



# Lightspeed Soundfield Classroom Audio

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The UK distributor of Lightspeed Audio Products

# Lightspeed History

Lightspeed  
Headquarters,  
Portland

- Background in noise-cancelling Pilot Headsets
- Soundfield division established 1990
- Largest Soundfield maker
- Over 100 employees



# Soundfield

## Classroom Audio Technology

*A speech intelligibility system that provides **clarity of voice** and **even sound distribution** throughout the classroom*

# Challenges Facing Today's Educators

## Adverse Learning Environments

**75%** of the school day involves listening activities, grades K-3

Dahlquist, 1998

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Up to **43%** of primary level students fail a minimal 15dB hearing screening on any given day

Source: MARRS – US Dept. of Education Study

Voice level is **reduced by 50%** each time the distance from the teacher doubles

Hyper Physics (@ C.R.Nave, 2005)

# Studies

MARRS Studies – [www.marrs-study.info](http://www.marrs-study.info)

33% of children had hearing loss on any given day.

Hearing Defect

Fluid in the Ears

Catarrh Ear / Glue Ear

Cold

# Acoustic Issues

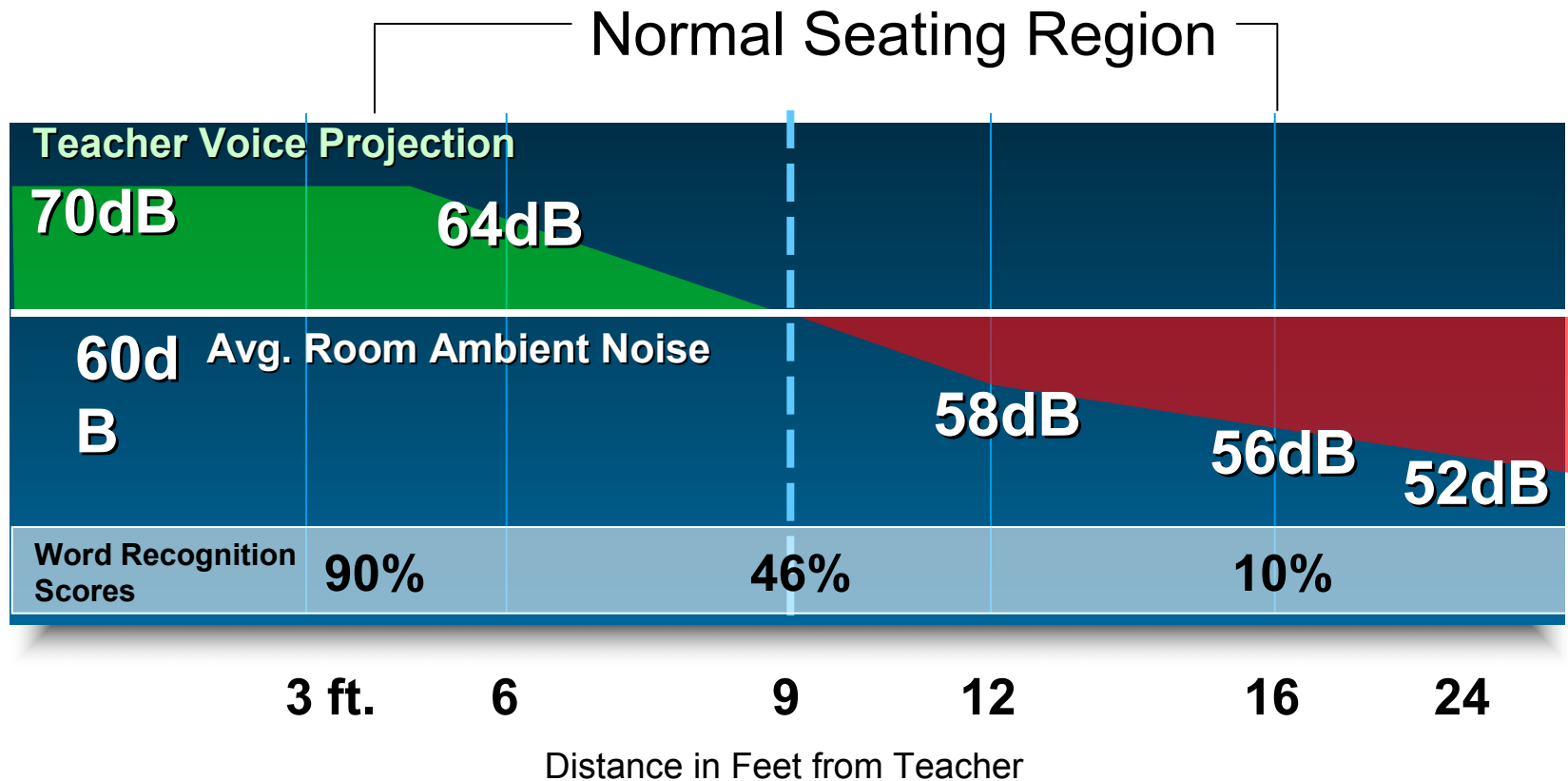
Distance

Noise – Internal and External

Reverberation





# Classroom Audio Technology: Signal to Noise Ratio



Source: Finitzo-Hieber & Tillman 1994

# Picking speech out of background noise - analogy

I see some beautiful flowers.	+20	
Big dogs can be dangerous.	+15	
I like to go to school.	+10	
It is lunch time soon.	+5	
Walk to the library now.	0	
Your brother is not here.	-5	



# The Psychological Dimension: Proxemics



People associate inclusion within the sound field with the *proxemic* “social distance”

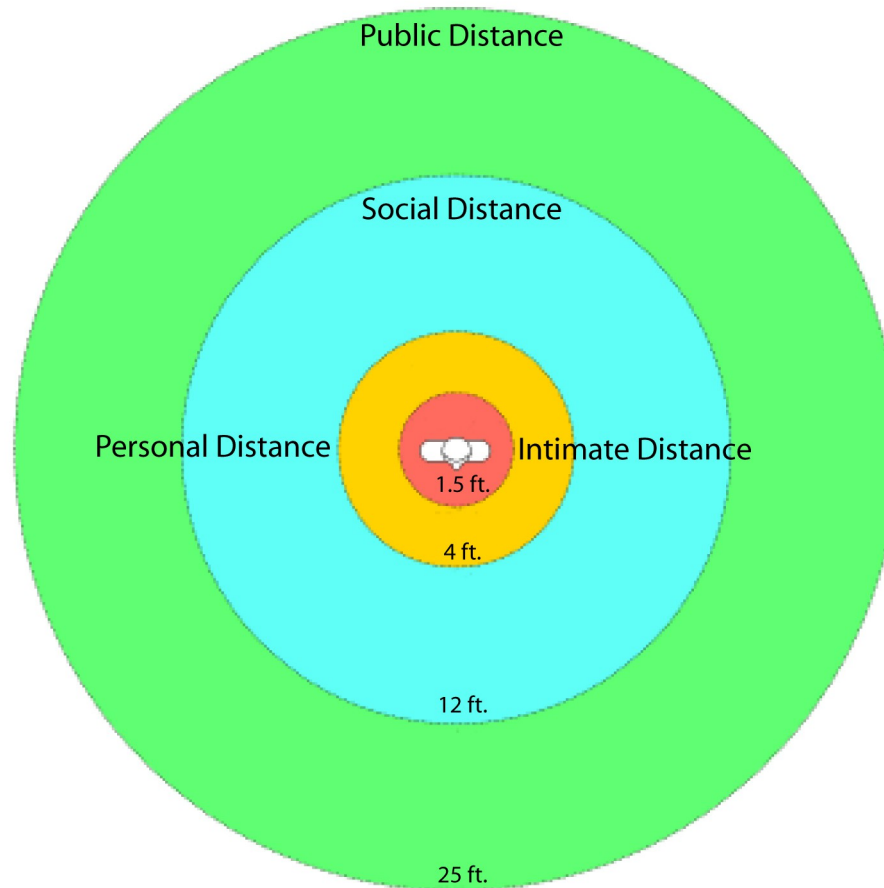
- *Proxemics is the study human interaction and behaviour at a set of measurable distances*
- *Students within the social distance of 7 to 12 feet are also within the typical sound field of the teacher’s voice*
- *Therefore, if the sound field is increased in size, students will feel that they are within the social distance regardless of where they are in the classroom*
- *People interacting at a social distance feel much more obliged to “pay attention” to the person speaking*



Creates a more conducive learning environment

- First there is hearing. Then there is *listening!*

# The Psychological Dimension: Proxemics



The “Social Distance” of 4 to 12 feet is the typical effective sound field for a teacher’s voice

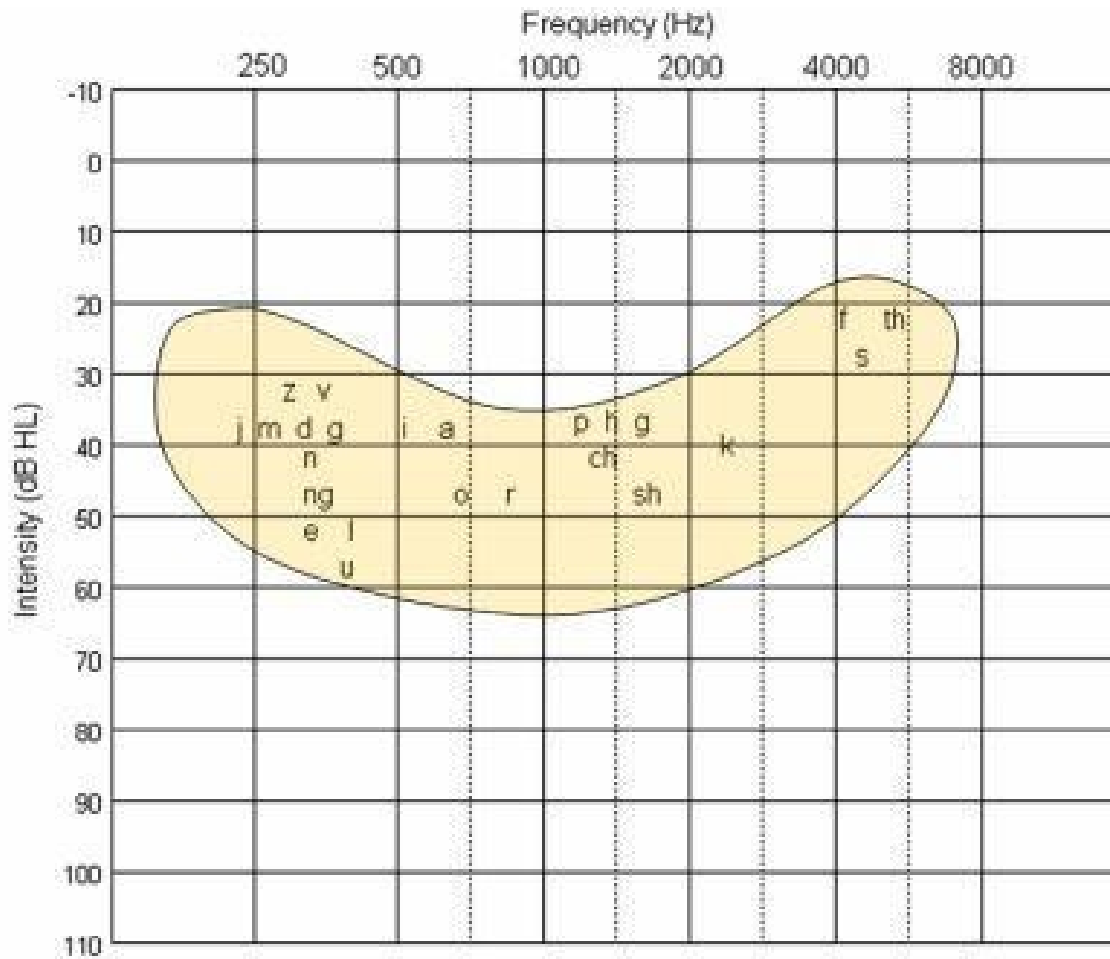
# Key Teaching Issues

Immigration's impact on the classroom - US

ELL and native English-speaking children at increasing distance –  
*Univ. of Florida Study*

Distance from Teacher (Feet)	3	6	9	12	18	24
<b>Native</b> English Avg. Test Score	99%	97%	95%	93%	84%	67%
<b>Non-Native</b> English Avg. Test Score	98%	93%	89%	82%	62%	42%

# Speech



# Speech sounds smear as RT increases

I see some beautiful flowers.

Big dogs can be dangerous.

I like to go to school.

It is lunch time soon.

Your brother is not here.

Wak to the library now.

I want a peanut butter sandwich.



Increasing Reverberation Time



# Vocal Issues

 Vocal Strain

 Absenteeism / Cost of supply teacher

 Speech spectrum

# Key Teaching Issues




Computers & printers

HVAC systems

Students talking



# Key Teaching Issues

 Auditory closure is the ability to decode a whole word after hearing only part of it. People with language disorders and dyslexia often have weaknesses in auditory closure.



 "The frog is on the l\_ \_." The answer is log.

# Why is it so effective?

**Hearing is the primary channel for learning**





**Children do not have fully formed cognitive  
recognition skills**



# How It Works...



# Key Issues for Soundfield Adoption

-  Installation costs
-  Teachers move from class to class, school to school
-  Hearing Impaired children move from class to class
-  Training time

# Introducing...

## REDCAT®

Money-saving, no installation, all-in-one audio system



## + REDMIKE®

Small, lightweight, easy-to-use microphone



# Microphone Options

**REDMIKE<sup>®</sup>**



Lightweight, small

No belt pack or wires

**REDMIKE<sup>®</sup> vc**

Easy to use volume controls



Boom mike available if needed

**REDMIKE<sup>®</sup> share**

Pass around mic for students



Built to withstand the  
classroom environment

# REDCAT

## InfraRED Classroom Audio Technology

Infra-red

2 mike channels

120 m2 no audio dropout guarantee

Compatible with PFM systems

No installation

Carry Case available





# REDCAT<sup>®</sup>

Money-saving, no installation, all-in-one audio system

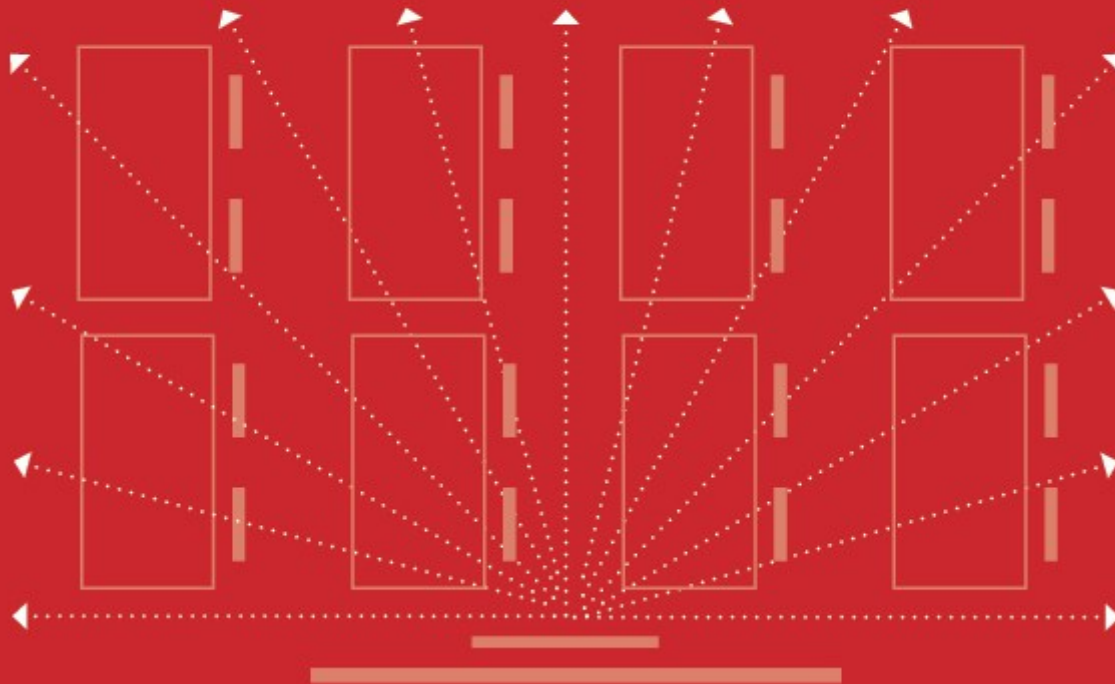


## All-in-one, no installation required

- **Saves time:** no more endless meetings around implementation
- **Saves money:** >30% cost savings compared to traditional sound systems
- **Simple:** easy to implement, easy to use
- **More Technology for Less:** put more systems into more classrooms
- **Clear Audio, Excellent Sound Distribution:** NXT Technology, high speech intelligibility

# NXT Technology

NXT™ technology utilizes the entire flat panel surface to emit audio in all directions, creating excellent sound distribution from a single speaker.



# Advantages of NXT Speakers

- ✍ Broad frequency range (100 – 18000 Hz for 0.6m<sup>2</sup> panel).
- ✍ Less fading with distance. (For example, at 3.5 meters distance, whereas fading would be 4dB for a DML, a comparable dynamic moving coil loudspeaker would exhibit 11dB fading, compared to the signal level at 1 meter.)
- ✍ Flat, may be produced in different shapes, may be decorated etc.

## Cone versus NXT speakers

- ✍ With cone speakers, the sound quality and volume lessens the further it is from the source. If the sound quality they produce can be described as hot at the centre and cold at the edges, then NXT produces an evenly dispersed, highly diffused 'warm' acoustic - similar in nature to the light produced by a fluorescent lamp.

# iR Media Connector



- ✎ Wireless audio integration without installation
- ✎ Flexibility in location - locate media & REDCAT where it is convenient
- ✎ Integrate under-utilized multimedia to REDCAT

# Installed Classroom Audio Options

## CAT 800 Series



820iR



CAT 855






CAT 860



CAT 885

# Unique Features

-  **Standard Sub-carrier Frequencies (iR) 2.06/2.54 MHz**  
**Alternate Sub-carrier Frequencies (iR) 3.20/3.70 MHz**
-  **PageFirst technology - emergency page priority (add-on)**
-  **Lightspeed Infrared Audio Systems and optional accessories are warranted for a period of five (5) years**



# Classroom Amplification....A Proven Technology

Overcomes effects of high **ambient noise** levels

Improves **attention** and **on-task times**

Lowers **stress** in classrooms

Reduces **behavioral** problems

Raises academic **test scores**

Increases class **interaction**  
and **participation**

MARRS Classroom Amplification Research Project



# Classroom Amplification Validated

**21% increase** in developmental reading assessment scores (DRA)

Chelius, Canby School District, OR, 2002

**30% gain** in EAL word recognition skills

Crandell, University of Florida, 1994

**17% increase** in “on task” behaviors

Allen, Dubuque Iowa Public Schools, 1996

**25% decrease** in teacher absenteeism  
in amplified classrooms

Gertel & Rosenberg 2004



# Voice Distribution – NOT Amplification



# The Lightspeed Advantage

Largest, most flexible range of soundfield products available today

All microphones work across all systems

No Audio Dropout guarantee with our Infra Red

Audiology Trial Programme

Trial units for schools

**5 YEAR NEXT DAY REPLACEMENT WARRANTY**



**Any Questions?**

*“The more children hear...  
the better they learn”*