

Using Telepresence to Enhance the Driving Experience



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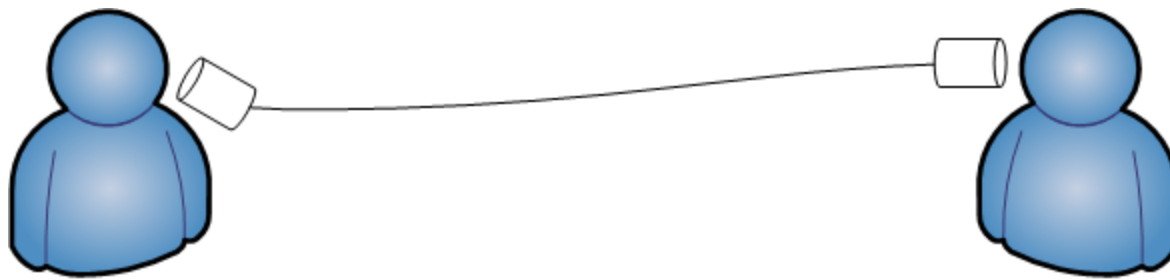
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Outline

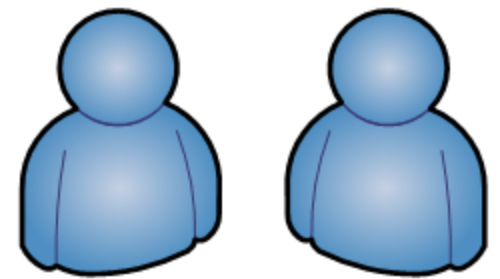
- What is Telepresence?
- Telepresence demo
- Driver Distraction
- Turning the vehicle into a Telepresence terminal
- Industry trends
- Standardization efforts
- Conclusions

What is Telepresence?

- Telepresence refers to the degree of realism created by a telecommunications system.
- A high degree of Telepresence causes users to feel like they are physically present at the far end of the connection; or that the far end is physically present in the local environment.

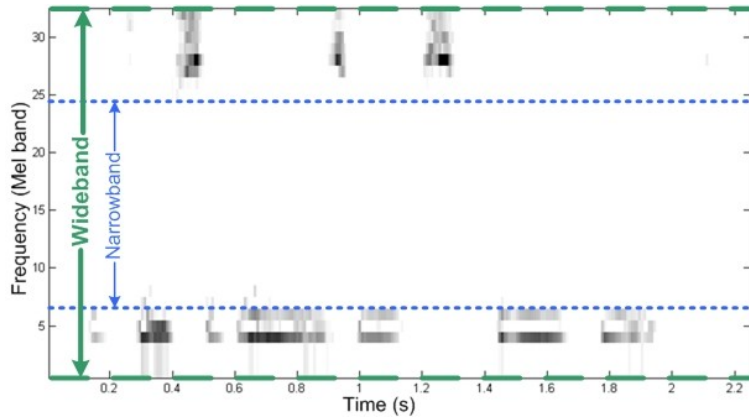


Low telepresence



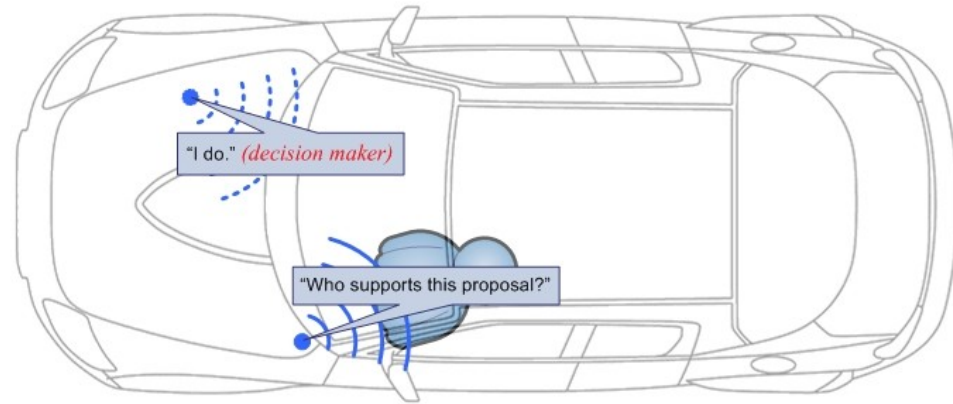
High telepresence

“Wider Bandwidth Speech” and “Spatial Audio Telephony” create a high degree of Telepresence



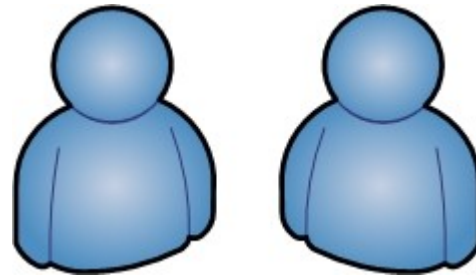
Wider bandwidth speech

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Spatial audio telephony

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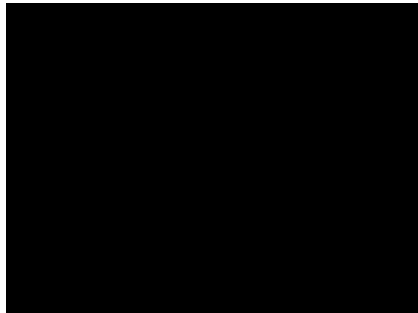


Telepresence

Telepresence demo

- *Try to hear what Rod (red shirt) is saying in the following video clips:*

Current telephony



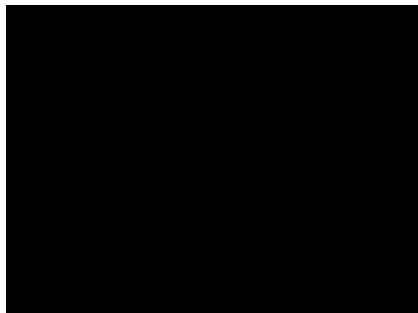
Video:

- Standard Definition
- 15 fps frame rate

Audio:

- Narrowband (300-3400Hz)
- Mono

Telepresence system



Video:

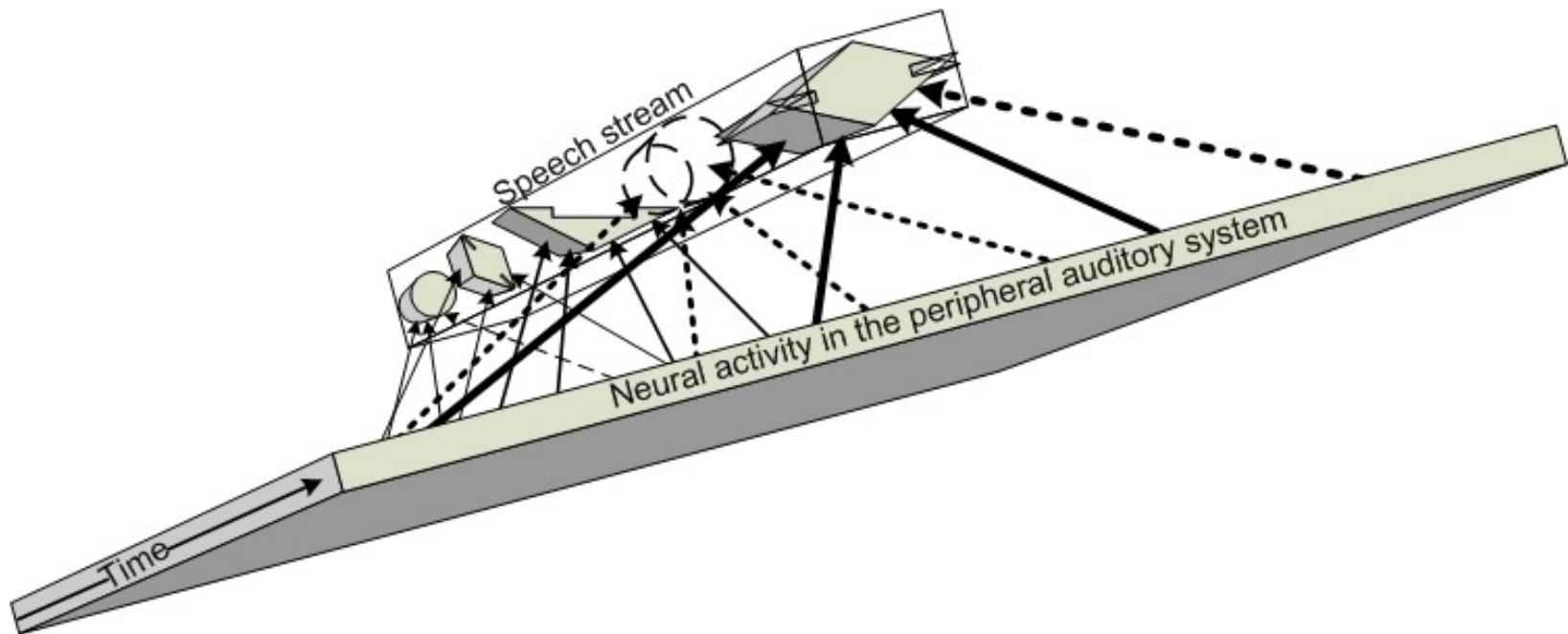
- High Definition
- 30 fps frame rate

Audio:

- Super-wideband (50-14000Hz)
- Stereo

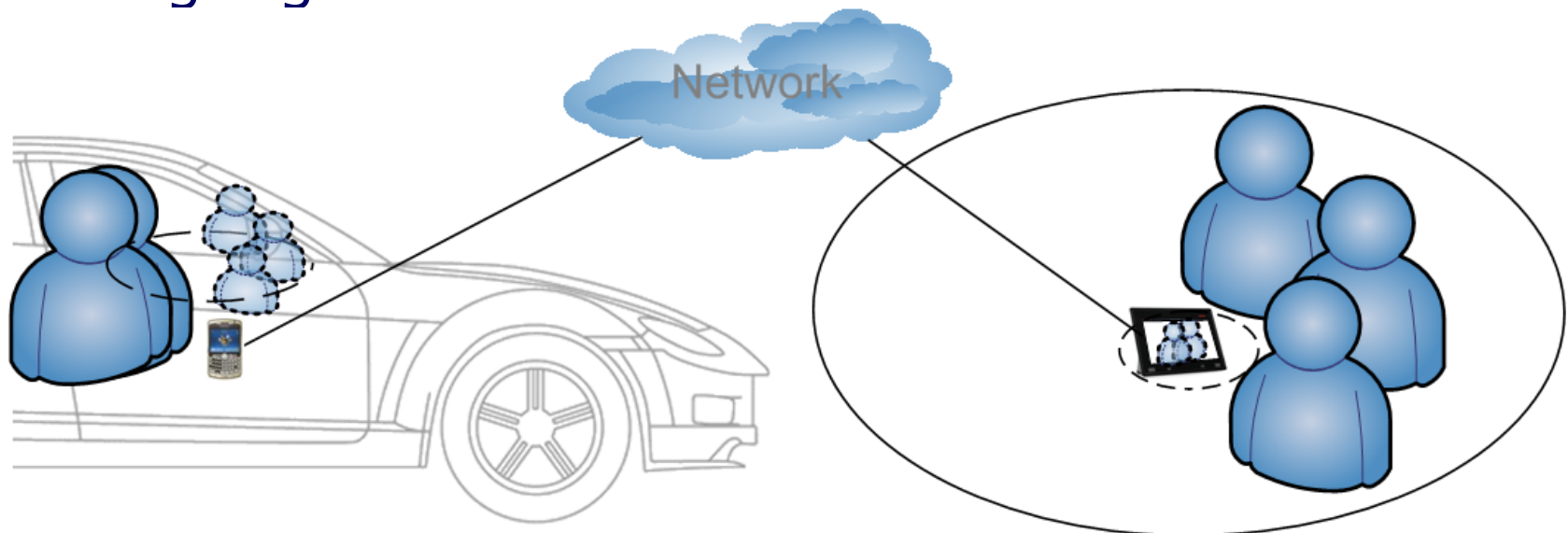
Telepresence systems improve speech comprehension

- Speech comprehension is more effortless
 - Better separation of speech from noise
 - More cues to identity of speech sounds

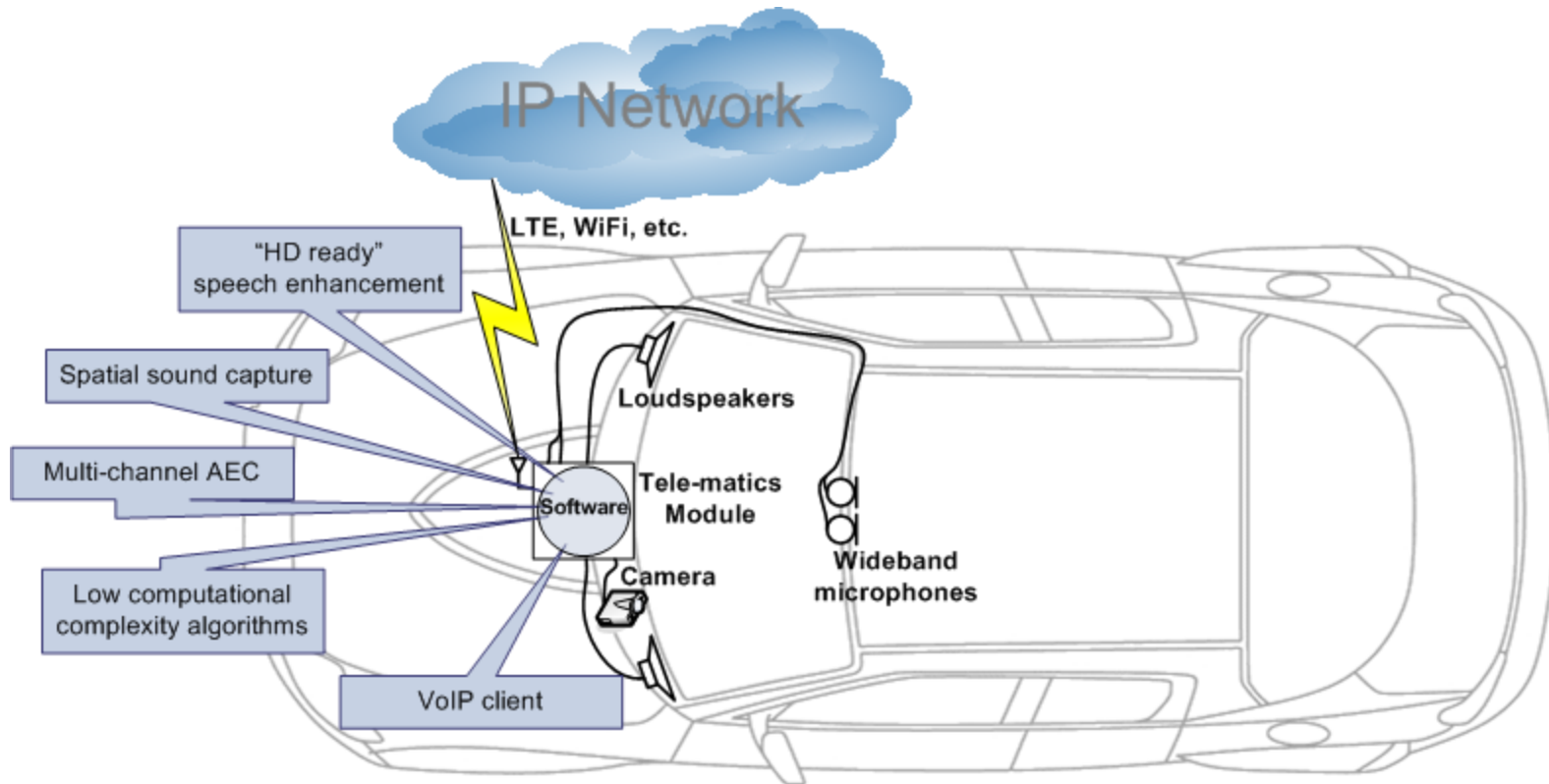


Telepresence systems reduce Driver Distraction

- Less *attention* used to comprehend speech
- Reduced load on *working memory*
- Less *fatigue*
- One-way video can reduce talking from far end during high driver workload



Turning the vehicle into a telepresence terminal



Mobile Wideband Deployment

- Orange has already started deploying wideband (50-7000Hz) on mobile networks in Europe
- WIND mobile started providing wideband service in February 2011 in Canada
- Verizon recently announced that it will start offering wideband with VoLTE starting in 2012
- AT&T is reported to start deploying in 2013
- ...wideband speech has finally arrived on mobile networks and usage will dramatically increase over the next couple of years

Everyday terminals are being enabled with Telepresence



The Fully Networked Car
Geneva, 2-3 March 2011



Availability of IP networks is increasing

- Experts agree that next generation networks will be IP-based
- LTE will enable VoIP over mobile carrier networks
- Broadband access to the home is another way VoIP availability is increasing
- WiFi hotspots may also increase due to demand for VoIP

Lack of standards slowing deployment of Telepresence

- In the short-term, telepresence will often be limited to devices of the “same type”
- Challenges to be addressed through standardization
 - 1) Functions and services offered by telepresence systems
 - 2) Speech communications performance assessment
 - 3) Signalling and negotiation of connection type
 - 4) Signal capture/playback coordination (taking device and environment dependencies into account)
 - 5) Signal transport
 - Mono signal with spatial info transmitted out-of-band
 - Multiple independent channels
 - Multi-channel codec

Standardization efforts related to Telepresence systems

- ITU-T SG 16
- ITU-T SG 12
- ITU-R SG 6C
- ITU-T SG 9
- Video Quality Experts Group (VQEG)
- ISO/IEC JTC 1/SC 29 WG11 (MPEG)
- ETSI
- 3GPP
- 3GPP2
- IEEE STIT
- IETF Real-time Applications and Infrastructure (RAI)
- International Multimedia Teleconferencing Consortium (IMTC)
- Unified Communications Interoperability Forum (UCIF)

Major standardization efforts are now underway

- Question 5 (*Telepresence Systems*) of ITU-T Study Group 16 (*Multimedia coding, systems and applications*)
 - Defining interoperability of Telepresence systems
 - Several major Telepresence companies participating
- Question 18 (*Conferencing and Telemeeting assessment*) of ITU-T Study Group 12 (*Performance, QoS and QoE*)
 - Defining test methods and performance requirements for Telepresence systems
 - First meeting in January 2011 indicates this will be a very active area

Conclusions

- There are compelling reasons for deploying Telepresence systems in an automotive environment
 - Better user experience
 - Less listening effort
 - Reduced driver distraction
- Vehicles platforms are well positioned for conversion into telepresence terminals
- VoIP terminals and IP network availability increasing
- Standards groups are starting to address roadblocks to widespread adoption of Telepresence systems