

Merging Travel Forecasting and Traffic Management Data and Models

M.G. McNally

Institute of Transportation Studies and
Department of Civil and Environmental Engineering
University of California, Irvine
<http://www.its.uci.edu/mmcnally/>

*GPS and Time-Geography Applications
for Activity Modeling and Microsimulation*
Santa Barbara, CA October 10-11, 2005

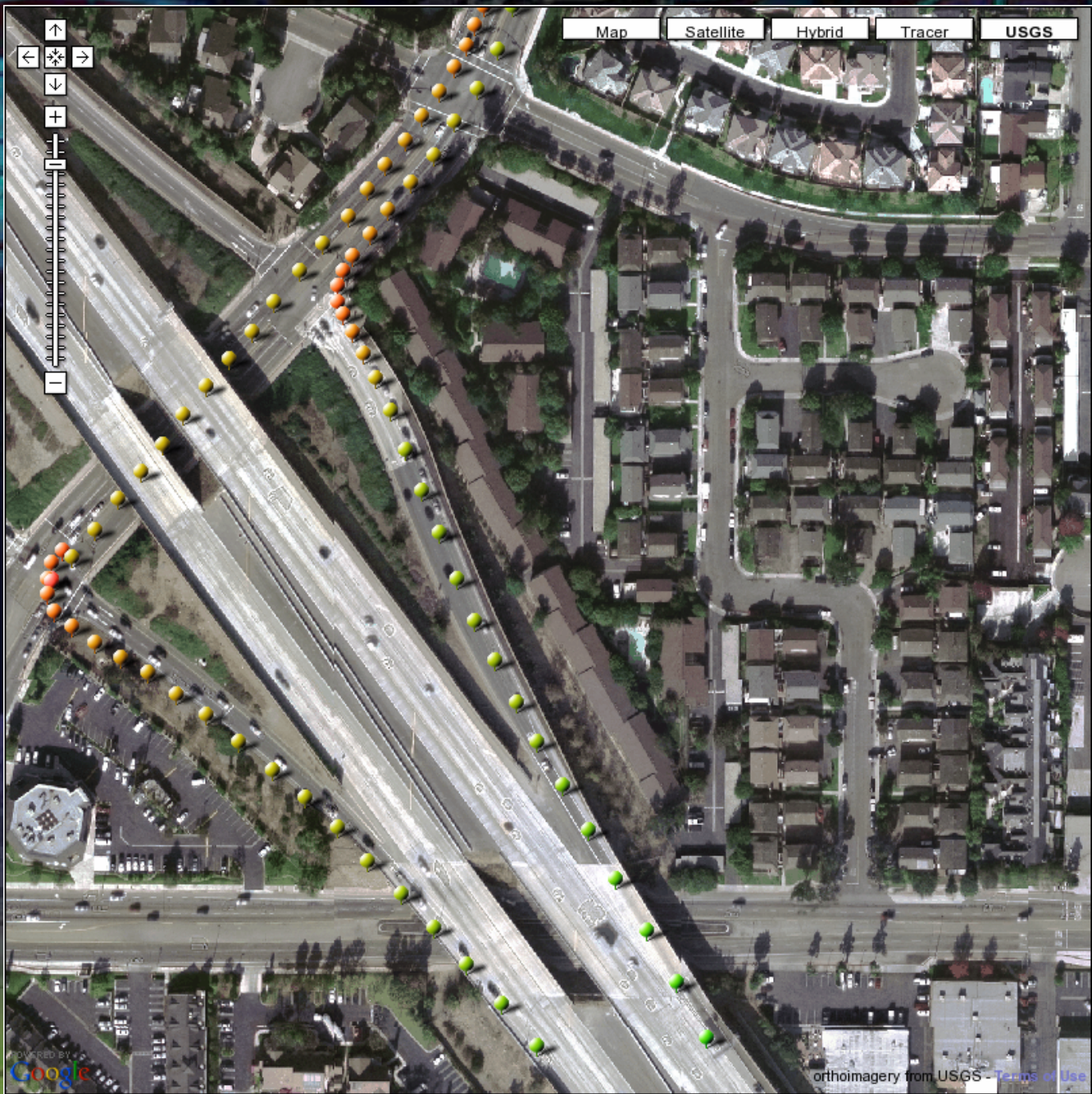
REACT! Travel/Activity Survey (Ming Lee)

- **REACT! is a web-based Travel/Activity Survey**
- **Self-administered Initial Interview gathers household socio-economic and location data**
- **Pre-travel and post-travel components. The Pre-travel component is used to record planned activities for the coming week. The Post-travel component records the preceding 24 hours of travel activity data**
- **Integrated with TRACER, an in-vehicle data collection system for expanded capabilities**
- **ZEVNET application**

TRACER (James Marca)

- GPS-based in-vehicle wireless communication tracking system
- PC104 Pentium Processor, Linux OS, Flash Ram, GPS / WAAS
- CDPD (GPRS) & 802.11b Wireless Communication and Data Transfer
- Time and location data easily collected over large time frames with little if any user interaction
- Integrated with REACT! and ANNE
- ATMS Testbed Web Site
- Link-based tracings for AQ models





Integrating REACT! & TRACER

GPS Recorded Trips

The data in the following table are the known trips associated with your household vehicles.

1. Click 'Add This Trip' to add the selected trip to the Final Schedule.
2. Click 'Show This Trip' to show the GPS tracking path on the map for the selected trip.
3. The GPS recorded time may not correct. The Start_Time and End_Time can be wrong or have error. You can change the time in the Travel Information form.
4. The GPS tracking data help you to remember what you have done today. You have right to not see these data.

Trip ID	Start Time	End Time	Vehicle Make	Model	Year
1	11/12/2002 9:09:22 AM	11/12/2002 9:39:40 AM	Honda	Acord	1997
2	11/12/2002 6:14:02 PM	11/12/2002 6:24:00 PM	Honda	Acord	1997
3	11/12/2002 6:50:22 PM	11/12/2002 6:59:24 PM	Honda	Acord	1997

Map of Irvine, Newport Beach, and Costa Mesa-GPS Tracking

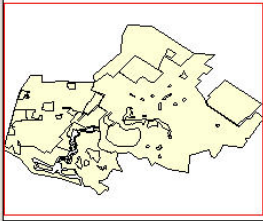
Full View | Zoom Out | Zoom In | Help | Quit

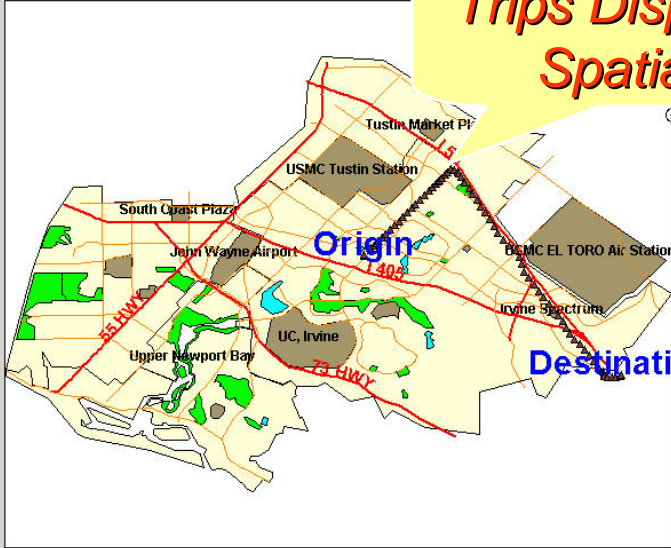
Instructions:

1. To zoom in: With [Zoom In] button pushed in, click on approximate location on map.
2. To zoom out: Click the [Zoom Out] button.
3. To pan the map: Right click and move the mouse on the map.
4. Click the [Full View] to see the full view of the map.
5. Click a point on the Navigation Map to move to the point on the larger map quickly.

Start Time: End Time:

Navigation Map





Trips Displayed Sequentially

Trips Displayed Spatially

ANNE: Appending Data to Tracer

**ANNE vs.
REACT!**

**In-vehicle or
post-travel
web-based
surveys to
elicit activity
attributes of
trips**



OpenMap applet for GPS Tracer - Netscape

File Edit View Go Communicator Help


Back Forward Reload Home Search Netscape Print Security Shop Stop

Bookmarks Location: file:///C:/james_school/gps/cvs_devel/cvs_duplicate/casa/gpstrace/lib/survey_omapplet.html

Home Google OpenMap applet quotes Slashdot:News f stocks LaTeX Index of /ads web design and Meerkat: An Ope xmlhack: develo hardware drool kuro5hin.org ll

File Navigate Control Layers Help

300,000 Mouse Mode Navigation



Lat, Lon (33.739887, -117.841736) - x,y (229,33)

Please answer the following questions about the trip shown in the map to the left, taken on August 1, 2000

Travel start time 6:53 pm

Travel end time 7:14 pm

Activity end time 7:42 pm

Activity dinner at wahoo's fish tacos

Was there any traffic? no yes

Alternate routes campus to bristol

Alternate destinations the wahoo's at park place

submit

Applet edu.uci.its.openmap.app.OpenMapApplet started

CASASIM (Craig Rindt)

- A theory of human activity focusing on interaction, emergence, and adaptation (FHT)
- Constructed a bottom-up model of activity execution via modified Contract Net Protocol to model interaction
- Activity system modeled using Agent-based Simulation with dual hierarchy of physical and social agents
- Transportation system modeled using ParaDyn microsimulation (a Paramics/Dynasmart hybrid)

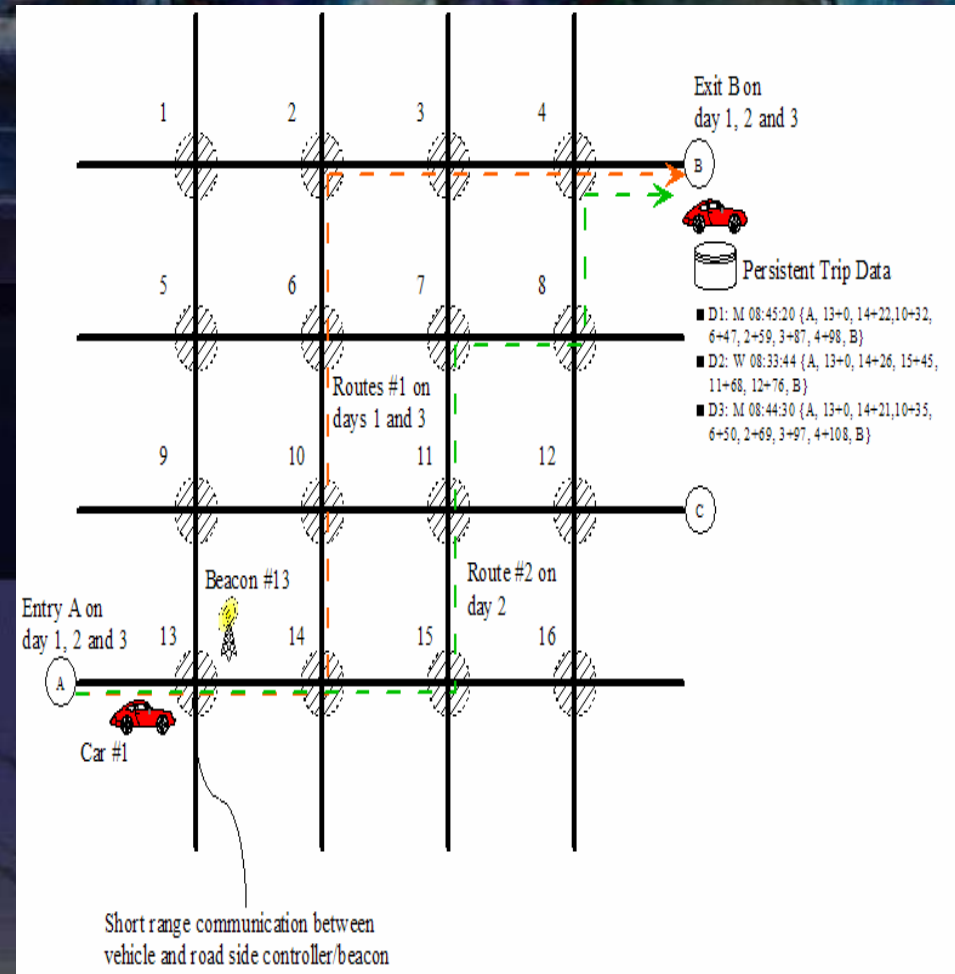
AUTONET ... and PTC

- AUTONET is an information technology architecture that features a mobile, ad-hoc, dynamic, peer-to-peer network that integrates vehicles, information, and communication systems
- Evolved from TRACER project and UCI ATMS Testbed projects directed toward traffic management (e.g., CARTESIUS)
- Simulation and field tests at UCI (and by many car companies)
- P2P architecture and application limitations led to PTC project



PTC (persistent traffic cookies)

- PTC addresses the problem of collecting, storing, and utilizing AUTONET-type data from each vehicle in a traffic network
- Each vehicle stores it's travel history (with driver consent) by accepting authenticated information from roadside controllers via short range wireless communication, producing a distributed database of historical travel patterns
- These historical travel patterns can be used to predict the movement of vehicles currently in the system, which can, in turn, be used for traffic control applications
- This same data can be used to build real-time demand matrices for both real-time traffic management and for conventional travel forecasting
- CASASIM feeds PTC simulation



A future...

- **Spatial data may be universally available from mobile service providers in ways analogous to how web click streams are converted into marketing data for businesses**
- **Location-based services may obviate the privacy issue in a manner similar to how web-based services have squashed the initial privacy uproar with cookies**
- **Must have “value” provided to users as a carrot**
- **The trick is to coax players to develop service-oriented technologies that can eventually converge and provide a development platform for arbitrary applications (such as traffic management and travel forecasting)**