, and toll cost for use in evaluating the mode choice model implementation. Develop procedures to modify travel time, distance and cost values in the input matrices in a controlled way in order to compare responses in the mode choice proportions to such changes.

##### Deliverables:

1.1 Technical Memorandum describing the mode choice model structure and utility equations

1.3 Technical Report describing the Mode Choice Model summary reports for the test bed, sensitivity tests and results, and instructions for applying the mode choice model in the FSUTMS context.

#### Task 2: Integration of Enhanced Mode Choice Model with Phase 1 Highway Assignment Approach

The enhanced mode choice model developed in Task 1 used a fixed set of model inputs derived from a single application of the Phase 1 dynamic tolling highway assignment procedure. For applications of the mode choice model and the dynamic tolling assignment model, a certain integration of the two procedures is desirable. This integration ensures better consistency between the travel times and costs that determine demand and the demand that influences travel time and costs. This task develops the integration procedure and refines the sharing of consistent information between the mode choice and traffic assignment procedures.

##### Subtask 2.1 Update feedback from phase I assignment model to inform the toll utilities in the mode choice model

Revise model scripts for both the mode choice model and assignment model so that demand matrices produced by the model choice model are used in the assignment model and level of service skim matrices produced in the assignment procedure are used in the mode choice procedure. Develop an iteration scheme such that the complete integrated system can run in a script.

##### Subtask 2.2 Test complete system for functionality

Develop summary procedures so that convergence of the complete system can be measured. These measures may be statistical measures that indicate the degree to which demand matrices, level of service matrices, network flows, etc. change for a given feedback iteration relative to the previous iteration. At complete system convergence, these measures would indicate insufficient change to warrant running additional iterations. This process will test the complete system, allow convergence properties to be evaluated, and allow model runtime performance properties to be evaluated.

##### Subtask 2.3 Document complete system development and testing results

A final report describing the development and testing of the complete system will be prepared. This report documents the new modeling procedures, testing procedures, testing results, and evaluations of system convergence and runtime performance. The report also identifies desirable features and challenges for the new FSUTMS model in terms of its general applicability as a standard model.

##### Deliverables:

2.2 Technical Memorandum describing the feedback procedure implementation, testing procedures, and testing results

2.3 Final Phase 2 Model Development Report

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**SCHEDULE**

This Task Work Order will be completed by June 30, 2013. The schedule is shown below.

