Voice Quality Services & Products

We improve cellular network QoS

Presenter: Caleb Bradley
Who are LCC?

- The leading supplier of supporting services and products to cellular telephone operators worldwide.
- Voice quality assessment is essential in measuring or comparing QoS (Quality of Service) delivered by a network.
Who are LCC?

- LCC is the only organisation actively developing and validating real-time voice quality tools on both sides of the Atlantic...
Who are LCC *in Europe*?

- the established leader in monitoring GSM networks

- EU STORMS (Software Tools for Optimisation of Resources in Mobile Systems) project partner

- CellAD(TM) autonomous QoS monitoring system with VQM (Voice Quality Measurement)
DSP-based “Robot-Subscriber”

CellAD = Cellular Access Diagnosis
Who are LCC *in USA* (McLean, VA)?

- tools for many networks: AMPS, CDMA, IDEN, IS136, PCS1900...

- Auryst(TM) voice quality measurement
## Evolution of Speech Quality Measurements

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Psychoacoustic Models

• **ITU-T rec. P.861 PSQM** PSQM+, PSQM++
  - Netherlands Royal PTT

• **AURYST**
  - Quackenbush, Barnwell, Clements Georgia Inst. Tech. 1988

• **VQM**
  - Wang, Sekey, Gersho UCSB 1991
VALIDATIONS by listening laboratories

Europe:
- TDF (Telediffusion de France, a partner with LCC in STORMS)

USA:
- COMSAT
- AT & T
Trained algorithms

- EPR (Expert Pattern Recognition)
  - uses neural network (Qvoice, PACE)

- 1997 U.S. NTIA: MNBs (Measuring Normalizing Blocks), ITU-T rec P.861 Appendix, for review 1998
Voice quality products from LCC

**DU-955 measuring unit**
- an autonomous robot subscriber (or manual measurement tool)
- contains a DSP which implements the VQM psychoacoustic hearing model of the non-linearities in frequency and amplitude which characterise the HHS (Human Hearing System)
- 5-8 second measurement cycle, delivers MOS estimates in real time
Voice quality services from LCC

Services to network operators and others:
- ongoing network simulations
- vocoder (codec) assessment in real and simulated network conditions
- validation of speech quality assessment algorithms and their real-time implementation

also VQM seminars!
TODAY'S KEY REQUIREMENT: benchmark comparisons of different network technologies and vocoders.
- LCC's credentials as a highly-reputed and qualified actor in objective speech quality assessment since 1994

- LCC's ongoing speech-quality products development and studies of new vocoders, networks and latest standards

- LCC is already connected with major validation institutions for speech quality in USA and Europe