TOPICS

Current DFW Modeling Environment

Our Key Decisions For TransCAD Implementation

Overview Of The DFW TransCAD-Based Regional Model

The Texas Statewide Analysis Model (TransCAD)

What Happens Next For NCTCOG

Suggestions For Florida
BUT FIRST, A QUESTION:

Come On, Ken, Is NCTCOG REALLY Using TransCAD, Or Is It Just A Shell For Your Own Programs?

ANSWER:

We Are REALLY REALLY Using TransCAD, For ALL Modeling Steps … And It Is Fully Batched!
CURRENT DFW MODELING ENVIRONMENT

5,000 Square-Mile Modeled Area

Five Full Counties Plus Four Partial Counties

5.0 Million People In 2000 (1,000 per square mile)

8.5 Million People For 2030 (1,700 per square mile)
CURRENT DFW MODEL APPLICATIONS

NCTCOG-Developed FORTRAN Programs (Mainframe)
  For Legacy Applications—Multimodal and Traffic-Only Modeling

TRANPLAN (PC)
  For Legacy Applications—Subarea Traffic Modeling

TransCAD (PC-Windows)
  For All New Travel Modeling Activities
KEY DECISION #1:
SOFTWARE SELECTION

We Are Tired Of Maintaining/Updating Our Own FORTRAN Programs
   It’s Difficult, Being Our Own Software Vendor!
   And It Costs Us A Lot Of Money To Rent Mainframe Time

Competitive Travel Model Software Procurement Process
   RFP Sent To Travel Model Software Vendors (1998)

Selection Committee
   NCTCOG, Texas DOT, DART, And Fort Worth Staff

TransCAD Selected From The Five Submissions
KEY DECISION #2:

Should We Convert Our Existing Travel Modeling Procedures To TransCAD?

…Or Do We Use TransCAD For A Brand New Round Of Full Model Calibrations?
ANSWER:

Since We Have New Data:
1994 Workplace Survey
1994 External Travel Survey
1996 Household Survey
1996 and 1998 Transit Onboard Surveys
1994 and 1999 Major Traffic Count Programs

But Our Current Models Were Calibrated From 1984 Survey Data…

It’s Time To Perform New Model Calibrations
(But Start With Our Existing Roadway And Transit Networks)
KEY DECISION #3:

Who Will Do The New TransCAD Model Development? Consultants Or NCTCOG Staff?

We Did Most Of The Work In-House (But Cambridge Systematics Did The Mode Choice Estimations)
TRANSCAD MODELING PROCESS

- ROADWAY NETWORK
- TRANSIT NETWORK
- DEMOGRAPHIC INFORMATION
- ZONE LAYER
- TRIP GENERATION
- TRIP DISTRIBUTION
- MODE CHOICE
- ROADWAY ASSIGNMENT
- TRANSIT ASSIGNMENT
- TRAVEL TIME CONVERGENCE

INPUT
PROCESS
DECISION

LOOP

NO
YES
TRANSCAD MODEL SIZE

4874 Zones Retained For ALL Modeling Steps
   From Trip Generation To Traffic/Transit Assignment
   Number of Zone-To-Zone Pairs = 23.8 Million

Year 2025:  27,000 Roadway Links + 9,600 Zone Connectors
   Over 36,000 Coded Links
   22,000 Network Nodes

2025 Regional Transit Plan
   410 Coded One-Way Bus Lines And 36 Rail Lines
   14,500 Bus Stops And 171 Rail Stations
TRIP GENERATION

We Converted Our FORTRAN Program To GISDK
  Took Over Six Months Of Staff Time
  Gave Us Valuable GISDK Programming Experience

Inputs
  Population, Households, Income, And Basic/Retail/Service Jobs
  Special Generators (Shopping Malls, Colleges, Hospitals, Airports)
TRIP DISTRIBUTION

Gamma-Based Gravity Model Formulation (7 Purposes)
- Four HBW Groups (Income Quartiles)
- HNW (Non-Airport)
- NHB (Non-Airport)
- Trucks (Vehicles With Six Or More Tires)

Base Year Trip Table Factoring (6 Purposes)
- HNW And NHB Airport Trips
- Four External-Related Auto/Truck Trips
MODE CHOICE

Four Transit Skims (Using TransCAD Pathfinder)

13 Market Segment Tables
    Nested Logit For HBW And HNW Trips
    Multinomial Logit For NHB Trips

Five Mode Choices
    Drive Alone
    Shared-Ride- 2 People In Vehicle
    Shared-Ride – 3 Or More People In Vehicle
    Transit Riders – Initial Walk Access To Transit
    Transit Riders – Initial Drive Access To Transit
TRAFFIC ASSIGNMENT

Three Time-of-Day, Generalized Cost, User-Equilibrium Assignments

AM Peak Period (2.5 hours = 6:30 a.m. to 8:59 a.m.)
PM Peak Period (3.5 hours = 3:00 p.m. to 6:29 p.m.)
OffPeak (18 hours)

Four Classes Loaded Simultaneously

Drive Alone Vehicles
Shared-Ride Vehicles “Allowed To See HOV lanes”
Shared-Ride Vehicles “Not Allowed To See HOV lanes”
Trucks
AUTOMATED NETWORK CONVERSION
INTEGRATED TRANSPORTATION INFORMATION SYSTEM
THE TEXAS STATEWIDE ANALYSIS MODEL

Covers Entire State, Plus “Buffer” Counties
4,742 Model Zones
1998 Calibration/Validation (19.8 million people)
2025 Forecast (31.2 million people)

Single Multi-Year Coded Network
Each Record Contains Separate Link Attributes For 1998 And 2025 (lanes, speed limit, estimated congested time, capacity)
THE TEXAS STATEWIDE ANALYSIS MODEL

**Passenger Travel**
- Vehicle Trips By Auto
- Person Trips By Air
- Person Trips By Rail (AMTRAK)
- Placeholder For High-Speed Rail

**Freight Travel**
- Commodities By Truck
- Commodities By Rail
- Commodities By Water
THE TEXAS STATEWIDE ANALYSIS MODEL:
POTENTIAL NCTCOG USES

Use Forecast Traffic Volumes For Our External Stations

Traffic Studies In Areas Outside Our 5,000 Square-Mile Urban Model
(But Within Our 16-County NCTCOG Area)
   e.g., Parker County Thoroughfare Plan

Commodity Flow Studies/Freight Bottleneck Studies
WHAT HAPPENS NEXT
FOR NCTCOG

Training Of “TransCAD Model Application Champions”
NCTCOG Staff
DART Transit Staff
Other Agencies (???)
Certification Of Consultants (???)

Prepare Additional Roadway/Transit “Supply And Demand”
Performance Reports

Model Documentation
Include The “What” As Well As The “Why”
WHAT HAPPENS NEXT FOR NCTCOG (cont.)

One Key To Good Modeling Is The Quality Of The Overall Information System

Improvements/Updates To Modeling Procedures
   Expansion Of The Modeled Area
   Destination Choice Instead Of Gravity Model Trip Distribution
   New Travel Surveys In 2005/2006
   Activity-Based Modeling (and other esoteric things)

Traffic Microsimulation
   TransCAD Subarea Analysis To Create “Windowed” OD Table
   Dallas CBD Project Underway (Using VisSim)
QUESTION:

In Hindsight, Would We Have Done Anything Differently?

ANSWER:

We Probably Would Have Made Greater Use Of Consultants In Our Model Development Effort—Or, At Least In The Critical “Strategic Planning” Stages!
ANYTHING ELSE?

We Use TransCAD For All Transit Coding, But Still Rely (For Legacy Modeling Purposes) On An Arc/Info Program For Our Roadway Coding

I Also Wish TransCAD 4.6 Existed, When We Started Our Model Development Effort!
Complete Your “Direct” Conversions From TRANPLAN To TransCAD
   Caliper Is The Most Capable Firm For Doing This Work
   Gives You An Early Indication Of Success

Final Testing/Comparison And “Ease Of Use” Checks Should Be Done By Others
   Include The End Users
   Start Using For Real-World Applications Work
   Start To Build Confidence With The TransCAD Tools
   …And Perhaps Identify Desired Improvements
A Major Parallel Effort Is Needed To Define, Develop, And Calibrate Updated TransCAD Modeling Procedures
Start With TRANPLAN-Converted Models (I think?)

Give Some “Really Serious Thought” About DOT, MPO, and Consultant Capabilities
Don’t Forget: The Underlying Information System Is Critical
Certification Program For Model Users and Model Improvers
A Few People Need To Become GISDK Programming Experts
A Few TransCAD Model Champions Might Be Better Than Lots Of People With A Little Bit Of TransCAD Knowledge