



# Voice Centric Multimodal Interaction in Cars

**Dirk Schnelle-Walka**

Functional Owner Speech

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harman/kardon

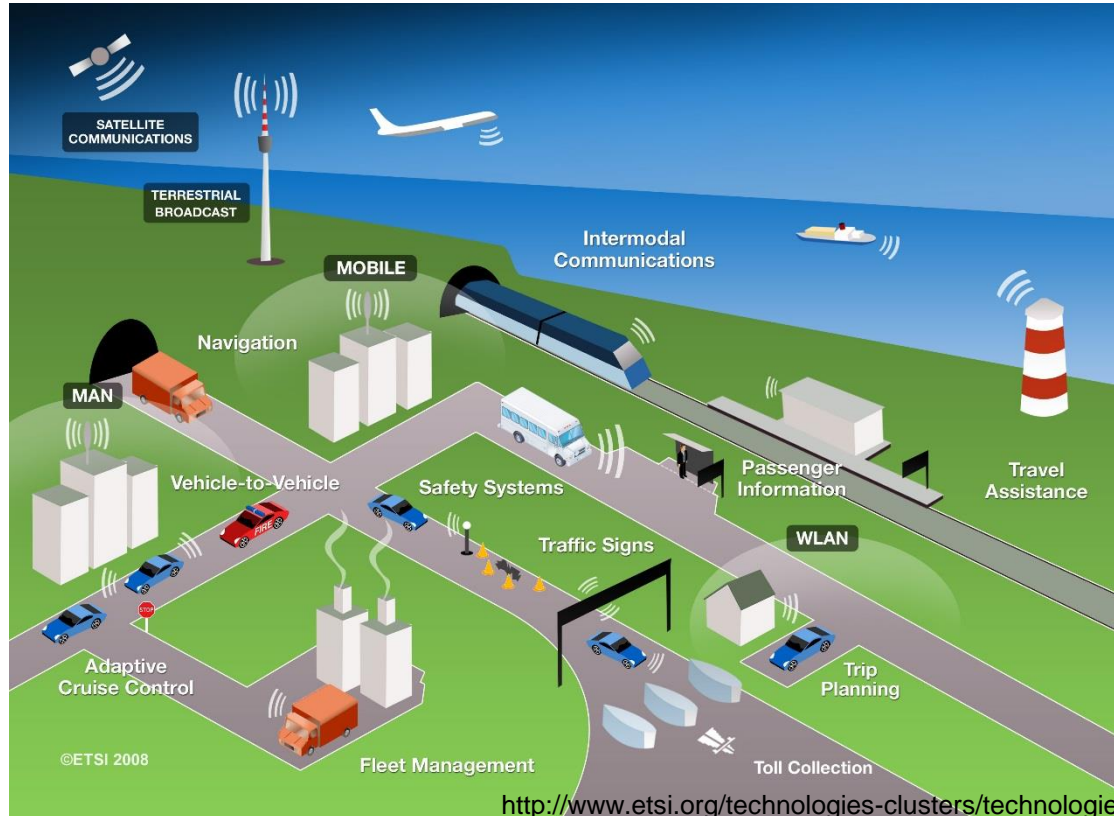


lexicon

mark Levinson



# The Connected Car

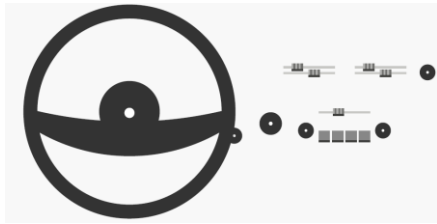


## Increasing User Expectations

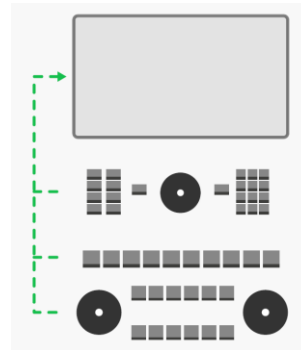
- **Pervasive and Distributed Computing is currently becoming a reality**
- **Affordable and accurate sensors for measuring physiological and mechanical systems are available off-the-shelf**
- **Networked objects a.k.a. Internet of Things find their way into our lives**
  - Available through smartphones
  
- **People become ever more dependent on their smart devices**
- **Beginning increasing expectations of embedded technology elsewhere in their lives**
  - Currently not adopted by car manufacturers

# Evolution of Controls

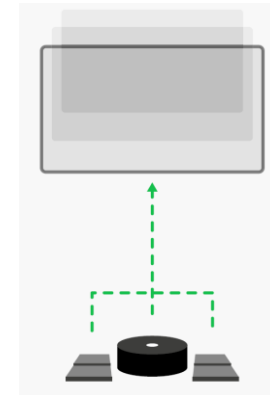
## Current Access to the IoT in Cars



1970: Knobs, switches and sliders offer direct control and manipulation



2013: Multimodal screen with GUI offer indirect control via knobs and switches



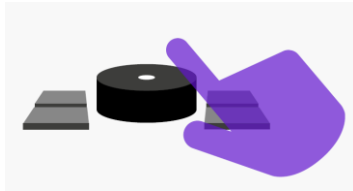
# Touch Screens

## Direct Manipulation without haptic feedback

- Adaptive UI
- Problematic with respect to learnability



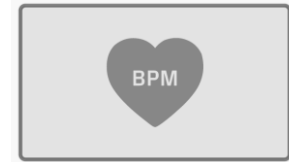
# Future In-Car Interaction



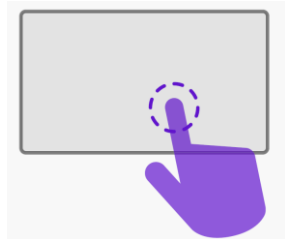
Haptic controls with embedded touch controls



Gesture control with visual & aural feedback loops



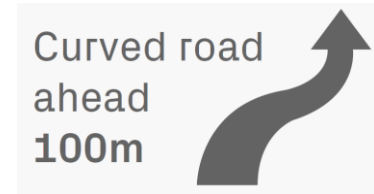
Soft interactions by computer vision



Touchscreens with possible haptic feedback



Voice control & feedback



Contextual information on secondary display (e.g. HUDs)

# Dirk Schnelle-Walka

- **Dr. Dirk Schnelle-Walka led the "Talk&Touch" group at the Telecooperation Lab at TU Darmstadt until end of 2014. Since then, he works as a functional owner speech for Harman in the automotive industry to take his research portfolio to an industrial level.**
- **His research focus is on voice-centric multimodal interaction in smart spaces.**
- **He authored more than 50 book chapters, journal article and conference papers and is chairing the IUI workshop on Interacting with Smart Objects and the EICS Workshop on Engineering interactive Systems with SCXML.**
- **He is also the head behind several open source projects around speech technology, e.g. the open source voice browser JVoiceXML**

# Thank You