TRANSIMS Version 4.0.06 Documentation Guide

This guide provides basic information on the documentation materials available as part of the TRANSIMS Version4 software. The Version4 documentation set includes a variety of different manuals, reference documents, training materials, and sample test case data. This guide outlines the organization of these documentation materials and provides a limited description so users can focus on the documentation resources which will best suit their needs when learning, testing, and applying the suite of TRANSIMS utilities.

Revision History

5/20/2010 Created by RSG, Inc.

Table of Contents

1.0 User Manuals

The TRANSIMS Version4 Software documentation set includes 12 "User Manuals" released to the user's community as Adobe PDF documents. The filenames of the User Manuals are listed below.

ActGen v4.0.pdf	IntControl v4.0.pdf	PopSyn v4.0.pdf
ArcNet v4.0.pdf	Microsimulator Output Files v4.0.pdf	Router v4.0.pdf
ArcPlan v4.0.pdf	Microsimulator v4.0.pdf	TransimsNet v4.0.pdf
ConvertTrips v4.0.pdf	Network Data Tables v4.0.pdf	UserPrograms v4.0.pdf

The User Manuals provide information on some of the principal utilities that comprise the TRANSIMS toolbox, specifically the **ActGen**, **ArcNet**, **ArcPlan**, **ConvertTrips**, **IntControl**, **Microsimulator**, **PopSyn**, **Router**, and **TransimsNet** functions. The purpose and functionality of the utility is described as well as a sample control file for the utility. In addition, each control key is documented with a sentence or two describing the control key. Finally, algorithm notes conclude the manual to give the reader a sense of how the utility works and the processes and calculations being performed. The User Manuals provide the most detailed documentation on these nine important and frequently used utilities.

2.0 Quick Reference Manuals

The TRANSIMS Version4 Software documentation set includes 45 "Quick Reference Manuals" released to the user's community as Adobe PDF documents and a single searchable compiled HTML format (Quick_Reference_Guides.chm). The filenames of the Quick Reference Manuals (pdf) are listed in the table below.

ActGen QR.pdf	ArcSnapshot QR.pdf	LinkSum QR.pdf	PlanSum QR.pdf	Sf3Prep QR.pdf
ActivityPattern QR.pdf	ConvertTrips QR.pdf	LocationChoice QR.pdf	PlanTrips QR.pdf	SubareaNet QR.pdf
AdjustPlans QR.pdf	Emissions QR.pdf	LocationData QR.pdf	PopSyn QR.pdf	SubareaPlans QR.pdf
ArcDelay QR.pdf	EnhanceNet QR.pdf	Microsimulator QR.pdf	ProblemSelect QR.pdf	TransimsNet QR.pdf
ArcDiff QR.pdf	EventSum QR.pdf	ModeChoice QR.pdf	Progression QR.pdf	TransitNet QR.pdf
ArcNet QR.pdf	GISNet QR.pdf	NewFormat QR.pdf	PUMSPrep QR.pdf	TripSum QR.pdf
ArcPlan QR.pdf	IntControl QR.pdf	PlanCompare QR.pdf	Relocate QR.pdf	Validate QR.pdf
ArcProblem QR.pdf	LineSum QR.pdf	PlanPrep QR.pdf	Router QR.pdf	VehGen QR.pdf
ArcRider QR.pdf	LinkDelay QR.pdf	PlanSelect QR.pdf	RunSetup QR.pdf	ZoneData QR.pdf

The Quick Reference (QR) manuals are probably the most frequently used documentation resource. The Quick Reference manuals have a short description in the header that describes the utility's purpose and functionality. The QR document provides a listing of all the control keys and differentiates which are required and which are optional. For control key parameters, the default value is specified as well as a range of permitted values. Finally a 'Notes' section provides additional documentation related to specific control keys and variable settings. A portion of the LinkDelay QR document is shown below.

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LinkDelay Quick Reference

Version 4.0.9

Revision History

1/8/2010 Edited by AECOM Consult, Inc.
4/15/2010 Edited by RSG, Inc.

Syntax:

LinkDelay [-flag] [control_file]

Purpose:

1. Merge, average, and/or convert Link Delay files, and
2. Smooth the link delays between time increments.

Required Keys

NET_LINK_TABLE	[net_directory]*filename*
LINK_DELAY_FILE	[project_directory]*filename*
NEW_LINK_DELAY_FILE	[project_directory]*filename*

Optional Keys

TITLE	Text
REPORT_FILE	*Filename*
REPORT_FLAG	FALSE {true/false/yes/no/1/0}
MAX_WARNING_MESSAGES	100,000

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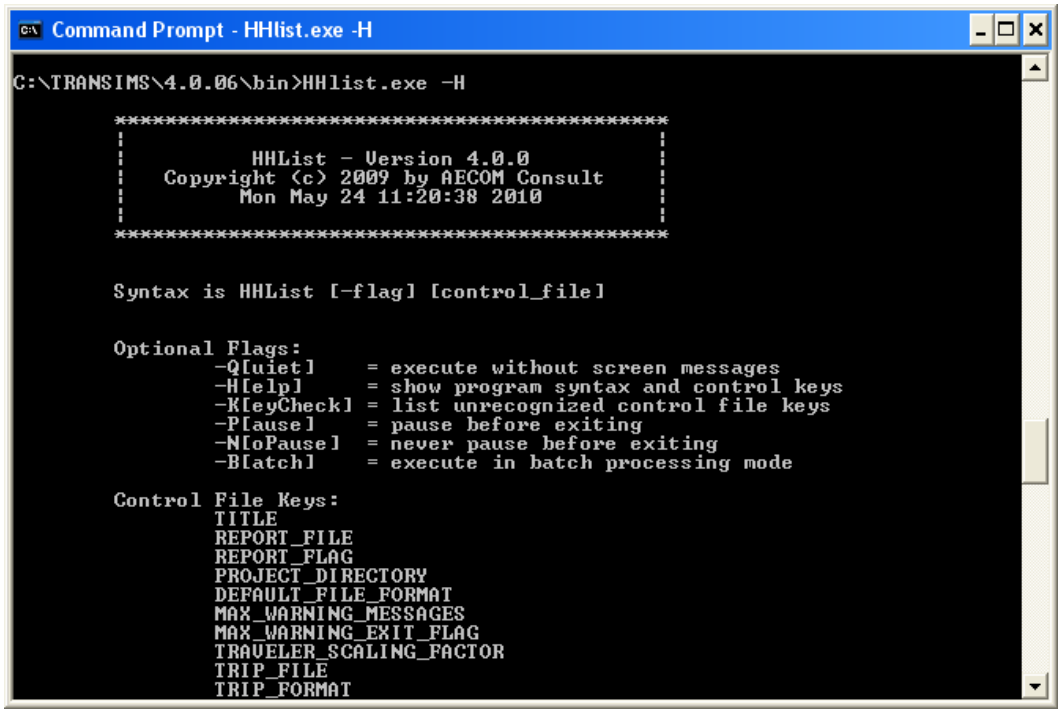
Note there are 69 individual functions that compromise the TRANSIMS Version4 software suite. Quick Reference manuals are available for 45 of the most frequently used utilities. Important information for the other 24 utilities can be garnered by executing the utility with the –H command line option. For example, typing *HHList.exe –H* at the command prompt will write out useful help information to the DOS screen about the **HHList** function. A screen capture is illustrated below. The command line options for executing the TRANSIMS utilities are described in more detail elsewhere in the documentation set.



3.0 How-To Documents

The TRANSIMS Version4 Software documentation set includes 15 “How-Tos” released to the user’s community as Adobe PDF documents. The filenames of the How-To documents and a brief description of each document are listed in the table below. There are three types of How-To documents.

How-To File	Description
Step-0_Installation and Testing How-To.pdf	install and run TRANSIMS programs on Windows and Linux computer systems
Step-1_Highway Network How-To.pdf	prepare and convert network data to the format required by TRANSIMS programs
Step-2_Transit Network How-To.pdf	prepare and convert transit data to the format required by TRANSIMS programs
Step-3_Network Edit How-To.pdf	use ArcGIS to edit TRANSIMS network files
Step-4_Population Synthesizer How-To.pdf	prepare input data and synthesizing household populations used for TRANSIMS activity-based models
Step-5_Activity Generator How-To.pdf	use an activity survey to assign activity patterns to household members and distribute them to activity locations
Step-6_Trip Table Conversion How-To.pdf	prepare and convert trip tables used in four-step models to the format required by TRANSIMS programs
Step-7_Router and Router Feedback How-To.pdf	use the TRANSIMS Router to generate travel plans for daily household trips
Step-8_Microsimulator How-To.pdf	use the Microsimulator to simulate person and vehicle movements on a network using travel plans generated by the Router
Command Line Development Using VC++ 2005 How-To.pdf	install the required and optional tools and setting up the environment for command-line development of Transims on a Windows platform
Diagnostics How-To.pdf	how to resolve some of the different types of errors that can be encountered when attempting to run the suite of TRANSIMS tools
Dynamic User Equilibrium How-To.pdf	configure the various tools available within the TRANSIMS toolbox to achieves a dynamic user equilibrium condition
Parallelization & Partitioning How-To.pdf	configure the various tools available within the TRANSIMS toolbox using parallelization and partitioning strategies with the goal of reducing model simulation runtime
Alexandria_4.0.06_How-To.pdf	prepare and run the TRANSIMS programs using the Alexandria_4.0.06 dataset
TestNet_4.0.06_How-To.pdf	prepare and run the TRANSIMS programs using the TestNet_4.0.06 dataset

The first type of How-Tos provide specific instructions on using particular TRANSIMS utilities. The “Step-0” through “Step-8” documents provide instruction on using a few of the key functions available in the TRANSIMS tool box, specifically **TransimsNet**, **TransitNet**, **ArcNet**, **PopSyn**, **ActGen**, **ConvertTrips**, **Router** and **Microsimulator**. These How-To documents use the Alexandria test case data to provide illustrative examples of script, inputs, and outputs and are procedurally linked. Therefore new users are advised to work their way though these documents in order to familiarize themselves with the full complement of functionality that is available. However, it is important to note that typical model applications do not use all of the tools in the TRANSIMS toolbox. For example, many applications thus far have elected to convert 4-step travel model demand from existing trip matrices and do not perform population synthesis and activity generation (Step 4 and Step 5). In addition, some applications have not developed transit networks (Step 2) and some applications have pursued subarea microsimulation only as opposed to regional simulation.

The second type of How-Tos provide instruction on broader issues related to TRANSIMS model development rather than specifics related to the use of individual utilities. These include the Command Line Development, Diagnostics, Dynamic User Equilibrium and Partitioning-Parallelization documentation.

Finally, the third type of How-Tos provide instruction on running the two sets of sample test case data available with the Version4 software, the Alexandria and TestNet case study datasets.

4.0 Training Courses

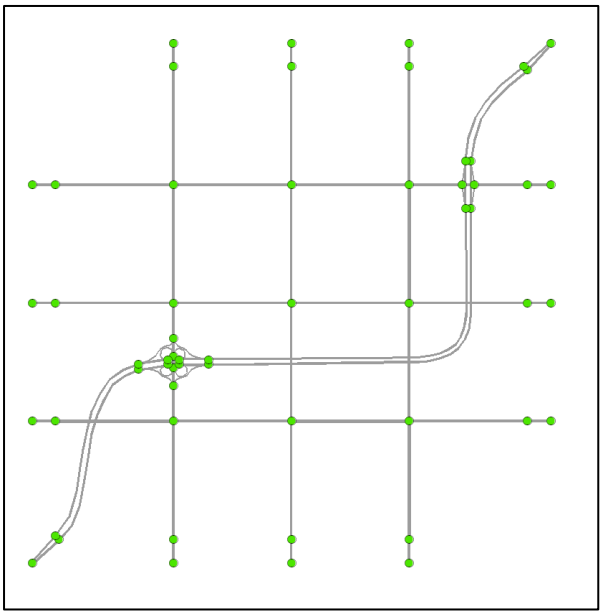
The Transportation Research and Analysis Computing Center (TRACC) actively promotes the use of TRANSIMS on its high performance computer cluster through direct support for modelers working on USDOT-related projects. TRACC's experts have also developed extensive training materials for use of TRANSIMS, including a three-day training course with lectures spanning the entire scope of the application. The material for the Training Courses was developed by Dr. -Ing. Hubert Ley of TRACC which is part of the Argonne National Laboratory (ANL). The TRANSIMS Version4 Software documentation set includes these 18 "Training Courses" released to the user's community as Adobe PDF documents. The filenames of the Training Course documents are listed below.

TRANSIMS - 0 - CAS Example (final).pdf
TRANSIMS - 1 - Introduction (final).pdf
TRANSIMS - 2 - Network (final).pdf
TRANSIMS - 3 - Population (final).pdf
TRANSIMS - 4 - Activities (final).pdf
TRANSIMS - 5 - Routing (final).pdf
TRANSIMS - 6 - Microsimulation (final).pdf
TRANSIMS - 7 - Feedback (final).pdf
TRANSIMS - 8 - Framework (final).pdf
TRANSIMS - 9 - Control Files (final).pdf
TRANSIMS - 10 - Trip Table Conversion (final).pdf
TRANSIMS - 11 - GIS Tools (final).pdf
TRANSIMS - 12 - Subarea Simulation (final).pdf
TRANSIMS - 13 - Resources (final).pdf
TRANSIMS - 14 - Partitions (final).pdf
TRANSIMS - 15 - Source Code (final).pdf
TRANSIMS - 16 - TRACC Cluster (final).pdf
TRANSIMS - 17 - Animations (final).pdf

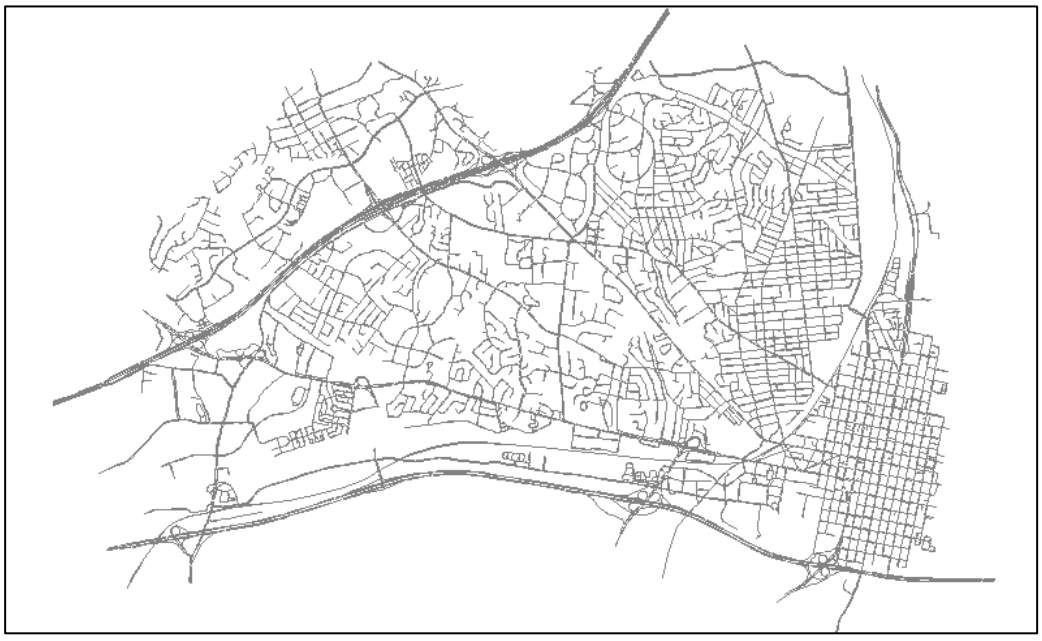
5.0 Test Cases

The TRANSIMS Version4 Software documentation set includes 2 sets of test case data. The "Alexandria_4.0.06" and "TestNet_4.0.06" test case data are released to the user's community as compressed zip files. The unzipped directory will contain a \bin\ directory, which contains the TRANSIMS executables (v4.0.06, 32-bit Windows compiled), and the test case directory. The Alexandria_4.0.06 and the TestNet_4.0.06 model directories contain a number of sub-directories for the inputs and outputs that will be generated upon executing the batch files. The How-To documents associated with each test case dataset provide instruction on how to prepare and run the TRANSIMS programs.

The TestNet dataset uses a small fictional network with only 72 links and roughly 30,000 trips. The intent of the TestNet test case data is to illustrate the use of the various tools and how they are applied in series to develop a complete TRANSIMS model simulation. The full model runs in less than 5 minutes on a typical desktop machine. The TestNet_4.0.06 network (links and nodes) is illustrated below.



The Alexandria test case data on the other hand uses a "real-world" network with 3,600 links and roughly 420,000 trips. The Alexandria test case data illustrates a more typical TRANSIMS model implementation using actual real-world data to represent the amount of travel demand utilizing the region's transportation system. The full model runs in about two hours on a typical desktop machine. The Alexandria _4.0.06 network (links) is illustrated below.



6.0 Implementations

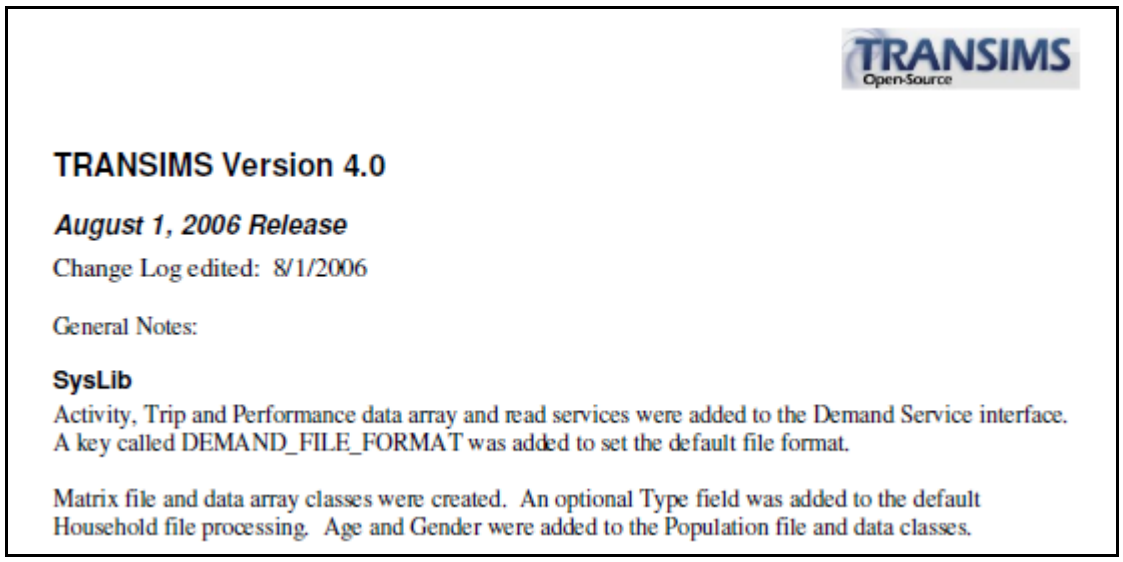
The TRANSIMS Version4 Software documentation set includes 6 "Implementations" reports released to the user's community as Adobe PDF documents. The Implementations

section of the documentation set includes final reports from TRANSIMS model implementation research that was conducted in Portland, Oregon, Buffalo, New York, Atlanta, Georgia, Burlington, Vermont and Sacramento, California. These reports detail the modeling methods, strategies, and systems that were developed using TRANSIMS tools and document the results generated by the simulations. While not specifically software documentation documents, these reports do provide good background on past TRANSIMS research and the direction disaggregate demand and supply side simulation based models are heading. The filenames of the Implementation reports are listed below.

Atlanta Peer Review Read Ahead.pdf
Buffalo Track 1 Report.pdf
Burlington Track 1 Report.pdf
Portland Track 1 Report.pdf
Portland Phase 2 Technical Report.pdf
Sacramento DaySim-TRANSIMS Report.pdf

7.0 Change Logs

The TRANSIMS Version4 Software documentation set includes Change Log reports which are released to the user's community as Adobe PDF documents. The Change Logs detail revisions made to the software resulting in new minor and major release versions. Minor release change logs have a naming convention like the file "Transims 4.0 8-1.pdf" which documents the August 1, 2006 release. A portion of the "Transims 4.0 8-1.pdf" minor release log is shown below, note the Change Log edited date stamp.



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TRANSIMS Version 4.0

August 1, 2006 Release

Change Log edited: 8/1/2006

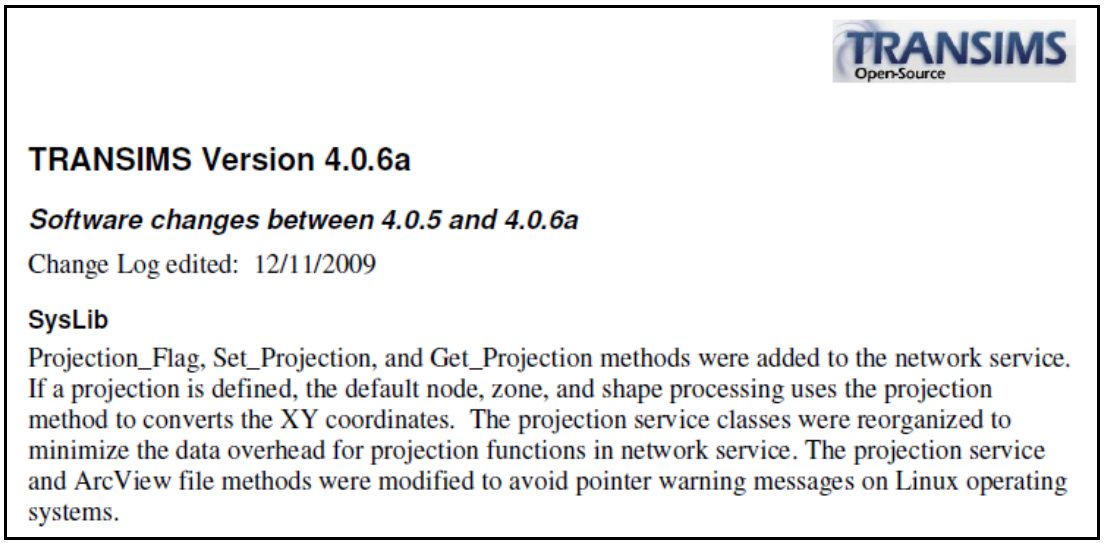
General Notes:

SysLib

Activity, Trip and Performance data array and read services were added to the Demand Service interface. A key called DEMAND_FILE_FORMAT was added to set the default file format.

Matrix file and data array classes were created. An optional Type field was added to the default Household file processing. Age and Gender were added to the Population file and data classes.

Major release change logs have a naming convention like the file "Transims 4.0.5 to 4.0.6a.pdf" which documents the Version 4.0.6a release. A portion of the "Transims 4.0.5 to 4.0.6a.pdf" major release log is shown below, again note the Change Log edited date stamp.



TRANSIMS Open-Source

TRANSIMS Version 4.0.6a

Software changes between 4.0.5 and 4.0.6a

Change Log edited: 12/11/2009

SysLib

Projection_Flag, Set_Projection, and Get_Projection methods were added to the network service. If a projection is defined, the default node, zone, and shape processing uses the projection method to converts the XY coordinates. The projection service classes were reorganized to minimize the data overhead for projection functions in network service. The projection service and ArcView file methods were modified to avoid pointer warning messages on Linux operating systems.

8.0 Software Spreadsheets

The TRANSIMS Version4 Software documentation set includes 5 "Software Spreadsheet" reports which are released to the user's community as Adobe PDF documents. The Software Spreadsheets detail revisions made to the suite of software, specifically whether new utilities have been added to each release version. For instance, by comparing "Version 4 Software v4.0.4.pdf" and "Version 4 Software v4.0.5.pdf" a user can identify that the utilities **ActBalance**, **EnhanceNet**, **EventSum**, **VISSINet**, and **VISSIMPlan** were new functions made available with the v4.0.5 release of the software that did not exist prior. In addition, the version of the **PlanSum** utility associated with the v4.0.4 release was 4.0.42. However, the version of the **PlanSum** utility released with the v4.0.5 release was 4.0.47 indicating that revisions and bug fixes to this utility occurred between January 7, 2009 (v4.0.4 release date) and May 1, 2009 (v4.0.5 release date).

The filenames of the Software Spreadsheet documents are listed below.

Version 4 Software.pdf
Version 4 Software v4.03.pdf
Version 4 Software v4.0.4.pdf
Version 4 Software v4.0.5.pdf
Version 4 Software v4.0.6a.pdf

A portion of the "Version 4 Software v4.0.6a.pdf" software spreadsheet is shown below.

TRANSIMS Version 4.0.6a Software (01/08/2009)

Program	Version	Documentation QR	Documentation Doc	Descriptions
ActBalance	4.0.0			Calculates attraction balancing factors for zones or districts
ActGen	4.0.36	X	X	Activity generation and location choice models
ActivityPattern	4.0.2	X		Household activity pattern matching
AdjustPlans	4.0.9	X		Adjust plans based on screenline traffic counts
ArcAddZ	4.0.1			Convert an XY shapefile to an XYZ or XYM shapefile
ArcDelay	4.0.17	X		Create ArcView shapefiles from Link Delay files
ArcDiff	4.0.5	X		Combine two ArcDelay files and calculate the difference
ArcNet	4.0.22	X	X	Create ArcView shapefiles from network tables
ArcPlan	4.0.21	X	X	Create ArcView shapefiles from Plan files
ArcProblem	4.0.3	X		Create ArcView shapefiles from Problem files
ArcRider	4.0.6	X		Create ArcView shapefiles from Ridership files
ArcSnapshot	4.0.14	X		Create ArcView shapefiles from Snapshot or Occupancy files
ArcTraveler	4.0.2			Create ArcView shapefiles from Trip or Activity files
CheckSurvey	4.0.4			Check for errors and correct household travel surveys
ConvertTrips	4.0.19	X	X	Convert trip tables to Activity or Trip files
CoordMatch	4.0.0			Rubber sheet network coordinates
DiurnalMatrix	4.0.0			Manipulate a matrix of diurnal distribution curves
DynusTNet	4.0.4			Convert TRANSIMS network to DyusT/DynaSmart file format
DynusTPlan	4.0.4			Convert TRANSIMS plans to DynusT/DynaSmart vehicle paths
Emissions	4.0.15	X		Apply emission rates to speed bin output files
EnhanceNet	4.0.1	X		Add link orientations and turning movement codes for Version 4
EventSum	4.0.8	X		Summarize and report data from Event files
ExportTransit	4.0.5			Export transit routes and schedules to Header and Nodes files
FileFormat	4.0.2			Copy files between two TRANSIMS file formats
GISNet	4.0.9	X		Convert GIS network data to generic network format
HHList	4.0.0			Randomly distribute households to CPU partitions
IntControl	4.0.19	X		Synthetically generate TRANSIMS signal and sign tables
LineSum	4.0.11	X		Summarize and report data from transit Ridership files
LinkDelay	4.0.9	X		Merge and average Link Delay files
LinkSum	4.0.27	X		Summarize and report data from Link Delay files
ListID	4.0.2			Create ID list files from TRANSIMS tables
LocationChoice	4.0.6	X		Location Choice component of activity generation
LocationData	4.0.9	X		Calculate and add data fields to activity location files
Microsimulator	4.0.75	X	X	Simulate highway and transit plan files
ModeChoice	4.0.3	X		Tour and trip mode choice models
NewFormat	4.0.6	X		Convert several Version 3 files to Version 4 format
PlanCompare	4.0.35	X		Compare two Plan files and select plans with time differences
PlanPrep	4.0.12	X		Merge, sort, and combine Plan files
PlanSelect	4.0.31	X		Select Plans for re-routing based on a variety of criteria