Data Management Group
Annual Report
2000

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SUMMARY

The Data Management Group (DMG), in cooperation with the funding agencies, has defined a set of urban travel data that is of collective interest to transportation planning agencies and the research community. Access to these data, which include results from various travel surveys and counting programs, is possible either interactively or by special request. During the year the funding agencies and their consultants together with the research community instigated 4763 data queries during 1236 computer sessions. In addition, there were 26 complex requests for data that required a customized computer program. Eight private firms were provided data on a cost recovery basis.

The funding agencies and several local governments, in addition to consultants working for these agencies and the research community, share the operation of the EMME/2 simulation package on the Data Management Group's computer system. During the year, the DMG provided support to these users in four major categories:

- development and maintenance of shared EMME/2 networks resulting in the release of a preliminary road and transit network representing the year 2001,
- technical assistance in the form of advice, macro writing, and EMME/2 training,
- assistance in the development and application of travel forecasting procedures,
- assistance in the application of EMME/2 modelling procedures to consultants working on projects for a member agency.

The DMG's role in information processing and support of EMME/2 is made possible by the sharing of a central computing resource at the DMG. A major challenge in 2000 was to maintain this service while operating out of four different locations in three different buildings, which was a situation caused by the demolition of the building at 42 St. George Street. During this turmoil, the DMG was able to improve remote access, improve system security, update system software and improve the web site. A rough measure of the web site's success is the number of hits. The number of hits on pages of the unsecured site, which contains general information but excludes access to the data base, was approximately 85,000. The corresponding number of hits on the secure site, which includes interactive data access, was approximately 50,000.

The DMG has agreed to manage the 2001 TTS under the guidance of the Transportation Tomorrow Survey Technical Committee with representation from all participating agencies. The Committee met for the first time in early 2000 and approved a work plan for the first phase of data collection. The interviewing phase for households outside the GTA and Hamilton began in September and continued until the first week of December 2000. More than 22,500 households in the areas outside the GTA were interviewed successfully. The final interviewing phase will occur in the Fall of 2001.

The DMG's interaction with the academic community resulted in 9 undergraduate and 7 graduate theses plus 10 reports, publications and presentations.

INTRODUCTION

The Data Management Group is a research project located at the Joint Program in Transportation, which is a research centre of the Faculty of Applied Science and Engineering at the University of Toronto. The Joint Program in Transportation was established in 1970 and the Data Management Group began operation in 1988. A history of both is contained in previous annual reports.[1]

Program approval and funding of the Data Management Group is the collective responsibility of the members of the Transportation Information Steering Committee (TISC), previously called the Toronto Area Transportation Planning Data Collection Steering Committee (TATPDCSC), with the following membership:

City of Hamilton, formerly Regional Municipality of Hamilton-Wentworth
City of Toronto
GO Transit
Ministry of Transportation, Ontario
Regional Municipality of Durham
Regional Municipality of Halton
Regional Municipality of Peel
Regional Municipality of York
Toronto Transit Commission

Each participating agency appoints a member of their technical staff to the Transportation Research and Data Management Group (TRADMAG), which is a standing committee of TISC, responsible for coordinating the needs of the funding agencies and the activities of the research project.

The Data Management Group operates with a part-time director, a full-time technical staff of four, and part-time technical staff and summer students. Administrative support is provided by the Joint Program in Transportation.

Until November 1999, the Joint Program and the Data Management Group were located at 42 St. George Street on the St. George campus of the University of Toronto. The building was demolished for the construction of a new building and the research project was relocated to temporary premises until July 2000. The Faculty of Applied Science and Engineering then provided newly renovated space for the Data Management Group at

Galbraith Building, Room 305
35 St. George Street
Toronto, Ontario M5S 1A4

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1 *Data Management Group Annual Report 1995, Report 54, Joint Program in Transportation (May 1996)*

Data Management Group Annual Report 1996, Report 59, Joint Program in Transportation (March 1997)

Data Management Group Annual Report 1997, Report 73, Joint Program in Transportation (October 1998)

INFORMATION PROCESSING

The Data Management Group (DMG), in cooperation with the funding agencies, has defined a set of data on urban transportation that is of collective interest to transportation planning agencies and the research community. These data can be summarized as follows:

- household, person and trip data from the 1986 Transportation Tomorrow Survey,
- household, person and trip data from the 1991 Transportation Tomorrow Survey,
- household, person and trip data from the 1996 Transportation Tomorrow Survey,
- trip data from the 1964 MTARTS,
- place of work and place of residence linkages from the 1986 Census,
- GO Rail and GO Bus surveys from 1983 to 1997,
- vehicle and person classification counts contained in all Cordon Counts from 1975 to 1998.

These data are stored on the DMG's computer system in a relational database structure. Access to these data is provided in three ways. First, access to travel information is provided to all registered users of the system with a command line procedure called 'drs'. Second, access to all information is provided to registered users with two browser-based procedures. Access to travel information is called 'iDRS', and the separate procedure for cordon count information is called 'CCDRS'. Third, because the data are complex, the staff at the DMG will extract information for a particular application using custom computer programs. This procedure is called a 'complex data request'.

Text-based Data Retrieval System 'drs'

Access to all these data, except Cordon Count data, can be extracted using a text screen displayed in a normal login to our system. The text-based data retrieval system (drs) was the original method for users to gain access to the system and was developed almost ten years ago. As the needs of the funding agencies changed and as more travel information became available, modifications and improvements have been implemented.

Staff at the DMG and frequent users of the EMME/2 software use this text-based data extraction method extensively with the aid of a data guide[2]. This is a convenient method of data extraction for users of EMME/2 as the initial text screen on system sign in can be used to access drs and resulting data files are automatically stored in their home directory. The following is a summary of the use of drs during the calendar year 2000 compared with a total in 1999.

2 *1996 Transportation Tomorrow Survey: Data Guide Version 2.1, Report 60, Joint Program in Transportation (August 1997), available at <http://www.jpint.utoronto.ca>*

Information Processing

Summary of Text Based 'drs' Data Requests

Month	Number of Data Queries	Number of Sessions
January	46	8
February	114	34
March	121	34
April	90	21
May	102	43
June	92	27
July	89	28
August	129	29
September	42	16
October	64	20
November	49	25
December	110	23
Total	**1048**	**308**
Total 1999	1305	353

Text Based 'drs' Users

City of Hamilton
City of Mississauga
City of Toronto
Data Management Group
IBI Consulting Group*
McCormick Rankin*
Ministry of Transportation, Ontario
Poulos & Chung Ltd.*
Regional Municipality of Peel
Totten Simms Hubicki Associates*
University of Toronto
(*access permission granted by a funding agency)

Internet Browser Data Retrieval System (iDRS)

Development of the data retrieval system using a web browser (iDRS) began in 1998 and was made fully functional in 1999. A complete description of the iDRS is contained in the DMG's 1998 Annual Report.[3] After extensive testing in-house, the final version was released to the funding agencies in June 1999. Corrections and refinements continued to be made in the year 2000.

System security is maintained by requiring all users to provide a login and password. Late in 1999, the funding agencies approved access to iDRS by consultants working on publicly funded transportation planning projects. During 2000, consultants were given access with approval by one of the funding

3 *Data Management Group Annual Report 1998, Report 81, Joint Program in Transportation (May 1999), available at <http://www.jpint.utoronto.ca>*

agencies for a restricted period of time, depending on the duration of the project. Late in 2000, the funding agencies gave approval for access to iDRS by any public or private agency. The initial experiment with more open access, which still requires a login and password, will begin in February 2001.

The following is a summary of the use of iDRS during the calendar year 2000 compared with a total in 1999.

Summary of Browser Based 'iDRS' Data Requests

Month	**Number of Data Queries**	**Number of Sessions**
January	96	31
February	67	17
March	308	57
April	32	20
May	372	67
June	216	30
July	96	22
August	70	20
September	32	12
October	86	47
November	93	33
December	40	14
Total	**1508**	**370**

Total 1999	536	160

Browser Based 'iDRS' Users

City of Mississauga
City of Toronto
Data Management Group
GO Transit
IBI Consulting Group*
Regional Municipality of Durham
Regional Municipality of Hamilton-Wentworth
Regional Municipality of Peel
Regional Municipality of York
Ryerson Polytechnic University
Toronto Transit Commission
University of Toronto
(*access permission granted by a funding agency)

Complex Data Requests

The interactive procedures available on drs and iDRS satisfy the majority of data needs. However, some data needs are too complex and require the intervention of an experienced analyst to formulate a custom query from the database. In addition, the DMG's staff can often help define the most relevant data for the problem at hand. There were 26 such requests for data in 2000. In addition, a small number of private firms ask for information. These requests are processed on a cost recovery basis. There were 8 such requests in 2000. The corresponding numbers were 39 and 4 in the calendar year 1999. Brief descriptions of special data requests in 2000 are contained in Appendix A.

Cordon Count Data Retrieval System (CCDRS)

The collective results from a regular program of detailed traffic counts undertaken over several years by various Regional Governments in the Greater Toronto Area on the road and transit systems are a rich source of valuable data for a wide range of transportation planning projects. Preliminary testing of the CCDRS in 1998 showed considerable promise to all funding agencies. The DMG assembled all such traffic counts for the years prior to 1998 in the file formats maintained by the Regional Governments. The DMG then prepared a common data base structure for the entire compilation. A preliminary version, without the complete set of 1998 counts, was made available to participating agencies in May 1999. After the Regional Governments checked the results of their 1998 count program, the results were added to the rest of the file and a complete data set was available in October of 1999. The complete data set contains detailed information from 38 separate cordon count programs undertaken by five Regional Municipalities spanning a time period from 1975 to 1998.

CCDRS was made fully functional in 1999. A complete description of the CCDRS is contained in the DMG's 1998 Annual Report (op. cit.). Corrections and refinements continued to be made in the year 2000 in conjunction with two summary reports that attempt to highlight the richness of the database. Each report uses 8 screenlines that divide the Regions plus 3 screenlines that provide some intra regional information. The first report[4] provides historical information on the changes in travel from 1985 until 1998, with particular emphasis on the changes in the morning and afternoon peak periods. The second report[5] investigates the unique character of the morning and afternoon peak periods at each of the screenlines in year 1998.

The preparation of these reports made extensive use of CCDRS, allowing the DMG to test and evaluate the procedures. The following is a summary of all uses of CCDRS during 2000 compared with a total for 1999.

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4 *Greater Toronto Area - Cordon Count Program Analysis of Traffic Trends 1985 to 1998, Report 84, Joint Program in Transportation (June 2000)*

5 *Greater Toronto Area - 1998 Cordon Count Program Analysis of Peak Periods, Report 85, Joint Program in Transportation (June 2000)*

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Information Processing

Summary of CCDRS Data Requests

Month	**Number of Data Queries**	**Number of Sessions**
January	149	39
February	85	27
March	62	28
April	115	51
May	509	127
June	254	62
July	388	63
August	402	58
September	36	18
October	48	34
November	133	32
December	26	19
Total	**2207**	**558**

Total 1999	411	108

CCDRS Users in 2000

City of Hamilton
City of Mississauga
City of Toronto
Data Management Group
Ministry of Transportation, Ontario
Regional Municipality of Durham
Regional Municipality of Halton
Regional Municipality of Peel
Regional Municipality of York
Toronto Transit Commission
University of Toronto

EMME/2 TECHNICAL SUPPORT

The funding agencies and several local governments, in addition to consultants working for these agencies, share the operation of the EMME/2 simulation package on the Data Management Group's computer system. In addition, support is given to teaching and research activities at the University of Toronto and Ryerson University. During the calendar year 2000, the DMG provided support to these users in four major categories:

- development and maintenance of shared EMME/2 networks,
- technical assistance in the form of technical advice, macro writing, and EMME/2 training,
- assistance in the development and application of travel forecasting procedures,
- assistance in the application of EMME/2 modelling procedures to consultants working on projects for a member agency.

Develop and Maintain the EMME/2 Networks

A decision was taken jointly by the DMG and TRADMAG to update the EMME/2 networks shared by all users from a representation of 1996 to a representation of 2001. Development of the 2001 Integrated Greater Toronto Area Road and Transit Network began as part of the 1996 TTS Initiatives program described in last year's annual report and continued as a task in the year 2000 work program of the DMG. A preliminary version of the integrated network was made available to the funding agencies in December 2000 and has been called Release 0. This preliminary network is based on data available up to August 2000. The major tasks undertaken to prepare this network were:

- compile the construction programs for provincial highways, regional and municipal roads as well as a description of the current transit service in all areas of the GTA plus Hamilton,
- assemble a base map of streets and highways in electronic format at a consistent projection (in this case NAD 83, Zone 17) and convert the 1996 EMME/2 network to this base map,
- with the 1996 network as a starting point, prepare a preliminary draft of the 2001 combined network with consideration given to construction programs up to the year 2021,
- develop a set of EMME/2 macros to check for network errors, coordinate the error checking by participating agencies, and implement the required network corrections,
- coordinate and implement the centroid location and connection for both the 1996 and 2001 GTA zone systems,

- implement a procedure to identify every link in the network that also represents a station in the cordon count database.

Technical Support To EMME/2 Users

Technical support can be considered to be of two types: support that is of short duration taking approximately one hour or less, and support of a substantial nature that requires several hours. Records are not maintained for short duration support as the act of recording is thought to be too time consuming. However, in 2000 there were 125 instances of support considered to be of a substantial nature. The requests fall into five broad categories:

- execution of a specific technical task in EMME/2,
- execution of a specific analytical or modelling task in EMME/2 with or without macro writing involved,
- technical assistance with setup of the EMME/2 program and related utilities,
- management of the data related to EMME/2 networks or trip tables,
- inquires pertaining to methodological and mathematical particulars of models and applications,

The following is a brief summary of the source of these requests for technical support over the year.

Source	Number
Funding Agencies	83
Local Municipalities	11
Research U of T	18
Research - other	1
Consultants	12

Assistance with Travel Forecasting Procedures

During the early part of 2000, while staff resources at the DMG were being supplemented with funds available from the 1996 TTS Initiatives program, the following tasks were undertaken:

- linking trucks movement related traffic counts data to the EMME/2 networks,
- investigation of HOV modelling approaches,
- modelling assistance provided to the Region of York,
- investigation of the directions for the EMME/2 network coding standard improvement.

These activities were part of an experiment in 1999 and 2000 to investigate the potential benefits to the funding agencies of providing technical support to modelling and forecasting projects. The GTA Modelling Group, a subcommittee

of TRADMAG, monitored the activities and recommended to the Steering Committee (TISC) in April 2001 that such activities continue in some form. Rather than allocate new resources to this activity, the DMG agreed to reallocate the existing staff complement on a trial basis. The demand for such services is unknown and the DMG will report to the Steering Committee in one year with a recommendation on the continuation of this type of support.

Modelling Assistance to Consultants

Over the past several years, a series of initiatives by the funding agencies has resulted in a valuable set of forecasting tools within the EMME/2 structure. In the current environment, these tools may be underutilized because of the limited number of experienced technical staff with sufficient experience in the operation of EMME/2 software, both in the offices of some funding agencies and private consultants. This experience is available at the DMG. At the Fall meeting of the Steering Committee, approval was given to make experienced DMG staff available to funding agencies and their consultants on a cost recovery basis.

Under this arrangement, the DMG staff would be available to any transportation planning agency (local, regional or provincial) in the GTA plus Hamilton and, in particular, to any private consultant working on projects for these agencies. The DMG staff is not to be used for one consultant to gain a competitive advantage over another in the bidding process. DMG support is available to any private consultant awarded a contract in the GTA plus Hamilton. However, it must be clear that the DMG is providing technical assistance and is not assuming responsibility for any aspect of the project. The arrangement is to be reviewed at the end of one year.

As a part of the new consulting initiatives, DMG's staff participated in two projects in 2000. One of them involved technical assistance in response to the private request by McCormick Rankin Corporation. The project dealt with conversion of EMME/2 banks from one computer platform to another. A second provided technical assistance to Earth Tech Inc. on an EMME/2 estimation of the traffic implications in a study initiated by the Ministry of Transportation Ontario.

COMPUTER SYSTEM SUPPORT

The role of the Data Management Group in information processing and technical support of EMME/2 is made possible by the sharing of a central computing resource at the offices of the DMG. The success of such a concept is dependent on three important conditions; a fast and reliable method to access the central system, ease of use, and a level of computing service that is consistent with current technology. Technical support staff at the DMG uses these principles to solve problems on a daily basis and as a guide to system improvement. As much as possible, reliable computer system access is provided every day of the week for 24 hours a day.

A major challenge in 2000 was to maintain this service while operating out of four different locations in three different buildings, which was a situation caused by the demolition of the building at 42 St. George Street. The final relocation of all computer equipment will not take place until early 2001.

Access to Computing Services

Access to computing services at the Data Management Group is currently provided in one of two ways. The first method, and the one used for the longest period of time, is by modem through a conventional telephone line. The second method is through an internet connection. During 1999 and 2000, the configuration on the DMG's end of modem connections was changed significantly in an effort to provide better service. The conventional telephone lines were replaced with a series of digital telephone lines (ISDN). In this way, new modems that support the V.90 protocol can connect at a much faster speed than was possible previously. This enhanced speed is available over a conventional telephone line. The new bank of ISDN telephone lines is now configured in a 'hunt group' that allocates the next available telephone line to an incoming call. During 2000, use of the lines was monitored to determine that sufficient capacity had been provided. It is evident that many agencies are moving to access through an internet connection rather than dialing the DMG directly. The new telephone lines allowed the DMG staff to implement a cost-effective improvement to the Ministry of Transportation's dedicated connection.

Access by the internet, the second method, continued to grow during the year as more and more offices activated internet service to their technical staff. In addition, private consultants working on projects for the funding agencies have found it to be more convenient to initiate an internet connection. The service is usually comparable in performance to a direct telephone connection, and in some instances faster. The software required for access is now provided by the DMG without charge and with complete instructions. Connection through the internet was improved during the year with the installation of an internal high speed connection including a connection to the University of Toronto's network, which is the entry point for internet users coming to the DMG. This tenfold increase in speed also increases the ability to accomodate more internet users

at the DMG.

System Security

Modem connection is the most secure method of access to our system. The trend to more users preferring access through the internet raises concern about system security. For example, in 2000 there were 485,000 unauthorized attempts to enter our system, which is more than 9,000 every week on average. In an attempt to reach a balance between ease of use by authorized users and protection against unauthorized users, the system now requires all users to access with a secure shell (SSH). The software has been customized for DMG users, including a capability to download files efficiently, and is available to all users on the DMG's secure web site.

In 1998, the DMG installed a computer dedicated exclusively to protecting the system from intruders over the internet . In 2000, an additional computer was installed and configured to protect the systems from intruders that may attempt access through the dedicated connection to the Ministry of Transportation. In addition, a series of experiments with intrusion detection procedures was undertaken and will continue into 2001. The new network equipment described above will allow, for the first time, the implementation of an Intrusion Detection System (IDS). These system security measures will remain unobtrusive and unnoticed by an authorized user of the system.

Related to system security, was a review in 2000 of software supporting the iDRS/CCDRS. The issue is to be certain that calls from this software to the files where the data are stored cannot be used as an entry point for a break-in. The precaution was taken after the Steering Committee (TISC) approved, at their October meeting, more general access to the iDRS location on the DMG's secure web site.

System Improvements

The technical staff undertook an investigation in 2000 of strategies for major computer system upgrades. The concept is to significantly improve the computing power and available disk storage to every user of the system. Implementation of the system improvements is planned for early 2001.

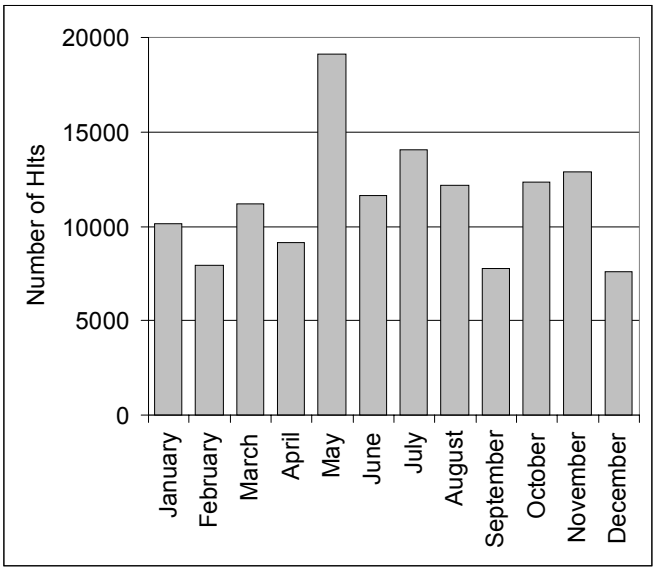
The latest version of EMME/2 (Version 9.2) was installed, tested and released to users during 2000. The DMG site was chosen by INRO, the suppliers of EMME/2, as a test site for their new graphical interface (ENIF). The test version of the software should be available for the operating system used by the DMG (UNIX) in early 2001.

Work is continuing on the implementation of a graphical selection procedure on CCDRS. Interactive display of graphical information about screen line and station location is complete, but a direct link to the selection procedures will require more development.

Web Site Development

The technical staff developed a web site in 1999 and 2000 that satisfies a combination of needs. The needs are broadly defined as a service to the casual user wanting general information about the DMG (unsecured site), a service to the technical planning staff in the GTA (secure site), and an information site for the 2001 TTS. The web site is now the first entry to iDRS and CCDRS described earlier in this report. This entry is through a secure portion of the site and requires a login name and password. This allows appropriate access restrictions to valuable data bases. The site also describes the procedures necessary to gain access. In addition, this secure portion of the web site contains software that members of the funding agencies can use, such as the secure shell mentioned above.

The unsecured portion of the site operates as two locations with <http://www.jpint.utoronto.ca> containing general information on the DMG, while <http://www.transportationtomorrow.on.ca> contains information particular to the conduct of the 2001 TTS. The DMG's portion of the site provides information on previous TTS as well as providing access to a list of all reports. The report list includes a link to electronic files of all recent reports in a form that can be easily downloaded and printed locally. The TTS site contains information that may be of interest to occupants of household contacted during the conduct of the survey. The site is an attempt to provide confirmation of the importance and authenticity of the survey.



One rough measure of the effectiveness of the web site is the number of times that users attempt to see a page on the site. Every attempt to read a page is recorded as a hit. The number of hits on pages of the unsecured site (excluding the TTS location) was approximately 85,000 (compared to 60,000 in 1999) and the corresponding number on the secure site was approximately 50,000 (compared to 20,000 in 1999). The distribution of the combined 135,000 hits was uneven over the year. The graph above indicates the number of hits per month over the year 2000. The TTS web site recieved 12,300 hits from July to December of 2000. It should be noted that many of the recorded hits on the unsecured sites can be attributed to search engines attempting to keep their files current.

2001 TRANSPORTATION TOMORROW SURVEY

The Transportation Tomorrow Surveys (1986, 1991 and 1996) are currently accepted by all public agencies as a sound information base on the characteristics of travel in the Greater Toronto Area. The combined data set from all survey years is actively used by local, regional and provincial planning agencies. Information from these travel surveys is now accepted as reliable evidence for judicial and quasi-judicial hearings. A decision to proceed with a 2001 TTS was taken in 1999 by the Transportation Information Steering Committee (TISC) and the administrative structure of the survey was approved. The responsibility for all policy and funding matters are to rest with TISC. The committee delegated the technical responsibility to a Transportation Tomorrow Survey Technical Committee with representation from all participating agencies, and gave management responsibility to a Management Team associated with the DMG. The participating agencies include the following:

City of Barrie
City of Guelph
City of Hamilton
City of Orillia
City of Peterborough
City of Toronto
County of Peterborough
County of Simcoe
County of Victoria
County of Wellington
GO Transit
Ministry of Transportation Ontario
Regional Municipality of Durham
Regional Municipality of Halton
Regional Municipality of Niagara
Regional Municipality of Peel
Regional Municipality of York
Toronto Transit Commission
Town of Orangeville

The technical committee met for the first time in early 2000 and approved a work plan for the first phase of data collection. The committee gave approval for the use of the same data collection methods as previous TTS with the same 5% random sample of households as used in the 1996 TTS. The strategy selected was to conduct the interviews for outside agencies in the Fall of 2000 from a single site located close to subway access in central Toronto. The smaller survey in 2000 allows for assembling the necessary equipment and computer support in stages as well as training interviewers and supervisors for the larger stage in the Fall of 2001. The interviewing phase began in September and continued until the first week of December 2000. More than 22,500 households in the areas outside the GTA were interviewed successfully.

DMG PUBLICATIONS

Publications generated by the activities of the DMG are placed on our web site at <http://www.jpint.utoronto.ca> in a format suitable for access and printing by the user. The following publications were created in the year 2000.

"Data Management Group Annual Report 1999", Report 82 (March 2000)

Gabriel Alvarado, "Conical Travel Time Functions for the GTA Road Network", Report 83 (June 2000)

"Greater Toronto Area - Cordon Count Program Analysis of Traffic Trends 1985 to 1998", Report 84 (June 2000)

"Greater Toronto Area - 1998 Cordon Count Program Analysis of Peak Periods", Report 85 (June 2000)

UNIVERSITY RESEARCH

A portion of the funding provided to the DMG is allocated to unspecified research on topics related to urban transportation. In addition to these funds, the very research nature of the DMG's activities is conducive to the development of other research projects, some of which receive funding from other sources. The research support that is made possible by the existence of the DMG include; access to the data bases, access to the EMME/2 network and modelling system, access to software (ArcInfo, Oracle, SAS, etc.), and technical support in the use of these data and software.

Undergraduate Theses Completed in 2000

Chen, A., "Travel Demand Analysis for Non-Work/School Trips in Trip Generation and Distribution Stages", B.A.Sc. (Toronto)

An analysis of trip generation and distribution models for non-work/school trips in the Greater Toronto Area. The influence of explanatory variables on trip generation models was examined using regression analysis. For the Trip Generation model observed trips are compared with predicted trips obtained from a calibrated gravity model.

Chow, T.T.L., "Non-Work/School Modal Split Modelling", B.A.Sc. (Toronto)

Determination of a modal split model for Non-Work/School Trips made in the Greater Toronto Area. The average number of household vehicles was related to mode choice using data obtained from the 1996 Toronto Tomorrow Survey (TTS).

Publications and Research

Eberhard, L.K., "A Spatial and Temporal Study of Automobile Ownership in the Greater Toronto Area: Implications to Transportation System Efficiency and Sustainability", B.A.Sc. (Toronto)

A description of automobile ownership trends, both spatial and temporal, in the Greater Toronto Area based on empirical findings from the analysis of 1986, 1991 and 1996 Transportation Tomorrow Survey (TTS) data. An attempt is made to examine trends in automobile ownership as they relate to achieving transportation system efficiency and sustainability. Automobile ownership levels are examined in the downtown core and the suburbs and the 'travel corridors' that extend from the City.

Ip, J., "Post-Modelling Evaluation Module", B.A.Sc. (Toronto)

The creation of EMME/2 macros to assist in the computation and display of major congestion measures using the output of the four stage urban modeling process in EMME/2. The major congestion measures examined are volume-to-capacity ratio, travel speed, level of service and delay.

Mastrangelo, G.P., "Modelling a Northward Transit Extension to Richmond Hill Using EMME/2", B.A.Sc. (Toronto)

An examination of a theoretical model of extending the Yonge Street subway into Richmond Hill using EMME/2. The subway was extended by three stops into Richmond Hill as far as Yonge and Highway 7 and three scenarios considering different headways between the trains were examined.

Moraes, R., "Personal and Travel Attributes of Telecommuters in the GTA", B.Eng. (Ryerson)

An investigation of the personal and travel characteristics of home based workers (telecommuters) in the GTA and the implications of such characteristics on travel demand. Using data derived from the 1996 Toronto Tomorrow Survey (TTS), travel characteristics such as average daily trips made, travel mode chosen and start time of trip were compared for home based workers and non-home based workers. Personal characteristics such as age, gender and the size of the household were also compared.

Ng, A., "Peak Period Travel Pattern", B.A.Sc. (Toronto)

An examination of Peak Period Travel Patterns using data from the 1986, 1991 and 1996 Toronto Tomorrow Survey (TTS). Variables such as travel mode, travel purpose, and characteristics of the trip maker such as age were examined to some extent.

Poon, W.W.L., "Empirical Analysis of the Relationship between Travel Behaviour and Distance from Subway Stations", B.A.Sc. (Toronto)

An examination of the affect of accessibility to subway stations on travel behavior including choice of travel mode. The distance to the subway is used as the accessibility factor and is examined at both the origin and destination ends of the trip. Accessibility is also related to the age of the trip makers and the population density of the area.

Ragusa, C., "Highway 407 Corridor Rapid Transit Study in EMME/2", B.A.Sc. (Toronto)

An investigation of the impacts of the addition of a rapid transitway along the Highway 407 corridor using EMME/2. Two vehicle alternatives were modeled along the transitway: buses and Light Rail transit. Trip assignment procedures were performed and the results analyzed.

Soans, N., "Analysis of Morning Peak Hour Home to School Trips for the GTA", B.A.Sc. (Toronto)

An analysis of morning peak hour home-to-school trips in the Greater Toronto Area using 1996 Toronto Tomorrow Survey (TTS) Data. This study focuses on the influences of gender and location on school trips.

Wu, W., "Relationship between Life-Cycle and Person Travel Attributes", B.Eng. (Ryerson)
An empirical analysis of the effects of age on travel characteristics in the GTA using 1996 Toronto Tomorrow Survey (TTS) data. Trip rates, mode of travel, trip purpose and trip length were examined with relation to the age of the tripmaker. The effect of other factors such as gender and the possession of a driver's license were also considered.

Graduate Theses Completed or in Progress in 2000

Hadayeghi, A.,"Macro Road Safety Models for Transportation Planning", M.A.Sc. (Toronto) in progress

Haroun, A., "Microsimulating Residential Housing Markets", Ph.D. (Toronto) in progress

Lee, A., "Vehicle Emissions Modelling", M.A.Sc. (Toronto) in progress

Mohammadian, A., "Modelling Household Automobile Transactions", Ph.D. (Toronto) in progress

Muhammad, B., "Modelling of Freeway HOV Lanes", M.A.Sc. (Toronto), in progress

Nazar, C., "Options for Replacing the Gardiner Expressway", M.A.Sc. (Toronto) in progress

Peiravian, F., "Road Network Modelling for Environmental Impact Analysis", Ph.D. (Toronto) in progress

Reports, Publications and Presentations in 2000

Miller, E.J., "Travel in the GTA: Past & Current Behaviour and Relation to Urban Form", presented in Panel III - Can Growth Be Managed? in Portrait of a Region: The Face of Our Future, a workshop sponsored by the Canadian Urban Institute, Toronto, December 12, 2000.

Miller, E.J., "Travel in the GTA: Past & Current Behaviour and Relation to Urban Form", presented to the Transportation Information Steering Committee, Toronto, December 6, 2000.

Miller, E.J. "Uses of TTS and Census Place of Work Data", presented at A Seminar on Applied Uses of Census Place of Work Data for Transportation and Planning Purposes, and Beyond", Mississauga, Ont., October 20, 2000.

Miller, E.J., "Travel in the GTA: Past & Current Behaviour and Relation to Urban Form", presented to the Greater Toronto Services Board, Toronto, October 6, 2000.

Miller, E.J., "Travel in the GTA: Past & Current Behaviour and Relation to Urban Form", presented to the Portrait of a Region, Workshop I, Richmond Hill, Ont., September 22, 2000.

Miller, E.J. and A. Shalaby, "Travel in the Greater Toronto Area: Past and Current Behaviour and Relation to Urban Form", The Neptis Foundation Study, Toronto: University of Toronto, January, 2000, 105 pages.

Miller, E.J. and Amer S. Shalaby,. "Historical Trends in Travel Beahvior in the Greater Toronto Area and Policy Implications", Proceedings of the 80th Annual Transportation Research Board Meeting,Washington D.C.

Miller, E.J. and Amer S. Shalaby, "Travel Behaviour in the Greater Toronto Area and Policy Implications", 3nd Transportation Specialty Conference, Canadian Society of Civil Engineering, London, Ontario.

Publications and Research

Miller, E.J. and Amer S. Shalaby, "Urban Form and Travel Behaviour Trends in the Greater Toronto Area, 1964-1996", The 2000 Meeting of the Canadian Regional Science Association, Toronto.

Shalaby, A.S., "An Approach to Assess Relative Contributions of Urban Changes to Travel Growth", 3nd Transportation Specialty Conference, Canadian Society of Civil Engineering, London, Ontario.

APPENDIX A DATA REQUESTS

Data Requests Summarized by Agency

In addition to the data requests that are served directly through the on-line interactive TTS Data Retrieval System (DRS), the DMG staff processed the following requests. The diversity of the requests illustrates the robust nature of the Transportation Tomorrow Survey Data sets as currently housed at the DMG.

Participating Agencies

February

Professor Eric Miller from the University of Toronto requested household, person, trip, and transit records from the 1996 TTS database for his undergraduate students.

Professor Pierre Filion from the University of Waterloo requested household, person and trip data for eight GTA neighbourhoods from the 1996 TTS database for a SSHRC project.

March

Region of York requested the average trip distances among regions for trips made in the 24-hour and morning peak period broken down by travel mode.

Origin-destination trip matrices for five time periods were requested by GO Transit from the 1986, 1991 and 1996 TTS.

1996 TTS origins and destinations within the City of Toronto were used to generate centroids based on a boundary file provided by the City of Toronto.

April

1996 TTS employment (including F/T, P/T, work at home) were requested by the City of Toronto for a specific downtown area.

May

Lists of cordon count screenlines and corresponding stations of regional boundaries were provided to the Ministry of Transportation.

Distributions of trips by trip distance on TTC system with and/or without other transit operators from the 1986, 1991 and 1996 TTS, were requested by Urban Renaissance Institute through the City of Toronto.

Kathleen McSpurren, a research associate with Professor Pierre Filion from the University of Waterloo requested trip data for eight GTA neighbourhoods from the 1996 TTS database for a SSHRC project.

APPENDIX A DATA REQUESTS (continued)

June

Trips made on three GO rail lines (Lakeshore East, Lakeshore West, Milton) during the AM peak period and 24 hour period were requested by IBI Group for a rapid transit study for TTC.

1996 TTS trips from work (usual place of work) to home during the afternoon peak period were extracted for auto driver mode and for trips made by persons who paid for parking at work. These data were provided to Morrison Hershfield for the study of "A Regional Analysis of the Environmental and Socio-Economic Consequences of Adopting the National Climate Change Transportation Table's Measures in Ontario" with the Provincial and Environmental Planning Office of the Ministry of Transportation Ontario.

The City of Toronto requested the number of dwelling units, residents, AM peak work trips, and 24-hour trips for several city employment nodes within the GTA. The request involved reassigning locations to the zone boundary provided by the City.

Distributions of trips by trip distance on the TTC system with both access and egress within Toronto were requested from the 1986, 1991 and 1996 TTS data, by Urban Renaissance Institute through the City of Toronto.

Origin-destination trip matrices for five time periods were requested by GO Transit from the 1986, 1991 and 1996 TTS.

The City of Toronto requested the number of dwelling units, population, and employment within 1 km of each subway station from the 1996 TTS.

Professor Eric Miller and Ph.D. Candidate Murtaza Haider from the University of Toronto requested household, person, trip and transit records within the City of Toronto from the 1996 TTS database for an impact study of rail transit on mode choice models.

July

Coordinates for selected intersections along Highway 7 were extracted for IBI for a study being conducted for the Urban Planning department of the Ministry of Transportation Ontario.

October

1996 TTS total 24-hour trips by transit for all trip types and work trips were extracted. These data were provided to Morrison Hershfield for the study of "A Regional Analysis of the Environmental and Socio-Economic Consequences of Adopting the National Climate Change Transportation Table's Measures in Ontario" with the Provincial and Environmental Planning Office of the Ministry of Transportation Ontario.

Coordinates for selected intersections in Simcoe County were extracted for IBI for a study being conducted for the SouthWestern Region Office and the Environmental Planning Office of the Ministry of Transportation Ontario.

Coordinates for selected intersections in the Georgian Triangle Area were extracted for IBI for a study being conducted for the SouthWestern Region Office of the Ministry of Transportation Ontario.

APPENDIX A DATA REQUESTS (continued)

Professor Eric Miller from the University of Toronto requested trip origin and destination zones and purposes, start times and home zones for all auto driver trips from the 1986 and 1996 TTS.

November

A list of all cordon count screenlines and corresponding stations and location was extracted for the City of Toronto.

1996 TTS household, population, transit and trip data were extracted for buffers defined for segments of four TTC routes. These data were provided to Tranplan Associates for a transit and land use study being conducted on behalf of the City of Toronto.

Average trip lengths and the number of trips were extracted for the municipalities of the GTA from the 1986, 1991 and 1996 TTS data for the Region of York.

Professor Eric Miller and Ph.D. Candidate Murtaza Haider from the University of Toronto requested GTA zone boundary files in a MapInfo format.

December

MapInfo polygons representing buffers around four defined TTS routes were provided to Tranplan Associates for a transit and land use study being conducted on behalf of the City of Toronto.

Private Data Requests

Read, Voorhees & Associates Ltd. requested sixteen trip matrices with different trip purposes, travel modes and trip start times from the 1996 TTS at both GTA zone level and planning district level.

BA Consulting Group Ltd. requested trips originated from or destined to 5 specific GTA zones from the 1996 TTS database during AM and PM peak periods.

Marshall Macklin Monaghan Ltd. requested the mode distribution of trips for each GTA zone in the City of Toronto during the AM peak period.

BA Consulting Group Ltd. requested the total dwelling unit count for 1991 GTA Zone 69 and morning and evening peak period O-D matrices for all trip purposes at planning district level with disaggregation in PD 2 from the 1996 TTS data.

Mediacom Inc. requested seven O-D matrices for auto person trips with respect to various gender and age groups at the planning district level from the 1996 TTS data.

BA Consulting Group Ltd. requested morning and evening peak period O-D matrices for all trip purposes at planning district level disaggregated in PD 10 from the 1996 TTS data.

APPENDIX A DATA REQUESTS (continued)

SernTec Engineering Inc requested home to work matrices for various travel modes, and matrices containing various household and employment (F/T, P/T, work at home) attributes sorted by traffic zone, household type, and the number of adults and children in the household from the 1996 TTS data.

SernTec Engineering Inc requested O-D matrices for all trip types and work trips for the morning peak period and the entire day from the 1996 TTS data.

Miscellaneous Data Requests

City of Toronto and TTC requested an update to the zonal aggregations available on iDRS to reflect the new (year 2000) ward boundaries in the City of Toronto.

City of Guelph requested the average auto occupancy for residents and for trips made to the City of Guelph for an Environmental Climate Study.