

# When will vehicular computing become pervasive?

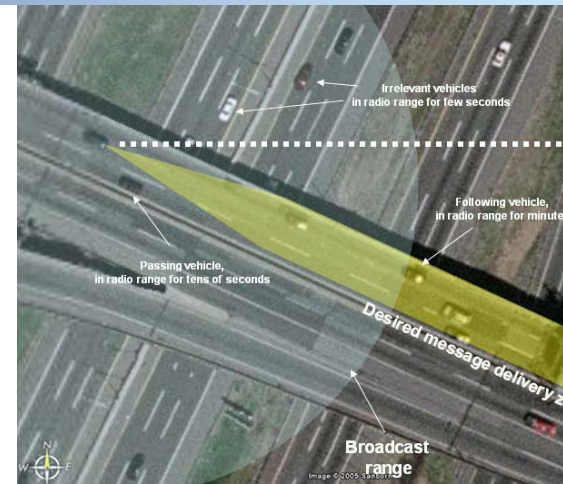
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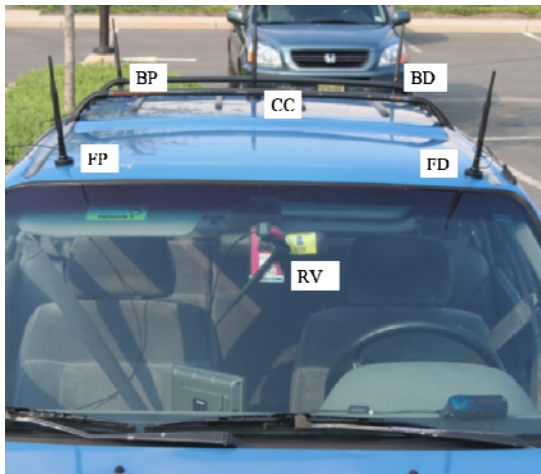
# Our Work: Location-Aware Networking and its Vehicular Applications



Traffic monitoring, sensing with probe vehicles, privacy



V2V and V2I Geocast



V2V Radio Propagation Measurements at 5 GHz



ORBIT Testbed:  
High-density 802.11 protocols

# When will vehicular computing become pervasive?

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- Embedded computing devices, invisible to use
  - Office: ~ 3-5 (mostly PC)
  - Home ~ 5-10
  - Car ~30-50
- Networked
  - Office: PCs and Servers
  - Home: PC and Phone
  - My Car: Most microcontrollers through CAN / LIN / MOST

So far, cars are the biggest success story of pervasive computing.

# What's missing? Spontaneous wireless interaction with External Environment

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- **Safety Application Examples**
  - Extended Electronic Brake Light
  - Intersection Collision Avoidance
  - Location-Aware Information Dissemination
- **Problem: Network Effect<sup>2</sup>**
  - Very high penetration rate required for measurable benefit
  - Requires time-consuming standardization across vendors
  - Product differentiation may be more difficult (?)
- **Problem: Alternative solutions not yet exhausted**
  - Radar / Lidar sensors do not suffer from network effect
- **Problem: Open platforms**
  - Most cellular providers still believe in closed, carefully managed systems, how do we convince the automotive industry?

# The Road Forward

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- The road forward
  - Regulation: Large-scale government testbed to convince regulators and public
  - Bundle entertainment / information services on safety hardware platform
- Third Brake Light
  - John Voevodsky showed 60% reduction in rear end collisions on a testbed with only 200 taxi cabs.
- How many would we need for an EEBL study?
  - 10,000 Manhattan cabs?
  - Integrated 802.11g/p solution for entertainment and safety appears more promising

# Thanks

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