datamanagementgroup

Annual Report
2011

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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) establish a common, centrally-accessible database containing information on transportation activities, zone systems, transportation networks and land use activity,
b) provide a transportation data retrieval service to the participating agencies,
c) monitor the adequacy of available data and propose approaches for adding to or updating the data as mutually agreed upon by the agencies,
d) promote greater interaction between university researchers and practitioners in the field of urban transportation planning,
e) promote the communication of transportation information and data obtained or administered by the Data Management Group to interested agencies and to the public,
f) 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 22nd 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 2011.

STAFF AND LOCATION

The DMG is located in offices at;

Department of Civil Engineering
University of Toronto
Galbraith Building, Room 305
35 St. George Street
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Full-time Technical Staff in 2011

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 2011

Justin Kwok, B.A.Sc. (Civil Engineering) University of Toronto

Brian Wong, B.A.Sc. (Civil Engineering) University of Toronto

Software Development and Technical Support in 2011

Michael O'Cleirigh, B.Computing (Computing & Information Science), University of Guelph

Summer Students in 2011

Darren Bynoe, 2nd year undergraduate, Department of Civil Engineering, Ryerson University

Gordon Hui, 3rd year undergraduate, Department of Civil 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

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	61,453	171,086	370,248	56,615
1991	24,507	72,496	157,349	14,896
1996	115,193	312,781	657,971	70,295
2001	136,379	374,182	817,744	85,095
2006	149,631	401,653	864,348	87,244

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 in 2004. The manual 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

Summary of Browser Based 'iDRS' Data Requests in 2011

Month	**Number of Data Queries**	**Number of Sessions**
January	1246	479
February	856	293
March	1376	461
April	1882	518
May	928	365
June	2690	1227
July	994	295
August	1255	439
September	1244	537
October	1302	539
November	1417	322
December	614	151
Total 2011	**15804**	**5626**
Total 2010	**14498**	**5379**

Since the public release, the use of the TTS data has been expanding. In 2011, there were 76 different agencies and groups that extracted the data through iDRS.

Affiliations of the Browser Based 'iDRS' Users in 2011

- AECOM
- ARUP
- Astral Out-of-Home
- BA Group
- CBS Outdoor
- CC Tatham & Associates
- Centennial College
- Centre for Sustainable Transportation
- CF Crozier and Associates
- City of Brampton
- City of Burlington
- City of Guelph
- City of Hamilton
- City of Mississauga
- City of Toronto
- Cole Engineering Group
- Cole Engineering Group
- Darmstadt University of Technology
- Delcan Corporation
- Dillon Consulting
- Entra Consultants
- GHD
- GO Transit
- Grant Thornton LLP
- Groupe Altus
- Halcrow Consulting
- Hatch Mott MacDonald
- HDR iTrans
- IBI Group
- IndEco Strategic Consulting
- ITS-ETO Consortium
- Lakehead University
- LEA Consulting
- Mark Engineering
- McCormick Rankin Corporation
- McGill University
- McMaster University
- Metrolinx
- MHBC Planning
- Ministry of Infrastruction Ontario
- Ministry of Transportation Ontario
- MMM Group
- Mohawk College
- Montufar Group

Affiliations of the Browser Based 'iDRS' Users in 2010 (continued)

Morrison Hershfield
Paradigm Transportation Solutions
Poulos & Chung
Queen's University
Read Voorhes & Associates Ltd
Region of Durham
Region of Niagara
Region of Peel
Region of Waterloo
Region of York
Ryerson University
Sernas Group Inc
Signs Outlet
St. Michaels Hospital
Stantec
Steer Davies Gleave
Tedesco Engineering
The Planning Partnership
Toronto Parking Authority
Toronto Transit Commission
Toronto Waterfront Viaduct
Town of Aurora
Town of Markham
Town of Richmond Hill
Tranplan Associates
Trans Plan Inc
Transport Action Ontario
Travol Inc
UEM Consulting
University of Toronto
University of Waterloo
York University

A History of iDRS Data Requests

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.

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

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 continues to be to reduce the number of such data requests in favour of users processing their request through iDRS. The success of this strategy is apparent in that all special data requests since 2009 have been associated with a funding partner or a research project. Three special data requests were made in 2010 and only two were requested in 2011. The special requests are listed below.

Data Requests from All Agencies

Disaggregate data from the 2006 TTS database were provided to Professor Darren Scott of McMaster University School of Geography and Earth Sciences to identify travel patterns for the Greater Toronto and Hamilton area.

Total trip distances of all auto driver inter-zonal trips during the morning peak period were provided to David Forsey, a M. A. Sc. student under the supervision of Professor Amer Shalaby for his thesis "Examining Travel Patterns in the Regional Municipality of York Before and After the Introduction of the VIVA Bus Transit System".

Development of Zone Boundary Files

The dramatic reduction in the number of agencies requiring help from the Data Management Group when compiling travel information is indicative of the success of iDRS. At the same time, many users have asked for maps showing the boundaries used in iDRS. Over the years, a set of PDF files have been made available on the DMG's web site.

1996 Traffic Zone Boundaries (January 1998)
http://dmg.utoronto.ca/reports/report94.html

2001 Traffic Zone Boundaries (January 2003)
http://dmg.utoronto.ca/reports/report94.html

2006 Traffic Zone Boundaries (June 2009)
http://dmg.utoronto.ca/reports/znbdy2006.html

However, a growing number of users have requested zone boundary files that can be used directly in GIS software, usually MapInfo or ArcInfo. Using TTS data in GIS software is made more complicated by the changes over the years in the coordinate system as well as changes in actual maps used to define the x-y coordinates. The result is that new TTS data becomes increasingly difficult to place in old mapping systems.

The result is that only certain years are available for any given zone boundary definition. The only boundary definition in which all TTS data can be compared are the 2001 Traffic Zone Boundaries. A summary of the TTS years and available zone bound-

ary definitions are shown below.

TTS DATA TO BOUNDARIES					
BOUNDARY DATA	2006 TTS	2001 TTS	1996 TTS	1991 TTS	1986 TTS
Local Municipality	X	X	X	X	X
2006 zones	X				
2001 zones	X	X	X	X	X
1996 zones		X	X		
1991 zones			X	X	X
1989 zones				X	X
TARMS zones				X	X

The complete set of Survey Boundary Files (November 2010) are available at:
http://dmg.utoronto.ca/spatial/boundary.html
The files are available in two formats; MapInfo Table (.tab), ESRI Shape File (.shp).

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, this cooperation made it possible for the DMG to assemble the most recent of such traffic counts in a common database structure and develop a Cordon Count Data Retrieval System (CCDRS).

Participating agencies are now using CCDRS as a tool in verifying their cordon count results. In 2009, another Cordon Count was undertaken by the participating regions. Updates to the existing Cordon Count database to include the 2009 counts were completed in 2010. 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

Summary of CCDRS Data Requests in 2011

Month	Number of Data Queries	Number of Sessions
January	192	48
February	84	22
March	41	20
April	174	52
May	117	40
June	124	41
July	207	63
August	169	44
September	62	28
October	106	23
November	105	37
December	26	13
Total 2011	**1407**	**431**

Total 2010	**3610**	**841**

Browser Based CCDRS Users in 2011

AECOM
Altus Group Economic Consulting
BA Group
Canadian Tire Corporation
Centennial College
City of Brampton
City of Mississauga
City of Toronto
Cole Engineering Group
Delcan
Grant Thornton LLP
Halcrow Consulting
HDR iTrans
IBI Group
Lakehead University
LEA Consulting
Ministry of Transportation Ontario
MMM Group
Mohawk College
Montufar Group

Browser Based CCDRS Users in 2011 (continued)

McCormick Rankin Corporation
Region of Durham
Region of Peel
Region of York
Talisker Corporation
Travol Inc
University of Toronto
University of Waterloo

A History of CCDRS Data Requests

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 associated with the release of a new cordon count.

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

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 databases are stored in Oracle, a relational database system, on a SUN Ultra Sparc server running Solaris. This server also hosts the DMG web site. On the DMG computer system, we have a server for running EMME2, a server for running GTA model, a server to manage the EMME3 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 above databases can be obtained using two data retrieval systems accessible through the DMG web site(iDRS and 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. We believe that having a centralized data management system is the most efficient and cost effective arrangement. Users have the flexibility to change the selection criteria and customize the results. The data are provided in an aggregated format that the confidentiality of the data is protected. The DMG staff has been involved in various stages of the TTS and Cordon Count program which enables us to provide support to the users on questions about the databases or clarifications of queries. The arrangement allows the data to be stored with confidential information attached while restricting users to appropriate aggregations. We are also able to compile special tabulations that require access to the confidential information; particularly the X-Y coordinates. There are alternatives such as letting individual funding agencies manage their own databases but the consistency of the data and efficiency of the service would be lost.

The DMG has done some early development to consolidate the two data retrieval systems and to improve the speed and functions. The DMG took advantage of a collective agreement between Oracle and the University of Toronto to obtain Oracle's data base software at little cost. However, the software does incur an annual maintenance charge that we plan to eliminate. Our long term plan is to migrate the database from Oracle to an open source database such PostgreSQL.

Support for a 2011 Transportation Tomorrow Survey:

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).

A final agreement in a workable funding formula for another travel survey was not

established until June of 2010. A decision was 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. In addition to the development and testing of a web browser for data collection, the DMG provides management support for the duration of the project,

A significant change occurred when it was discovered that apartment numbers could now be extracted as part of the sample of survey area households. In the fall of 2011, the survey subsequently collected travel information from approximately 60,000 households spread across the entire survey area. The final interview phase will occur in the fall of 2012.