Update on Public Safety Communications Intelligibility in High Background Noise

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Background

- In the fall of 2006 some fire departments discovered that voice audio from digital radios in the presence of background noise (common to fire operations) may cause distortion to the degree of becoming unintelligible.
- Test results published in June 2008
- Modified best practices and IAFC interim report published in July 2008

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What's New Since Summer '08?

- Project 25 created the Audio Performance Working Group
- Manufacturers introducing radios with noise cancelling mics.
- Manufacturers developing after-market lapel mics with noise cancelling mics.
- Updated P25 vocoder released in Fall 09.
  - Specifically helps address intelligibility in the presence of PASS noise.
- Updated recommendations need to be tested.

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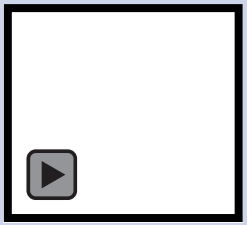
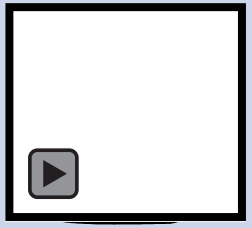
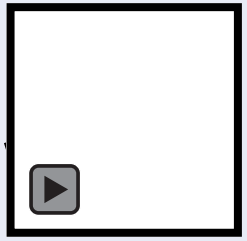
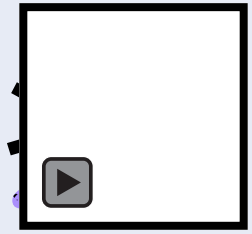
Moving the Mic Closer

	1” from voice port	Against voice port
Analog 12.5 kHz FM		
12.5 kHz Digital P25		

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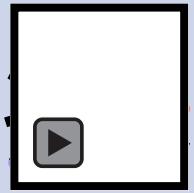
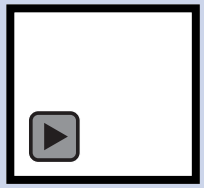
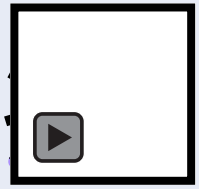
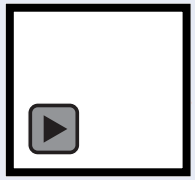
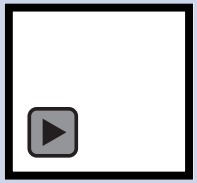
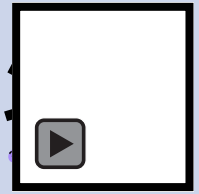
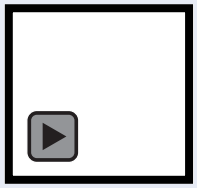
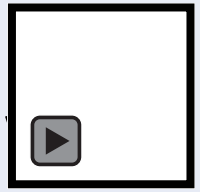
Noise Canceling Mics

Proper Orientation

	Without NC	With NC
12.5 kHz Analog FM		
12.5 kHz Digital P25		

Improper Orientation

	Without NC	With NC
12.5 kHz Analog FM		
12.5 kHz Digital P25		

Can make a big difference if employed properly.

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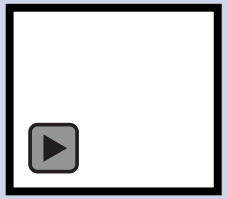
Previous Vocoder Version	September 2009 Vocoder Version
	

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Upcoming Testing

- Created reference systems for P25, 25 kHz analog FM, 12.5 kHz analog FM
- Will test vocoder change to improve PASS performance
- Will test improvements based on updated best practices from IAFC
- Provide a performance baseline for the 3 systems
- Will include moderate RF channel degradation

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Significant Concerns in Mic Design

- Should minimize wiring to head
  - Could become a snare hazard
  - Should break away without breaking in case of snare
- Should not compromise the heat-protective envelope
  - Wires conduct heat through envelope becoming a burn hazard
- Should not increase the dress time of the firefighter
- Should consider the environmental conditions
  - Water, smoke, heat, crawling on floor
- Should consider the ensemble as a whole
  - Helmet, Nomex® hood, mask, gloved hands
- Must work well with the DVSI IMBE/AMBE+2 vocoder

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Thank you!

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