Introduction to the TTS 2.0 R&D Program

Presented at TTS 2.0: Developing a New Travel Data Collection Program for the GGH

University of Toronto, June 19, 2015

UNIVERSITY OF TORONTO
FACULTY OF APPLIED SCIENCE & ENGINEERING
Transportation Research Institute

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Outline

- Oct. 3/14 workshop summary
- R&D program needs
- TTS 2.0 design
- Year 1 plan activities

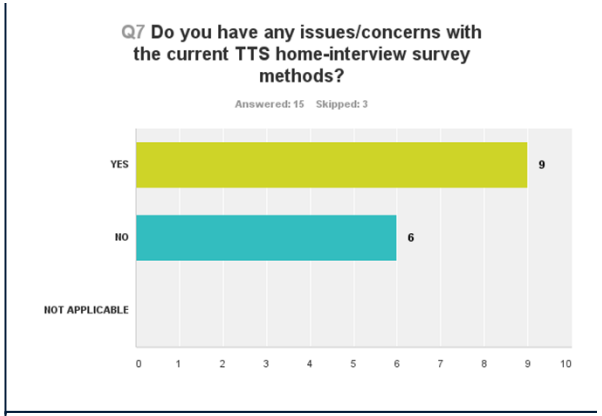
Oct. 3/14 Workshop Summary

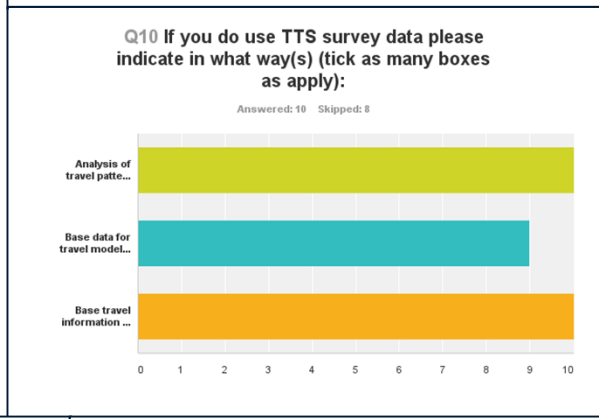
Time	Speaker/Chair	Topic
8:30-8:45		Registration & Coffee
8:45-9:00	Tija Dirks; EJ Miller	Welcome, Introductions, Workshop Overview
9:00-10:30	**Chair: David Pritchard, Metrolinx**	**GGH Data Needs & Methods**
9:00-9:30	K Nurul Habib (UofT)	Survey Methods 101: Overview of key survey methodogical isses that must be addressed in any data collection effort
9:30-9:55	A Shalaby (UofT)	Summary of Roorda & Shalaby GTHA data needs report
9:55-10:15	K Nurul Habib (UofT)	Summary of new GGH Survey Needs survey
10:15-10:30	David Pritchard	Brief general Q&A / discussion of data needs
10:30-10:45		Break
10:45-12:45	**Chair: Mike Wehkind, City of Toronto**	**New Methods for Data Collection**
10:45-11:15	Martin Lee-Gosselin (Lee-Gosselin Associates)	Summary of the TAC survey methods study
11:15-11:45	Pierre Tremblay (MTQ)	The Quebec Experience
11:45-12:15	Catherine Morency (Polytechnique Montreal)	Montreal Experience with advanced methods
12:15-12:45	Tom Adler (RSG)	The US Experience
12:45-1:30		Lunch
1:30-4:15	**Chair: Tija Dirks, MTO**	**Priorities & Options for Moving Forward**
1:30-1:45	EJ Miller (UofT)	Breakout session instructions
1:45-2:45	Breakout facilitators	Breakout session: Priorities & options for moving forward
2:45-3:15	Break	Prepare breakout session reports
3:15-4:15	Breakout rapporteurs	Breakout session reports & general discussion
4:15-4:30	Tija Dirks; EJ Miller	Workshop summary & next steps

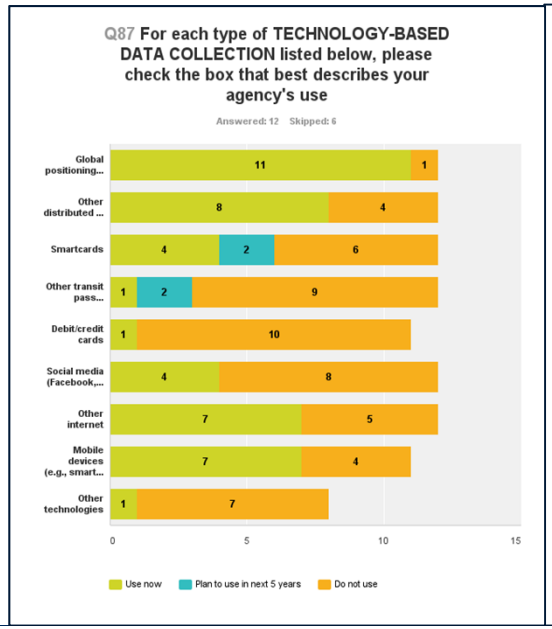
- A one-day workshop to discuss GGH travel survey issues & options was held at UofT.
- 40 attendees from 12 local/regional agencies, 3 provincial agencies (Metrolinx, MTO MTQ), 3 universities (UofT, Laval, Polytechnique Montreal) and 1 consulting firm (RSG).
- For presentations & details see: http://uttri.utoronto.ca/research/projects/travel-survey-methods-greater-golden-horseshoe/

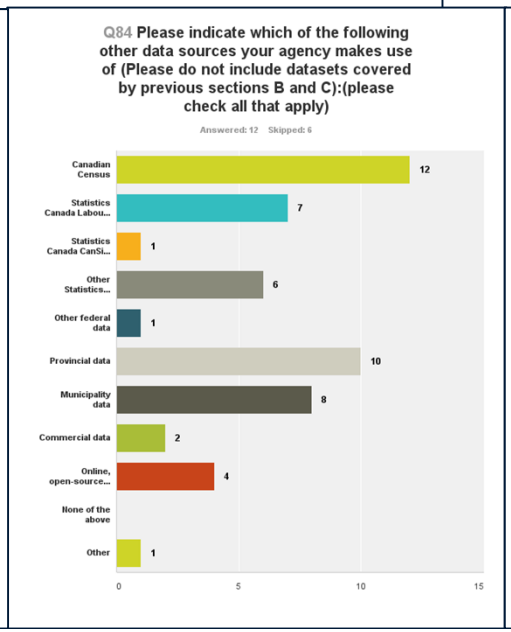
Oct. 3/14 Workshop Findings

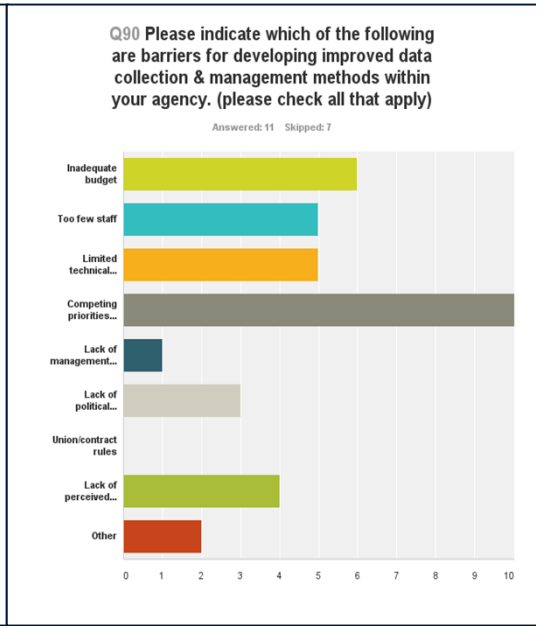
- Strong consensus concerning the value of TTS-style data for a wide variety of transportation planning, analysis and modelling needs. We must continue to collect such data.
- Similar consensus that a variety of methodological and practical problems exist with the current TTS that are worsening over time. We must develop new data collection methods if the quality and utility of our survey data are to be maintained.
- Considerable openness appears to exist for experimentation with promising new methods.











Need for a R&D Program

- Coming out of the October workshop it was clear that:
  - Many issues exist.
  - Many options for addressing these issues exist.
  - A “clear path”, preferred data collection design for the region cannot be easily identified.
- A multi-year R&D program is required to explore options and develop the next generation data collection program for the GGH.
- The Data Management Group (DMG) within UTTRI was commissioned by TISC to prepare and submit a proposal for this R&D program.

Key Elements of R&D Program Design

- Start with a clean slate:
  - Do not rule out options too quickly.
  - Explore wide range of technologies, methods and data sources.
- Must be a credible, robust replacement for current TTS:
  - Scalable to the GGH.
  - Cost-effective.
  - Addresses weaknesses of TTS.
  - High quality data.

R&D Program Key Elements (2)

- Designing for the future:
  - Must address current & emerging needs.
  - Add capabilities to current TTS where needed & feasible.
  - Flexible for addressing future needs.
- Exploit 2016-17 TTS:
  - We have a 3-year “window” to prepare for selection & implementation of the new methods (but need to start now!).
  - Ideal opportunity to experiment & research – do not have to “lock in” too quickly.
  - Run tests in parallel to 2016-17 TTS.

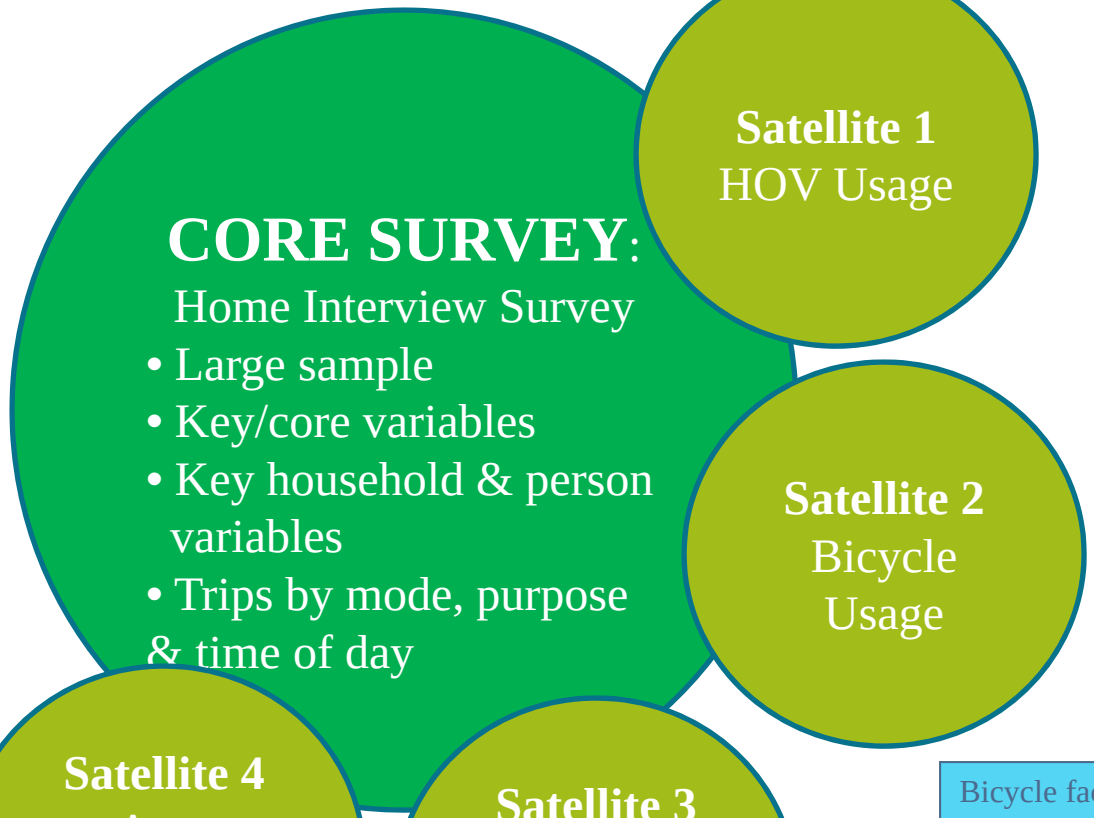
R&D Program Key Elements (3)

- Test technology, but be needs driven, not technology driven.
- Core-satellite design paradigm.
- Research-based but outcomes oriented.
- Incremental, iterative testing.

Technologies / Survey Modes

- Variations/extensions of current land-line telephone interview.
- Web-based.
- (Active) Smart phone-based.
- Passive data sources (including passive smart phone methods).
- Other?

CORE-SATELLITE DATA COLLECTION DESIGN PARADIGM



- Screenline counts, all vehicle types
- Transit boarding counts
- Roadway speed-time studies
- Transit line headways, speeds, etc.; transit fare policies
- Parking supply & price
- Auto operating costs, including tolls
- Road segment capacities, speeds, etc.
- Census data

- HOV lane inventory, rules, …

- Bicycle facilities inventory (bike lanes, bike parking, …)
- Bike-share services & usage

- Vehicles by type, vintage, fuel type, etc.
- Capital & operating costs of vehicles by type, vintage, fuel type, etc.

- Inventory of major facilities for seniors: community centres, health care facilities, etc.

Possible Satellite Surveys

- Post-secondary students.
- Transit onboard surveys / ride counts.
- Mode-specific surveys (walk, bike, HOV?).
- Special generator surveys.
- Other special sub-markets?

Important Considerations

- Do not reinvent wheels.
- Priority is to develop a strong core survey.
- Key satellites, however, also need investigating – holistic design approach.
- Interfaces/synergies across pilot tests and survey modes being tested.
- Iterative design & testing process.

Continuous vs. Cross-Sectional Data Collection

- Another issue to be investigated is the potential for a continuous data collection program rather than cyclical “ramping up & ramping down” to do large repeated cross-sectional surveys.
- Web, smartphones, passive data streams, etc. all lend themselves to a continuous approach.
- May be significant financial & administrative benefits.
- Statistical issues needed investigating.

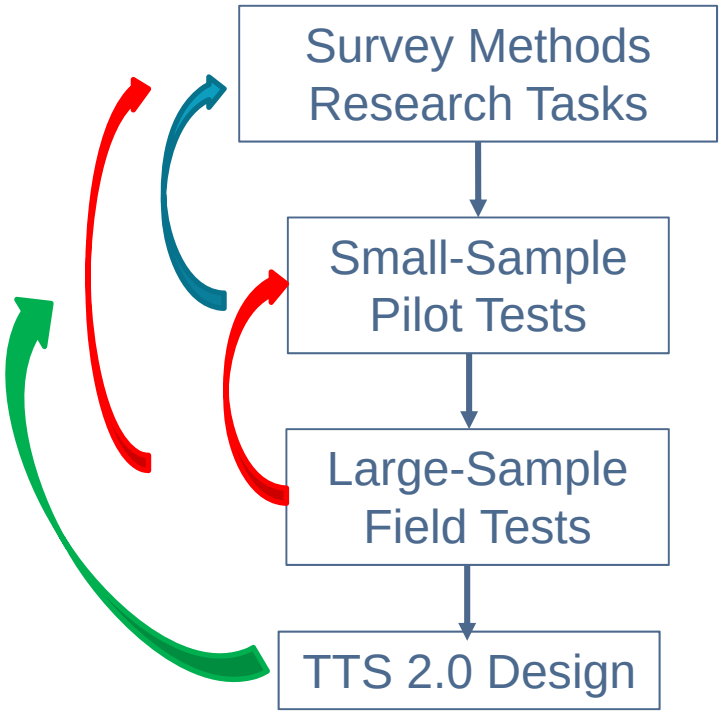
Research Topics in Support of Pilots

- A number of design issues need to be investigated prior to launching the pilots.
  - Alternative sampling frames for each survey mode of interest.
  - Evaluation of passive data sets & methods.
  - Assessment of Presto Card data.
  - Detailed investigation into continuous survey methods & potential.

Methodological Research Topics

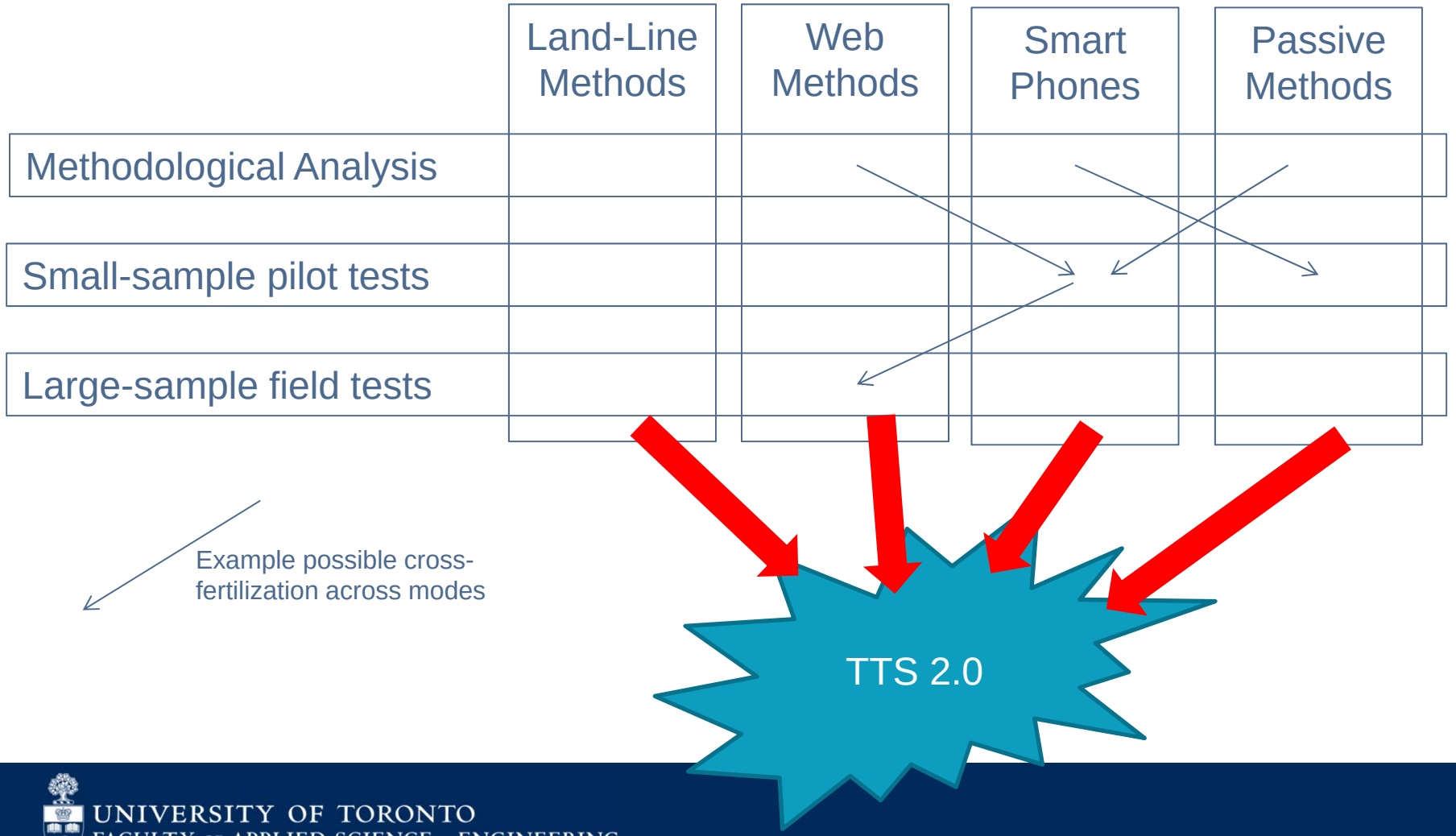
1. Land-line-based methods
2. Web-based methods
3. Smart phone methods
4. Presto Card options
5. Passive data options
6. Satellite design options
7. Continuous Survey Options
8. Data fusion methods
9. Analysis of test results

Overall R&D Program Design



- Iterative process of:
  - Research & analysis
  - Small-sample pilot testing:
    - Proof of principle
    - Exploration of many options
    - "Component testing"
  - Large-sample field tests:
    - Heavy-duty testing of "proto 2.0" designs
    - GGH scalability/applicability
    - Operational feasibility
  - Evolutionary development of the final TTS 2.0 design.

Investigation of Alternative Survey Modes



Study Team

- Principal Investigator: Prof. E.J. Miller
- Project Manager: Prof. K.M. Nurul Habib
- UTTRI Co-Investigators:
  - Prof. M.J. Roorda
  - Prof. A. Shalaby
- External Advisors:
  - Prof. Emeritus Martin Lee-Gosselin (Laval)
  - Prof. Catherine Morency (Polytechnic Montreal)
- Research Staff:
  - DMG staff (Susanna Choy; Reuben Briggs)
  - Full-time Research Associate
- UofT graduate & undergraduate students

- Additional public & private sector expertise will be drawn upon as needed throughout the project

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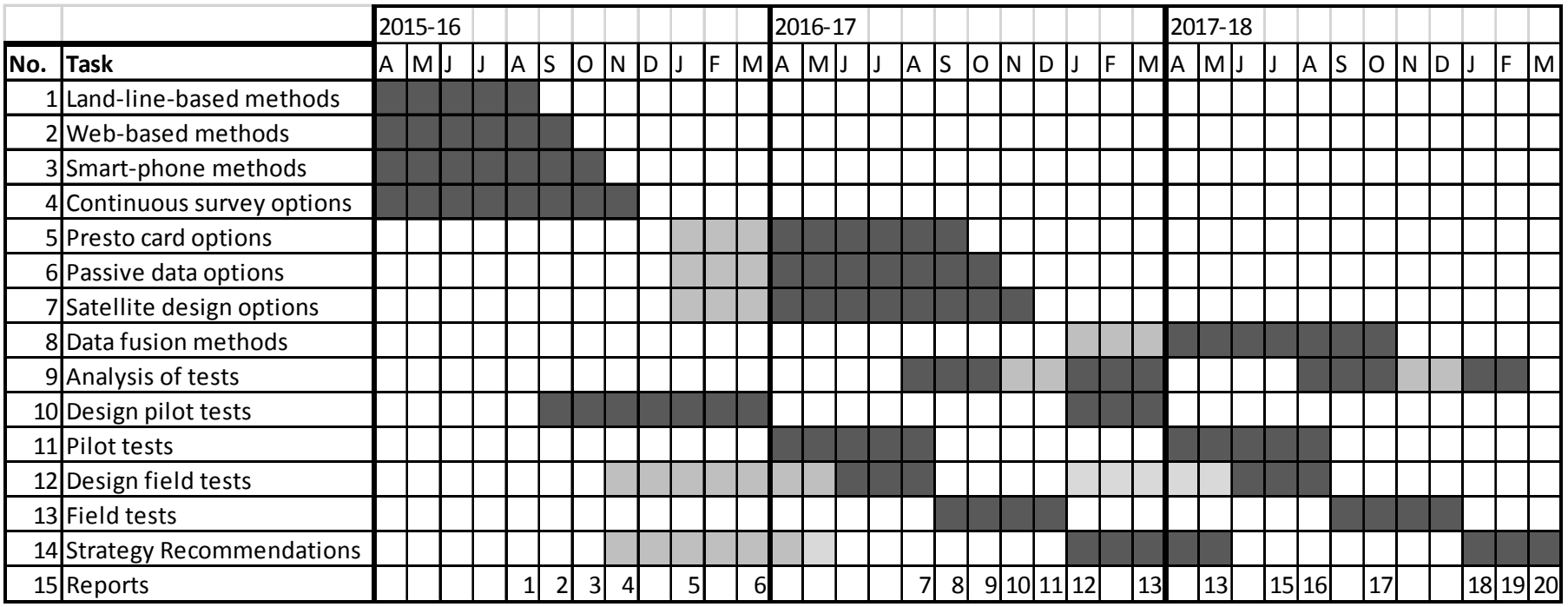
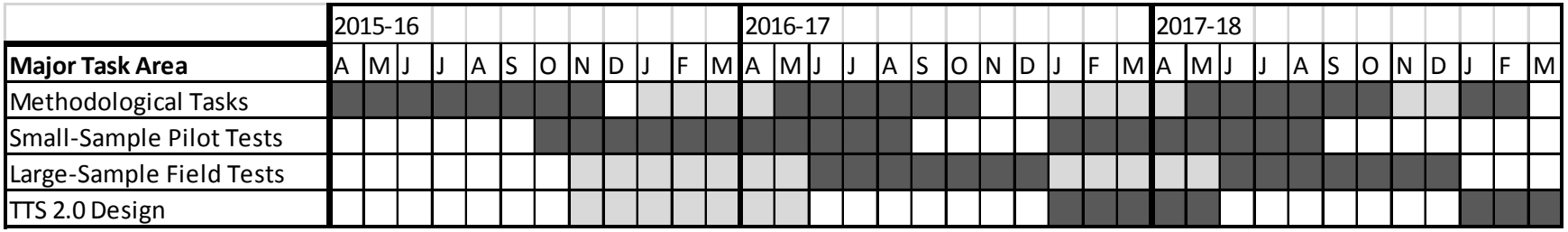
The Transportation Association of Canada Survey Methods Study Research Team!

Work Plan & Schedule (1)



Work Plan & Schedule (2)



- Year 1:
  - Resolution of basic research issues
  - Design of Round 1 (2016) pilot & field tests
- Year 2:
  - Spring-Summer: Pilot tests
  - Fall: Field Tests in parallel with 2016 TTS, part 1
  - Winter: Analyze Round 1 tests & design Round 2
- Year 3:
  - Spring-Summer: Pilot tests
  - Fall: Field Tests in parallel with 2016 TTS, part 1
  - Winter: Finalize TTS 2.0 design

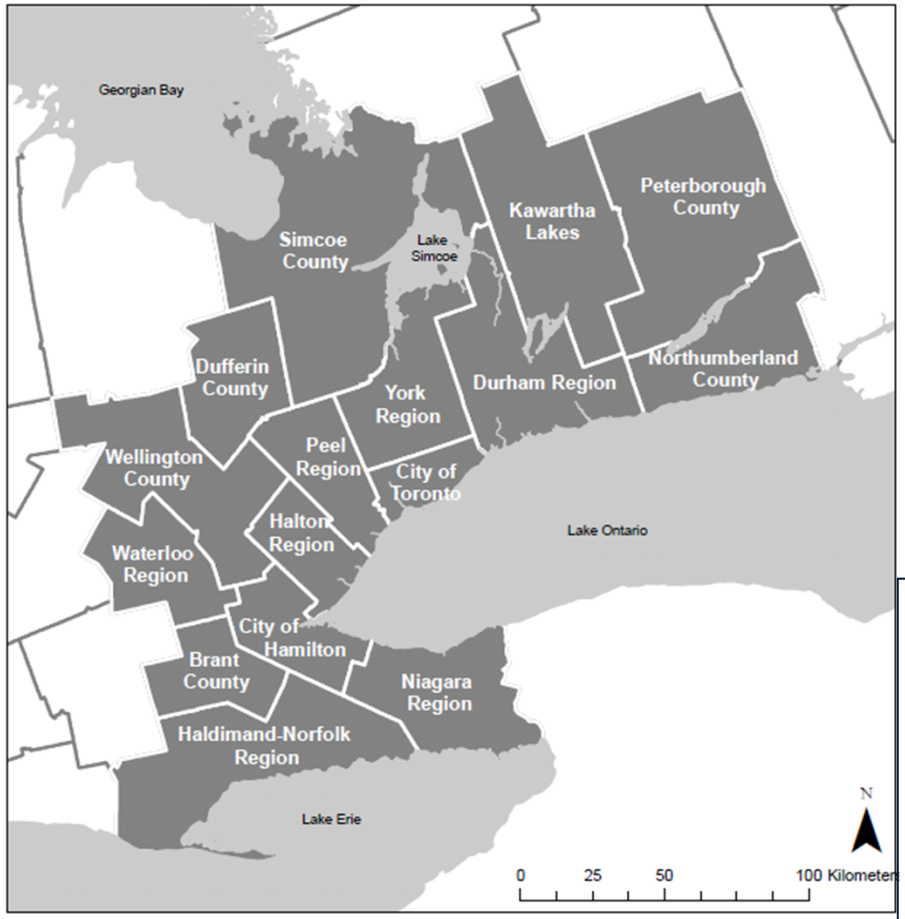
Deliverables

No.	Reports	Due Date
1	Land-Line-Based Survey Methods	August 31, 2015
2	Web-Based Survey Methods	September 30, 2015
3	Smart phone -Based Survey Methods	October 31, 2015
4	Continuous Survey Design Options	November 30, 2015
5	Draft Round 1 Pilot Test Design	January 15, 2016
6	Final Round 1 Pilot Test Design	March 31, 2016
7	Draft Round 1 Field Test Design	August 31, 2016
8	Presto Card Applicatons for Planning & Modelling	September 30, 2016
9	Passive Dataset Applications	October 31, 2016
10	Satellite Survey Options	November 30, 2016
11	Analysis & Evaluation of Round 1 Pilot Tests	December 31, 2016
12	Design & Conduct of Round 1 Field Tests	January 31. 2017
13	Analysis & Evaluation of Round 1 Field Tests	March 31, 2017
14	Round 2 Pilot Test Design	April 30, 2017
15	Draft Round 2 Field Test Design	July 31, 2017
16	Analysis & Evaluation of Round 2 Pilot Tests	August 31, 2017
17	Data Fusion Methods & Applications	October 31, 2017
18	Design & Conduct of Round 2 Field Tests	January 31, 2018
19	Analysis & Evaluation of Round 2 Field Tests	February 28, 2018
20	TTS 2.0 Final Project Report	March 31, 2018

TTS 2.0 Year 1 Schedule

		Year 1: 2015-16											
No.	**Task**	A	M	J	J	A	S	O	N	D	J	F	M
1	Land-line-based methods												
2	Web-based methods												
3	Smart-phone methods												
4	Continuous survey options												
5	Design pilot tests												
6	Design field tests												
7	Reports					1	2	3	4		5		6

- Tasks 1-4 well underway.
- 2016 pilot test design will begin in earnest in September (more on this later this morning).


Georgian Bay
Simcoe County
Lake Simcoe
Kawartha Lakes
Peterborough County
Dufferin County
York Region
Durham Region
Northumberland County
Wellington County
Peel Region
City of Toronto
Halton Region
Lake Ontario
Waterloo Region
City of Hamilton
Brant County
Niagara Region
Haldimand-Norfolk Region
Lake Erie
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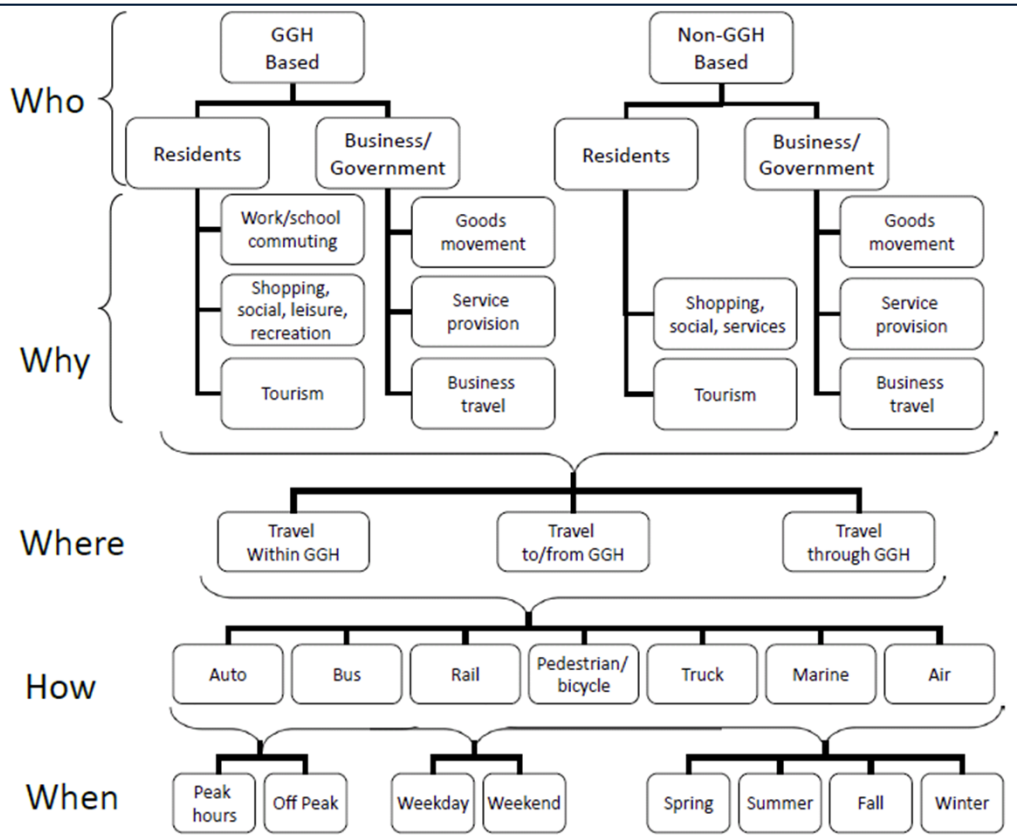
100 Kilometers

Questions?


Who
Why
Where
How
When
GGH Based
Non-GGH Based
Residents
Business/ Government
Residents
Business/ Government
Work/school commuting
Shopping, social, leisure, recreation
Tourism
Goods movement
Service provision
Business travel
Shopping, social, services
Tourism
Goods movement
Service provision
Business travel
Travel Within GGH
Travel to/from GGH
Travel through GGH
Auto
Bus
Rail
Pedestrian/ bicycle
Truck
Marine
Air
Peak hours
Off Peak
Weekday
Weekend
Spring
Summer
Fall
Winter