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# Operational Concepts and Enabling Technologies & System Architecture

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Agenda Item #7

TAC Meeting #4, April 24, 2015

Monterey, CA



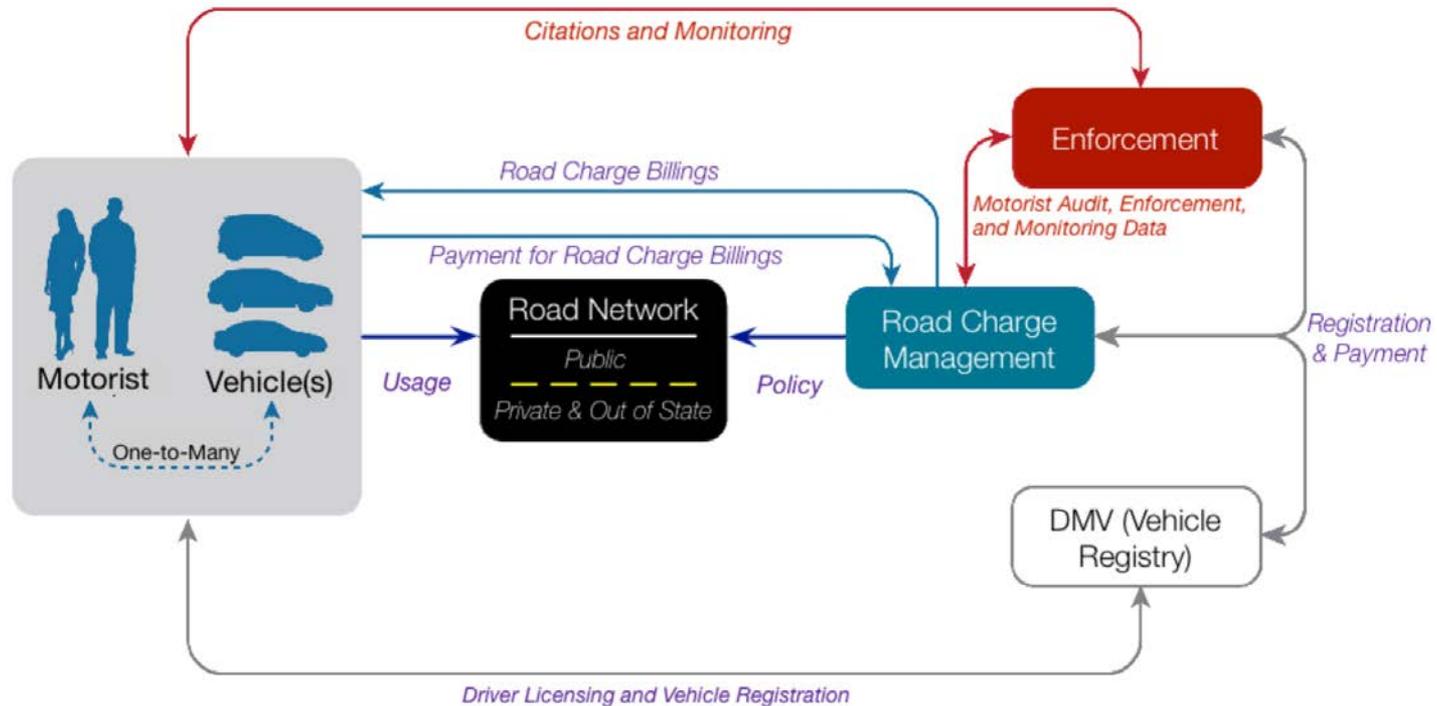
# Topics in Today's Presentation

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- ◆ System overview with and without commercial account managers
- ◆ Motorist experience for each of the seven operational concepts
- ◆ Additional operational concept considerations
- ◆ Motorist experience for the technologies supporting automated operational concepts
- ◆ Fuel tax refunds
- ◆ List of other motorist scenarios
- ◆ Additional notes on odometer fraud
- ◆ Implications of including out-of-state participants in the pilot



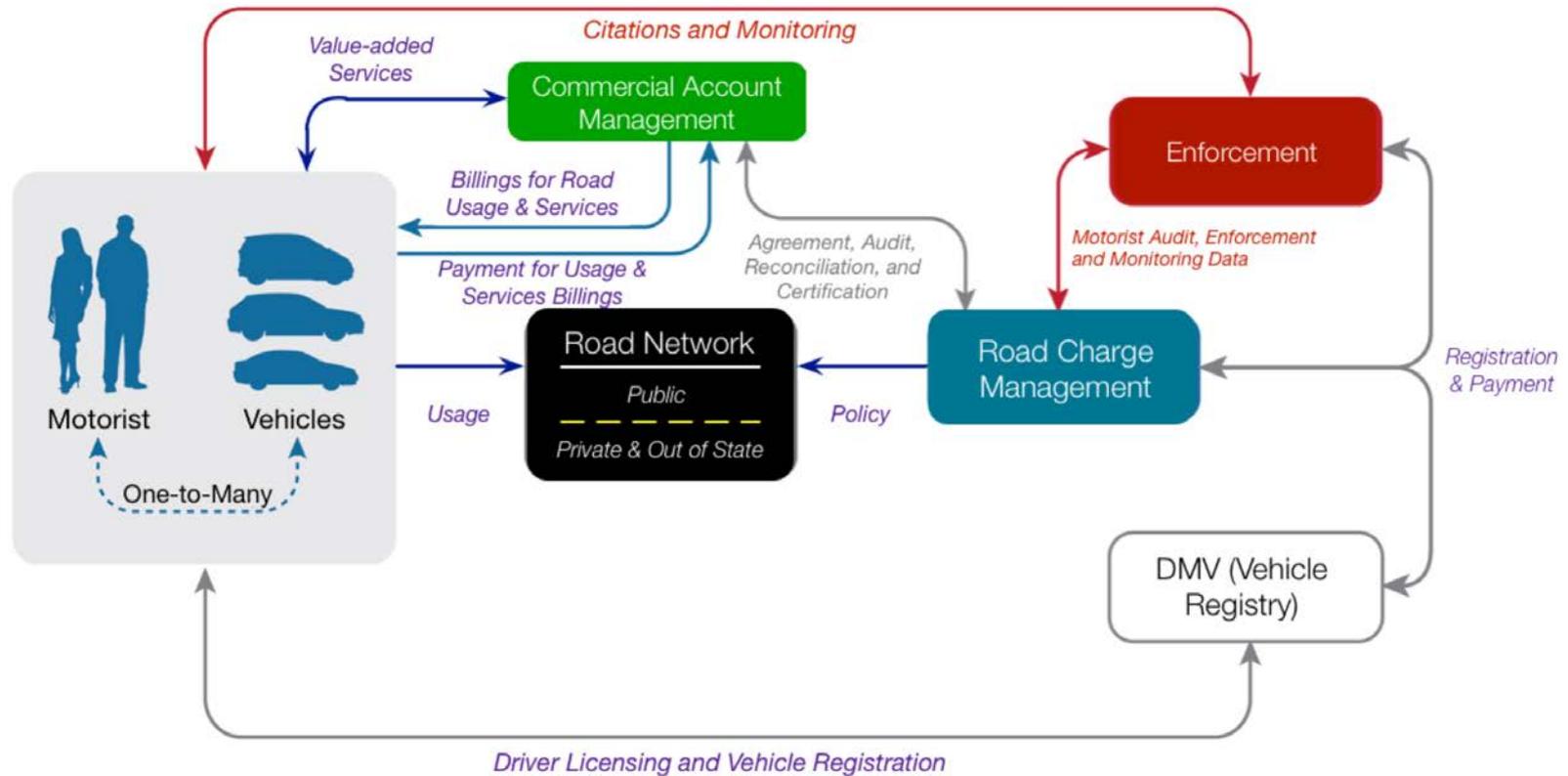
# System Overview without Commercial Account Managers (CAMs)



- ◆ Account management is performed by the state
- ◆ It may be more efficient for the state to manage manual methods, even when CAMs are present, depending on the business case



# System Overview with Commercial Account Managers (CAMs)



- ◆ Motorists opting for automated concepts may use commercial account managers



# Motorist Experience and TAC Perspective on the Operational Concepts

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- ◆ Motorist Experience FAQ:
  - ✧ How is road use recorded and reported?
  - ✧ When do I register and pay?
  - ✧ Where do I register and pay?
  - ✧ What is it like to drive with a selected operational concept?
- ◆ TAC FAQ:
  - ✧ What technical options may the TAC choose for the pilot?
  - ✧ How will this concept be enforced?
  - ✧ What are the challenges or drawbacks of the operational concept?



# Concept 1: Time Permit: Motorist Perspective

- ◆ How is road use recorded and reported?
  - ✦ Motorist buys time permit
  - ✦ Unlimited driving for a given period of time
- ◆ When do I register and pay?
  - ✦ Purchase prior to using the roadway network
  - ✦ May allow for permit to apply retroactively
  - ✦ Exceeding grace period → penalty
- ◆ Where do I register and pay?
  - ✦ DMV office
  - ✦ Web/smartphone
  - ✦ Retail (gas/grocery/convenience)
- ◆ What is it like to drive with a time permit?
  - ✦ Same as normal



# Concept 1: Time Permit: TAC Perspective

- ◆ What technical options may the TAC choose for the pilot?
  - ✦ Window stickers
  - ✦ Electronic registration of license plate
- ◆ How will this concept be enforced?
  - ✦ Visual checks (window stickers), or
  - ✦ Electronic checks (license plate)
- ◆ What are the challenges or drawbacks of the time permit?
  - ✦ Not distance-based
  - ✦ High cost on a per-mile basis to prevent overuse



# Concept 2: Engine Run Time: Motorist Perspective

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- ◆ How is road use recorded and reported?
  - ✦ In-vehicle device measures engine run time
  - ✦ Use reported to an account manager
- ◆ When do I register and pay?
  - ✦ Register with an account manager
  - ✦ Prior to using the roadway network
  - ✦ Account manager provides equipment
  - ✦ Device installed by a professional mechanic
  - ✦ Account manager provides periodic invoices
- ◆ Where do I register and pay?
  - ✦ Web/smartphone app
  - ✦ Account manager (may have retail offices)
  - ✦ DMV office (if state is account manager)
- ◆ What is it like to drive with an engine run time device?
  - ✦ Same as normal



# Concept 2: Engine Run Time: TAC Perspective

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- ◆ What technical options may the TAC choose for the pilot?
  - ✧ None
  - ✧ Requires development of new device
- ◆ How will this concept be enforced?
  - ✧ Device professionally installed
  - ✧ Device detects removal from the vehicle
  - ✧ Data analysis to determine violations
- ◆ What are the challenges or drawbacks of engine run time?
  - ✧ Requires development of new device
  - ✧ Could encourage speeding
  - ✧ Could increase dissatisfaction with roadway infrastructure
  - ✧ Hard to provide credits for out-of-state/off-road miles
  - ✧ Possible minimum credit score requirement



# Concept 3: Mileage Permit: Motorist Perspective

- ◆ How is road use recorded and reported?
  - ✦ Recorded by vehicle odometer
  - ✦ Reported through permit purchase
- ◆ When do I register and pay?
  - ✦ Prior to using the roadway network
  - ✦ May allow for permit to apply retroactively
  - ✦ Exceeding grace distance → penalty
- ◆ Where do I register and pay?
  - ✦ DMV office
  - ✦ Web/smartphone
  - ✦ Retail (gas/grocery/convenience)
- ◆ What is it like to drive with a mileage permit?
  - ✦ Same as normal; Drive until permit expiration
  - ✦ Need reminders of expiration mileage: window sticker, app



# Concept 3: Mileage Permit: TAC Perspective

- ◆ What technical options may the TAC may choose for the pilot?
  - ◇ Window stickers
  - ◇ Electronic registration of license plate
- ◆ How will this concept be enforced?
  - ◇ Visual checks (window stickers), or
  - ◇ Electronic checks (license plate)
  - ◇ Need official start odometer reading
- ◆ What are the challenges or drawbacks of the mileage permit?
  - ◇ Potential for odometer fraud
  - ◇ Legal requirement to notify motorists approaching permit expiration:
    - Potential Solution: automated check of permit validity
  - ◇ Hard to give mileage credit for out-of-state & on private roads



# Concept 4: Odometer Charge (post-pay): Motorist Perspective

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- ◆ How is road use recorded and reported?
  - ✦ Recorded by vehicle odometer
  - ✦ Reported by motorist or by authorized representative
- ◆ When do I register and pay?
  - ✦ Registration prior to using the roadway network
  - ✦ Official “start” odometer reading recorded at registration
  - ✦ Pay at end of reporting period (annual/quarter/month)
- ◆ Where do I register and pay?
  - ✦ Self-reporting: Internet, smartphone app, phone, postcard
  - ✦ Official reporting: DMV or authorized representative
- ◆ What is it like to drive with a time permit?
  - ✦ Same as normal



# Concept 4: Odometer Charge (post-pay): TAC Perspective

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- ◆ What technical options may the TAC choose pilot?
  - ✧ Odometer reading by motorist
  - ✧ Odometer reading by authorized representative
- ◆ How will this concept be enforced?
  - ✧ Spot odometer checks
    - Some mandatory official odometer checks?
  - ✧ Data analysis of odometer readings
    - Audits of certain individuals
- ◆ What are challenges or drawbacks of odometer charge (post-pay)?
  - ✧ Potential for odometer fraud
  - ✧ Cash flow challenges
  - ✧ Evasion due to year end payment
  - ✧ Hard to give mileage credit for out-of-state & on private roads





# Concept 5: Odometer Charge (pre-pay): TAC Perspective

- ◆ What technical options may the TAC choose for the pilot?
  - ✦ Odometer reading by motorist
  - ✦ Odometer reading by representative
- ◆ How will this concept be enforced?
  - ✦ Spot odometer checks
    - Some mandatory official odometer checks?
  - ✦ Data analysis of odometer readings
    - Audits of certain individuals
- ◆ What are challenges or drawbacks of the odometer charge (pre-pay)?
  - ✦ Potential for odometer fraud
  - ✦ Potential for low pre-payments
  - ✦ Hard to give mileage credit for out-of-state & on private roads

PAY ONLINE: Log on to the IRS website and enter the name of our best online payment service. Go to [irs.gov](http://irs.gov) and search for payment options. You can schedule your payments up to one year in advance. Do not mail this form if you use **MySARL** Pay.

IF NO PAYMENT IS DUE, DO NOT MAIL THIS FORM.

2010 Estimated Tax for Individuals File and Pay by April 15, 2010 540-ES

1201103 Form 540-ES 2010



# Concept 6: Automated Distance Measurement (no location data): Motorist Perspective

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- ◆ How is road use recorded and reported?
  - ✦ In-vehicle device measures distance
  - ✦ Reported to an account manager
- ◆ When do I register and pay?
  - ✦ Register with an account manager
  - ✦ Prior to using the roadway network
  - ✦ Account manager provides periodic invoices
- ◆ Where do I register and pay?
  - ✦ Web/smartphone app
  - ✦ Account manager retail offices
  - ✦ DMV (if state is account manager)
- ◆ What is it like to drive with automated distance measurement?
  - ✦ Same as normal
  - ✦ Potential access to value-added services



# Concept 6: Automated Distance Measurement (no location data): TAC Perspective

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- ◆ What technical options may the TAC choose for the pilot?
  - ✦ UBI-type devices
  - ✦ Smartphone
  - ✦ Telematics
  - ✦ Other location-based devices
- ◆ How will this concept be enforced?
  - ✦ UBI insurance devices: analysis of disconnection data
  - ✦ Smartphone: same as odometer readings
  - ✦ Telematics: difficult to defraud
- ◆ What are the challenges or drawbacks of automated distance measurement (no location data)?
  - ✦ Possible minimum credit score requirement
  - ✦ Hard to give mileage credit for out-of-state & on private roads



# Concept 7: Automated Distance Measurement (general location): Motorist Perspective

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- ◆ How is road use recorded and reported?
  - ✦ In-vehicle device measures distance
  - ✦ Reported to an account manager
- ◆ When do I register and pay?
  - ✦ Register with an account manager
  - ✦ Prior to using the roadway network
  - ✦ Account manager provides periodic invoices
- ◆ Where do I register and pay?
  - ✦ Web/smartphone app
  - ✦ Account manager retail offices
  - ✦ DMV if state is account manager
- ◆ What is it like to drive with automated distance measurement?
  - ✦ Same as normal
  - ✦ Potential access to value-added services
  - ✦ Switchable devices available



# Concept 7: Automated Distance Measurement (general location): TAC Perspective

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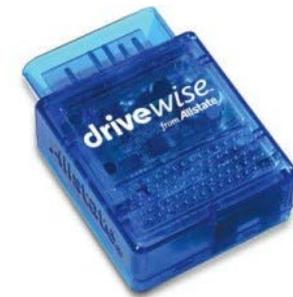
- ◆ What technical options may the TAC choose for the pilot?
  - ✦ UBI-type devices
  - ✦ Smartphone
  - ✦ Telematics
  - ✦ Other location-based devices
- ◆ How will this concept be enforced?
  - ✦ UBI insurance devices: analysis of disconnection data
  - ✦ Smartphone: same as odometer readings
  - ✦ Telematics: difficult to defraud
- ◆ What are the challenges or drawbacks of automated distance measurement (no location data)?
  - ✦ Minimum credit score requirement



# Technology: Usage-based Insurance Type Device: Motorist Perspective

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- ◆ **How do I install the device and set up the service?**
  - ✧ Receive device in mail or at retail location
    - Comes with installation instructions
  - ✧ OBDII port easily located (most vehicles)
    - Hotline for customer service
  - ✧ Create account, complete setup steps, plug in device
- ◆ **What unique requirements or features does the device have?**
  - ✧ Device must be reinstalled after vehicle service
    - Account manager can send notification
  - ✧ Value-added service examples:
    - Usage-based insurance
    - Driving guidance
    - Geo-fencing
    - Automatic diagnostics



# Technology: Smartphone: Motorist Perspective

- ◆ **How do I install the device and set up the service?**
  - ❖ Download/Install road charging app
  - ❖ Complete signup process
  - ❖ Pair phone with vehicle via Bluetooth
  - ❖ Take picture of vehicle odometer
  - ❖ One phone can be paired with two or more vehicles
  - ❖ Two or more phones can be paired with one vehicle
- ◆ **What unique requirements or features does the device have?**
  - ❖ After first Bluetooth pairing, pairing is automatic
    - Phone will only pair to that vehicle
  - ❖ Occasional odometer pictures required
  - ❖ For automated reporting with general location, phone must be in vehicle and have battery power



# Technology: Telematics: Motorist Perspective

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- ◆ **How do I install the device and set up the service?**
  - ✧ Download road charging app
  - ✧ Install it
  - ✧ Complete signup process
- ◆ **What unique requirements or features does the device have?**
  - ✧ Enable or disable use of location data through the app
  - ✧ View account details through the app



# Technology: Other Location-based Devices: Motorist Perspective

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- ◆ **How do I install the device and set up the service?**
  - ✧ Must be installed by professionals
  - ✧ Complete signup process separately
- ◆ **What unique requirements or features does the device have?**
  - ✧ Designed for commercial vehicles
  - ✧ May provide commercial vehicle fleet applications



# Fuel Tax Credits

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- ◆ If fuel tax remains in place, state may wish to give credits for fuel taxes paid
- ◆ Two methods for manual concepts, smartphone and other devices:
  1. Based on estimate of fuel usage for miles traveled;  
May use EPA's "Combined City-Highway" fuel economy rating
  2. Based on paper receipts
- ◆ UBI-type devices can measure fuel consumption on ~70% of cars
  - ✧ For those vehicles, exact tax on fuel actually used can be refunded
  - ✧ Cannot determine which state fuel is purchased in
- ◆ Telematics can measure fuel consumption and state fuel purchased in



# Additional Notes on Odometer Fraud

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- ◆ **Problem**: digital odometer is fraud easy, does not leave evidence
- ◆ **Possible Solution**: data analysis of reported odometer readings to determine suspicious cases; investigate those cases further:
  - ✧ Automatic investigation using car title verification services
  - ✧ DMV fraud investigators
  - ✧ Odometer readings required at auto repair shops, smog checks
  - ✧ California is one of the top 5 states for odometer fraud
  - ✧ High penalties for odometer fraud, ~\$1000-\$2500 per vehicle



# Implications of Including Out-of-State Pilot Participants

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- ◆ Charging out-of-state drivers on California roads may be desirable
  - ✧ As long as fuel tax remains in place, it may not be necessary
- ◆ Possibilities for recruiting out-of-state participants:
  - ✧ Western Road Usage Charge Consortium
  - ✧ Oregon's Road Usage Charging program
  - ✧ California's nonresident daily commuter permits
- ◆ Three different scenarios for including out-of-state participants:
  - ✧ As registered California drivers
  - ✧ Out-of-state participants registered in their own state
  - ✧ Temporary road charging payment options



# Out-of-State Participants as Registered California Drivers

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- ◆ Out-of-state residents are treated the same as California residents
- ◆ Holders of California's nonresident daily commuter permits would be ideal



# Out-of-State Participants Registered in Their Own State (Interoperability)

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- ◆ Add participants already registered for a road charging pilot program in their own state to the California program
- ◆ For Automated Mileage Reporting with General Location option
- ◆ Would demonstrate technical interoperability
- ◆ Oregon will have such participants
  - ✧ Some possibility that Washington State and Colorado will also have pilot participants



# Out-of-State Participants with Temporary Road Charging Payment Options

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- ◆ Short-term visitors to state choose short-term operational concepts
  - ✧ Time Permit
  - ✧ Mileage Permit
- ◆ Sign up via smartphone app, Internet, or purchase in retail store
  - ✧ For mileage permit, start odometer reading is also needed
- ◆ Example Increments:
  - ✧ Time permit: a few days, one week, or two weeks
  - ✧ Mileage permit: 500, 1000, or 2000 miles

