Atlanta Urban Mobility:
DOT ARRA FTA
Transit Capital Assistance
TIGER
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Sustainable Business Development
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Vital network of “Urban Mobility Hubs”

There will be a convergence of technologies and industries. Collaboration and leverage from manufactures, energy/utility companies, IT, and business will occur.

Transportation and utilities will become interdependent.
Electric Vehicles

• Full Battery Electric Transit Connect Commercial Van in 2010
• Full Battery Electric Focus in 2011
• All New Hybrid Vehicles Including Plug-In Version in 2012
### Stakeholders

<table>
<thead>
<tr>
<th>Category</th>
<th>Requirements</th>
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| Transportation Providers | • Vehicle location information  
                           | • Schedules                                                                 |
| Vehicle Providers      | • Vehicle connectivity  
                           | • Intelligent communications interface                                      |
| IT Providers           | • Hardware and software integration  
                           | • Network management  
                           | • Connectivity between vehicle networks and outside world                   |
| External Service Providers | • Revenue streams from advertising/subscription based services  
                             | • Access to portals and external information  
                             | • Any desired 3rd party tie-in                                             |
| Government             | • Road and signal management  
                           | • Wireless infrastructure  
                           | • Public safety integration                                                 |
| Users                  | • Localized, situational information  
                           | • Feedback and preferences  
                           | • Network dispersion                                                       |
Communication Pathways

• Two-way communication between:
  – Vehicle/Vehicle
    – Location data, road condition, hazard warnings, driving status (traction, speed)
  – Vehicle/User
    – Information requests from the user
    – Directions and navigation
    – Warnings, safety info
  – Vehicle/Portable Devices
    – Synchronization of personal data
    – Access to music, multimedia
    – Utilization of additional connectivity
  – Vehicle/Infrastructure
    • Emergency services
    • Traffic signals
    • Toll collection
    • Service/control centers
  – Transportation network devices/external networks (the internet, etc)
    – Local services, events, information
    – 3rd party services designed for any stakeholder within the mobility network
Communication Pathways
Network Structure

• Vehicular ad-hoc network (VANET)
  – Short-range wireless technology to enable frequency re-use, limit interference
  – All vehicles act as potential nodes, forming a “mesh” network
    • No legacy client and server protocol
    • Vehicles connect and disconnect from access points and each other as needed
  – Potential bandwidth scales with the number of users
  – Local information is prioritized, transferred quickly and easily

• Infrastructure access points
  – Long-range wireless access to reach a wider audience
  – Provides a link to central IT backbones and external networks

• Vehicle intelligent communications interface
  – Switches between the most appropriate available protocol on the fly
  – Filters and relays relevant information to the user based on their situation and preferences
  – Enables synchronization between vehicles, information sources, and mobile devices
Ad-hoc, Mesh Network

- “Multi-hopping” between nodes (both fixed and mobile) maintains signal strength for reliable communication
- Multi-hopping routes data in real-time through obstacles or interference points (e.g., buildings, crowded streets, subway tunnels)
- Allows deployment of wireless resources in areas previously too costly or remote to do so via traditional wired or fixed wireless access means
- Self-healing and self-configuring, and nodes communicate automatically to form networks, reducing need for manual configuration
- Permits flexible, redundant, and decentralized deployment options (e.g., on buses, trains, taxis, cars) create geographically dynamic coverage areas
- Highly scalable
  - Bandwidth automatically “right-sized” to number of mobile, transmitting sources in designated area, better accommodating population growth
Open Architecture & Protocol

• Prevents proprietary technology “lock-in” and third-party vendor “lock out”
• Invites participation, facilitates collaboration, and enables more rapid evolution of the technology and its uses
• “Economy of Network Scale” – can leverage existing public and private wired and wireless network infrastructure, including personal devices such as laptops and PDAs, to create robust communication platform
• Capable of being financed almost entirely by the end-users of the individual, mobile devices
• Significant reduction of wireless infrastructure operating and capital costs to city associated with system expansion and integration