

Item 4, TFS 9/17/04

Status of the TPB Regional Travel Model, Version 2.1 D, Draft #50

Presented to the Travel Forecasting Subcommittee on
September 17, 2004

Ronald Milone, COG/TPB

Model release dates

Model version	Release date
Version 2.1 C	December 2002
Version 2.1 D, Draft #16	March 2004
Version 2.1 D, Draft #18	May 2004
Version 2.1 D, Draft #28	July 2004
Version 2.1 D, Draft #50	Sept. 17, 2004 (Today)

Draft #50 vs. Draft #28 of Ver 2.1D

- Full mode choice model is run in each of the six speed feedback iterations; MSA procedure updated accordingly
- Eight K-factors have been dampened
- Modified freeway volume-delay function

TRB review: Modeling topics

1. Model validation;
2. Travel estimation for trucks and commercial vehicles;
3. Bus network characterization;
4. Use of adjustment factors;
5. Speed feedback incorporating mode choice; and
6. Traffic speed and volume estimation for air pollution emissions estimation.

Ver 2.1D Draft #50 vs. Ver 2.1C

- Traffic assignment:
 - Free-flow speeds and capacities have been updated.
 - Freeway VDF: Made steeper and the speed floor has been raised from 7 mph to 12 mph.
 - Equilibrium assignment process: changed from a *maximum* of 10 iterations to a *fixed number* of 20 iterations. Gap tolerance is checked.
- Toll modeling capability has been added to the model so that monetary values are considered in the trip distribution and traffic assignment steps.
- All cost components in the model previously developed in constant 1980 dollars are now developed in 1994 dollars.

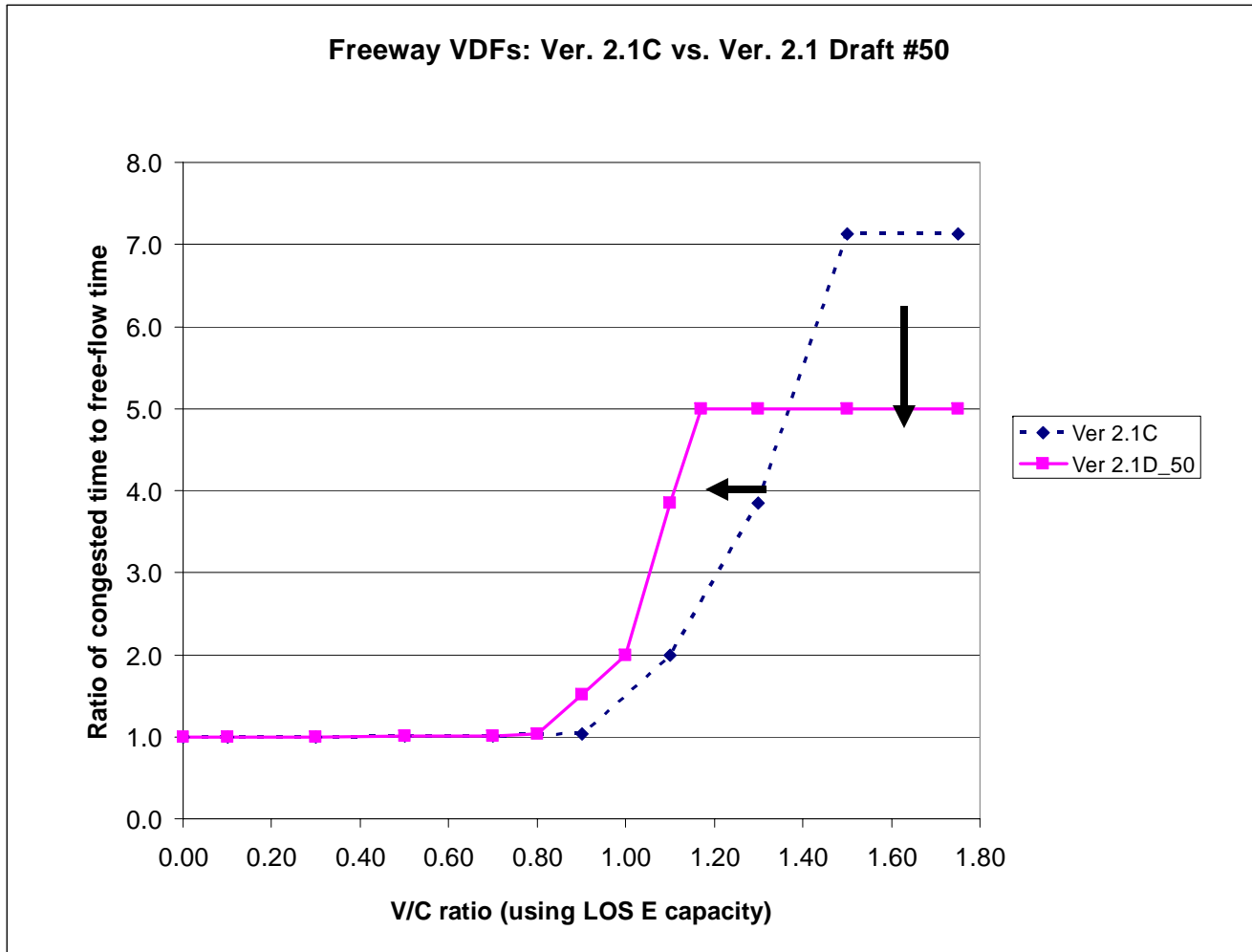
Ver 2.1D Draft #50 vs. Ver 2.1C

- Zonal area type designations normally developed as a function of land activity density may now be optionally assigned an override value.
- Model is now applied as a series of six iterations and the full mode choice model is applied in each iteration.
- The NHB F-factors have been updated.

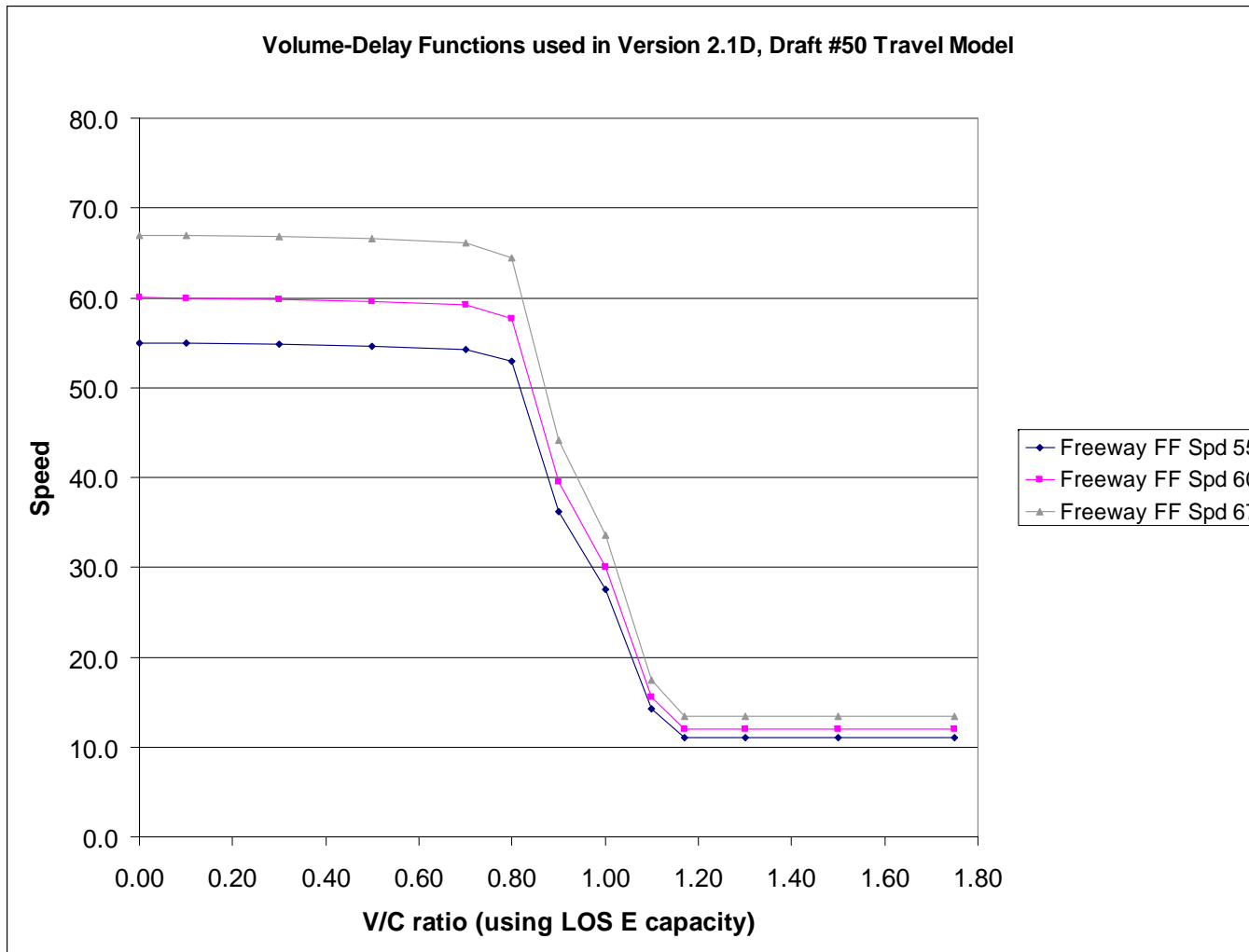
Ver 2.1D Draft #50 vs. Ver 2.1C

- Transit pathbuilding has been updated:
 - PATHSTYLE parameter in the transit network build program has been updated.
 - Development of walk links has been updated.
- Resulting from the above two transit pathbuilding updates, the mode choice model was re-estimated. The re-estimation also took into account recent FTA guidelines on ranges and characteristics of various mode choice coefficients.
- Added a bus speed model.
- K-factors: number and magnitude reduced.

Freeway VDFs



Freeway VDFs

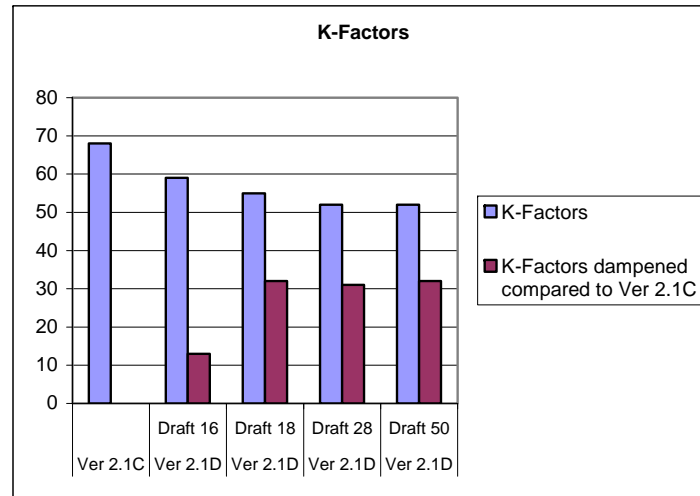
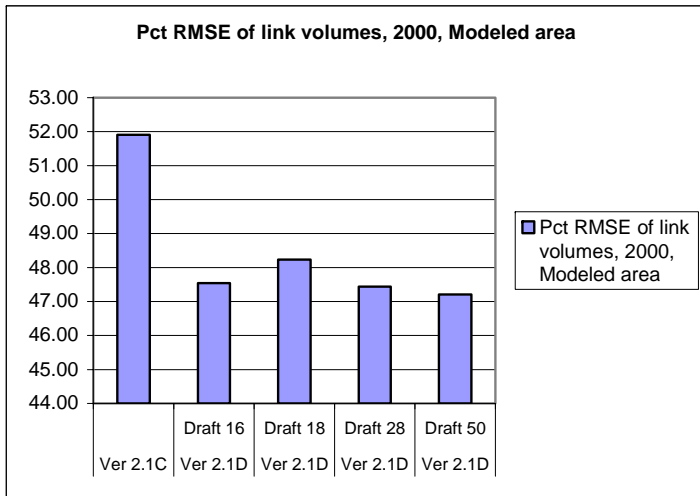
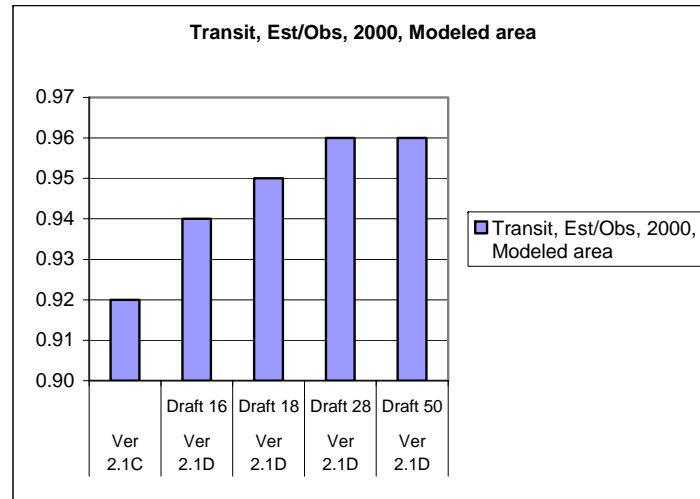
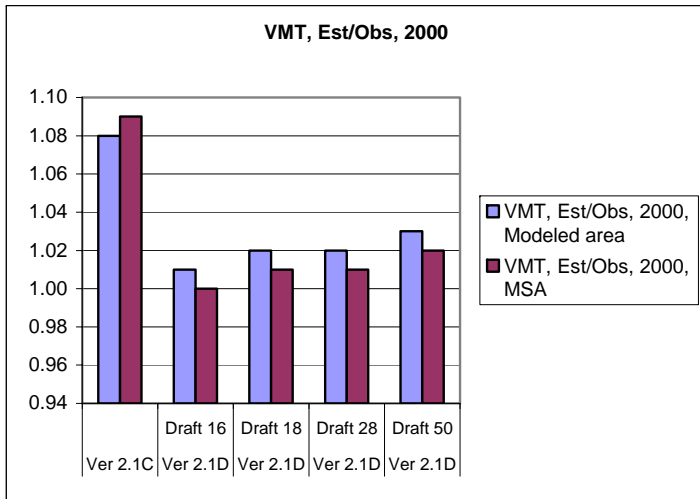


Summary of changes to K factors

	Travel Model				
	2.1C	2.1D #16	2.1D #18	2.1D #28	2.1D #50
Number of K factors	68	59	55	52	52
Number of K factors removed	--	9	13	17	17
Of the remaining K factors, the number reduced in magnitude	--	13	32	31	32
Number of K factors added	--	0	0	1*	1*

* K factor added: Prince William Co. to DC core (value 2.8)

Progression of model performance



Progression of model performance

	Ver 2.1C	Ver 2.1D Draft 16	Ver 2.1D Draft 18	Ver 2.1D Draft 28	Ver 2.1D Draft 50
Release date	12/23/02	03/19/04	05/21/04	07/23/04	09/17/04
VMT, Est/Obs, 2000, Modeled area	1.08	1.01	1.02	1.02	1.03
VMT, Est/Obs, 2000, MSA	1.09	1.00	1.01	1.01	1.02
Transit, Est/Obs, 2000, Modeled area*	0.92	0.94	0.95	0.96	0.96
Link volume Pct RMSE, 2000, Modeled area	51.91	47.54	48.23	47.44	47.21
K-Factors	68	59	55	52	52
K-Factors dampened compared to Ver 2.1C	0	13	32	31	32
Land use	6.3	6.3	6.4 emp adj	6.4 emp adj	6.4 emp adj

* Screened for missing values

Ref: modelCompar21c_21d50_2.xls

Model results: 2000 VMT

(Thousands)	MSA Summary		
	Estimated	Observed	Est/Obs Ratio
DC	6,650	5,781	1.15
MD	42,954	43,144	1.00
VA	39,721	38,308	1.04
Total MSA	89,325	87,233	1.02

The table reflects highway links with coded ground counts.

Source: i6_highway_assignment.rpt

9/13/2004

v2.1 D perf00.xls

Model results: Mode choice, 1994

(screened)

Purpose/Mode =====	Est. =====	Obs. =====	Diff. (E - O) =====	Ratio (E / O) =====
HBW:	432,732	457,306	-24,574	0.95
% Transit:	16.17	16.88	-0.71	0.96
Car Occ:	1.12	1.12	0.01	1.01
HBS:	25,792	27,825	-2,033	0.93
% Transit:	1.19	1.30	-0.10	0.92
Car Occ:	1.24	1.23	0.01	1.00
HBO:	142,610	139,367	3,243	1.02
% Transit:	2.16	2.15	0.00	1.00
Car Occ.:	1.43	1.44	-0.01	0.99
NHB:	135,460	117,963	17,497	1.15
% Transit:	2.80	2.50	0.29	1.12
Car Occ.:	1.25	1.25	0.00	1.00
ALL:	736,594	742,461	-5,867	0.99
% Transit:	4.52	4.63	-0.11	0.98
Car Occ:	1.30	1.30	0.00	1.00

Ref: COMPARE_MCEO_SCR_94.TXT

Model results: Mode choice, 2000

(screened)

Purpose	Est	Obs	Diff. (Est-Obs)	Ratio (Est/Obs)
HBW	502,001	538,582	-36,581	0.93
<i>Pct. Transit</i>	16.78%	17.80%	-1.02%	0.94
HBS	34,079	33,262	817	1.02
<i>Pct. Transit</i>	1.39%	1.36%	0.03%	1.02
HBO	163,864	151,645	12,219	1.08
<i>Pct. Transit</i>	2.24%	2.07%	0.16%	1.08
NHB	156,238	166,461	-10,223	0.94
<i>Pct. Transit</i>	2.90%	3.09%	-0.18%	0.94
Total	856,182	889,950	-33,768	0.96
<i>Pct. Transit</i>	4.72%	4.89%	-0.18%	0.96

Ref: compare_mceo_00_uns_scr.xls

Comparison of regional demographic and travel trends over time

V2.1D #50

	1994	2000	2030	pct change	
				'94-'00	'94-'30
Households	1,940,449	2,144,177	3,012,414	10.5%	55.2%
Employment	3,273,042	3,441,356	5,138,239	5.1%	57.0%
Population	5,245,630	5,746,025	7,783,770	9.5%	48.4%
Total Motorized Person Trips	21,443,448	23,785,266	33,706,454	10.9%	57.2%
Motorized Person Trips per HH	11.05	11.09	11.19	0.4%	1.3%
Motorized Person Trips per Capita	4.09	4.14	4.33	1.3%	5.9%
Walk & Bike Trips, HBW only	167,136	180,539	282,383	8.0%	69.0%
Auto Occupancies	1.30	1.30	1.30	0.2%	-0.2%
Transit Person Trips, Internal	778,617	881,851	1,286,020	13.3%	65.2%
Transit Percentage	3.63%	3.71%	3.82%	2.1%	5.1%
Total Vehicle Trips	16,877,563	18,743,129	26,819,215	11.1%	58.9%
Regional VMT	127,859,959	143,644,783	209,151,179	12.3%	63.6%
VMT per Capita	24.37	25.00	26.87	2.6%	10.2%
VMT per HH	65.89	66.99	69.43	1.7%	5.4%

Notes:

Transit constraint is assumed for modeled years after 2005.
2030 network does not include the Inter-County Connector

Ref: vfs_ftpres2004-09.xls

9/17/04

Presentation to TPB Travel Forecasting
Subcommittee

16

Conclusion

- Performance of the Ver. 2.1D #50 model is superior to prior models
- Model adjustments are the least extensive to date
- Four of the six TRB topics have been addressed; Further enhancements will continue

Next Steps

- Work on the mobile source emissions post processor
- Complete network coding for upcoming AQ conformity determination
- AQ conformity results to be released Oct.1; 30 day comment period to follow.
- Ver. 2.1D #50 model will be adopted when the TPB approves the TIP & CLRP based on the conformity determination