Overview of NHTSA's Visual-Manual Distraction Guidelines for Integrated Electronic Devices

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A Technology Explosion

"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"

"We're working hard to make the car the ultimate mobile device"

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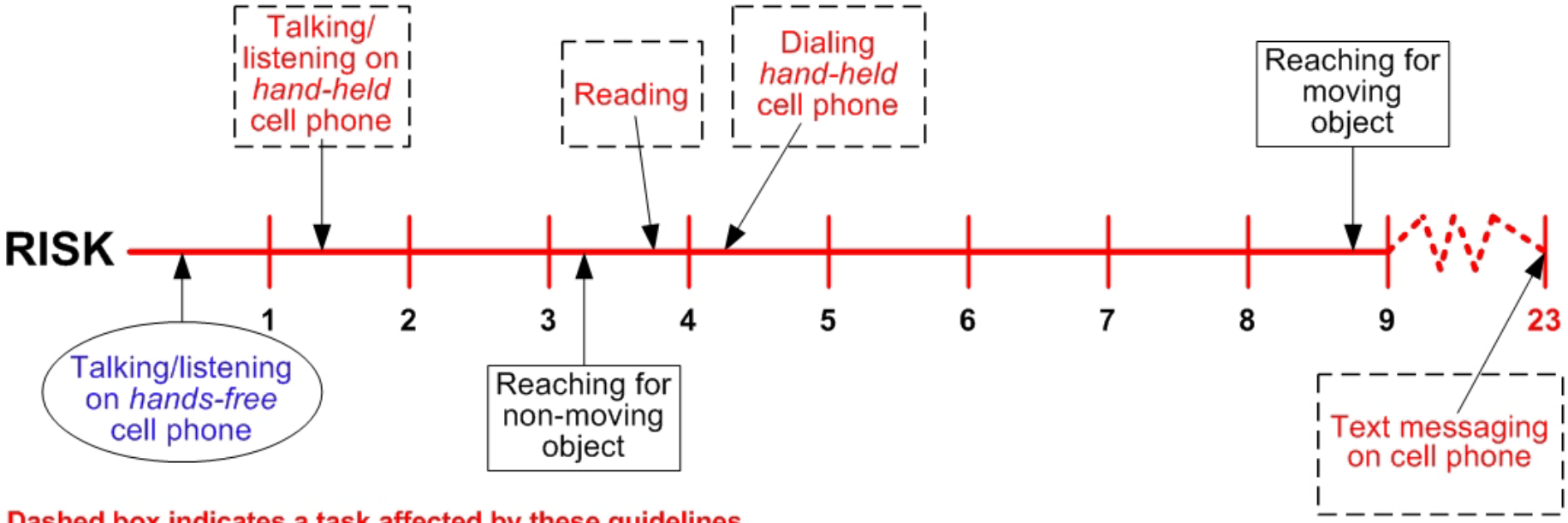
NHTSA's Distraction Plan

- 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



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

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