



Driver distraction research priorities Input from US-EU Driver Distraction and HMI working group

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The US-EU Driver Distraction and HMI WG

- Part of the US-EU Bilateral Task Force on ITS
- General objective
 - Identify opportunities for research collaboration, align research and to identify differences
- Members:
 - US: Chris Monk (FHWA, WG leader), Eric Traube (NHTSA), Dan McGehee (U. Iowa)
 - EU: Johan Engström (Volvo, WG leader), Wolfgang Höfs (EC), Alan Stevens (TRL), Andreas Keinath (BMW)
 - Japan: Saturo Nakajo (MRI; observer)
- Key focus to date: Obtain a common understanding of driver distraction and inattention

The Focus Group on driver distraction

- Held April 28, 2010 in Berlin
- Report will be published soon on US DOT and EU eSafety website
- Aims:
 - Agree on a general definition of driver distraction
 - Define top-10 research needs
- Invited experts:

US Participants			EU Participants	
Richard Hanowski	VTTI		Michael Regan	INRETS
Bill Horrey	Liberty Mutual		Alan Stevens	TRL
John Lee	U. of Wisconsin		Trent Victor	Volvo

Driver distraction definition

- A clearcut definition of driver distraction is needed to
 - Estimate the true magnitude of the driver distraction problem
 - Enable comparison between studies
- Proposed definition:

Driver distraction is the diversion of attention from activities critical for safe driving to a competing activity.

Current activity: The US-EU Inattention Taxonomy project

- **Objective:** Define a common taxonomy of driver inattention for use in accident/ incident analysis and the design of safety systems
- Time frame: June 2011 – December 2012
- Working group: WG + Focus Group experts

Top-ten research needs (without ranking)

1. **Performance indicators and metrics** related to crash risk (includes modeling).
2. Standardized **test or experimental procedures**
3. **Generalizability** of methods (including simulator, test track and naturalistic driving)
4. Drivers' **willingness to engage and disengage** in distracting activities (different driver groups, behavior regulation and change, social norms and how they may be changed over time, e.g., socially accepted risk)
5. **Cognitive distraction** (definition, categorization, and relationship to other types of distraction, measurement, and impact/real-world implications).
6. **Risk** associated with different, technology and non-technology-related, activities (exposure, workload from both the driving task and competing task; individual differences; multitasking strategies and self-regulation; taxonomies for defining and coding driver engagement in distracting activities)
7. **Countermeasures** for preventing driver distraction and mitigating its effects.
8. **Distractions outside of the vehicle**
9. **Work-induced distractions** and activities that drivers and other road users (e.g., pedestrians and bicyclists) engage in across transportation modes.
10. **Cognitive underload** and the potentially protective effects of distracting activities.

Change of hat...

Willingness to engage in distracting activities

- **What we know:** Eyes off road strongly associated with increased crash/near crash risk
- **What we don't know:** What makes people take their eyes off the road at a certain moment?
 - Balance between motivation and perceived risk...
 - Can the balance be changed through driver feedback/caoching?
 - Emotional (social) value of secondary tasks – e.g. texting

Generalizability of results on cognitive distraction

- Glaring discrepancy
 - Controlled experiments (simulator, test-track, on-road) demonstrate performance impairments
 - Naturalistic driving studies find no increased relative risk or even protective effects
 - Limited scientific basis for policy-making
- Potential issues - controlled experiments
 - Use of repeated critical scenarios -> expectancy -> top-down control
 - Often do not account for controlled-automatic distinction: Do effects only occur for controlled driving tasks requiring working memory?
- Potential issues – naturalistic driving studies
 - Are all forms of cognitive distraction observable from video?
 - May cognitive distraction affect factors more upstream in the causal chain? If so, may not be captured in the 6-second window often used in ND analysis...

Countermeasures: Some highlights

- **General challenge:** To reap the benefits of new information and communication technology while minimising their distraction potential
- **Technology:**
 - Safe driver-vehicle interaction: Promote non-visual modes of interaction while still taking the issue of cognitive distraction very seriously
 - Real-time inattention feedback and workload management
- **Behaviour-based safety**
 - Obtain long term behavioural change by means of coaching, feedback, incentives and changes in organisation culture