Human Factors for Connected Vehicles Program

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V2V Safety Framework

Maturing the V2V Research
- Initial Crash Problems
- Performance Measures
- Testing Procedures
- Interoperability Requirements
- Initial Security Models
- Driver Vehicle Interface Guidance

Model Deployment
- Benefits Framework
- Driver Clinics
- Performance Testing
- Model Deployment
- Experimental Design

Evaluation
- Evaluation Plan
- Data
- Conduct Evaluation
- Run Simulations

Supporting Policy Elements
- Implementation
- Technical
- Legal

Moving Towards a Decision
- Safety Benefits
- Performance Requirements
- Test Procedures
- Driver Acceptance

Moving Towards an Operation Model
- Data Collection
- Data Evaluation & Analysis
- Establishing an Operational Environment
- Results
Human Factors for Connected Vehicles

**Outcome Goal**
- Connected Vehicle technologies and applications will have Driver Vehicle Interfaces (DVI) that effectively communicate safety and various levels of non-safety driving related information while managing workload and minimizing distraction

**Product Goal**
- Human Factors Guidelines to ensure interfaces are effective without increasing distraction or creating high workload
  - Produced in time to inform 2013 Agency Decision
Program Scope

- **Multiple User Groups:**
  - Light vehicles
  - Commercial Vehicles
  - Transit operators
  - Age groups: Older and Younger drivers

- **Multiple Applications:**
  - V2V and V2I
  - Safety, Mobility, Sustainability
    - Special concern about non-safety applications
  - Original equipment, Nomadic (carry-in) devices, software “Apps”

Focus is on “Connected” Applications
HFCV Guidelines

- Human Factors Guidelines for Connected Vehicle Systems
- Focus will be on Driver-Vehicle Interfaces (DVI) for:
  - Safety and Non-Safety applications
  - Integrated and aftermarket devices
- Will inform 2013 Agency decision
Generating the Guidelines

- Driver-Vehicle Interface (DVI) Integration
- DVI Design Guidance
- Evaluation and Measurement
- Safety Pilot DVI Criteria
- Stakeholder Input
- Distraction Mitigation
- Effective Warnings

HFCV Guidelines 2013
Phase 1 Accomplishments (2011)

- Effective Warnings Research
  - Six (6) studies investigating a range of issues for warning design
  - Final Report being prepared for publication

- Distraction Mitigation Best Practices
  - Test procedures to assess distraction potential
  - Outcomes being harmonized with NHTSA Distraction Guidelines
Phase 1 Accomplishments (2011)

- **Integration Requirements**
  - Initial test-track study examining potential integrated and portable display locations
  - Final Report being prepared for publication

- **Safety Pilot DVI Design Criteria**
  - Completed in March 2011
Generating the Guidelines

- Driver-Vehicle Interface (DVI) Integration
- Distraction Mitigation
- Effective Warnings
- Stakesholder Input
- HFCV Guidelines 2013
- DVI Design Guidance
- Evaluation and Measurement
- Safety Pilot DVI Criteria
Phase 2 Accomplishments (ongoing)

- Multi-DVI Integration
  - Concept of Operations
- Integration Framework
  - Research to support layers
- DVI Guidance Research
  - Research focusing on CV-specific contexts

- New Starts in 2012
  - Portable Devices
  - Information from V2V and V2I Sources
Additional HFCV Activities

- **Predictive DVI Evaluation Software Tool**
  - Software tool for designers to be able to estimate distraction potential or workload issues for their DVI and system configurations

- **Longer-term Exposure Field Operational Experiment**
  - Driver adaptation study
  - To be awarded this Fall
Upcoming Outreach Events

- Workshop at Automotive UI Conference in October
- Outreach/Stakeholder Public Event planned for Fall 2012 in Washington, DC
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