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16. Abstract This report, as a follow-up to the previous report, presents the results of the model estimation task. The final commodity-specific modal split models are presented, followed by a discussion of their implications. These models are embedded within a larger Geographic Information System (GIS) based modeling system, the development of which is also presented here. This model system is intended to forecast the effects of port expansions, market changes, and network changes on the statewide transportation network.			
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**FREIGHT MODAL SPLIT:
ESTIMATION RESULTS AND MODEL IMPLEMENTATION**

by

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Research Report Number 0-1833-5

Research Project 0-1833
*Infrastructure Impacts and Operational Requirements Associated with
the Next-Generation Container Ships (Megaships)
on the Texas Transportation System*

Conducted for the

TEXAS DEPARTMENT OF TRANSPORTATION

in cooperation with the

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Research performed in cooperation with the Texas Department of Transportation and the U.S. Department of Transportation, Federal Highway Administration.

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1. INTRODUCTION

An evaluation of the potential landside traffic impacts of international economic expansion in maritime container freight trade is necessary to plan an efficient and productive transportation system. The focus of this project is to contribute toward such an evaluation of the potential landside traffic impacts by developing a modeling system that can forecast the effects of port expansions, market changes, and network changes on the statewide transportation network. The modeling system consists of two main components – the modal split model and the network assignment model. Previously, in Report 0-1833-4, we discussed the conceptual framework for the modal split model, the structure for the model, and the data sources and data assembly procedures for model estimation. In this report, we present the estimation results for the modal split model, discuss the network assignment model, and describe the procedures used to integrate the modal split and network assignment within a Geographic Information System (GIS) platform. The resulting GIS-based modeling system is a flexible tool that can be used to study the impacts of economic expansions and policy implementations on statewide road and rail traffic.

The remainder of this report is organized as follows. Section 2 presents and interprets the model estimation results. Section 3 discusses the procedures adopted to embed the modal split model within a GIS interface and integrate the modal split model with network assignment. Section 4 provides step-by-step instructions for the execution of the GIS-based application. Section 5 concludes the report.

2. MODE SPLIT ESTIMATION RESULTS AND DISCUSSION

Report 0-1833-4 discusses the steps undertaken to assemble the data sets for mode split. The primary data source in data assembly is the Reebie data. At the end of the data assembly process, seven commodity-specific data sets were assembled for each of seven aggregate commodity types. The aggregate commodity types are (a) agriculture and related products, (b) hazardous materials, (c) construction materials, (d) food and related products, (e) manufacturing products, (f) machinery and equipment, and (g) mixed freight shipments. The dependent variable of analysis in each of the seven data sets is the fraction of total tonnage moved by rail between each pair of counties within Texas. The objective in the estimation stage is to determine the impact of relevant exogenous variables (such as travel impedance, distance of haul, shipment size, and county socioeconomic characteristics) on the fraction of tonnage moved by rail (as opposed to the fraction moved by road). A binary fractional split model is used for this purpose (details of the fractional split model formulation have been provided in Section 3 of the previous report and will not be repeated here).

In this report, we present the estimation results for five of the seven commodity types identified earlier. This is because two of the commodity groups (machinery and equipment, and mixed freight shipments) have a rail share of zero for 99.9% of the county-to-county commodity flows. The dominance of the road transport mode for these two commodities leads to inadequate variation in the rail fraction, which in turn makes it impossible to estimate a mode split model for these commodities.

Table 1 presents the estimation results for each of the remaining five commodity types. The constant term is negative for all commodity types, reflecting the higher road share in commodity movement. The other independent variables are categorized into three groups: the impedance variable, zonal socioeconomic characteristics, and other variables. The impedance variable is defined as the county-to-county centroidal distance and accounts for any distance-related modal bias. The zonal socioeconomic characteristics include population and geographic area of the county, total annual personal income and payroll, employee count, and number of establishments by size for origin and destination counties. The “other” variables group comprises shipment size and a dummy variable that takes a value of 1 for intracounty freight interchanges. The effect of each of the three groups of variables on the fraction of commodity flow by rail is discussed in turn in the next three sections.

2.1. Impedance

As observed in Table 1, distance does not appear to have any effect on the rail fraction of agricultural and related products and hazardous materials. However, distance has a negative effect on rail share for construction materials and manufacturing products and a positive effect for food products. The negative effect of distance on rail share for the construction material and manufacturing product categories is a little surprising, since we would expect higher rail shares for longer hauls. However, the result might be reflecting higher travel time differences between rail and road for longer distances, with time favoring truck movements for long hauls.

Table 1. Estimation results: best specification model by commodity type

Variables	Agricultural & Related Products		Hazardous Materials		Construction Materials		Food & Related Products		Manufacturing Products	
	Parameter	t-stat	Parameter	t-stat	Parameter	t-stat	Parameter	t-stat	Parameter	t-stat
Constant	-3.4033	-6.70	-5.2345	-24.69	-4.5855	-27.58	-6.6887	-10.24	-6.1582	-22.80
Impedance distance	-	-	-	-	-0.2059	-3.69	0.2947	2.89	-0.1616	-2.16
Origin socioeconomics										
Origin population	-77.9598	-5.06	4.4291	2.16	-7.3743	-2.46	-4.5946	-1.70	5.7014	1.89
Origin area	-	-	0.2851	1.98	0.5463	7.02	-0.7420	-1.23	0.5048	3.34
Origin personal income	2.3087	3.67	-0.1135	-1.38	0.1735	1.37	0.3432	2.40	-0.1520	-1.55
Origin payroll	-0.8890	-4.48	0.0471	1.10	-0.2714	-3.36	-0.1833	-2.92	-	-
Origin employee count	-106.1313	-2.48	-15.6901	-5.05	-	-	-	-	-	-
Origin # estab (1-500)	14.9046	4.14	1.1626	2.77	1.2108	2.93	-	-	-0.7482	-1.06
Origin # estab (500-1k)	25.7713	1.59	-	-	-	-	3.5599	2.31	6.0321	2.52
Origin # estab (> 1000)	21.4750	4.35	3.9868	4.32	2.2923	2.47	-	-	-3.2057	-3.42
Dest socioeconomics										
Dest population	-	-	8.0581	4.49	-	-	-5.8814	-1.56	5.2057	2.50
Dest area	-0.4809	-1.13	0.2103	2.13	-	-	0.5251	3.98	0.4174	3.75
Dest personal income	0.1870	2.11	-0.1634	-1.79	-0.1411	-2.44	-	-	-0.1715	-1.69
Dest payroll	-	-	0.0946	1.98	-	-	-0.1536	-2.30	-0.0539	-1.04
Dest employee count	-	-	-9.3254	-3.21	-16.0850	-3.82	-17.8542	-1.74	-4.8414	-1.24
Dest # estab (1-500)	-	-	-	-	1.2074	4.57	1.8093	2.00	-	-
Dest # estab (500-1000)	-	-	-	-	8.3067	3.40	12.1688	2.20	4.2836	1.53
Dest # estab (> 1000)	-1.9983	-3.11	2.0354	2.17	-	-	-	-	-	-
Other variables										
Shipment size (tons)	0.8261	10.30	0.0002	1.89	0.0031	6.10	-	-	-	-
intracounty dummy	-	-	0.7453	1.32	-	-	-	-	-	-
Log-Likelihood	-105.4595		-1024.130		-1039.385		-284.3056		-605.1219	
Restricted Log-Likelihood	-577.317		-1763.628		-1811.437		-533.2275		-1089.553	
chi-sqd.	943.7151		1478.9970		1544.1030		497.8439		968.8631	

2.2. Zonal Socioeconomics

The effect of zonal socioeconomics indicates that rail is the preferred mode when the origin and destination zones have a large number of establishments. This might be a result of better rail network infrastructure around zones with a large number of

establishments. On the other hand, truck is the preferred mode when the origin and destination zones have a large number of employees. The effect of the other zonal socioeconomic characteristics may be similarly interpreted.

2.3. Other Variables

The estimation results indicate that rail is the preferred mode for shipments of larger size and this is intuitive. However, this result applies only for agricultural products, hazardous materials, and construction materials. The intracounty dummy variable is significant only for hazardous materials. The sign on the parameter indicates that rail is the preferred mode for shipping hazardous materials within a county.

3. IMPLEMENTATION WITHIN A GEOGRAPHIC INFORMATION SYSTEM PLATFORM

3.1. Implementation Framework

The application of the mode split models discussed in the previous section is straightforward. The inputs required for application include throughput at the port by commodity type, markets served by the port and their socioeconomic characteristics, and the impedance measure between the port and each market. These inputs can correspond to the current situation or a projected future situation. The predicted mode splits can then be translated into rail and truck freight movements on the statewide transportation networks using a network assignment procedure.

The spatial nature of the application problem in the current context makes implementation within a Geographic Information System framework appealing. A GIS-based model implementation package provides the user with a realistic and easily comprehensible visualization of commodity flows on the Texas transportation networks. In our project, we use TransCAD as the application platform. TransCAD is a flexible GIS platform developed by Caliper Corporation, Inc. It has an embedded network assignment procedure, which is particularly helpful in obtaining link flows on the road and rail networks from the predicted county-to-county road and rail mode splits. Specifically, we use the all-or-nothing assignment procedure of TransCAD to load commodity flows onto the road and rail networks. The detailed sequence of operations during application is discussed in the next section. (The development of the user interface in TransCAD is

carried out by coding in the Caliper script (GISDK); the actual code for the entire application package is provided in Appendix A.)

3.2. Sequence of Operations in Application

The sequence of operations during the application of the GIS-based modeling package is presented in Figure 1. The figure describes the structure of the GIS-based platform from a user's perspective.

The procedure starts with the options of either performing a quick demonstration or going directly to the application. The demonstration provides the user with a sample application (see instructions in Section 4). The demonstration will be particularly useful for first-time users, since the application requires specific input data formats. Users familiar with the procedure can skip the demonstration and proceed directly to the implementation.

The first stage of the application process involves specification of the inputs. The program requires the following inputs: (a) the port of origin, chosen from a given list of Gulf ports, (b) the commodity types passing through the port, chosen from a given list of seven aggregate commodity types, (c) data table of markets served and commodity-specific throughputs to each of the destination markets, (d) data table with the socioeconomic characteristics of origin and destination counties, and impedance data for all origin-destination county pairs, and (e) the sensitivity of rail share to each of the input variables, which is essentially the model parameters estimated. Of these inputs, default socioeconomic characteristics, impedances, and modal split model parameters are embedded within the modeling system. However, the modeling system is capable of

accepting user-defined data for each of these. This provision makes the system spatially and temporally transferable.

The modal split model uses the input data to estimate rail and road mode shares. The results are displayed on a digitized map of Texas. The commodity-specific road and rail tonnages transported to each of the destination markets form an attribute of the destination zones, and can be viewed by clicking the market of interest. This data is also available in a database format, which forms the input to the network assignment procedure and can be exported to other applications. Following the computation of modal splits for each port to destination county interchange, network assignment is performed and the road and rail tonnages are loaded onto the shortest path between the origin port and each of the destination markets. The freight tonnage forms an attribute of the links of the road and rail networks and clicking on any specific link displays the total tonnage moved over that link.

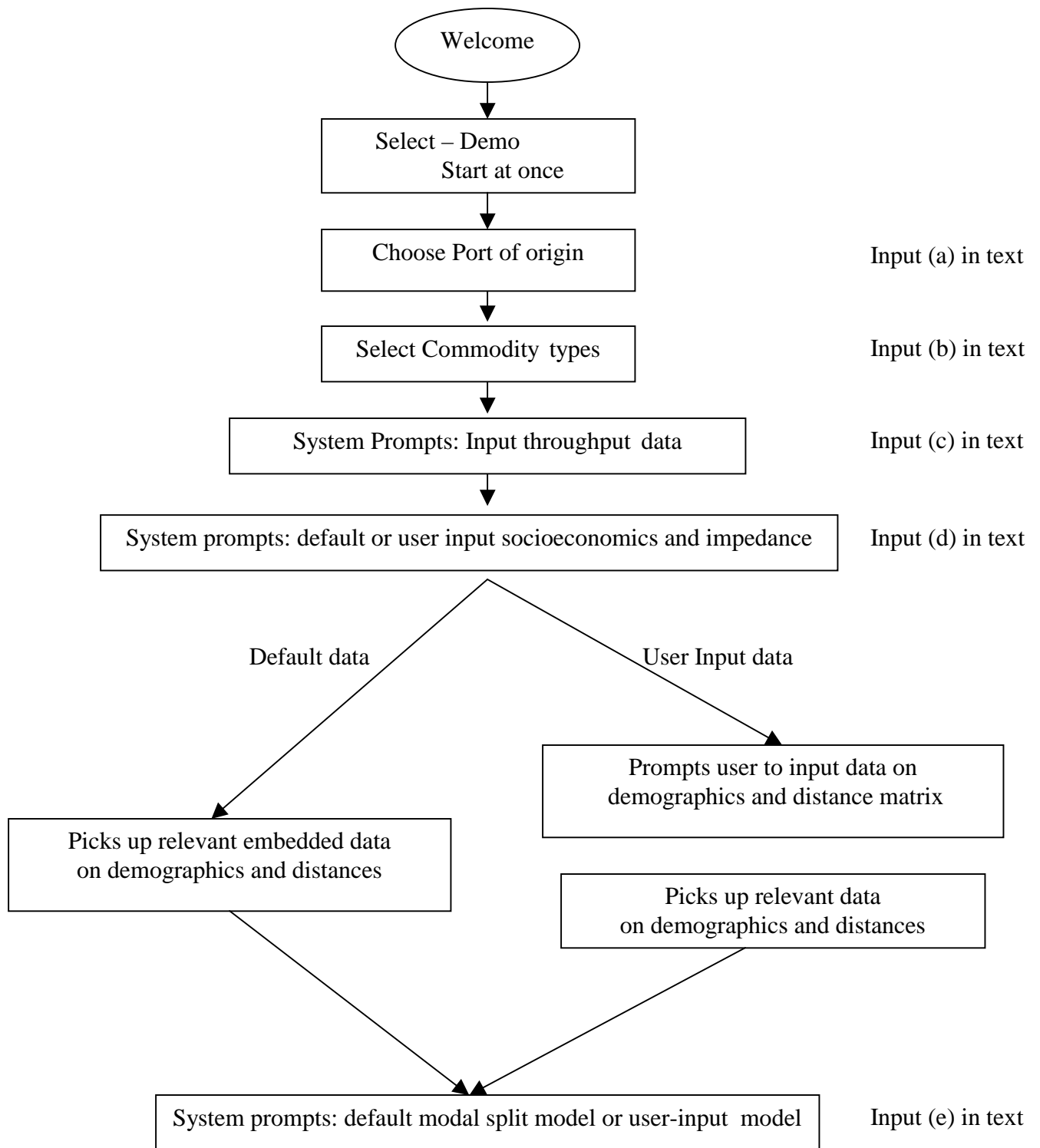


Fig. 1. Flowchart: sequence of operations

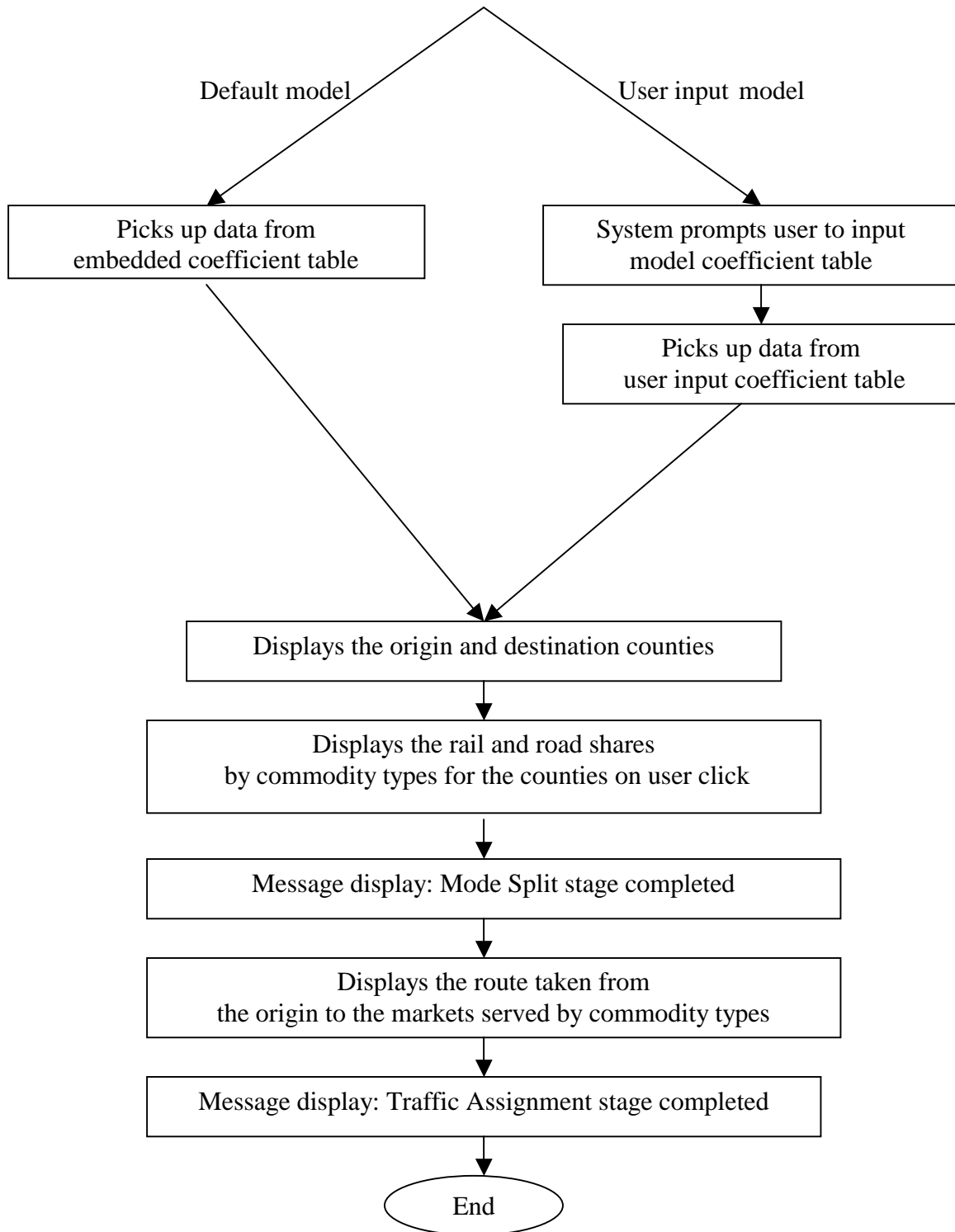


Fig. 1. Flowchart: sequence of operations, continued

4. USERS' GUIDE TO THE GEOGRAPHIC INFORMATION SYSTEM MODELING SYSTEM

This section provides the user with instructions for the execution of the Geographic Information System (GIS) based implementation package. The various system and program requirements are discussed and guidelines are provided to enable the efficient use of the application.

The inputs required by the program are summarized in Table 2. All inputs should be in dbase format and should follow the precise structure laid out in the table. Sample table structures that can be followed in the preparation of inputs are provided in Appendix B. As indicated in Table 2, some of the inputs have default data sets embedded within the system and are available to the user. This data will necessarily have to be user input only in projected, future situations or in situations other than Texas county-to-county freight flows.

Table 2. Input data tables

Input Table	Description	Comments
Throughputs and Markets served	Tonnage of throughputs by commodity type(s) to each of the markets served by the port.	Necessary input
Zonal Demographics	Various zonal demographic characteristics (relevant to the modal split model being applied) such as population, area, income, number of employees, number of establishments, etc.	Optional input, embedded data available (1996)
Impedance	Interzonal distances for every port-market interchange.	Optional input, embedded data available
Modal Split Model Parameters	Estimated coefficients (specific to commodity class) for the variables used in the modal split model, such as distance, log of distance, shipment size, etc.	Optional input, default model parameters embedded

The outputs of the modal split and traffic assignment steps are available in both a tabular form as well as in the form of a digitized display overlaid on the map of Texas. At the end of the mode split procedure, the map of Texas is displayed with the origin and the destination counties highlighted in black and blue, respectively. These zones are linked to the corresponding mode split data, allowing for a quick visual survey of the mode split with reference to the geography of the zones. Pure data tables that form the backdrop to the visual display are also created. These tables provide the commodity-specific tonnages transported by road and rail, which can be further used as inputs into the network assignment procedure.

In the traffic assignment step, the rail and road tonnages are loaded onto the Texas road and rail networks, following an all-or-nothing assignment procedure. The total freight tonnage (across all commodities) is stored as an attribute of the link that forms part of the route between each origin-destination pair. The output is displayed as route systems on the Texas road and rail networks. Selecting a link opens the attribute table corresponding to that link and displays the total tons of freight of all commodity types transported on that link. This data is also available in dbase format and can be exported to other applications.

The following step-by-step instructions will serve as a user guideline to run a sample application in the modeling system. This sample run uses the default data sets and a sample input data file provided in the system.

- a) Open TransCAD and choose *Tools – Add Ins*. Select the modeling system “TX Ports – freight flows”.

- b) From the welcome screen, which provides the user with two options — demo or start at once — select the “Demo” option.
- c) Select the origin port from the drop-down menu as “Texas City”. Click on OK.
- d) Select all the commodity types from the drop-down menu that follows.
- e) The next dialog box requires the “throughputs and markets served” input data table. A sample input table is stored within the system for demonstration purposes. From the dialog box that opens, select the input data file “Inputs.dbf”.
- f) Click on YES when the system prompts you to use the default data set for zonal sociodemographics.
- g) The program displays all the variables used in the default model and the data for the model is provided in the input table. Click on OK to continue.
- h) Click on YES when the system prompts the user to use the default model.
- i) The input stage is now complete. The system performs the modal split and the output appears on the screen as a display of the map of Texas, with the origin port shaded in black and the destination markets in blue. Click on the info tool, the “i” icon in the TransCAD toolbox, and click on any of the markets to view a table with the commodity-specific tonnages transported by road and rail from the port of Texas City. The output data for the mode split step is available in a separate database file.
- j) Click on OK when the system displays the message that the mode split stage has been completed. This prompts the system to proceed with the network assignment step.
- k) The output of the network assignment procedure is viewed on a map of Texas with the statewide road and rail networks. The routes along which the commodities are

transported between the origin and the destination counties are displayed as a route system. Click on the info tool, the “i” icon in the TransCAD toolbox, and click on any link on the network to obtain the total freight flow on the link. The link tonnages are available in road- and rail-specific database files.

- 1) When the system displays a message that the traffic assignment stage is completed, click on OK to exit the program.

5. CONCLUSION

This report presents the results for commodity-specific modal split models estimated using Reebe data. A Geographic Information System (GIS) based modeling system developed within TransCAD to implement the modal split models and to integrate the output of these models with a network assignment procedure is discussed. The resulting TransCAD-based application platform provides a flexible tool to analyze the impacts of port expansion and market changes on commodity flows on the Texas road and rail networks.

APPENDIX A

GISDK CODE

```
macro "start"
Dim a[2]
a=runDbox("Start")
if a = "No"
then
goto vee
else do
dim c[2]
c=runDbox("Select Origin Port")
end

if c[1]="Cancel"
then do
goto vee
end
else do
x=c[1]
Code_file = "d:\\Portinfo.dbf"
Code_view =OpenTable("Port","DBASE",{Code_file,})
view_c= Code_view + "|"
cx=LocateRecord(view_c, "PORT", {x},)
cval=GetRecordValues("Port", cx, {"PORT","[FIP]","NAME"})
xx=cval[2][2]
end
dim c[2]
c=runDbox("Select Commodity types")
if c[1]=0
then do
goto vee
end
else do
runmacro ("input")
end
vee:
endmacro

Dbox "Start",,50,8

init do
str="Start"
enditem

text 5,1,40,4
variable:str
align:center
button "Yes" 10,5,5
default do return ("Yes")
enditem
```

```

button "No" 33,5,7
do return ("No")
enditem
endDbox

```

```

Dbox"Select Origin Port"
init do
dim b[1]
Market = {"Aransas","Beaumont","Brownsville","Corpus
Christi","Freeport","Galveston","Harlingen","Houston","Isabel","Mansfield","Orange","Port Arthur","Port
of Lavaca/Point Comfort",
"Port of Palacios","Sabine Pass","Texas City","Victoria"}
enditem

```

```

popdown menu 5,5,20,10
editable
prompt:"Select"
list:Market
variable:b[1]
button "OK" 6,10,4 default
do return (b)
enditem
button "Cancel" 12,10,6
cancel do return({"Cancel","null"})
enditem
endDbox

```

```

Dbox"Select Commodity types"
init do
dim b[1]
Types= {"Food & RelatedProducts","Hazardous Materials","Construction Materials","Agricultural &
RelatedProducts","Manufacturing Products","Machinery & Equipment","Mixed Freight Equipment"}
enditem
Scroll List 0,0,30,6 List: Types Multiple Variables: b[1]
button "OK"6,10,4 default
do return (b[1])
enditem
button "Cancel" 12,10,6
cancel do return({0,0})
enditem
endDbox

```

```

macro"input"
on escape do
return()
end
Input_file = ChooseFile({"dBase file","*.dbf"},
{"Comma-delimited Text","*.txt;*.csv"},
{"Excel Worksheet","*.xls"}}, "Choose an input data file.")

Input_view=OpenTable("Input","DBASE",{Input_file,})
view_set =Input_view + "|"

```

```

record_count = GetRecordCount("Input",)
y=record_count
rh=LocateRecord(view_set,"O_CNTY",{ "+xx"},)
vals=GetRecordsValues(view_set, rh, {"O_CNTY", "D_CNTY",
    "Food", "Haz_mat", "Const_mat", "Agri", "Mfg", "Machinery", "MFreight"}, {" "O_CNTY",
    "null"}}, 256, "Row", null)

Code_file = "d:\\Cntycode.dbf"
Code_view =OpenTable("Code", "DBASE", {Code_file,})
view_c= Code_view + "|"
dim datain[y]
for i=1 to y
do
    cxx=LocateRecord(view_c, "CNTY_NAME", {vals[i][2],})
    cvalx=GetRecordValues("Code", cxx, {"[FIP]", "CNTY_NAME"})
    datain[i]={null,null,null}
    datain[i][1]=(cvalx[1][2])
    datain[i][2]=cvalx[2][2]
end

dim v[2]
v=runDbox("Default or New")

If v = "Yes"
then do
    Demo_file = "d:\\Demographics\\demographics.dbf"
    Demo_view=OpenTable("Demo", "DBASE", {Demo_file,})
    view_d= Demo_view + "|"
    xy=LocateRecord(view_d, "FIP", {xx},)
    vals1=GetRecordValues("Demo", xy,
{"FIP", "NAME", "[POP]", "[SQMI]", "[SQKM]", "[POP_SQKM]", "[POP_SQMI]", "[TESTAB]", "[EMP_15]
", "[EMP_67]", "[EMP_89]", "[EMPLCNT]", "[PAYROLL]", "[PERSINC]"})
    dim myabc[y]
    for i=1 to y do
        rc=LocateRecord(view_d, "FIP", {datain[i][1],})
        abc=GetRecordValues("Demo", rc,
{"[FIP]", "NAME", "[POP]", "[SQMI]", "[SQKM]", "[POP_SQKM]", "[POP_SQMI]", "[TESTAB]", "[EMP_1
5]", "[EMP_67]", "[EMP_89]", "[EMPLCNT]", "[PAYROLL]", "[PERSINC]"})
        myabc[i]={ null,null,null,null,null,null,null,null,null,null,null,null,null,null }
        myabc[i][1]=RealToString(abc[1][2])
        myabc[i][2]=abc[2][2]
        myabc[i][3]=IntToString(abc[3][2])
        myabc[i][4]=RealToString(abc[4][2])
        myabc[i][5]=RealToString(abc[5][2])
        myabc[i][6]=RealToString(abc[6][2])
        myabc[i][7]=RealToString(abc[7][2])
        myabc[i][9]=RealToString(abc[9][2])
        myabc[i][10]=RealToString(abc[10][2])
        myabc[i][11]=RealToString(abc[11][2])
        myabc[i][12]=IntToString(abc[12][2])
        myabc[i][13]=IntToString(abc[13][2])
        myabc[i][14]=RealToString(abc[14][2])
    end
end

```

```

ffip_file = "d:\Codework.dbf"
ffip_view =OpenTable("work","DATABASE",{ffip_file,})
view_f= ffip_view + "|"
dim fdain[y]
  for i=1 to y
    do
      fxx=LocateRecord(view_f, "FIP", {dain[i][1]},)/100//
      ffip=GetRecordValues("work", fxx, {"[FIP]","[FFIP]"})
      fdain[i]={null,null}
      fdain[i][1]=IntToString(ffip[1][2])
      fdain[i][2]=ffip[2][2]
    end
//190//
Dist_file ="d:\Dist\MATRIXDIST.dbf"
Dist_view=OpenTable("Dist","DATABASE",{Dist_file,})
view_dist= Dist_view + "|"
dim myscr[y]
  for i = 1 to y do
    pq=LocateRecord(view_dist, "OFIPS", {xx},)
    scr=GetRecordValues("Dist", pq, {fdain[i][2]})/110//
    myscr[i]={null,null,null}
    myscr[i][1]=(scr[1][2])
  end
Distl_file ="d:\Dist\LOGDIST.dbf"
Distl_view=OpenTable("Distl","DATABASE",{Distl_file,})
view_distl= Distl_view + "|"
dim lmyscr[y]
  for i = 1 to y do
    pq=LocateRecord(view_distl, "DFIPS", {xx},)
    lscr=GetRecordValues("Distl", pq, {fdain[i][2]})
    lmyscr[i]={null,null,null}
    lmyscr[i][1]=RealToString(lscr[1][2])
  end
end
else do

  Demo_file = ChooseFile({"dBase file","*.dbf"},
    {"Comma-delimited Text","*.txt;*.csv"},
    {"Excel Worksheet","*.xls"}}, "Choose demographic file".)
  Demo_view=OpenTable("Demo","DATABASE",{Demo_file,})
  view_d= Demo_view + "|"
  xy=LocateRecord(view_d, "FIP", {xx},)
  vals1=GetRecordValues("Demo", xy,
{"FIP","NAME","[POP]","[SQMI]","[SQKM]","[POP_SQKM]","[POP_SQMI]","[TESTAB]","[EMP_15]
","[EMP_67]","[EMP_89]","[EMPLCNT]","[PAYROLL]","[PERSINC]"}))
  dim myabc[y]
    for i=1 to y do
      rc=LocateRecord(view_d, "FIP", {dain[i][1]},)
      abc=GetRecordValues("Demo", rc,
{"[FIP]","NAME","[POP]","[SQMI]","[SQKM]","[POP_SQKM]","[POP_SQMI]","[TESTAB]","[EMP_1
5]","[EMP_67]","[EMP_89]","[EMPLCNT]","[PAYROLL]","[PERSINC]"}))

```

```

myabc[i]={ null,null,null,null,null,null,null,null,null,null,null,null,null,null }
myabc[i][1]=RealToString(abc[1][2])
myabc[i][2]=abc[2][2]
myabc[i][3]=IntToString(abc[3][2])
myabc[i][4]=RealToString(abc[4][2])
myabc[i][5]=RealToString(abc[5][2])
myabc[i][6]=RealToString(abc[6][2])
myabc[i][7]=RealToString(abc[7][2])
myabc[i][9]=RealToString(abc[9][2])
myabc[i][10]=RealToString(abc[10][2])
myabc[i][11]=RealToString(abc[11][2])
myabc[i][12]=IntToString(abc[12][2])
myabc[i][13]=IntToString(abc[13][2])
myabc[i][14]=RealToString(abc[14][2])
end
ffip_file = "d:\Codework.dbf"
ffip_view =OpenTable("work","DBASE",{ffip_file,})
view_f= ffip_view + "|"
dim fdatain[y]
for i=1 to y
do
fxx=LocateRecord(view_f, "FIP", {datain[i][1],})
ffip=GetRecordValues("work", fxx, {"[FIP]","[FFIP]"})/165//
fdatain[i]={ null,null }
fdatain[i][1]=IntToString(ffip[1][2])
fdatain[i][2]=ffip[2][2]
end

Dist_file ="d:\Dist\MATRIXDIST.dbf"
Dist_view=OpenTable("Dist","DBASE",{Dist_file,})
view_dist= Dist_view + "|"
dim myscr[y]
for i = 1 to y do
pq=LocateRecord(view_dist, "OFIPS", {xx},)
scr=GetRecordValues("Dist", pq, {fdatain[i][2]})
myscr[i]={ null,null,null }
myscr[i][1]=(scr[1][2])
end

Distl_file ="d:\Dist\LOGDIST.dbf"
Distl_view=OpenTable("Distl","DBASE",{Distl_file,})
view_distl= Distl_view + "|"
dim lmyscr[y]
for i = 1 to y do
pq=LocateRecord(view_distl, "DFIPS", {xx},)
lscr=GetRecordValues("Distl", pq, {fdatain[i][2]})

lmyscr[i]={ null,null,null }
lmyscr[i][1]=RealToString(lscr[1][2])
//Showmessage(lmyscr[i][1])//
end
end

```

```

dim b[2]
b=runDbox("Default or User input model")
if b="Yes"
then do
    Coeff_file = "d:\\Coefficients\\Coefficient.dbf"
    Coeff_view=OpenTable("Coeff","DBASE",{Coeff_file,})
    view_co= Coeff_view + "|"
end
else do
    Coeff_file = ChooseFile({{"dBase file","*.dbf"},
        {"Comma-delimited Text","*.txt;*.csv"},
        {"Excel Worksheet","*.xls"}}, "Choose coeff file.")
    Coeff_view=OpenTable("Coeff","DBASE",{Coeff_file,})
    view_co= Coeff_view + "|"
end
reco = GetFirstRecord(view_co, {"Constant", "null"})//296//
hi=GetRecordsValues(view_co, null,
{"Constant","Distance","Log_Dist","Totalton","O_pop","D_pop","O_sqmi","D_sqmi","O_inc","D_inc","O
_empcnt","D_empcnt","O_pay","D_pay","O_emp499","D_emp499","O_emp999","D_emp999","O_emp1k
","D_emp1k"},null,y,,)

//Assume 10 tons equals 1 truck load, and 120 tons equals 1 railcar load//

trucks=10
rail=120

dim util[y]
table_view=CreateTable("First","d:\\Trips\\Food & Related Products.dbf","DBASE",
{"ID","Integer",8,null,"No"},{"RailCars","Integer",8,null,"No"},{"TruckTrips","Integer",8,null,"No"})
str=GetTableStructure(table_view)
dim Ton_Rd[y]
dim probrd[y]
dim Ton_Rl[y]
dim Trips_Rd[y]
dim Trips_Rl[y]

for i= 1 to y do
if vals[i][3]<>0
then do

util[i]=hi[1][1]+hi[2][1]*(myscr[i][1])/100+hi[3][1]*(Stringtoreal(lmyscr[i][1]))+(hi[4][1]*vals[i][3])/1000
+
hi[5][1]*(vals1[3][2])/1000000+hi[6][1]*(StringToint(myabc[i][3]))/1000000+hi[7][1]*(vals1[4][2])/1000
+hi[8][1]*(stringtoreal(myabc[i][4]))/1000+
hi[9][1]*(vals1[14][2])/1000000+hi[10][1]*(Stringtoreal(myabc[i][14]))/1000000+hi[11][1]*(vals1[12][2])
/1000000+hi[12][1]*(stringtoint(myabc[i][12]))/1000000+
hi[13][1]*(vals1[13][2])/1000000+hi[14][1]*(stringtoint(myabc[i][13]))/1000000+hi[15][1]*(vals1[9][2])/
10000+hi[16][1]*(stringtoreal(myabc[i][9]))/10000+
hi[17][1]*(vals1[10][2])/1000+hi[18][1]*(stringtoreal(myabc[i][10]))/1000+hi[19][1]*(vals1[11][2])/100+
hi[20][1]*(stringtoreal(myabc[i][11]))/100

    probrd[i]= 1/(1+exp(util[i]))

```



```

Ton_RI[i]=(1-probrd[i])*vals[i][3]
Ton_Rd[i]=(probrd[i])*vals[i][3]
Trips_Rd[i]=R2I(Ton_Rd[i]/trucks)+1//because it rounds of to the lower integer level//
Trips_RI[i]=R2I(Ton_RI[i]/rail)+1
end
else do
//Ton_RI[i]=0.0000
//Ton_Rd[i]=0.0000
Trips_Rd[i]=0
Trips_RI[i]=0
end
rh=AddRecord(table_view,{{"ID",datain[i][1]},{ "RailCars",Trips_RI[i]},{ "TruckTrips",Trips_Rd[i] }})
end

dim util[y]
table_view=CreateTable("Second","d:\\Trips\\Hazardous Materials.dbf","DATABASE",
{{"ID","Integer",8,null,"No"},{"RailCars","Integer",8,null,"No"},{"TruckTrips","Integer",8,null,"No"}})
str=GetTableStructure(table_view)
dim Ton_Rd[y]
dim probrd[y]
dim Ton_RI[y]
dim Trips_Rd[y]
dim Trips_RI[y]

for i=1 to y
do
if vals[i][4]<>0
then do
util[i]
=hi[1][2]+hi[2][2]*(myscr[i][1])/100+hi[3][2]*(Stringtoreal(lmyscr[i][1]))+(hi[4][2]*vals[i][4])/1000+
hi[5][2]*(vals1[3][2])/1000000+hi[6][2]*(StringToint(myabc[i][3]))/1000000+hi[7][2]*(vals1[4][2])/1000
+hi[8][2]*(stringtoreal(myabc[i][4]))/1000+
hi[9][2]*(vals1[14][2])/1000000+hi[10][2]*(Stringtoreal(myabc[i][14]))/1000000+hi[11][2]*(vals1[12][2])/
/1000000+hi[12][2]*(stringtoint(myabc[i][12]))/1000000+
hi[13][2]*(vals1[13][2])/1000000+hi[14][2]*(stringtoint(myabc[i][13]))/1000000+hi[15][2]*(vals1[9][2])/
10000+hi[16][2]*(stringtoreal(myabc[i][9]))/10000+
hi[17][2]*(vals1[10][2])/1000+hi[18][2]*(stringtoreal(myabc[i][10]))/1000+hi[19][2]*(vals1[11][2])/100+
hi[20][2]*(stringtoreal(myabc[i][11]))/100
probrd[i]= 1/(1+exp(util[i]))//145//
Ton_RI[i]=(1-probrd[i])*vals[i][4]
Ton_Rd[i]=(probrd[i])*vals[i][4]
Trips_Rd[i]=R2I(Ton_Rd[i]/trucks)+1
Trips_RI[i]=R2I(Ton_RI[i]/rail)+1
end
else do
//Ton_RI[i]=0.0000
//Ton_Rd[i]=0.0000
Trips_Rd[i]=0
Trips_RI[i]=0
end
rh=AddRecord(table_view,{{"ID",datain[i][1]},{ "RailCars",Trips_RI[i]},{ "TruckTrips",Trips_Rd[i] }})
end

```

```

dim util[y]
table_view=CreateTable("Third","d:\\Trips\\Construction Materials.dbf","DBASE",
{{"ID","Integer",8,null,"No"},{"RailCars","Integer",8,null,"No"},{"TruckTrips","Integer",8,null,"No"}})
str=GetTableStructure(table_view)
dim Ton_Rd[y]
dim probrd[y]
dim Ton_Rl[y]
dim Trips_Rd[y]
dim Trips_Rl[y]
for i=1 to y
do
  if vals[i][5]<>0
  then do
    util[i]
    =hi[1][3]+hi[2][3]*(myscr[i][1])/100+hi[3][3]*(Stringtoreal(lmyscr[i][1]))+(hi[4][3]*(vals[i][5])/1000+
    hi[5][3]*(vals1[3][2])/1000000+hi[6][3]*(StringToint(myabc[i][3]))/1000000+hi[7][3]*(vals1[4][2])/1000
    +hi[8][3]*(stringtoreal(myabc[i][4]))/1000+
    hi[9][3]*(vals1[14][2])/1000000+hi[10][3]*(Stringtoreal(myabc[i][14]))/1000000+hi[11][3]*(vals1[12][2])
    /1000000+hi[12][3]*(stringtoint(myabc[i][12]))/1000000+
    hi[13][3]*(vals1[13][2])/1000000+hi[14][3]*(stringtoint(myabc[i][13]))/1000000+hi[15][3]*(vals1[9][2])/
    10000+hi[16][3]*(stringtoreal(myabc[i][9]))/10000+
    hi[17][3]*(vals1[10][2])/1000+hi[18][3]*(stringtoreal(myabc[i][10]))/1000+hi[19][3]*(vals1[11][2])/100+
    hi[20][3]*(stringtoreal(myabc[i][11]))/100
    probrd[i]= 1/(1+exp(util[i]))
    Ton_Rl[i]=(1-probrd[i])*vals[i][5]
    Ton_Rd[i]=(probrd[i])*vals[i][5]
    Trips_Rd[i]=R2I(Ton_Rd[i]/trucks)+1
    Trips_Rl[i]=R2I(Ton_Rl[i]/rail)+1
  end
  else do
    //Ton_Rl[i]=0.0000
    //Ton_Rd[i]=0.0000
    Trips_Rd[i]=0
    Trips_Rl[i]=0
  end
  rh=AddRecord(table_view,{{"ID",datain[i][1]},{"RailCars",Trips_Rl[i]},{"TruckTrips",Trips_Rd[i]}})
end

dim util[y]
table_view=CreateTable("Fourth","d:\\Trips\\Agricultural & Related
Products.dbf","DBASE",{{"ID","Integer",8,null,"No"},{"RailCars","Integer",8,null,"No"},{"TruckTrips","
Integer",8,null,"No"}})
str=GetTableStructure(table_view)//401//
dim Ton_Rd[y]
dim probrd[y]
dim Ton_Rl[y]
dim Trips_Rd[y]
dim Trips_Rl[y]
for i=1 to y
do

  if vals[i][6]<>0

```

```

then do
  util[i]
=hi[1][4]+hi[2][4]*(myscr[i][1])/100+hi[3][4]*(Stringtoreal(lmyscr[i][1]))+(hi[4][4]*(vals[i][6])/1000+
hi[5][4]*(vals1[3][2])/1000000+hi[6][4]*(StringToint(myabc[i][3]))/1000000+hi[7][4]*(vals1[4][2])/1000
+hi[8][4]*(stringtoreal(myabc[i][4]))/1000+
hi[9][4]*(vals1[14][2])/1000000+hi[10][4]*(Stringtoreal(myabc[i][14]))/1000000+hi[11][4]*(vals1[12][2])
/1000000+hi[12][4]*(stringtoint(myabc[i][12]))/1000000+
hi[13][4]*(vals1[13][2])/1000000+hi[14][4]*(stringtoint(myabc[i][13]))/1000000+hi[15][4]*(vals1[9][2])/
10000+hi[16][4]*(stringtoreal(myabc[i][9]))/10000+
hi[17][4]*(vals1[10][2])/1000+hi[18][4]*(stringtoreal(myabc[i][10]))/1000+hi[19][4]*(vals1[11][2])/100+
hi[20][4]*(stringtoreal(myabc[i][11]))/100
  probrd[i]= 1/(1+exp(util[i]))
  Ton_Rl[i]=(1-probrd[i])*vals[i][6]
  Ton_Rd[i]=(probrd[i])*vals[i][6]
  Trips_Rd[i]=R2I(Ton_Rd[i]/trucks)+1
  Trips_Rl[i]=R2I(Ton_Rl[i]/rail)+1
end
else do
  //Ton_Rl[i]=0.0000
  //Ton_Rd[i]=0.0000
  Trips_Rd[i]=0
  Trips_Rl[i]=0
end
rh=AddRecord(table_view,{{ "ID",datain[i][1]},{ "RailCars",Trips_Rl[i]},{ "TruckTrips",Trips_Rd[i]}})
end

dim util[y]
table_view=CreateTable("Fifth","d:\\Trips\\Manufacturing
Products.dbf","DATABASE",{ "ID","Integer",8,null,"No" },{ "RailCars","Integer",8,null,"No" },{ "TruckTrips",
Integer",8,null,"No" } })
str=GetTableStructure(table_view)
dim Ton_Rd[y]
dim probrd[y]
dim Ton_Rl[y]
dim Trips_Rd[y]
dim Trips_Rl[y]

for i=1 to y
do
  if vals[i][7]<>0
  then do
    util[i]
=hi[1][5]+hi[2][5]*(myscr[i][1])/100+hi[3][5]*(Stringtoreal(lmyscr[i][1]))+(hi[4][5]*(vals[i][7])/1000+
hi[5][5]*(vals1[3][2])/1000000+hi[6][5]*(StringToint(myabc[i][3]))/1000000+hi[7][5]*(vals1[4][2])/1000
+hi[8][5]*(stringtoreal(myabc[i][4]))/1000+
hi[9][5]*(vals1[14][2])/1000000+hi[10][5]*(Stringtoreal(myabc[i][14]))/1000000+hi[11][5]*(vals1[12][2])
/1000000+hi[12][5]*(stringtoint(myabc[i][12]))/1000000+
hi[13][5]*(vals1[13][2])/1000000+hi[14][5]*(stringtoint(myabc[i][13]))/1000000+hi[15][5]*(vals1[9][2])/
10000+hi[16][5]*(stringtoreal(myabc[i][9]))/10000+
hi[17][5]*(vals1[10][2])/1000+hi[18][5]*(stringtoreal(myabc[i][10]))/1000+hi[19][5]*(vals1[11][2])/100+
hi[20][5]*(stringtoreal(myabc[i][11]))/100
    probrd[i]= 1/(1+exp(util[i]))/438//
    Ton_Rl[i]=(1-probrd[i])*vals[i][7]

```

```

    Ton_Rd[i]=(probrd[i])*vals[i][7]
    Trips_Rd[i]=R2I(Ton_Rd[i]/trucks)+1
    Trips_Rl[i]=R2I(Ton_Rl[i]/rail)+1
end
else do
//Ton_Rl[i]=0.0000
//Ton_Rd[i]=0.0000
    Trips_Rd[i]=0
    Trips_Rl[i]=0
end
rh=AddRecord(table_view,{{"ID",datain[i][1]},{"RailCars",Trips_Rl[i]},{"TruckTrips",Trips_Rd[i]}})
end

dim util[y]
table_view=CreateTable("Sixth","d:\\Trips\\Machinery &
Equipment.dbf","DATABASE",{{"ID","Integer",8,null,"No"},{"RailCars","Integer",8,null,"No"},{"TruckTrips
","Integer",8,null,"No"}})
str=GetTableStructure(table_view)
dim Ton_Rd[y]
dim probrl[y]
dim Ton_Rl[y]
dim Trips_Rd[y]
dim Trips_Rl[y]
for i=1 to y
do
if vals[i][8]<>0
then do
    probrl[i]= 1.0000
    Ton_Rl[i]=1.0000*vals[i][8]
    Ton_Rd[i]=0.0000
    Trips_Rd[i]=R2I(Ton_Rd[i]/trucks)
    Trips_Rl[i]=R2I(Ton_Rl[i]/rail)+1
end
else do
//Ton_Rl[i]=0.0000
//Ton_Rd[i]=0.0000
    Trips_Rd[i]=0
    Trips_Rl[i]=0
end
rh=AddRecord(table_view,{{"ID",datain[i][1]},{"RailCars",Trips_Rl[i]},{"TruckTrips",Trips_Rd[i]}})
end

dim util[y]
table_view=CreateTable("Seventh","d:\\Trips\\Mixed Freight
Shipments.dbf","DATABASE",{{"ID","Integer",8,null,"No"},{"RailCars","Integer",8,null,"No"},{"TruckTrips"
,"Integer",8,null,"No"}})
str=GetTableStructure(table_view)
dim Ton_Rd[y]
dim probrl[y]
dim Ton_Rl[y]
dim Trips_Rd[y]
dim Trips_Rl[y]
for i=1 to y

```

```

do
  if vals[i][9]<>0
    then do
      probrl[i]= 1.0000
      Ton_Rl[i]=1.0000*vals[i][9]
      Ton_Rd[i]=0.0000
      Trips_Rd[i]=R2I(Ton_Rd[i]/trucks)
      Trips_Rl[i]=R2I(Ton_Rl[i]/rail)+1
    end
  else do
    //Ton_Rl[i]=0.0000
    //Ton_Rd[i]=0.0000
    Trips_Rd[i]=0
    Trips_Rl[i]=0
  end
  rh=AddRecord(table_view,{{"ID",datain[i][1]},{"RailCars",Trips_Rl[i]},{"TruckTrips",Trips_Rd[i]}})
end

table_view=CreateTable("Mark","d:\\Trips\\Markets.dbf","DBASE",{{"ID","Integer",8,null,"No"},{"Origin","String",16,null,"Yes"},{"Market","String",12,null,"Yes"}})
str=GetTableStructure(table_view)
for i=1 to y do
  rh=AddRecord(table_view,{{"ID",datain[i][1]},{"Origin",vals[i][1]},{"Market",vals[i][2]}})
end

//new starts//
food_file="d:\\Trips\\Food & Related Products.dbf"
food_view=OpenTable("First","DBASE",{food_file,})
view_f=food_view+"|"
dim a[y]
dim b[y]
dim c[y]
for i=1 to y do
a=LocateRecord(view_f,"ID",{datain[i][1],})
b=GetRecordValues("First",a,{"[RailCars]","[TruckTrips]"})
c[i]={null,null}
c[i][1]=b[1][2]
c[i][2]=b[2][2]
end

haz_file="d:\\Trips\\Hazardous Materials.dbf"
haz_view=OpenTable("Second","DBASE",{haz_file,})
view_h=haz_view+"|"
dim d[y]
dim e[y]
dim f[y]
for i=1 to y do
d=LocateRecord(view_h,"ID",{datain[i][1],})
e=GetRecordValues("Second",d,{"[RailCars]","[TruckTrips]"})
f[i]={null,null}
f[i][1]=e[1][2]
f[i][2]=e[2][2]
end

```

```

const_file="d:\\Trips\\Construction Materials.dbf"
const_view=OpenTable("Third","DATABASE",{const_file,})
view_c=const_view+"|"
dim g[y]
dim h[y]
dim j[y]
for i=1 to y do
g=LocateRecord(view_c,"ID",{datain[i][1],})
h=GetRecordValues("Third",g,{"[RailCars]","[TruckTrips]"})
j[i]={null,null}
j[i][1]=h[1][2]
j[i][2]=h[2][2]
end

agri_file="d:\\Trips\\Agricultural & Related Products.dbf"
agri_view=OpenTable("Fourth","DATABASE",{agri_file,})
view_a=agri_view+"|"
dim k[y]
dim l[y]
dim m[y]
for i=1 to y do
k=LocateRecord(view_a,"ID",{datain[i][1],})
l=GetRecordValues("Fourth",k,{"[RailCars]","[TruckTrips]"})
m[i]={null,null}
m[i][1]=l[1][2]
m[i][2]=l[2][2]
end

mfg_file="d:\\Trips\\Manufacturing Products.dbf"
mfg_view=OpenTable("Fifth","DATABASE",{mfg_file,})
view_mfg=mfg_view+"|"
dim n[y]
dim o[y]
dim p[y]
for i=1 to y do
n=LocateRecord(view_mfg,"ID",{datain[i][1],})
o=GetRecordValues("Fifth",n,{"[RailCars]","[TruckTrips]"})
p[i]={null,null}
p[i][1]=o[1][2]
p[i][2]=o[2][2]
end

mach_file="d:\\Trips\\Machinery & Equipment.dbf"
mach_view=OpenTable("Sixth","DATABASE",{mach_file,})
view_mach=mach_view+"|"
dim q[y]
dim r[y]
dim s[y]
for i=1 to y do
q=LocateRecord(view_mach,"ID",{datain[i][1],})
r=GetRecordValues("Sixth",q,{"[RailCars]","[TruckTrips]"})
s[i]={null,null}

```

```

s[i][1]=r[1][2]
s[i][2]=r[2][2]
end

mix_file="d:\\Trips\\Mixed Freight Shipments.dbf"
mix_view=OpenTable("Seventh","DATABASE",{mix_file,})
view_mix=mix_view+"|"
dim t[y]
dim u[y]
dim v[y]
for i=1 to y do
t=LocateRecord(view_mach,"ID",{datain[i][1],})
u=GetRecordValues("Seventh",t,{"RailCars"},"TruckTrips"})
v[i]={null,null}
v[i][1]=u[1][2]
v[i][2]=u[2][2]
end

new_table=CreateTable("New","d:\\Trips\\Total","DATABASE",{{"RouteID","Integer",8,null,"No"},{"ID","Integer",8,null,"No"},{"RailCars","Integer",8,null,"No"},{"TruckTrips","Integer",8,null,"No"}})
str=GetTableStructure(new_table)
dim new[y]
for i=1 to y
do
new[i]={null,null}
new[i][1]=c[i][1]+f[i][1]+j[i][1]+m[i][1]+p[i][1]+s[i][1]+v[i][1]
new[i][2]=c[i][2]+f[i][2]+j[i][2]+m[i][2]+p[i][2]+s[i][2]+v[i][2]

add=AddRecord(new_table,{{"RouteID",i},{"ID",datain[i][1]},{"RailCars",new[i][1]},{"TruckTrips",new[i][2]}})
end

RunMacro("G30 File Close All")
CopyDatabase("d:\\Texas Counties_fips","d:\\Trips\\geo.dbd")
mp1=OpenMap("d:\\texascntys.map", {
    {"Menu", "My System Menu"},
    {"Toolbar", "My own custom toolbar"},
    {"Auto Project", "True"}})
Setlayer("Texas Counties")

a=Getmap()
mp2 = CreateMap("Texas", {
    {"Scope", GetLayerScope("Texas Counties") },
    {"Menu", "My System Menu"},
    {"Toolbar", "My own custom toolbar"},
    {"Auto Project", "True"}
})
//Closemap(a)

geo_file = "d:\\Trips\\geo.dbd"
lyrs = GetDBLayers(geo_file)
new_lyr = AddLayer("Texas", "Counties", geo_file, lyrs[1])

```

```

Savemap("Texas","d:\\Trips\\new.map")
closemap()

mp1=OpenMap("d:\\Trips\\new.map", {
    {"Menu", "My System Menu"},
    {"Toolbar", "My own custom toolbar"},
    {"Auto Project", "True"}})
Setlayer("Counties")

Code_file = "d:\\Portinfo.dbf"
Code_view =OpenTable("Code","DBASE",{Code_file,})
view_c= Code_view + "|"
cab=LocateRecord(view_c, "Port", {vals[1][1]},)
cabl=GetRecordValues("Code", cab, {"Port","[FIP]","NAME"})

SelectByIDs("Origin","More", {cabl[2][2]})
for i=1 to y do
SelectByIDs("Destinations","More",{datain[i][1]})
end
SetDisplayStatus("Origin", "Active")
SetDisplayStatus("Destinations", "Active")
SetFillColor("Origin", ColorRGB(0, 0, 0))
SetFillColor("Destinations", ColorRGB(0, 0, 65535))
redrawmap()
Open = OpenTable("New", "DBASE", {"d:\\Trips\\Total.dbf",})
info = GetViewTableInfo("New")
//showarray(info)
JoinTableToLayer("d:\\Trips\\geo.dbf","Texas Counties", "DBASE","D:\\Trips\\Total.dbf" ,, "ID",)
SaveMap("d:\\Trips\\modesplit.map")
b=Getmap()
//Showmessage(b)
closemap(b)

CopyDatabase("d:\\Modified Texas Roads","d:\\Trips\\highways.dbf")

mp1=OpenMap("d:\\newmap.map", {
    {"Menu", "My System Menu"},
    {"Toolbar", "My own custom toolbar"},
    {"Auto Project", "True"}})
c=Getmap()
//Showmessage(b)

mp2 = CreateMap("Texasroads", {
    {"Scope", GetLayerScope("NA Highway") },
    {"Menu", "My System Menu"},
    {"Toolbar", "My own custom toolbar"},
    {"Auto Project", "True"}
})
geo_file = "d:\\Trips\\highways.dbf"
lyrs = GetDBLayers(geo_file)
//Showarray(lyrs)
new_lyra= AddLayer("Texasroads", "Xsection", geo_file, lyrs[1])

```



```

new_lyra = AddLayer("Texasroads", "Highway",geo_file, lyrs[2])
//Showmessage(new_lyra)
//Showmessage(new_lyrb)
Savemap("d:\\Trips\\roads.map")

info = CreateRouteSystem("d:\\Trips\\goodroute",
"d:\\Trips\\highways.dbd", "NA Highway",{ "Binary Tables","True"},{"Label","Routes"},{"Links
Table","Complete",,},{ "Name","CreatedRoutes"},{"Routes Table","False"},{"Operator", "S", 30, 0,
"False"}},{ "Stops","Stops",})
layer_name = info[1]
path = info[2]
//Showmessage("next is layer name")
//Showmessage(layer_name)
//Showmessage(path)
//Showmessage("routesystem created")
//on escape default
actual_lyr_name = AddRouteSystemLayer("Texasroads", "abcd", "d:\\Trips\\goodroute.rts",)
//Showmessage("added")
net_handle = ReadNetwork("d:\\roadnetwork")
n_nodes = NetworkNodes(net_handle)
n_links = NetworkLinks(net_handle)
//Showmessage("done")
Setlayer("NA Highway Xsection")
//Showmessage("Layer Set")
id_file="d:\\xsection.dbf"
id_view=OpenTable("xid","DBASE",{id_file,})
view_id=id_view+"|"
abc=LocateRecord(view_id,"ID",{cabl[2][2],})
def=GetRecordValues("xid",abc,{"[ID]","[XID]"}))
SelectByIDs("Origin","More",{def[2][2]})
for i=1 to y do
xy=LocateRecord(view_id,"ID",{datain[i][1],})
yz=GetRecordValues("xid",xy,{"[ID]","[XID]"}))
SelectByIDs("Destinations","More",{yz[2][2]})
end
//Showmessage("selected")

//setDisplayStatus("Origin","Active")
//setDisplayStatus("Destinations","Active")
//showmessage("displayset")
//SetFillColor("Origin", ColorRGB(0, 0, 65535))
//SetFillColor("Destinations", ColorRGB(0, 0, 0))

pqr=AddShortestPathRoutes(net_handle, "abcd", "NA Highway Xsection|Origin", "NA Highway
Xsection|Destinations", , , {"Node ID","NA Highway Xsection.ID"},{,})

new_table=CreateTable("Links","d:\\Trips\\Links","DBASE",{ "RouteID","Integer",8,null,"No"},{"LinkI
D","Integer",8,null,"No"},{"TruckTrips","Integer",8,null,"No"})
str=GetTableStructure(new_table)
dim names[y]
dim ids[y]
dim c[y]
dim abc[y]

```

```

dim b[y]
for i=1 to y do
  names = GetRouteNames("abcd")
  // Showmessage(names[i])
  ids = GetRouteIDs("abcd", {names[i]})
  c[i]=ids[1]
  //Showmessage(I2S(c[i]))
  a = GetRouteLinks("abcd", names[i])
  abc= ArrayLength(a)
  b[i]=abc
  x=b[i]
  //ShowMessage(I2S(x))
  a = GetRouteLinks("abcd", names[i])
  // ShowArray(a)
  for k=1 to x do
    //Showmessage(I2S(a[k][1]))
    add=AddRecord(new_table,{{ "RouteID",c[i]},{ "LinkID",a[k][1]},{ "TruckTrips",new[i][2]}})
  end
end

first_file ="d:\\Trips\\Links.dbf"
first_view=OpenTable("Links","DBASE",{first_file,})
view_first= first_view + "|"
rslt = AggregateTable("See","Links","DBASE","d:\\Trips\\See","LinkID",{ "TruckTrips","sum", },
  {"TruckTrips","min", },
  {"TruckTrips","max", },
  {"TruckTrips","average",})
  ,null)
//Showmessage("Firststepfine")
view1= OpenTable("See", "DBASE", {"d:\\Trips\\See.dbf",})
num=Getrecordcount("See",null)
//
//ShowMessage(I2S(num))
z=num
view_info = GetViews()
//Showarray(view_info)
view=view1 + "|"
rh = GetFirstRecord(view,{{ "LinkID","null" }})
values = GetRecordsValues(view,null,{{ "[LinkID]","[TruckTrips]"},null,z,,)
//Showarray(values)
//Showmessage(I2S(values[1][2]))
//Showmessage(R2S(values[2][2]))
//for i=1 to 10 do
//Showmessage(I2S(values[1][i]))
//Showmessage(R2S(values[2][i]))
//end
latest_table=CreateTable("Sum_1","d:\\Sum_1","DBASE",{ "LinkID","Integer",8,null,"No" },{"TruckTrips",
"Integer",8,null,"No" })
for i=1 to z do
  add_rec=AddRecord(latest_table,{{ "LinkID",values[1][i]},{ "Trucktrips",values[2][i]}})
end

Open = OpenTable("Sum_1", "DBASE", {"d:\\Sum_1.dbf",})

```

```

info_array = GetViewTableInfo("Sum_1")

JoinTableToLayer("d:\\Trips\\highways.dbd", "NA Highway", "DBASE", "d:\\Sum_1.dbf" ,, "LinkID",)
SetLayer("Highway")
SaveMap( "d:\\Trips\\Path.map")
Showmessage("Close")
maps = GetMapNames()
for i = 1 to maps.length do
    CloseMap(maps[i])
end
Endmacro

Dbox"Default or New" ,,50,8
init do
str="Do you want to use default demographic dataset?"
enditem

text 5,1,40,4
variable:str
align:center
button "Yes" 10,5,5
default do return ("Yes")
enditem

button "No" 33,5,7
do return ("No")
enditem
endDbox

Dbox"Default or User input model" ,,50,8
init do
ShowMessage("The default model has the following variables -
Distance,Logdistance,Tonnage,OriginPopulation,DestinationPopulation,OriginIncome,DestinationIncome,
OriginPayroll,DestinationPayroll")
str="Do you want to use the default modal split model?"
enditem
text 5,1,40,4
variable:str
align:center
button "Yes" 10,5,5
default do return ("Yes")
enditem
button "No" 33,5,7
do return ("No")
enditem
endDbox

Dbox "Exit" ,,50,8
Toolbox
init do
Showmessage("Exit")
enditem
endDbox

```


APPENDIX B

SAMPLE INPUT DATA TABLES

Table 3. Throughputs and markets served

Origin port	Dest county	Food	Hazardous Materials	Construction Materials	Agriculture & Related Products	Manufacturing Products	Machinery & Equipment	Mixed Freight Shipments
FREEPORT	BEE TX	12	12	10	12	32	0	43
FREEPORT	WOOD TX	34	77	20	34	43	0	0

Table 4. Zonal socioeconomics

FIPS	Name	pop	sqmi	pop_sqmi	testab	emp_15	emp_67	emp_89	emplcnt	payroll	persinc
48025	Bee TX	25135	880.2	28.60	1394	1379	15	0	11930	199561	284952
48023	Baylor TX	4385	870.8	5.00	395	389	3	3	3985	37974	69740

Table 5. Impedance data table

Origin county	Dest county	Distance	Log Distance
48001	48001	14.4	1.16
48001	48003	80.6	1.91
48001	48005	343.7	2.54

Table 6. Modal split model parameters

Comm	Const	Dist	Log Dist	Total ton	Origin pop	Dest pop	Origin sqmi	Dest sqmi	Origin Inc	Dest Inc	Origin Empl Count	Dest Empl Count	Origin pay	Dest Pay	Origin Emp 499	Dest Emp 499	Origin Emp 999	Origin Emp 1k	Dest Emp 1k
Food	-6.69	0.23	0	0	-4.60	-4.89	-0.74	0.52	0.34	0	0	-15.63	-0.15	-0.12	0	1.63	3.6	0	0
Agri	-2.87	0	0	0.83	-77.98	0	0	-0.48	2.3	0.18	-1	0	-0.93	-0.21	12.31	0	23.34	21	-2