
Dr. W. Riley Garrott
Elizabeth N. Mazzae
NHTSA Research and Development
January 26, 2012
A Technology Explosion

“We’re working hard to make the car the ultimate mobile device”

“The car is an expensive phone”

“The company that can accommodate as many different mobile devices as possible, and integrate them in the car -- they're the guys who are going to win long term”
Guidelines are significant portion of Initiative 2
In 2010, 17% of Crashes (899,000) Involved Driver Distraction

Task-Related Risk and **Tasks Affected by Guidelines**

- Talking/listening on *hand-held* cell phone
- Reading
- Dialing *hand-held* cell phone
- Reaching for moving object
- Reaching for non-moving object
- Text messaging on cell phone

Dashed box indicates a task affected by these guidelines
Boxes indicate visual-manual tasks
Ovals indicate auditory-vocal tasks

The most distracting tasks are visual-manual intensive
Why Voluntary Guidelines for Limiting Distraction?

- Electronics are changing rapidly
  - Guidelines can react faster than FMVSS

- Distraction testing results depend upon subject’s abilities
  - Distraction due to task varies from person-to-person
  - Distraction test results based on overall capabilities of group of subjects
  - FMVSS testing results should not depend on subject pool selected

- Goal of NHTSA’s Guidelines
  - Better-designed in-vehicle electronic device interfaces
  - Discourage introduction of egregiously distracting non-driving tasks performed using electronic devices
  - Discourage electronic devices that exceed a reasonable level of complexity for secondary tasks.
Existing Guidelines for Reducing Driver Distraction

- Multiple sets of guidelines have been developed
  - Alliance of Automobile Manufacturers (Alliance Guidelines)
  - European Union
  - Japan Automobile Manufacturers Association
Areas of Needed Improvement for Existing Distraction Guidelines

- Based on our internal agency review, the following appear to be key areas in need of improvement or revision for visual-manual interfaces:
  - Scope of distraction guidelines
  - Definition of a task
  - Establishing test procedures
  - Handling test participant variability
Scope of NHTSA Guidelines

- Technologies covered by the guidelines
  - Advanced telematics
  - This can be expanded to include conventional systems
    - Not currently covered in existing guidelines, (ex., radios) may need to be included due to increasing in complexity
    - Satellite radios: number of radio stations
    - Multifunction radios: soft keys, menus
  - Any other types of systems?
Scope of NHTSA Guidelines

- Use of lockouts/restricting access
  - Currently, some media, such as video, are already restricted by Alliance guidelines (good!)

- What else should be restricted?
  - System functions covered by new laws, e.g., texting
  - Technologies not intended for use while driving restricted

- Array of new technologies, media (ex., social networking sites) on horizon displaying material of great interest to drivers

- Questions that arise:
  - Pace: how fast is too fast?
  - Driver control: would drivers be able to cancel the task?
  - Driver motivation: once activated, would drivers cancel the task even if they could?
Defining a Task

- Existing task definition may not accommodate the current, and future, technological capabilities

- Improve task definition to make it:
  - Goal-centric
  - Precise
  - Repeatable
  - Applicable to current and future technologies
  - Start, End state is critical

- Role of interruptability: should it be taken into account?

- Transition between tasks: should it be considered?
Establishing Test Criteria

- Distraction Metrics (i.e., how to measure distraction effects on driving performance)
  - Currently there are two metrics in the Alliance Guidelines – eye glance threshold of 2/20 seconds, and lane keeping task/headway
    - Are these interchangeable (i.e., do they measure the same thing)?
    - Should both be allowed? Or required?
    - Are there better metrics available?
Establishing Test Criteria

Acceptance criteria:

- Objective criteria: Ensures all tasks are measured against the same requirements
- Relative to baseline task: Allows comparisons within same person
- NHTSA’s challenge: determine which is most appropriate for the metrics selected
Establishing Test Procedures

- Assessment test participants characteristics
  - Age: Restricted to 45 – 65 in Alliance guidelines
    - Advanced technologies used to be restricted to luxury car owners, but now are accessible to all
    - Most studies show an effect of age when interacting with technology, so this factor may impact results
  - Experience level: novice, informed, expert
  - Motivation: from where are participants recruited
Handling Test Participant Variability

- Currently, the Alliance guidelines approach is to take mean of glances duration.
- There may be a better way to deal with than averaging glance duration (e.g., another statistical approach)
- Long glances at same point in the task may indicate an issue
Research Supporting Visual-Manual Guideline Development

- Research conducted to obtain information on which to base aspects of guidelines
  - Distraction assessment method
    - Eye glances,
    - Alliance performance tests, or
    - NHTSA performance test
  - What level of distraction is too much?
  - Minimum number of assessment test participants
  - Assessment participant criteria (age, technology familiarity)
  - Statistical approach for handling assessment test data variability and outliers
Contact Information

Dr. W. Riley Garrott
Riley.Garrott@dot.gov
(937) 666-3312

Elizabeth N. Mazzae
Elizabeth.Mazzae@dot.gov
(937) 666-3314