

WORK PLAN 2023-24

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1. Introduction

This document presents the proposed work plan for Travel Modelling Group (TMG) operations for the fiscal year 2023-24 (April 1, 2023 through March 31, 2024). This work plan is presented in the context of a projected two-year "look-ahead" presenting proposed longer-term tasks for the year 2024-25 as well. This two-year perspective facilitates undertaking tasks that may not be completable within TMG's normal one-year planning horizon. This enables TMG to be more ambitious in its plans and objectives. This is particularly important given the pandemic-induced delay in undertaking the "2021" TTS, now scheduled for completion in the spring of 2023, as well as supporting the planning for development of a "next generation" of TMG tools (in particular, GTAModel V5) that will be based on the 2022 TTS and that need to be designed to address the complex modelling and planning changes facing TMG member agencies in the coming post-pandemic years.

Section 2 of the report presents and discusses the major tasks to be undertaken by TMG during this time, with detailed focus on the 2023-24 tasks. Section 3 defines the deliverables and milestones associated with these tasks. Section 4 then presents the budget for the 2023-24 fiscal year, along with projections for near-term future budgets.

2. Major Tasks & Schedule

Discussions were held with the TMG Technical Advisory Committee (TMGTAC), leading to development of work plan presented below. Table 1 presents the proposed 2023-24 detailed schedule of tasks, along with a very preliminary projection for year 2024-25. The primary focus of the overall two-year plan is the development and implementation of a "next generation" GTAModel V5 that will represent a significant leap forward in capabilities relative to the current GTAModel V4, which has been undergoing incremental improvements since the original V4.0 was introduced into operational practice with the City of Toronto in early 2016. At the same time, TMG must be able to continue to support its existing tools and models and member agencies usage of same.

As indicated in Table 1, the work plan consists of 9 tasks. Dark shaded boxes in the table indicate a primary work area in the given month, while more lightly shaded boxes indicate lower-level, more on-going "background" levels of effort. The number in each box indicates the approximate number of person-days per week anticipated to be allocated to the given task in the given month by TMG staff. These sum to 10 days per week.¹ These numbers should be taken as representative of the level of effort assigned to the task, but the actual amount of time will inevitably deviate to varying degrees from these forecasts. Assuming effectively 48 working weeks in the year (2 weeks vacation per staff member and the University shuts down for approximately two weeks during the Christmas Break), yields the total number of days per year per task shown in the second-last column in the table, with the last column indicating the percentage of total staff time allocated to each of these tasks. Tasks have been sequenced in the schedule so as to balance staff workload as best as possible, as well as to respect the logical interconnections among certain tasks. Other tasks requiring sustained by lower weekly levels of staff commitments are then sequenced around the major tasks. The following sub-sections discuss each of the 9 tasks in detail.

¹ 5 days each for the two TMG staff members, Williams Diogu and Amit Sandhel. Time allocations for students, postdocs and the Senior Software Architect (James Vaughan) – all funded from other sources – are not shown.

Table 1: 2023-24 TMG Major Tasks & Schedule

TMG 2023-24 Work Plan		2023-2	4											Days A	located
No.	ТАЅК	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total ¹	%
1	GTAModel V5 design & preliminary analysis	3	3	3	3	3	3							72	15.0%
2	GTAModel V5 development, testing & implementation							6	6	6	6	6	6	144	30.0%
	2022 Base Network	2	2	2										24	5.0%
2	GTAModel V4 maintenance & incremental development	1	1	1	2	2	2	1	1	1	1	1	1	60	12.5%
, ,	TMG Network Modelling Toolbox Development & Maintenance	1	1	1	2	2	2	1	1	1	1	1	1	60	12.5%
e	XTMF: Upgrades/ Maintenance & V2.0 Development	2	2	2	2	2	2	1	1	1	1	1	1	72	15.0%
7	Documentation of TMG products	1	1	1	1	1	1	1	1	1	1	1	1	48	10.0%
8	3 Outreach & Training (4 workshops)				W1		W2			W3			W4	480	Total
9	Meetings: TMGSC (2) & TMGTAC (6)		TAC	TAC		TAC		SC	TAC		TAC	TAC	SC		
	TMG Staff Average Weekly Time Allocation (Days) ²	10	10	10	10	10	10	10	10	10	10	10	10	10.0	
Sug	gested 2023-24 Workshops ³														
W1	GTAModel V5 Preliminary Design														
W2	GTAModel V5 Final Design														
W3	GTAModel V5 Preliminary Results 1														
W4	GTAModel V5 Draft Final Results 2														
Legend															
n	Lighter, on-going effort (TMG staff)	n = approximate, average number of TMG days per week for this task													
n	Heavy, focussed effort (TMG staff)														
	TMG maiintenance, support, etc.														
Not	es:														
1	Estimated total days of staff time allocated to the task, assuming 48 worki	ing week	s per yea	ar (staff i	take 2 w	eeks vac	ation an	d the Ui	niversity	closes					
	for 2 weeks/year during the Christmas Break).														
	2 5 days/week for Williams Diogu & Amit Sandhel. Student & postdoc time r	not inclu	ded in th	is table.	James V	aughan t	time also	not allo	ocated in	this tab	le.				
	Provisional. Topics may change.														
Prel	iminary Draft TMG 2024-25 Work Plan	2024-25										Days A	located		
No.	TASK	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total	%
1	I GTAModel V5 design & preliminary analysis													0	0.0%
2	GTAModel V5 development, testing & implementation	6	6	6	6	6	6	6	6	6	6	6	6	288	60.0%
3	GTAModel V4 maintenance & incremental development	1	1	1	1	1	1	1	1	1	1	1	1	48	10.0%
4	TMG Network Modelling Toolbox Development & Maintenance	1	1	1	1	1	1	1	1	1	1	1	1	48	10.0%
5	XTMF: Upgrades/ Maintenance & V2.0 Development	1	1	1	1	1	1	1	1	1	1	1	1	48	10.0%
6	Documentation of TMG products	1	1	1	1	1	1	1	1	1	1	1	1	48	10.0%
7	7 Outreach & Training (3 workshops)		W1				W2			W3			W4	480	Total
8	Meetings: TMGSC (2) & TMGTAC (6)	TAC		TAC		TAC		SC	TAC		TAC	TAC	SC		
TMG Staff Average Weekly Time Allocation (Days) ²		10	10	10	10	10	10	10	10	10	10	10	10	10.0	

2.1 GTAModel V5 Design & Preliminary Analysis

GTAModel V5 is intended to be a major extension and upgrade of GTAModel V4 across virtually all components of the model system, including the addition of a number of capabilities not currently present in V4. It will be implemented in XTMF V2, which is itself a "next generation" rewrite and reconfiguration of XTMF V1 (within which GTAModel V4 is implemented) that has been underway within TMG for the past several years. It will be developed using TTS 2022 data, taking fall, 2022 as its base year, but will also use TTS data from previous years where possible to improve and demonstrate the temporal transferability of the model system.² Road and transit networks will be coded based on NCS22.

As another major extension of GTAModel, V5 will take the entire GGH as its "internal" study area, representing a significant expansion relative to its current GTHA study area. While this will entail significantly more effort on TMG's part to develop V5, motivations for this expansion of the model system study area include:

- At least one major GTAModel application already exists outside the GTHA (the Region of Niagara).
- It aligns the GTAModel and GGHM study areas, facilitating the sharing of networks and other data, comparison of model results, and collaboration on the joint development of the two model systems.
- It also opens the possibility for MTO and/or Metrolinx to use GTAModel for some applications, where appropriate.
- It opens the possibility of additional GGH municipalities adopting GTAModel and joining TMG (Region of Waterloo, Simcoe County/Barrie, etc.).
- The GO Rail system already extends beyond the GTHA, and so requires a wider study area to be modelled properly.
- The Toronto-Waterloo "Innovation Corridor" is a major economic driver of the region and should be modelled holistically.

It is also important to note that, despite the base model covering the entire GGH, it will still be possible for individual agencies to custom-tailor their model system implementations, both in terms of detailed zone system design and study area definition. As but one example, Durham Region need not include Regions such as Niagara or Waterloo in their implementation if their inclusion is not warranted for Durham planning purposes.

Among the expected features of GTAModel V5 are:

- Complete update of the TASHA core procedures and software for activity episode generation and scheduling, including greater sensitivity to transportation level-of-service changes.
- Improved integration between mode choice and activity location choice.
- Explicit modelling of parking supply and demand at both residential and non-residential trip ends.
- Explicit modelling of a range of mobility services (ridehailing, demand-responsive transit, etc.).
- Improved modelling of household auto ownership and other "mobility tool" choices (driver's licences, mobility service memberships, etc.).
- Incorporation of the network and demand modelling improvements begun in the 2022-23 work plan, including: improved road link volume-delay function; improved calibration of transit travel times; and upgraded modelling of Place-of-Residence-Place-of-Work linkages.

² This is particularly important given the possible "lingering effects" of the COVID-19 pandemic on travel behaviour in the fall of 2022. A major research challenge will be to ensure, as best as possible, that the post-pandemic "new normal" is captured in GTAModel V5.

- The availability through Metrolinx of detailed historical data concerning GO Bus ridership will be explored in collaboration with Metrolinx to improve our capability to model GO Bus route and mode choice. While a small segment of the overall travel market, GO Bus plays a critical role in the regional transit system, both servicing O-D trips directly and in providing connectivity with the rest of the regional network, notably GO Rail. But it has historically been a difficult service to model adequately, given both previous lack of detailed data and the complexity of behaviour involved.
- Improved modelling of active transportation (walking and bicycling) mode choice.
- Improved representation of the trip-making population's socio-economic attributes to support improved mobility equity analyses.³

This is a major undertaking – the largest since TMG's development of GTAModel V4 in 2014-15. It will require additional resources beyond the current TMG staff to accomplish. At a minimum, several of Prof. Miller's PhD students⁴ will be heavily involved in the work, as will as two postdoctoral fellows (PDFs)⁵. These will be supported by additional research funds from a variety of sources outside of the base TMG budget.

In the first 6 months of the year, prior to the first availability of 2022 TTS data, the modelling team will engage in a detailed design exercise to flesh out the details of the model system upgrades briefly sketched above, as well as engage in preliminary analyses of existing TTS data (2016 and earlier) to test these ideas as best as possible. During the period of preliminary research and testing the work will be principally undertaken by the PhD students and PDFs, with the strong support of James Vaughan, our Senior Software Architect, and the direct supervision and guidance of Prof. Miller, with TMG staff support where appropriate and feasible, given their other commitments to the 2023-24 work plan. The students' work will align closely with their individual PhD thesis topics, all of which are related to different components of "next generation" agent/activity-based microsimulation modelling.

On-going results will be reported in TMGTAC meetings as well as in two workshops. In the July workshop, a preliminary V5 model design will be presented for discussion. In the September workshop, the draft final model system design will be presented, along with the proposed work plan for the remainder of the 2023-24 work period for model system development and testing.

Deliverables: Regular reports on progress at TMGTAC meetings. A preliminary V5 design and analysis results will be presented at the July workshop. The "draft final" V5 design and development work plan will be presented at the September workshop.

2.2 GTAModel V5 Development, Testing & Implementation

As indicated in Table 1, formal work on GTAModel development, testing and implementation will begin in the fall of 2023, once at least preliminary TTS 2022 data are available. Given the current state of the TTS program there is some risk associated with possible delays in their timeline. But we are hopeful that we will be able to get access to at least a preliminary, "unofficial" release of the data in a timely way so that we can begin model development and testing. In particular, unweighted trip records can be used in the first instance for preliminary development of many models within the system. Final model system calibration and validation will, of course, require the final release of the weighted dataset.

³ TTS 2022 is expected to include an extended set of personal and household characteristics

⁴ Ladan Berahman, Mohammad Haghighi, Mwendwa Kiko and Shuoyan Xu.

⁵ Nael Alsaleh and Sanjana Hossein.

The exact timeline for V5 development, testing and final release is difficult to determine at this time. In Table 1, we are assuming a full 1. 5 years (the second half of 2023-24 and all of 2024-25), with a final release of V5.0 for operational use in early 2025. We are hopeful that this timeline can be accelerated with this release occurring sometime in 2024. A refined timeline will be developed during the model system design (Task 1) and provided to TMGTAC and TMGSC by the end of September 2023.

Deliverables: On-going updates at TMGTAC meetings and workshops scheduled for December 2023 and March 2024. A detailed work plan and schedule for completing the V5 development and implementation in work year 2024-25 will be presented to TMGSC in March 2024 for approval.

2.3 2022 Base Emme Network

In 2022-23, TMG began development of a base EMME road and transit network for fall, 2022 conditions to support travel demand modelling using 2022 TTS data. This work will continue through the first quarter of the 2023-24 work year. The network will be coded using the 2022 Network Coding Standard (NCS22), and with centroid connectors to the new 2022 DMG zone system, once it is available.⁶ The spatial extent of the network will be the entire GGH, both to establish greater compatibility with the GGHM model system network and to support the extension of the GTAModel study area to the entire GGH.

As usual, TMG agency partner staff have been contacted to assist in updating and error-checking the 2022 network in their regions.

Deliverables: Validated 2022 Emme base network by July 31, 2023.

2.4 GTAModel V4 Maintenance

Various versions of GTAModel V4 are now being used or are in the process of being adopted by the Cities of Toronto, Mississauga, Brampton and Vaughan, Regions of Durham, Halton, Niagara and Peel, the Town of Bradford, ARTM in Montreal,⁷ JTRC in Halifax⁸ and the Monterrey, Mexico regional metropolitan area^{9,10}. As usage of the model system increases, so does the need for TMG staff to provide technical support to the agencies and their consultants using the software and to continuously update/fine-tune the software as usage identifies weaknesses in the code that can be incrementally improved. Continuing increment improvements to the model system will be implemented in parallel to the planning for and development of GTAModel V5. "Lessons learned" through this on-going support for V4 will also provide inputs in the V5 design and implementation where possible.

Deliverables: On-going maintenance and support for GTAModel implementations and usage.

⁹ A joint University of Toronto – Technologico de Monterrey project.

⁶ This new zone system is underdevelopment by DMG at the time of this work plan's preparation. Note that the base network (and NCS22) does not depend upon a particular zone system, but it will be convenient to have a standard version of the network connected to the base DMG 2022 traffic zone system.

⁷ The University of Toronto has a service contract with ARTM to undertake this implementation. This work does not materially impact the TMG work plan.

⁸ WSP Canada is undertaking this implementation. This work does not materially impact the TMG work plan.

¹⁰ The University of Toronto is also collaborating with MIT on a joint application of GTAModel and MIT's SimMobility model system for analysis of Hwy 407 pricing scenarios.

2.5 TMG Network Toolbox Maintenance

A primary rationale for the TMG is to develop standard tools, procedures and templates for general use by member agencies for network modelling. These tools are primarily of two types: XTMF-based modules and Emme/4 Modeller procedures. In 2021-22 an Aimsun Toolbox was added as well. Tool development will be an on-going, primary activity of the TMG throughout its existence, as it evolves an ever-increasing suite of network modelling and analysis tools for members' use. Tool development occurs in two primary ways. First, TMG staff are constantly refining/extending existing tools and developing new tools through the course of their on-going model system development, network coding and testing and other work tasks. Second, recommendations for tool development are regularly generated by the TMGTAC on an ongoing basis. A major focus of this work is continuing to upgrade the Emme Toolbox to be fully compatible with Python 3, which is needed to run the most recent releases of Emme.

While many of the Toolbox modules have been developed for application in GTAModel, these modules can also be used in other, non-GTAModel applications, either as stand-alone Emme-based analyses or in other travel demand model systems. TMG encourages its members to consult with both our documentation and staff with respect to possible applications, as well as possible extensions to the Toolbox to meet their specific needs.

Deliverables: On-going maintenance and expansion of the Emme and Aimsun Toolboxes.

2.6 XTMF Upgrades/Maintenance & V2.0 Development

Similarly, XTMF, as a primary software system for TMG work, is constantly being upgraded. It needs to be maintained, and technical support needs to be provided for its use by member agencies, their consultants, etc. Incremental additions and improvements (and associated updating of documentation) will occur as needed and as they are generated by continuing development of the TMG Toolbox and other TMG modules and models. The current release of XTMF is Version 1.11. A significantly upgraded and redesigned V2.0 has been under design by TMG over the past several years and will go into operational application with GTAModel V5. In parallel to the XTMF V2 development, the TMG Toolbox is also being upgraded to work with XTMF V2.

As with the Toolbox, a primary application of XTMF is the implementation of GTAModel. But, XTMF has been explicitly designed to support the implementation of a wide variety of model systems, where a "model system" is an executable process. Procedures exist for estimating model parameters (logit models, gravity models, etc.), data manipulation, report generation, etc. Agency members interested in possible XTMF applications should consult TMG staff for discussion and support.

Deliverables: Operational release of XTMF 2.0 in parallel to GTAModel V5 development.

2.7 Documentation of Software & Models

Continuous updating of documentation of XTMF, GTAModel and TMG Toolbox software and procedures is an on-going task on TMG. As indicated in the discussions in the preceding sections and in Table 3 below, documentation of all TMG activities and products is an integral component of all tasks and deliverables. All documentation is available on the TMG website.

2.8 Outreach & Training

A critical component of TMG activities in all phases of its work must be training, technology transfer and outreach. In order to succeed, TMG must be responsive to its collaborating partners' needs. It must also

get the tools that it is developing into the hands of its partners for their use. The TMG's role is intended to be one of tool developer, not to be the user of these tools on behalf of its partners in operational applications (except in special cases). These activities in 2023-24 will include:

- On-going updating and elaboration of the TMG web site.
- Documentation of all procedures, etc. developed by the TMG (Task 6).
- Regular (approximately every other month) meetings will be held with TMGTAC to discuss work in progress, next steps in the work plan and to disseminate work plan results (see Section 2.8).
- Training workshops will also be organized providing the opportunity to present and discuss in greater detail recent TMG work and products. As shown in Tables 1 and 2, 4 workshops are proposed for 2023-24. These workshops generally are held 10:00-12:00 Wednesday mornings. Workshop topics will be finalized in consultation with TMGTAC, but they are expected to focus on the on-going design and development of GTAModel V5.

2.9 Meetings

In addition to the TMGTAC meetings discussed in Section 2.7, regular meetings with TMGSC will be held to discuss work plan progress, budget, overall TMG directions for work and other administrative and supervisory matters.

An important role of the TMGTAC meetings will be to monitor work plan progress and to identify and recommend "mid-course" changes to the approved work plan as might be warranted by either work progressing much more slowly or more quickly than originally anticipated or by new priorities, needs or opportunities emerging during the course of the work. Given the research nature of the TMG work plan, it is important to maintain "nimbleness" in the work plan in order to maximize its effectiveness as conditions and opportunities evolve over time.

It is proposed that 6 TMGTAC and 2 TMGSC meetings be held during 2023-24. Each meeting is generally 2 hours in length and is usually held on a Wednesday morning (10:00-12:00). The proposed schedule for these meetings (including the workshops discussed in Section 2.7) is shown in Table 2.

TMGTAC Meetings	Workshops	TMGSC Meetings					
May 3, 2023	July 5, 2023	October 4, 2023					
June 7, 2023	September 27, 2023	March 6, 2024					
August 2, 2023	December 6, 2023						
November 1, 2023	March 27, 2024						
January 17, 2024							
February 7, 2024							
Notes:							
1. All meetings and workshops 10:00-12:00, unless otherwise posted.							

2. All meetings and workshops will be online, unless otherwise posted.

3. 2023-24 MILESTONES & DELIVERABLES

Table 3 lists the primary deliverables and milestones for the 202-243 work plan.

Tab	le 3:	Summary of 2023-24 TMG Delive	erables & Milestones

No.	Task	Deliverable	Due Date
1	GTAModel V5 design & preliminary analysis	Preliminary V5 design	July, 2023
		Draft final V5 design & work plan	September, 2023
2	GTAModel V5 development, testing & implementation	Monthly progress updates	November, 2023 February, 2024
		Preliminary results workshop 1	December, 2023
		Preliminary results workshop 2 & Year 2024-25 work plan	March, 2024
3	2022 Base Network	Validated 2022 Emme base road & transit network	July, 2023
4	GTAModel V4 maintenance & incremental development		On-going
5	TMG Network Modelling Toolbox Development & Maintenance		On-going
6	XTMF: Upgrades/ Maintenance & V2.0 Development		On-going
7	Documentation of TMG products		On-going
9	Outreach & Training	4 workshops	See Table 2 for dates
9	Meetings	2 TMSC meetings & 6 TMGTAC meetings	See Table 2 for dates

4. 2023-24 BUDGET

Table 4 presents the proposed budget for 2023-24 TMG operations, based on agreed contribution levels for each participating agency. The majority of the budget (62.7% total; 88.9% of direct expenditures) is for TMG staff. In addition to the usual budget item for Emme and Aimsun software licences essential to TMG operations,¹¹ a modest budget for upgrading computer hardware included to support updating TMG computational capabilities, which are also essential to its on-going operations.

University of Toronto cash and major in-kind contributions are also explicitly shown in Table 4 in order to make clear the full costs of the project and the University's significant contribution to TMG operations. Although these represent an under-estimation of the full University in-kind contributions, they significantly exceed the total project overhead paid by the member agencies to the University as part of their contributions.

Projections of the budget for the next three years (2024-27, inclusive) are also provided in Table 4. Note that, <u>based on current assumptions</u>, the 2023-24 and projected future agency contributions over this planning period are expected to remain at the 2020-21 levels.

¹¹ A Visum license is also available for TMG use within the UofT ITS Lab.

Table 4: TMG 2023-24 Budget

TMG Budget	2023-24	2024-25 ⁴	2025-26 ⁴	2026-27 ⁴			
Expenses	Amount	Amount	Amount	Amount			
Salaries ¹	\$167,865.89	\$173,120.20	\$178,132.45	\$183,293.51			
Computer Hardware	\$15,000.00	\$15,000.00	\$15,000.00	\$15,000.00			
Software Licences (Emme, Aimsun, misc.)	\$6,000.00	\$6,000.00	\$6,000.00	\$6,000.00			
Contingency	\$0.00	\$0.00	\$0.00	\$0.00			
Overhead (@40%)	\$79,000.00	\$79,000.00	\$79,000.00	\$79,000.00			
Total Expenses	\$267,865.89	\$273,120.20	\$278,132.45	\$283,293.51			
Percent increase in expenses over previous year	3.22%	1.96%	1.84%	1.86%			
Revenues	2023-24	2024-25 ⁴	2025-26 ⁴	2026-274			
Member Contributions	Amount	Amount	Amount	Amount			
Metrolinx	\$66.000.00	\$66.000.00	\$66.000.00	\$66.000.00			
MTO	\$34.000.00	\$34.000.00	\$34.000.00	\$34.000.00			
City of Toronto	\$34.000.00	\$34.000.00	\$34.000.00	\$34.000.00			
City of Hamilton	\$21.000.00	\$21.000.00	\$21.000.00	\$21.000.00			
Region of Durham	\$21.000.00	\$21.000.00	\$21.000.00	\$21.000.00			
Region of Halton	\$21.000.00	\$21.000.00	\$21.000.00	\$21.000.00			
Region of Peel	\$21.000.00	\$21.000.00	\$21.000.00	\$21.000.00			
Region of York	\$21.000.00	\$21.000.00	\$21.000.00	\$21.000.00			
City of Brampton	\$7.500.00	\$7.500.00	\$7.500.00	\$7.500.00			
City of Mississauga	\$7,500.00	\$7.500.00	\$7.500.00	\$7.500.00			
City of Vaughan	\$7,500.00	\$7.500.00	\$7.500.00	\$7.500.00			
Toronto Transit Commission	\$7,500.00	\$7.500.00	\$7.500.00	\$7,500.00			
Region of Niagara	\$7,500.00	\$7.500.00	\$7.500.00	\$7,500.00			
Total Member Contributions	\$276,500.00	\$276,500.00	\$276,500.00	\$276,500.00			
Carry-Forward from Previous Year ³	\$9.501.98	\$18,136,09	\$21,515,89	\$19,883,44			
Additional Revenue (UofT Subsidy)	\$0.00	\$0.00	\$0.00	\$0.00			
Total Revenues ²	\$286,001.98	\$294,636.09	\$298,015.89	\$296,383.44			
Percent Increase in contributions over previous year	2.8%	0.0%	0.0%	0.0%			
Total Revenues - Total Expenses	\$18 136 09	\$21 515 89	\$19 883 44	\$13 089 93			
Contributions-Actual Expenses	\$18,130.05	\$21,515.85	-\$1 632 45	-\$6 793 51			
	<i>90,03</i> 4.11	<i>\$3,373.00</i>	<i></i> 032.43	<i>40,733.31</i>			
Notes:							
1. 2 full-time TMG staff salaries + benefits + 1 undergrad	luate summer re	search assistant					
TIMG staff salary increases based on current salary so	nedule for USW	employees at U	Jof I.				
This may change in the future.							
2. "Total Revenues" Include carry-forward from the prev	lous year.						
3. Estimated.	TC may join TM		ac their CTANA	dal implementi	ans como onlino		
		3 III future years		del implementi	ons come onime.		
University of Toronto In-Kind Contributions	4=0.000.00						
Principal Investigator Time	\$50,000.00						
Senior Software Architect Time	\$52,000.00						
Post-Doctoral Fellow Time	\$30,000.00						
Graduate Research Assistants Time	\$60,000.00						
Office Space & telephones	\$6,000.00						
	\$198,000.00						
Uoti In-Kind - Total Overhead Contribution	\$119,000.00						
Insectudes other Uot I in-kind contributions to TMG that are very difficult							
Deta Management Crown surgest of TMC							
Internet access							
Administrative support							
LofT computers & software in addition to explicit TMG	equipment & co	oftware					
oon computers a sortware in addition to explicit two	comprise a sc	neware.					