datamanagementgroup

Annual Report
2012

prepared by: Data Management Group
Department of Civil Engineering
University of Toronto
Telephone: (416) 978-3916

INTRODUCTION

The Data Management Group (DMG) was established in 1988 on the basis of a proposal from the University of Toronto's Joint Program in Transportation for an autonomous research group with the following objectives:

(a) to establish a common, centrally-accessible database containing information on transportation activities, zone systems, transportation networks and land use activity,

(b) to provide a transportation data retrieval service to the participating agencies,

(c) to monitor the adequacy of available data and propose approaches for adding to or updating the data as mutually agreed upon by the agencies,

(d) to promote greater interaction between university researchers and practitioners in the field of urban transportation planning,

(e) to promote the communication of transportation information and data obtained or administered by the Data Management Group to interested agencies and to the public,

(f) to further the improvement of transportation demand analysis, research, and forecasting in the Greater Toronto Area.

Although the administration of the group has changed to the Department of Civil Engineering at the University of Toronto, the DMG continues to be guided by these objectives into this its 24th year of continuous operation.

Program approval and funding of the DMG is the collective responsibility of members of the Transportation Information Steering Committee (TISC) with the following membership:

City of Hamilton
City of Toronto
Metrolinx
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, and is responsible for coordinating the needs of the funding agencies and the activities of the research project.

This report provides a brief profile of the staff employed and a description of the activities undertaken by the DMG during the calendar year 2012.

STAFF AND LOCATION

Full-time Technical Staff in 2012
Susanna Choy, B.A.Sc. (Industrial Engineering), M.Eng. (Civil Engineering) University of Toronto, P.Eng.

Reuben Briggs, B.A.Sc. (Civil Engineering), M.A.Sc. (Civil Engineering) University of Toronto, P.Eng.

Urban Transportation Planning Interns in 2012
Justin Kwok, B.A.Sc. (Civil Engineering) University of Toronto

Software Development and Technical Support in 2012
Michael O'Cleirigh, B.Computing (Computing & Information Science), University of Guelph

Ho-Yan (Justin) Chan, B.A.Sc. (Electrical & Computer Engineering), University of Toronto

Summer Students in 2012
Ian Weinberger, 2nd year undergraduate, Department of Civil Engineering, University of Toronto

Alan Oh, 3rd year undergraduate, Department of Electrical & Computer Engineering, University of Toronto

Part-time Director
Gerald N. Steuart, Professor Emeritus, Department of Civil Engineering, University of Toronto

Data Management Groups Web Site
http://www.dmg.utoronto.ca

The DMG is located in offices at;
Department of Civil Engineering
University of Toronto
Galbraith Building, Room 305
35 St. George Street
Toronto, Ontario M5S 1A4
Telephone: (416) 978-3916
FAX: (416) 978-3941

INFORMATION PROCESSING

The term 'information processing' is used in this instance to describe a set of activities supporting the management, storage and distribution of urban travel information. The principle components of this information are the results of the Transportation Tomorrow Surveys and a collection of all Cordon Count surveys.

Transportation Tomorrow Surveys and iDRS

Under the guidance of TISC, a series of urban travel surveys have been conducted every five years since 1986. The DMG administers the data files on urban travel contained in the 1986, 1991, 1996, 2001 and 2006 Transportation Tomorrow Surveys in the form of a set of relational databases with various methods of access. Direct access to the original files is restricted to DMG staff to ensure that information on a particular household cannot be identified. Currently, data files available to iDRS users contain the following information:

Number of Records

Year	Households	Persons	All Trips	Transit Detail
1986	61453	171086	370248	56615
1991	24507	72496	157349	14896
1996	115193	312781	657971	70295
2001	136379	374182	817744	85095
2006	149631	401653	864348	87244

The increasing size of the databases reflects not only growth in the area but also changes in the size of the area surveyed.

Originally, a staff member at the DMG processed every request for travel information and stored the results in a computer file that was then forwarded to the end user. In the mid 1990s, in an effort to improve access, staff at the DMG developed a text-based data retrieval system (drs) as the original method for external users to gain access to the data files and complete the data extraction themselves. This retrieval system was very effective when a modem was used as the principle method of remote access to the DMG's computer system. Over the past ten years, as the demand for travel data grew and the Internet became the preferred method of remote access, a data retrieval system specifically designed for Internet access was developed (iDRS). All the features of drs were incorporated into the browser-based iDRS and the drs process was phased out. In order to meet the changing needs of the data, the DMG continues to improve the functions of iDRS and is in the process of developing a new version of the software.

The initial release of iDRS was restricted to use by the funding agencies. As the DMG gained more experience with the procedure and continuous improvements were made, more users were allowed access. In 2002, access to iDRS was made available to any individual that requested access. The individual is required to sign an agreement form

and system security is maintained by giving each user a unique login and password. This procedure has the added benefit that agencies outside the Greater Toronto and Hamilton Area that participated in the 1996, 2001 and 2006 Transportation Tomorrow Surveys can access their data without the need to set up their own database system.

The iDRS procedures are reasonably complex, therefore, the DMG staff compiled a user's manual, which is available to all existing and potential users at:

> http://www.dmg.utoronto.ca/pdf/idrs/idrs_manual.pdf

A majority of data requests processed by iDRS use one of the several zone systems that have been defined by the participating agencies over the years. In 2007, the DMG completed the task of linking travel data for all TTS (including the 2006 TTS) to the 2001 zone system. The result is that users can trace historical trends using a consistent spatial definition. In 2009, the DMG assembled a new 2006 zone system from files submitted by the 2006 TTS participants. Only the 2006 TTS data set has been assigned to the new zone system.

Access through iDRS needs to be used in conjunction with the latest description of the data files, which is documented in the publication '2006 Transportation Tomorrow Survey: Data Guide', available at:

> http://www.dmg.utoronto.ca/reports/ttsreports.html

A History of iDRS Data Requests

Year	Number of Data Queries	Number of Sessions
1999	536	160
2000	1508	370
2001	7495	727
2002	6924	1411
2003	16239	2695
2004	13124	2142
2005	10654	2032
2006	9369	1771
2007	18971	2950
2008	21006	4045
2009	19745	3788
2010	14498	5379
2011	15804	5626
2012	16818	5938

When the browser based data extraction procedure (iDRS) was first released in 1999, the users were registered users of the DMG's computer system. The initial use of iDRS was encouraging. Subsequently in late 2000, the Steering Committee gave approval for use by anyone registering and providing information on their affiliation. The growth in use of TTS data is reflected in the growth of the use of iDRS for data extraction. The following table shows the growth since iDRS was first introduced in 1999. The 'Number of Sessions' reflects the number of times registered users, including DMG staff, have initiated a data retrieval session. The 'Number of Queries' reflects the number of times an output was generated during a session. Almost without exception, many queries are generated during a given session.In 2012, there were 81 different agencies and groups that extracted the data through iDRS.

Summary of Browser Based iDRS Data Requests in 2012

Month	Queries	Sessions
January	1145	403
February	1233	407
March	699	228
April	1183	415
May	1315	466
June	1665	563
July	1096	319
August	1420	525
September	2390	892
October	1708	584
November	1927	758
December	1037	378

Total 2012	16818	5938
Total 2011	15804	5626

Affiliations of the Browser Based iDRS Users in 2012
   AECOM
   ARUP
   Associated Engineering
   BA Group
   Brock University
   Canadian Fitness and Lifestyle Research Institute
   CBS Outdoor
   CC Tatham & Associates
   Centre for Sustainable Transportation

Affiliations of the Browser Based 'iDRS' Users in 2012 (continued)

CF Crozier and Associates
City of Barrie
City of Brampton
City of Guelph
City of Hamilton
City of Hong Kong
City of Mississauga
City of Toronto
City of Vaughan
City of Waterloo
Cole Engineering Group
Community Development Halton
Concordia University
Creative Urban Projects
Darmstadt University of Technology Spatial and Infrastructure Plan
Delcan Corporation
Dillon Consulting
DMG
Entra Consultants
Environ International
EXP services
Genivar Inc
GHD
GO Transit
Gosselin Associates
Halcrow Consulting
HDR iTrans
IBI Group
IndEco Strategic Consulting
LEA Consulting
Mark Engineering
McCormick Rankin Corporation
McGill University
McMaster University
Metro College
Metrolinx
Ministry of Transportation Ontario
Massachusetts Institute of Technology
MMM Group
Montufar Group
NSW Transport
Paradigm Transportation Solutions
Poulos & Chung
Project Neutral
Queen's University
Read Voorhes & Associates Ltd
Region of Durham
Region of Peel
Region of Waterloo

Affiliations of the Browser Based 'iDRS' Users in 2012 (continued)

> Region of York
> Rexcel Systems
> RJ Burnside
> Ryerson University
> Sernas Group Inc
> St. Michaels Hospital
> Steer Davies Gleave
> Tedesco Engineering
> The Pembina Institute
> The Planning Partnership
> Toronto Environmental Office
> Toronto Parking Authority
> Toronto Public Health
> Toronto Transit Commission
> Toronto Waterfront Viaduct
> Town of Aurora
> Town of Markham
> Transtech GHD
> UEM Consulting
> University of Pennsylvania
> University of Toronto
> University of Waterloo
> York University

TTS Special Data Requests

The interactive procedures available with 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. Although special data requests are an important function, an objective of the DMG is to reduce the number of such data requests in favour of users processing their request through iDRS. Two special data requests were made in 2011 and six were requested in 2012. A growing interest in using disaggregate data for travel forecasting is largely responsible for the increase. The special requests for 2012 are listed below.

TTS Special Data Requests from All Agencies in 2012

The Department of Public Health of the City of Toronto requested demographic information such as age, gender, employment and student status for the residents of City of Toronto by their transportation modes and trip purposes from the 2006 TTS.

The City of Toronto was divided into quintiles based on ten different measures of 'walkability' for the Institute for Clinical Evaluative Sciences and the St. Michael's Hospital. Indices such as vehicles per household and per person, trips made per person by different travel modes from the 2006 TTS data were evaluated.

2006 TTS trip and transit access locations for bicycle trips and transit trips with bicycle access or egress were provided to the Ministry of Transportation, Ontario.

The Cycling Think Tank at the Cities Centre, University of Toronto requested 2006 TTS data on cyclists and the households making cycling trips in the City of Toronto aggregated by Ward. Data included the number of households with cyclists , the average size of those households and the average age of cyclists.

The City of Toronto requested 1986 and 2006 TTS household, person and trip data for an area around Eglinton Ave East and Eglinton Ave West from Jane St to Kennedy Rd. Data included # of persons in a household, no of vehicles available to household and trip mode, purpose and origin and destination zones.

Restricted access to the 2006 TTS trip data was provided to Peter Kucirek to build and validate a transit model for his M.A.Sc. research, Department of Civil Engineering, University of Toronto.

Restricted access to the 1986 TTS household data was provided to Jared Duivestein to develop a vehicle ownership model for his M.A.Sc. research, Department of Civil Engineering, University of Toronto.

Restricted access to the 2006 TTS trip and trip data was provided to Mohamed Mahmoud to develop a transit accessibility model for this Ph.D. research, Department of Civil Engineering, University of Toronto.

Cordon Counts and CCDRS

The City of Toronto (then the Regional Municipality of Metropolitan Toronto) began collecting detailed information on the type and volume of traffic crossing selected points on the road system as early as 1975. The counting locations were selected such that screen lines or cordon lines could be defined and the counting program has continued on a regular basis since that time, usually twice in a five year cycle. Subsequently, other Regions began similar programs. Given the number of Regions with a similar program, they began coordinating their count programs and defining a common set of data standards. In 1998 the DMG assembled the most recent of such traffic counts in a common database structure and developed a Cordon Count Data Retrieval System (CCDRS). CCDRS is now widely used by a wide variety of public and private agencies.

In addition, participating agencies now use CCDRS as a tool in verifying their cordon count results. The approved procedure is to place new cordon count data directly into the CCDRS database with a disclaimer notice to all users that the new information is preliminary. In 2011, another Cordon Count was undertaken by the participating regions. The 2011 count information was placed on CCDRS as it was received and as the DMG received correction. The funding partners were still reviewing their count information at the end of 2012 and the disclaimer was still in place.

The CCDRS procedures are reasonably complex and new users should refer to the user's manual. The manual is available to all existing and potential users at:

http://www.jpint.utoronto.ca/PDF/doc104.html

A History of CCDRS Data Requests

Year	Number of Data Queries	Number of Sessions
1999	411	108
2000	2207	558
2001	2662	713
2002	5596	931
2003	2439	642
2004	2392	631
2005	3724	767
2006	3611	798
2007	5243	1416
2008	2392	725
2009	2223	557
2010	3610	841
2011	1407	431
2012	2009	576

The growth in access to the CCDRS data is reflected in the increased number of data extraction. The following table shows the growth since CCDRS was first introduced in 1999. The 'Number of Sessions' reflect the number of times registered users, including DMG staff, have initiated a data retrieval session. The 'Number of Queries' reflects the number of times an output was generated during a session. Almost without exception, many queries are generated during a given session. The busiest years were just after restrictions on access to the data were removed. An increase in activity is usually asso-ciated with the release of a new cordon count.

Summary of Browser Based CCDRS Data Requests in 2012

Month	Queries	Sessions
January	128	47
February	198	58
March	117	34
April	31	11
May	149	63
June	112	37
July	224	42
August	88	42
September	243	50
October	168	66
November	414	84
December	137	42

Total 2012	**2009**	**576**
Total 2011	**1407**	**431**

Affiliations of the Browser Based CCDRS Users in 2012
AECOM
BA Group
City of Brampton
City of Mississauga
City of Toronto
Cole Engineering Group
Concordia University
Corporate Geographics
Dillon Consulting
DMG
Environ International
Genivar Inc
Halcrow Consulting
HDR iTrans
IBI Group
LEA Consulting
McCormick Rankin Corporation
Metrolinx
Ministry of Transportation Ontario
MMM Group
Montufar Group

Affiliations of the Browser Based CCDRS Users in 2012 (continued)

Peter Dalton
Region of Durham
Region of Halton
Region of Peel
Region of Waterloo
Region of York
Steer Davies Gleave
Talisker Corporation
Travol Inc
University of Guelph
University of Toronto
University of Waterloo
Urban Metrics
URS Canada Inc
Valcoustics Canada Limited

Cordon Count Special Data Requests

The interactive procedures available with CCDRS 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. Although special data requests are an important function, an objective of the DMG is to reduce the number of such data requests in favour of users processing their request through CCDRS. There were no special data request related to the cordon counts in 2011 or 2012.

TRANSPORTATION TOMORROW SURVEY SUPPORT

The Transportation Information Steering Committee (TISC) reviewed a series of issues identified in the 2006 TTS and commissioned a set of three consultant studies to provide guidance on how to proceed with any further surveys. The process and final decision to proceed with the planning of a 2011 TTS is described in the DMG's 2008 Annual Report.

> http://dmg.utoronto.ca/pdf/reports/dmgannualreports/an_rpt2008.pdf

In a manner similar to all Transportation Tomorrow Surveys since 1991, the Data Management Group assumed the role of project management. This arrangement facilitates the coordination of the two projects (TTS and DMG) with the added advantage that the DMG staff becomes conversant with all aspects of the data they subsequently administer for the funding agencies.

Agreement on a workable funding formula for another travel survey was not established until June of 2010. A decision was then taken to delay the interviewing phases until the fall of 2011 and 2012. During the intervening time, the DMG continued to develop software to support the use of a web browser for a respondent to complete the travel survey. A first of pilot test of the web browser procedure was carried out in October 2010 with subsequent tests carried out in the spring of 2011. The response was disappointing, which resulted in changes to the options available to households in the pre-interview letter. Essentially, the option to complete a questionnaire using a web browser became an effective method of establishing contact with a household.

In the fall of 2011, the survey collected travel information from approximately 60,000 households spread across the entire survey area, which includes a total of 23 local, regional, provincial and transit operating agencies in South Central Ontario. During the interviewing phase in the Fall of 2011, a serious problem developed in the process of attaching x-y coordinates to all spatial locations. Consequently, this geo-coding phase of the project was continued in the offices of DMG during the period in 2012 leading up to the Fall 2012 interviewing phase. The result was an operational computer support procedure for geo-coding and the completion of all 2011 records before the 2012 interviewing phase began.

The Fall 2012 interviewing phase collected travel information from 97,000 households and the final geo-coding and validation of the travel data are to be competed at the DMG for an anticipated release of the data by the Summer of 2013.

COMPUTER RESOURCES AND TECHNICAL SUPPORT

Computer System at the Data Management Group

DMG is the custodian of the TTS, Cordon Count, 1964 MTARTS and GO Transit survey (prior to 1997) databases. These data are stored in Oracle, a relational database system, on a SUN Ultra Sparc server running Solaris. This server also hosts the DMG web site. In addition, the DMG operates a computer system including a server for running EMME2, a server for running GTA model, a server to manage the EMME3/EMME4 licences, a server to handle the DMG mail, a backup server, and a file server where the data files of the funding agencies are stored. All these servers are located behind the DMG firewall for security reasons.

Information from the databases can be obtained using the DMG web site (http:\\dmg.utoronto.ca) and one of the two interactive data retrieval systems, iDRS or CCDRS. An individual is required to complete a data access request form to obtain a user account. Once the account is set up, the individual can use the retrieval system at any time and as often as required. All years of the TTS and Cordon Count Data are compiled and stored in a consistent way, and the TTS and Cordon Count data are frequently used together in regional planning projects or traffic impact studies. A summary of the use and the users of this service is contained earlier in this annual report.

The DMG maintains a server for running EMME2 remotely to support agencies that have not completed migrating their modelling efforts to the newer EMME3 or EMME4. INRO, the developers of the EMME software, no longer provide support for EMME2 but allow the DMG to operate the software without support. The software required for remote access to EMME2 is available to registered users. A registered user must be directly associated with one of the funding partners, either as an employee or a consultant.

The newer EMME3/EMME4 software is run locally on a personal computer with all relate files stored locally. This results in much faster operation. Each local machine requires access to an authentication key to operate the software. Rather than each agency purchasing a licence from INRO to use the software locally, DMG negotiated a concurrent licence for authentication of several machines operating at the same time. The DMG then dedicated a server to provide remote authentication to the participating partners.

The DMG is in the process of migrating the current suite of supporting hardware and software to more recent and cost effective alternatives.

Computer Support for the Transportation Tomorrow Survey

The computer support system for the Transportation Tomorrow Survey was designed and implemented by DMG staff. Software support, developed over a number of years, consists of 4 major components. The first component is the direct data entry software used by interviewers to record the information obtained during a telephone interview

directly into a computer database. The software has been under continuous improve-ment since its initial use in 1991. The second component is the interactive software used for attaching x-y coordinates to spatial locations. This geocoding software has been continuously improved since first used in 1996. The third component is the web browser software to allow respondents to complete the survey questionnaire remotely. This software has been under continuous development since 2007. The fourth com-ponent is the system management software (SMS) that ties all the components togeth-er, manages the sample of household and distributes the workload. The DMG contin-ues to refine all of the components in 2012.

Hardware support began with the first TTS interviewing phase in 2011. The 2011 sys-tem consisted of 3 servers and 95 work stations complete with the necessary cabling and remote access. The 2012 system consisted of 4 servers and the previously used work stations with the addition of 40 new work stations. Each time, in the Fall of 2011 and the Fall of 2012, the complete system was transported and set up in rented space within a matter of weeks. Each time, the system was then dismantled and removed be-fore the first of January.