

# Real-Time Data Collection through ITS Architectures in Anchorage

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# Outline

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- Discrete Traffic Assessment in Anchorage
- Distributed Traffic Assessment in Anchorage
- Current Results
- Future Projects

# Discrete Traffic Assessment in Anchorage

# Discrete Traffic Gathering in Anchorage



# Discrete Traffic Gathering in Anchorage

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# Distributed Traffic Assessment in Anchorage

# Distributed Data Gathering

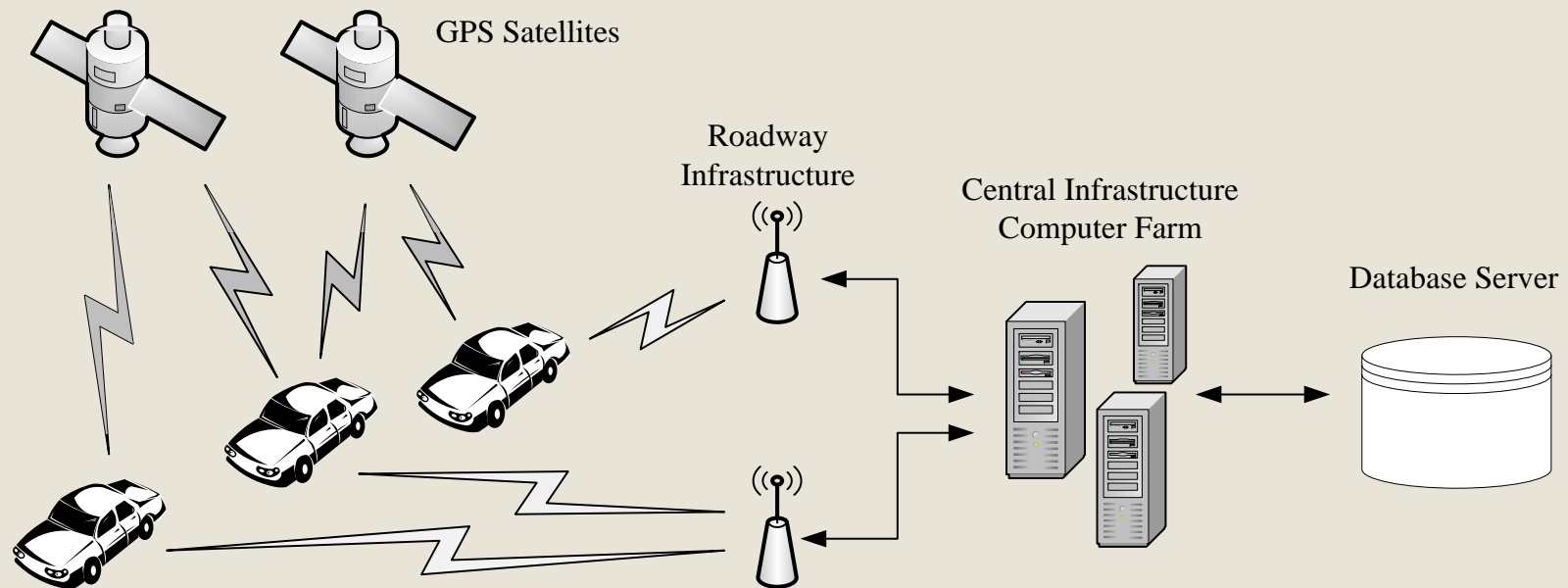
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- Instead of just gathering data at discrete locations, data can now be gathered from individual vehicles
- This can be accomplished through devices installed in vehicles or devices that are traveling with the vehicle
  - These devices can report speed, location, and possibly other vehicular parameters
- This allows real-time data to be gathered

# Proposed Traffic Gathering in Anchorage

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## Architecture





# Proposed Traffic Gathering in Anchorage

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## Vehicle-Tracking Devices



# Proposed Traffic Gathering in Anchorage

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## Cellular Probes



# Privacy Concerns

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- The data which is transmitted has a unique identifier associated with it, but this identifier is not associated with a vehicle
- We are only interested in the main arterials and not residential streets
- The location of the device is not exposed to the public, but only a map showing an aggregation of the data

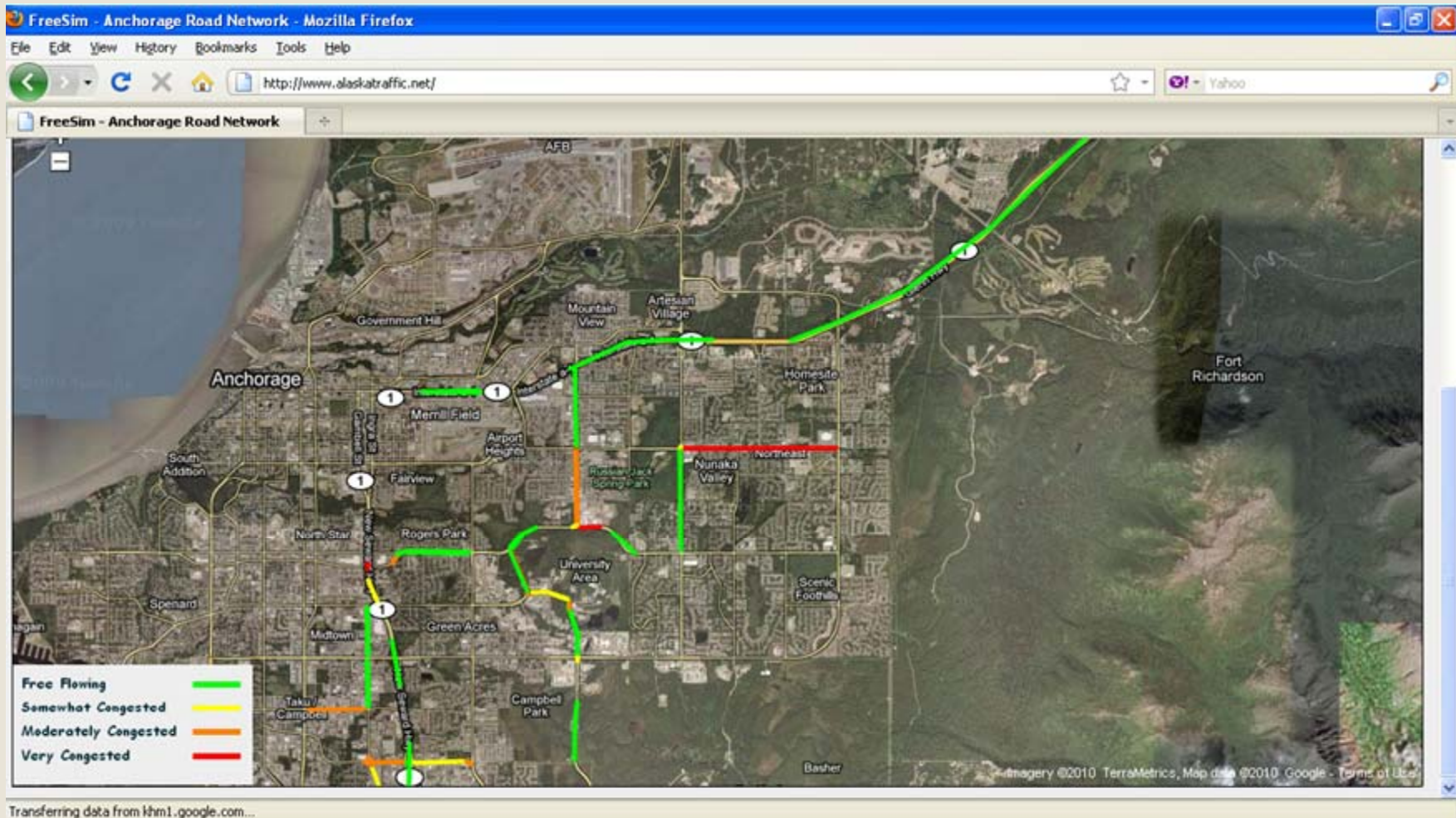
# Current Results

# Current Status

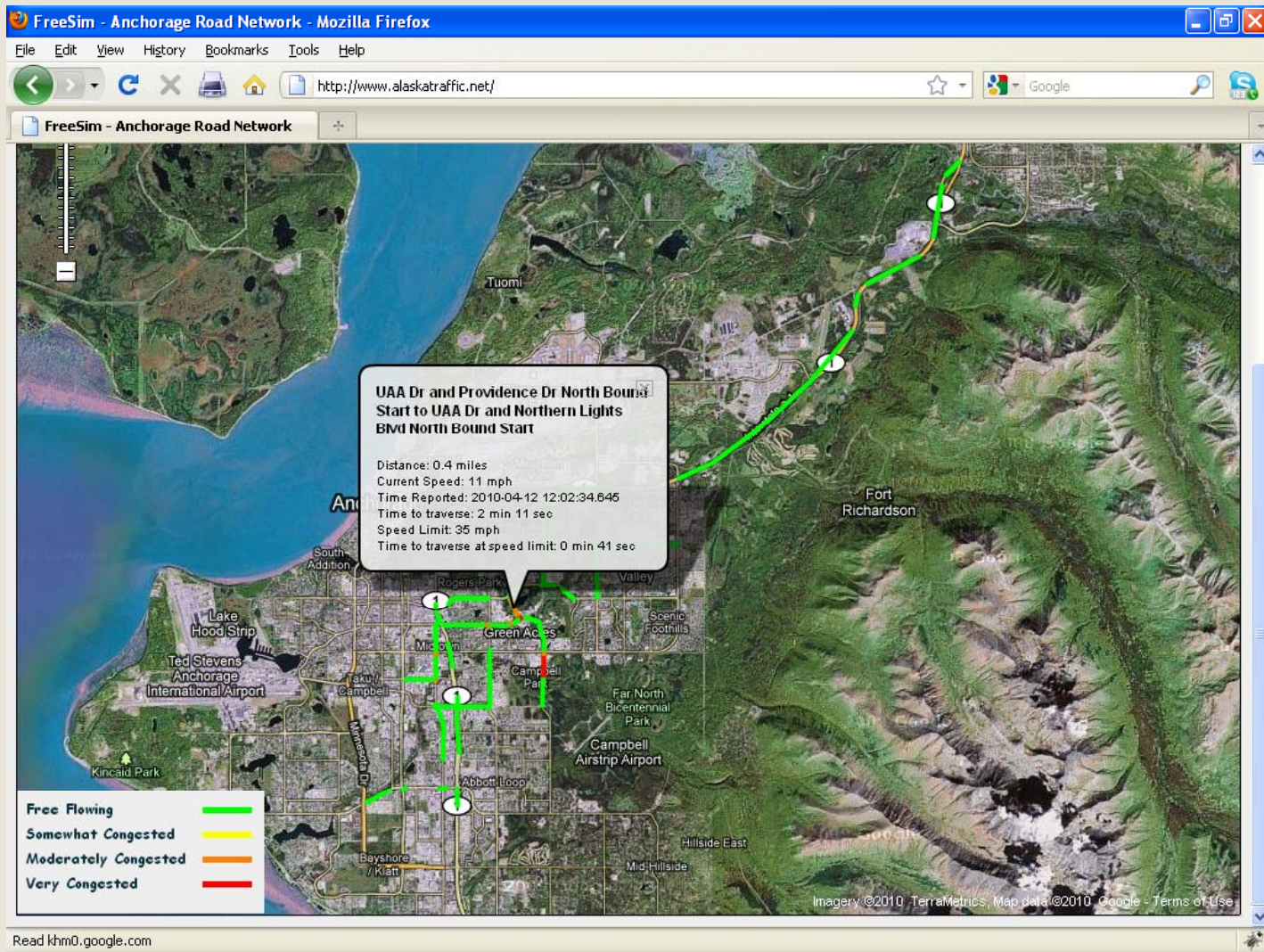
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- Currently, we have 65 vehicles being tracked
  - Volunteers
  - VPSI Share-A-Ride vans
  - Delivery vehicles
- We are currently working on creating the smartphone application and have some promising preliminary results
- We have spoken with Yellow Cab and Checker Cab in Anchorage, and they are both willing to work with us, though we have not received any data from them yet
- We have spoken with the Municipality about retrieving data from the Peplemover, but have not received any data from them yet

# Current Results - FreeSim



# Current Results - FreeSim



# Additional Information

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- The data shown on <http://www.alaskatraffic.net> stays live for 30 minutes if no other vehicle drives along the roadway
  - We are trying to assess if that length of time still reports accurate data or if the data is stale in a period less than that
- The project is free and open-source, and it is being used by other universities around the world in conjunction with departments of transportation
- We have determined travel times along certain arterials (such as Tudor between Elmore and the Seward Highway), and can aggregate the data we have over periods of time
  - This has been requested by the Municipality of Anchorage for their speed study that goes into their annual report



# Future Projects

# Future Projects

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- The applications of this data are too many to enumerate, but here are a few of the projects that are on our short-term list
  - Interfacing with the Municipality of Anchorage and the Alaska DOT to provide them with a summary of the data
  - Advertising <http://www.alaskatraffic.net> for the public to view when we, the MOA, and the DOT feel the information displayed is accurate enough for the public
  - Creating efficient and accurate algorithms for determining amount of time to traverse roadways based on data available
  - Retrieving GPS data from additional vehicles through devices already installed or through installing more devices
  - Tracking snow plows and showing on the map the roads that have already been plowed in real-time

# Future Projects

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- Aggregating all of the data we can in real-time to provide a single interface
- Working with freight, delivery, and taxi companies to determine how they can use this data and what data they can provide
- Determining fastest paths in real-time and notifying drivers of the fastest way to get to their desired destinations
- Solving academic problems with practical applications, such as the Dynamic Traveling Salesman Problem
- Determining how to reduce cost for the devices through V2V2I aggregation algorithms and WiFi or another form of wireless transmission
  - The US FCC has already standardized vehicular communication using DSRC with 75MHz allocated on the 5.9GHz band
  - The IEEE has standardized 802.11p for vehicular communication
- Other projects as determined by key stakeholders

# Questions?

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