



M6Link, A Tool for Integrating Transportation Model and MOBILE6 Output

**Mobile Source Present and Future Models
Workshop**

November 7, 2002



Introduction

What is M6Link?

- **M6Link is a FORTRAN based tool used to create onroad mobile emission inventories.**
- **M6Link allows the user to take advantage of the detailed output created by MOBILE6 in the creation of an onroad inventory.**





Agenda

The topics discussed will include

- **The output from the EMME/2 Transportation Model**
- **The output from MOBILE6**
- **The functions performed by M6Link**





Overview

Why create M6Link?

- The EPA has included significantly more detail in the MOBILE6 model than was available in the MOBILE5 model. Existing software was not able to take the best advantage of the available data.
- The M6Link tool is used to create onroad emission inventories appropriate for use in conformity analyses and State Implementation Plans.





EMME/2 Output

- **EMME/2 produces files that contain data on vehicle trips on transportation network links.**
- **These data include the number of vehicle trips, vehicle speeds, facility type, area type, etc.**
- **The data reflect an annual average weekday.**
- **Four files are produced for each of four daily time periods.**





EMME/2 Output

The 4 time periods employed by EMME/2 are

- **AM Peak (6 AM – 9 AM)**
- **Midday (9 AM – 3 PM)**
- **PM Peak (3 PM – 6 PM)**
- **Nighttime (6 PM – 6 AM)**





EMME/2 Output

The 4 vehicle classes employed by EMME/2 are

- **Light Duty commercial vehicles**
- **Medium Duty commercial vehicles**
- **Heavy Duty commercial vehicles**
- **Noncommercial vehicles**





EMME/2 Output

The 5 area types employed by EMME/2 are

- **CBD (Central Business District)**
- **Urban**
- **Urban Fringe**
- **Suburban**
- **Rural**

These five area types are based upon population and employment density for the district and vary by year. (Pop * 2 Emp)





Sample Portion of EMME/2 Output File

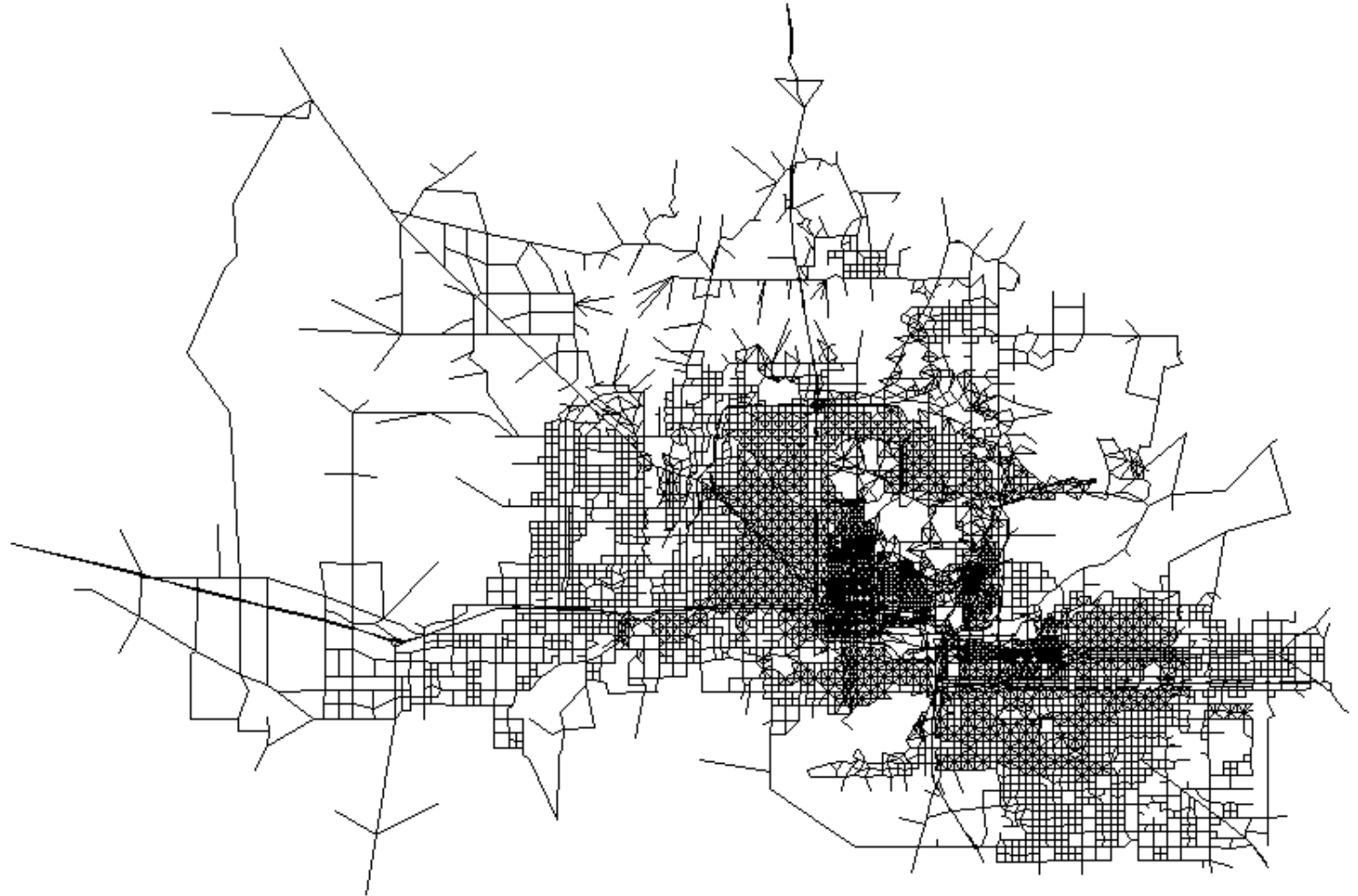
INODE	JNODE	LENGTH	TIMAU	VOLAU	HOV	LOV	HVY	MED	LGT	FTYPE	ATYPE	URBAN
611	4419	0.53	1.590	1594.0	63.213287	1184.202026	31.440102	54.474640	260.622986	5	2	1
611	4424	0.51	1.530	504.1	2.794422	433.474060	7.143683	7.258739	53.387028	5	2	1
611	4496	0.50	1.500	985.9	2.825805	827.480225	15.632309	19.596180	120.341171	5	2	1
612	4013	0.50	1.500	6504.7	36.010239	5128.071289	91.006310	288.102600	961.460144	5	2	1
612	4088	0.50	1.500	1309.4	11.937249	961.595520	21.734552	102.353363	211.810532	5	2	1
612	4183	0.50	1.500	6184.5	196.052078	3864.610840	137.141891	607.731384	1378.963257	5	2	1
613	4183	0.50	1.500	1786.4	8.821926	1104.828003	31.481869	137.954361	503.322357	5	2	1
613	4271	0.51	1.530	991.6	3.784084	562.544373	26.691328	76.740540	321.827881	5	2	1
613	4284	0.48	1.440	1730.6	22.030258	1028.561279	42.169380	98.144875	539.737671	5	2	1
613	4356	0.50	1.500	3766.5	75.250984	1855.552979	136.207672	315.665649	1383.832275	5	2	1
614	4356	0.50	1.500	1006.1	10.578897	649.678833	15.032702	84.768478	246.049210	5	2	1
614	4428	0.51	1.530	2615.9	15.065224	1828.461182	48.307037	187.760056	536.335205	5	2	1
614	4430	0.25	0.750	2981.2	69.178635	2091.064209	51.726448	177.607635	591.577881	5	2	1
614	4499	0.50	1.500	3749.5	125.645447	2317.320557	109.165833	280.919312	916.462280	5	2	1
615	3923	0.24	0.576	1611.3	11.562439	1330.012939	24.698345	27.853745	217.187622	5	3	1
615	3951	0.97	2.328	621.0	20.250055	493.122284	9.055546	15.743872	82.804367	5	3	1
616	4088	0.50	1.200	1746.3	16.907505	1423.104614	20.732248	78.999664	206.604004	5	3	1
616	4181	0.50	1.200	909.3	18.623320	681.807068	15.508553	44.428810	148.949158	5	3	1
617	4181	0.50	1.200	1132.2	10.953424	915.203796	16.857676	23.017342	166.193176	5	3	1
617	4271	0.53	1.272	916.4	8.515818	681.652527	18.258720	30.569878	177.408859	5	3	1
617	4278	0.51	1.224	645.6	6.979456	523.624329	10.882579	13.372239	90.714027	5	3	1
617	4328	0.25	0.600	2617.9	51.893101	2023.068726	50.033611	66.876831	426.027222	5	3	1
618	4366	0.50	1.200	79.8	0.605980	58.243080	2.073277	2.522475	16.363676	5	3	1
618	4428	0.49	1.176	760.9	6.585859	578.873169	16.970469	25.631670	132.804047	5	3	1
618	4438	0.49	1.176	864.6	10.317697	588.887329	18.053905	103.486168	143.859985	5	3	1
618	4504	0.50	1.200	457.0	6.866774	357.914581	10.946039	12.160444	69.114754	5	3	1
619	4261	0.51	1.224	338.5	0.235075	283.447235	5.531513	6.644482	42.617725	5	3	1
619	4278	0.43	1.032	551.9	3.739688	462.898346	7.589914	11.743742	65.972359	5	3	1

Note: Full file contains data for approximately 30,000 one way links where each row contains data for a single one way link.





EMME/2 Road Network





MOBILE6 Outputs

The database formatted output of MOBILE6, used by M6Link, includes emission factors by...

- **Hour of the Day**
- **Area Type**
- **Facility Type**
- **Vehicle Type**
- **Emission Type**





M6Link Functions

Part 1

- Read in transportation network files
- Temporally allocate traffic from four time periods of day to hourly traffic volumes
- Spatially allocate traffic to grid cells
- Create speed profile files appropriate for input to MOBILE6
- Apply adjustments to reconcile with HPMS VMT data
- Adjusts annual average data to be day specific





M6Link Functions

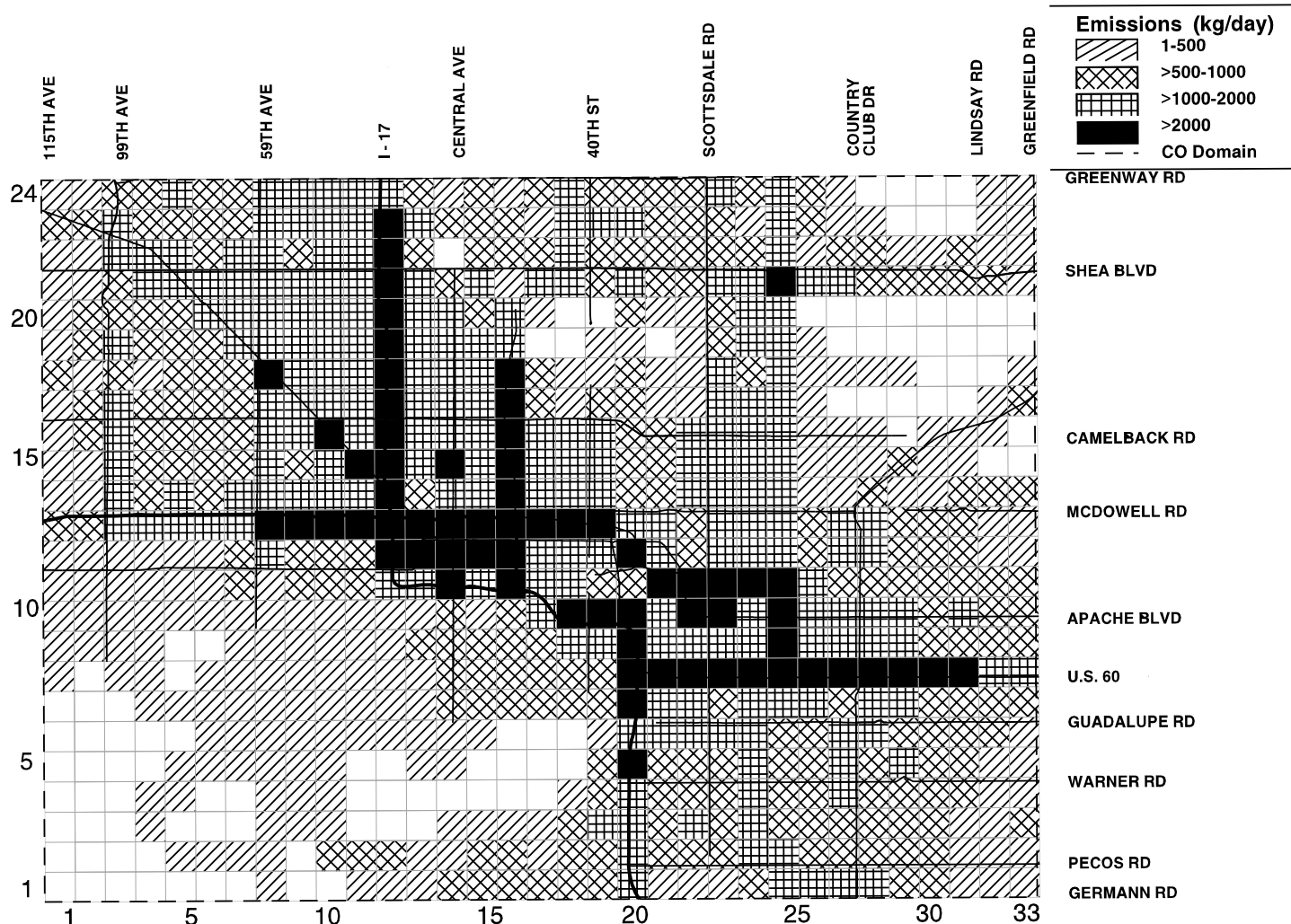
Part 2

- Read in output from first part of M6Link and MOBILE6
- Condense emission factors from 28 vehicle classes to 4 vehicle classes used by EMME/2
- Combine I/M and non-I/M EFs
- Adjust VMT by vehicle class to reflect MOBILE6 assumptions
- Combine EFs with VMT estimates to produce gridded hourly emission total estimates





Sample M6Link Output (using ArcView)



SAMPLE PLOT. CO Onroad Mobile Source Emissions - Output produced by M6Link.
Maximum Value = 4,029 kg/day at (14,13). Total = 662,340 kg/day





For more information

Contact Roger Roy

602-254-6300

www.mag.maricopa.gov