

Evaluation of Anonymous Mobile Sampling for Traffic Management

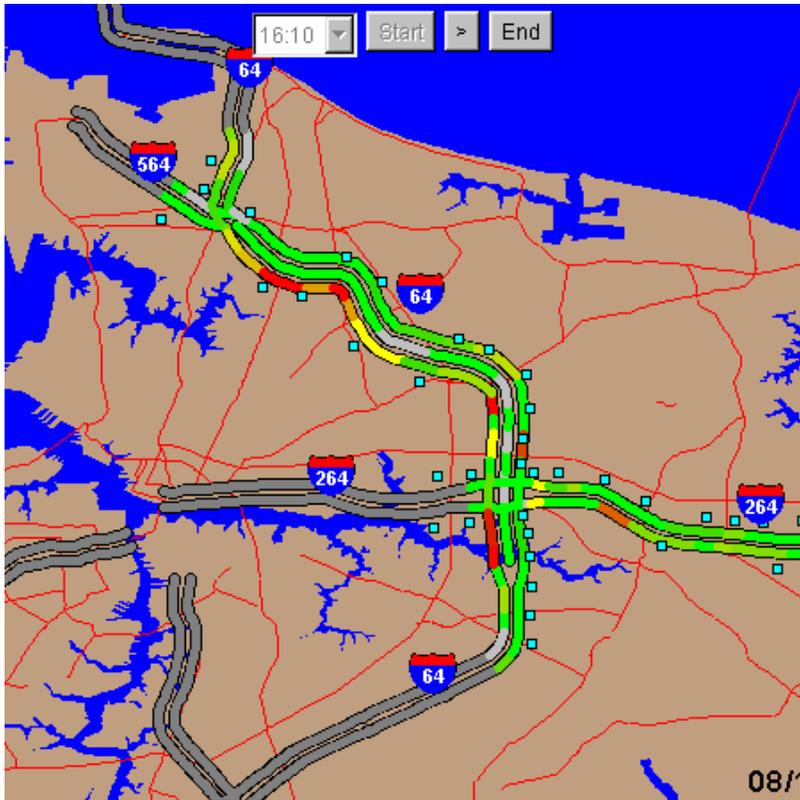
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DEPARTMENT OF CIVIL &
ENVIRONMENTAL
ENGINEERING

Outline

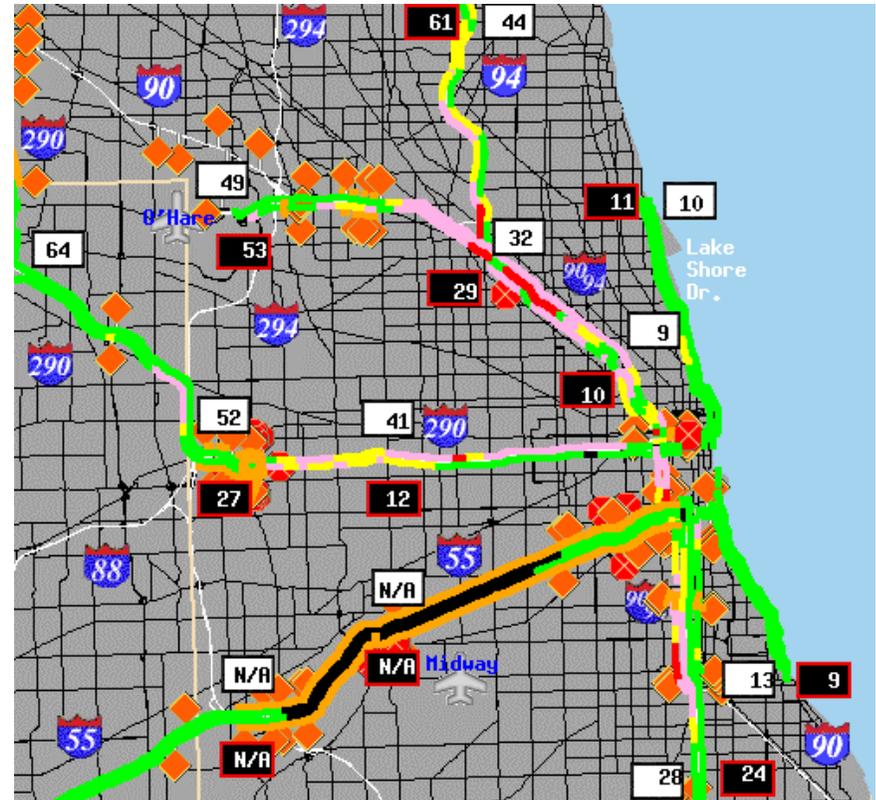
- Some traffic data shortcomings
- One possible remedy – cellular geolocation
- The MD/VA demonstration project
- What does “evaluation” mean?
- Assessing the accuracy of the data
- Demonstrating what it can do for ATMS and ATIS
- Should a DOT pay for it, and if so, how much?

Examples of congestion maps



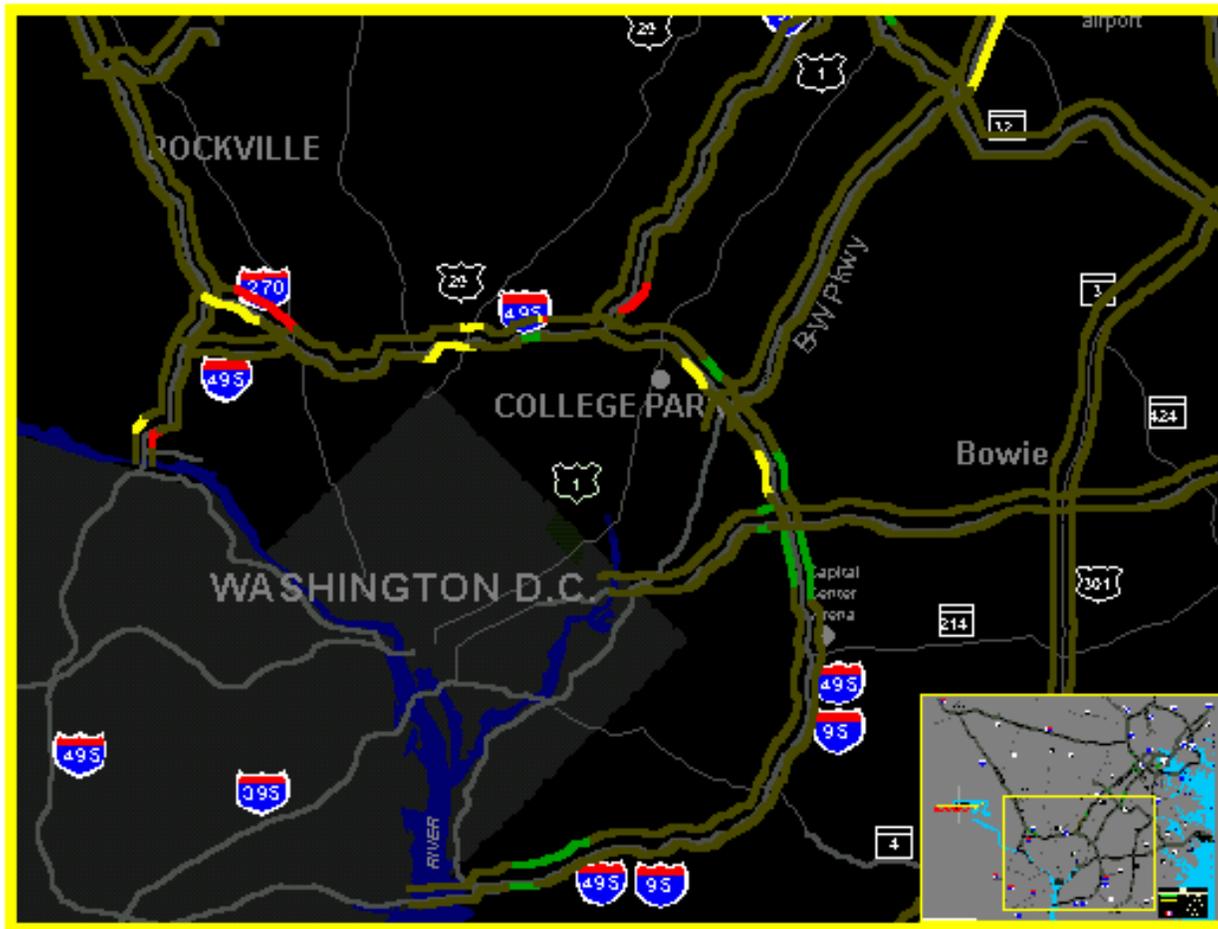
Hampton Roads, VA

August 28, 2000



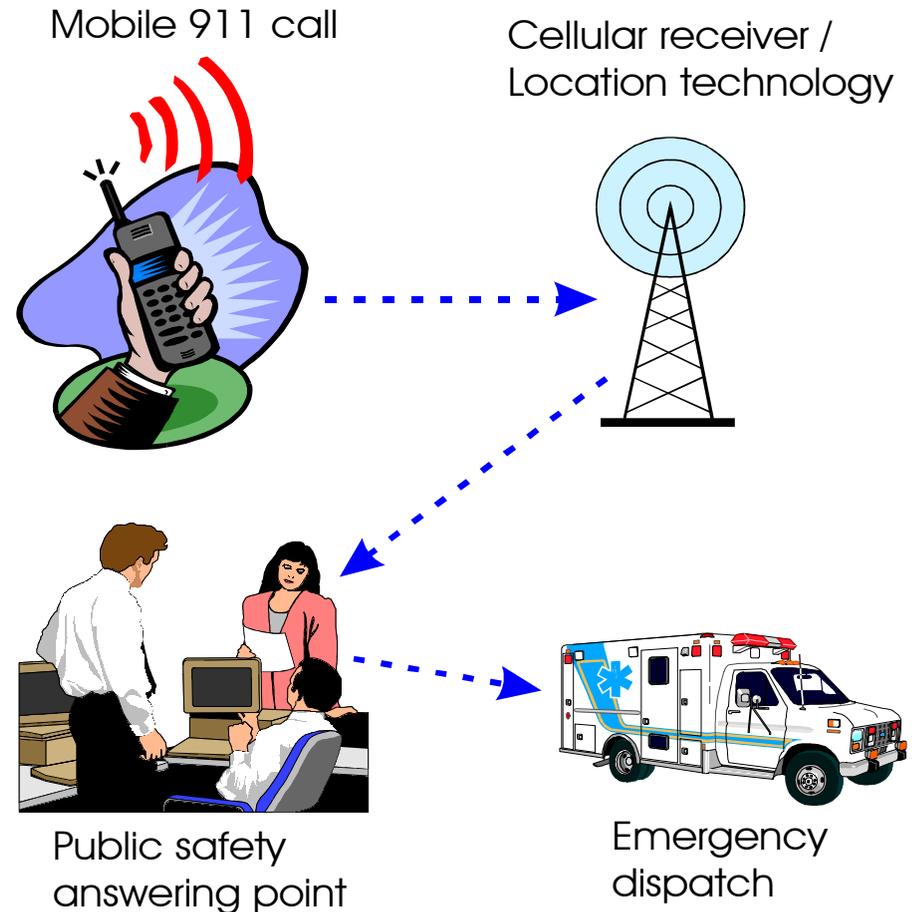
Chicago, IL

A more typical, realistic map?

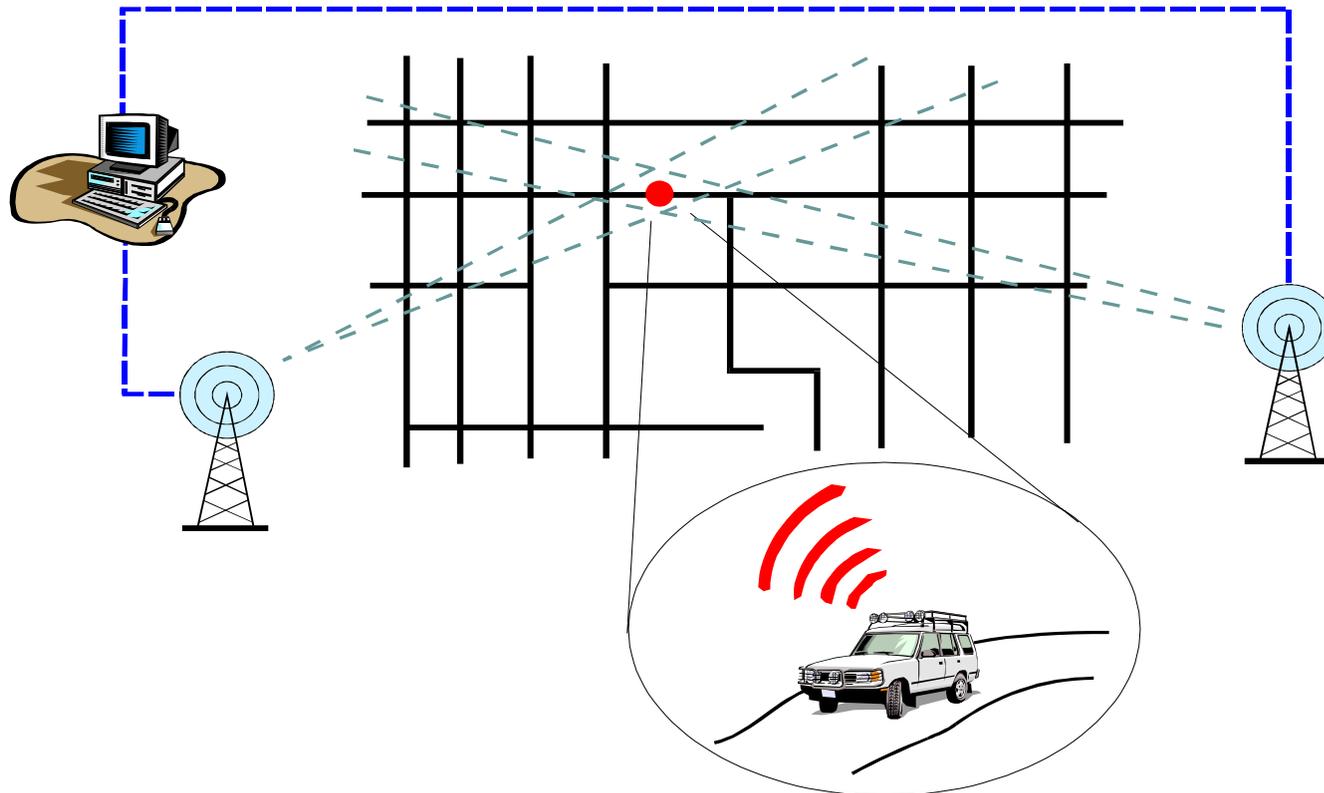


FCC E-911 Mandate for ALI

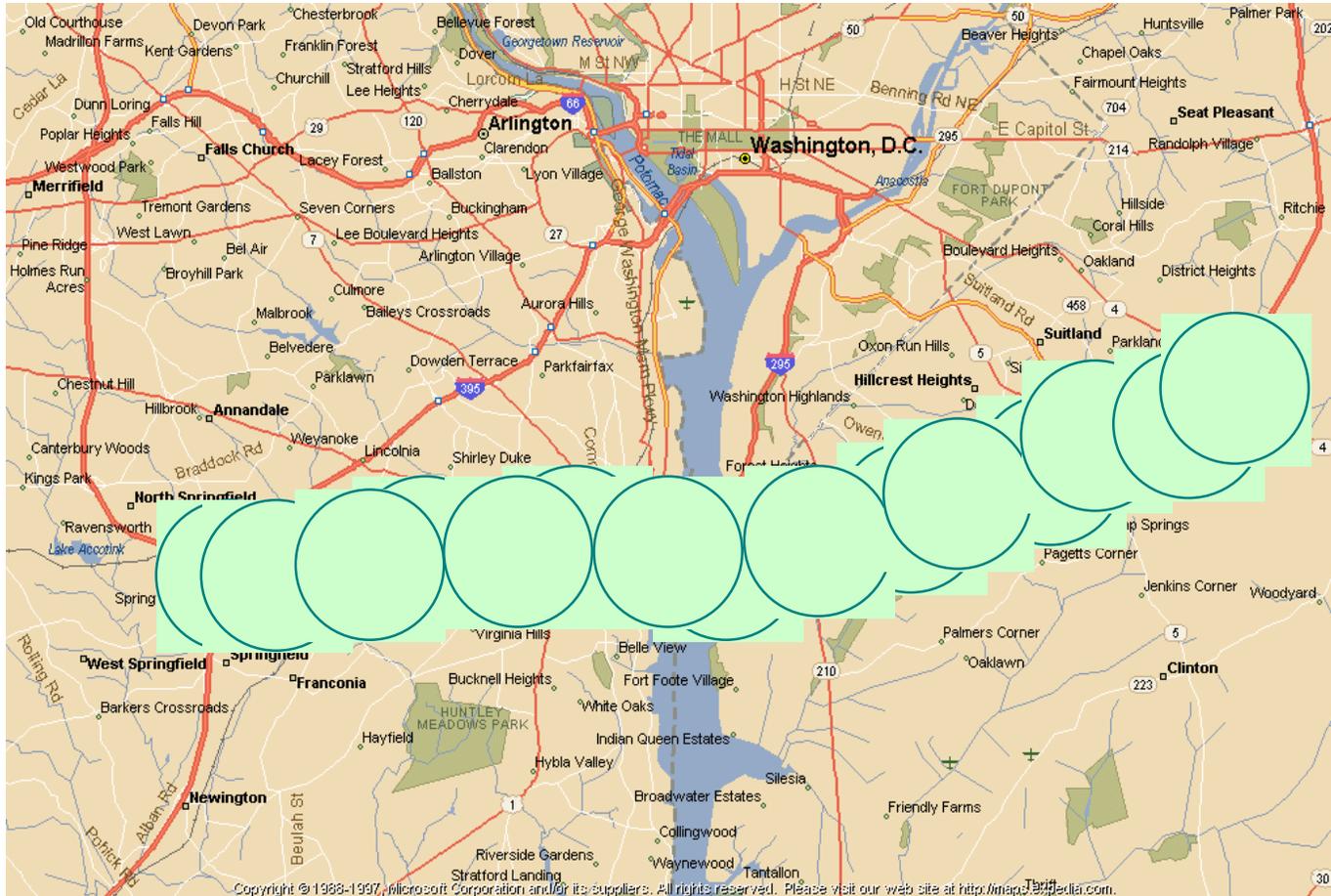
- Determine lat/long coordinates of mobile 911 calls
- < 125m RMS error, 66% of the time
- Technology-neutral
- Implement by the year 2001



How vehicles might be located



MD-VA Demonstration Project (1)

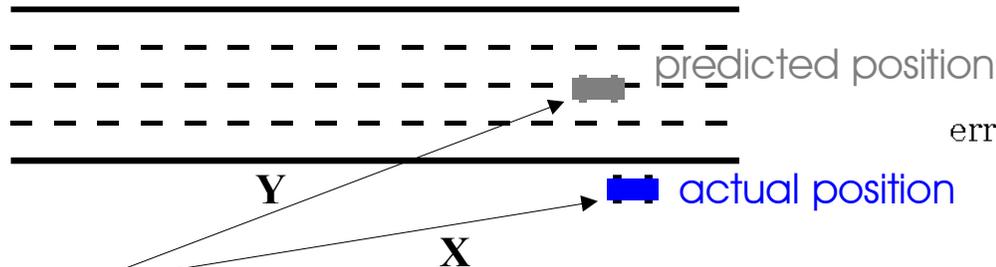


What does “evaluation” mean?

- Testing technical specifications
- Developing prototype applications
- Assessing benefits
- Determining costs

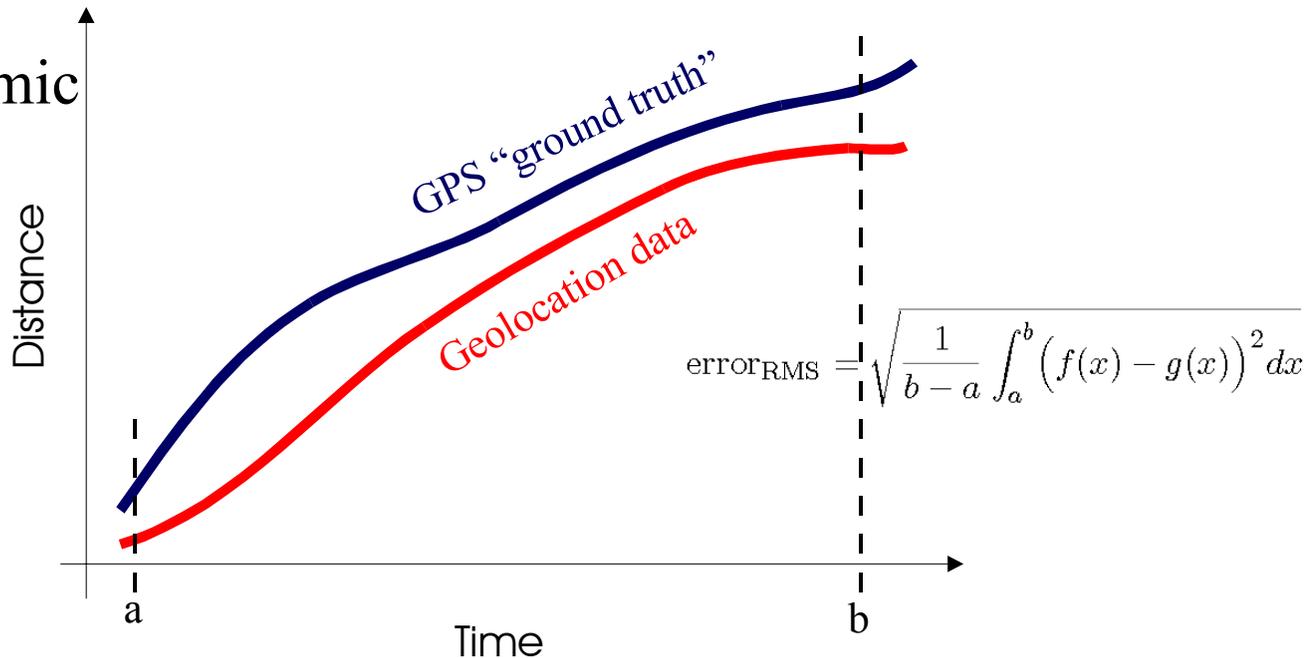
Location accuracy

- Static



$$\text{error}_{\text{RMS}} = \sqrt{\frac{1}{n} \|\mathbf{X}_i - \mathbf{Y}_i\|^2}$$

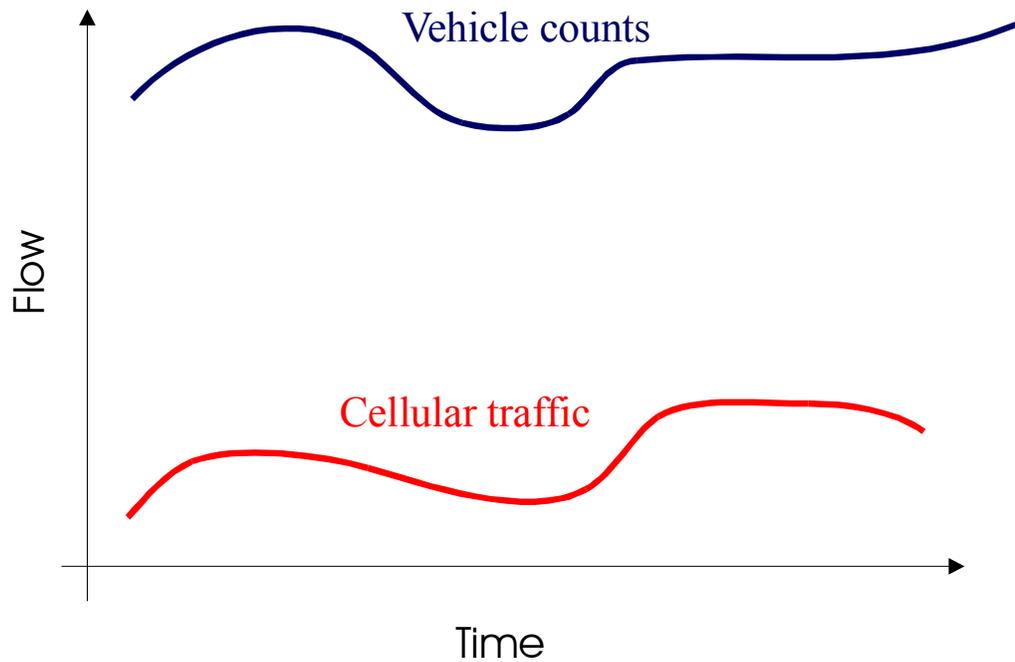
- Dynamic



Prototype applications

- Use of speed data to obviate the installation of double-loop speed traps
- Use of select loop flow measurements and cellular volume counts to estimate flows in uncovered areas
- Use cellular speed measurements to estimate average travel speeds on sections of arterials
- Prototype system status map
- Dual-trigger incident detection
- Small scale O-D estimation
- Travel times to feed VMS, in-vehicle systems

Use of select loop flow measurements and cellular volume counts to estimate flows in uncovered areas



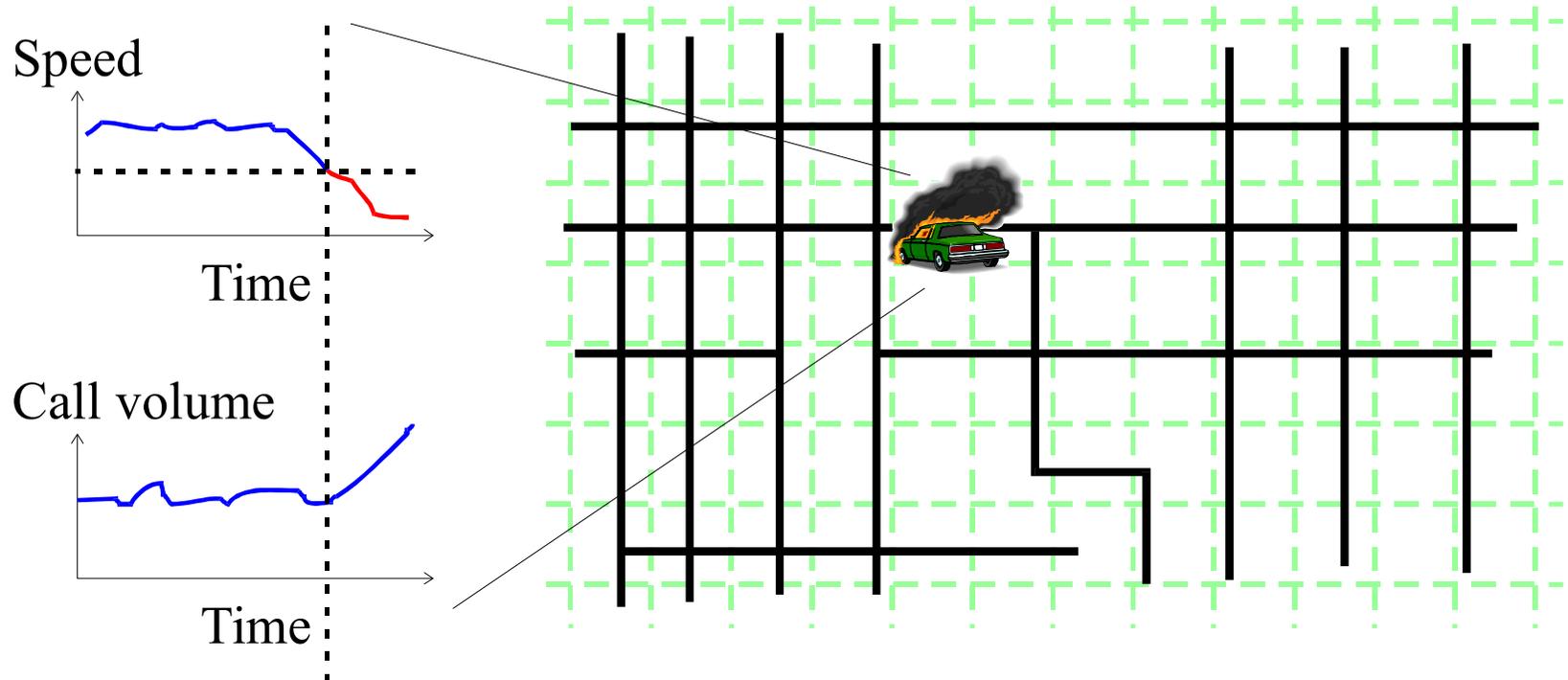
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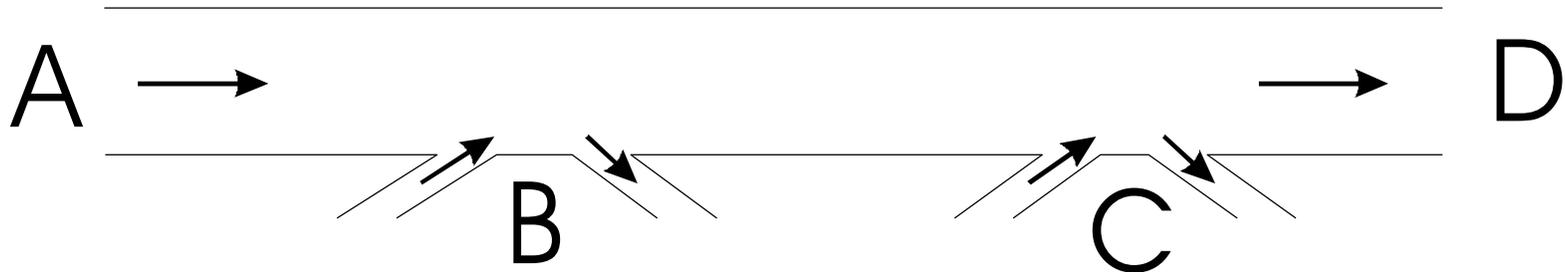
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Dual-trigger incident detection



Small scale O-D estimation



| from \ to | A | B | C | D |
|-----------|----------|----------|----------|----------|
| A | ---- | 10% | 40% | 50% |
| B | ---- | 5% | 20% | 75% |
| C | ---- | ---- | 10% | 90% |

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Assessing benefits

- Substitute costs for the collection of some existing data
- Improved ability to perform according to basic TOC measures of effectiveness
- How to assess the value of new functions added?

Cost model?

- Largely dependent on the business model that data providers elect to adopt
- Different levels of possible aggregation
- Who provides application support?
- Integration
- Archival and data ownership

Summary

- Where are we now?
- What is the rest of our schedule?