Advanced Technology Approach to Assessing Road User Charges: Research Progress

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Overview of presentation

- Principles of user-based financing
- Current ITS applications to collect tolls
- Public policy issues
- New GPS technologies for assessing road user charges

User-based financing: Four bases for pricing public-use facilities

- Generate revenue
- Cover costs of providing service
- Influence behavior to induce greater or less use
- Achieve equity or other social objectives

Problems with current methods

- Toll roads lose 15 to 20 percent
- Delays at toll booths are onerous
- Fuel tax evasion may be 15 percent
- Alternative fuels portend a poor future for fuel taxes

Characteristics of ideal system of user charges

- Low collection cost
- Stable revenue stream
- Users occasioning greater costs pay more
- Low evasion rate
- Incentive to use appropriate roads
- Unaffected by type of propulsion

Two fundamental ITS approaches to collecting road use charges

- Smart roads with dumb vehicles
- Smart vehicles with dumb roads

Technology behind the smart vehicle approach to collecting user charges

- Global positioning system (GPS)
- 24 satellites that beam signals
  - Satellites beam signals but do not receive them
  - There is no charge for using the signals

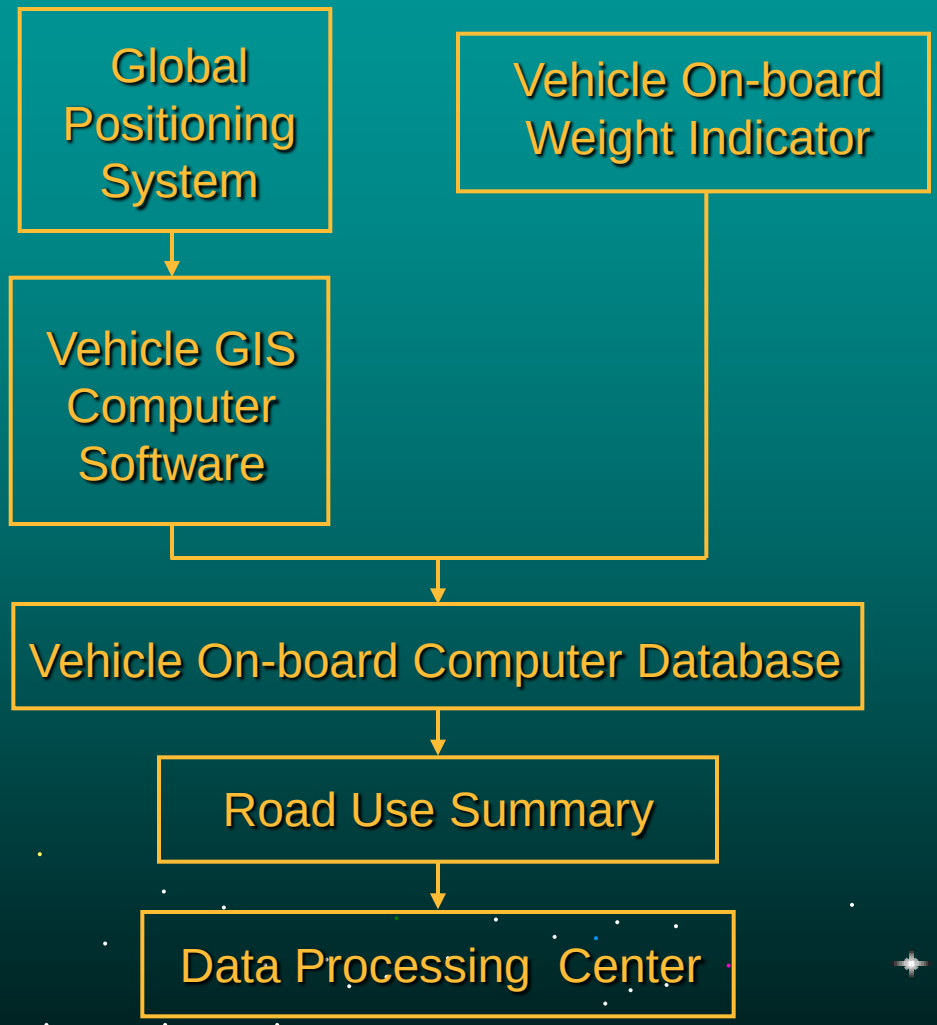
Funding partners for this research

- FHWA
- California
- Connecticut
- Iowa
- Kansas
- Michigan
- Minnesota
- Missouri
- North Carolina
- Ohio
- Oregon
- South Carolina
- Texas
- Utah
- Washington
- Wisconsin

Key components of on-board system

- GPS provides real-time location information to vehicle
- GIS road data file
- On-board computer compares GPS and GIS to record road use

New approach to charging road users



Advantages of the new approach

- Road-specific user charges that are commensurate with damage
- Ability to charge congestion fees
- Improved transportation planning
- Can keep system as simple as a state wishes

Public policy advantages

- Ability to charge on the basis of actual miles traveled
- Incentives to avoid congested roads
- Incentives to operate heavy vehicles on appropriate roads

Need for on-board weight indicators

- Current weigh-in-motion (WIM) scales are feasible only on major highways
- Vehicle weight is a big factor in road damage
- Actual vehicle weight, not registered weight, is appropriate
- Should reweigh with every cargo change

GPS-based financing is good policy

- Stable revenue stream
- Vehicles that create higher costs pay more
- Possible incentive to use appropriate roads
- Type of vehicle power unimportant
- Privacy is maintained

Major benefits to road users

- Expedited permitting for interstate truckers
- Low-cost on-board navigation systems
- Automatic emergency-location identification
- Lower registration fees
- Mileage-based insurance is possible
- Private, high-performance tollways become feasible

Issues to resolve

- GPS accuracy, especially near tall buildings
- Transition from old to new approach
- Encryption of data for privacy
- Operation of billing center and method of billing/payment
- Rental autos and NAFTA trucks

Implementation—addressing privacy concerns

- Data polygons could be used to measure miles driven in each state
- No data on specific trips would be stored
- Would allow fair apportionment of user revenue to the states