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Design Activity	Acoustic Issue
#1 Siting a building in a favorable acoustic environment	Sound transmission in a free field
#2 Designing indoor spaces for the proper acoustic environment	Sound absorption and reflection
#3 Designing adjacent spaces for acoustic independence	Characteristics of sound transmission in materials

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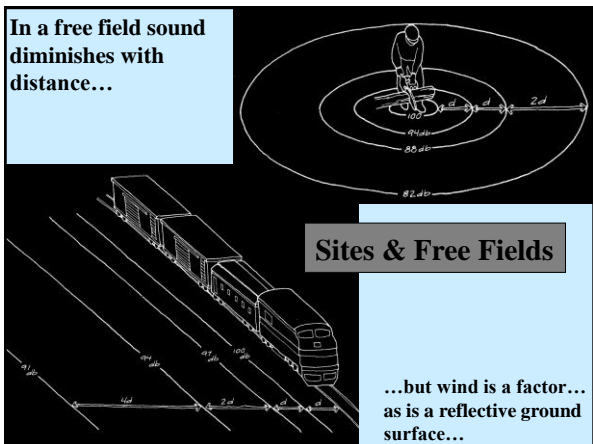
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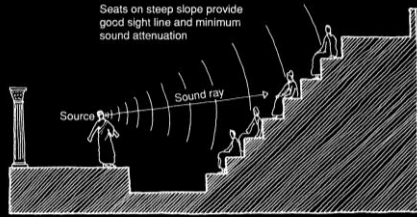
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**Line-of-Sight**  
In a pure free field  
direct sound rules



Seats on steep slope provide good sight line and minimum sound attenuation



Epidaurus

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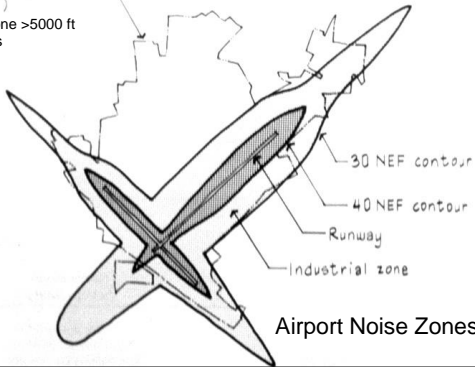
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**Planes aloft are free field sources...**

Commercial zone (>5000ft from runways)  
Commercial zone >5000 ft from runways




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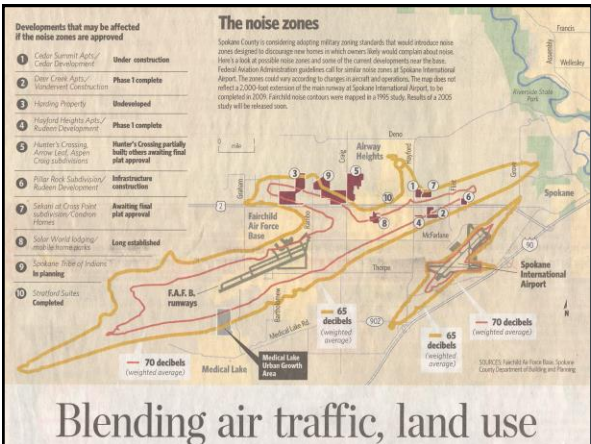
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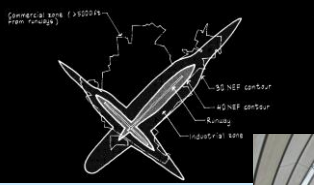
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### Don't build in the acoustic flood plain!



Alpine House  
Kew Gardens, London



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### In urban settings reflected sound alters free field character...



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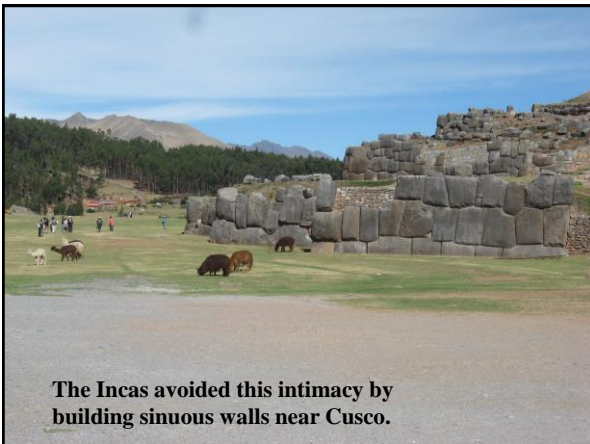
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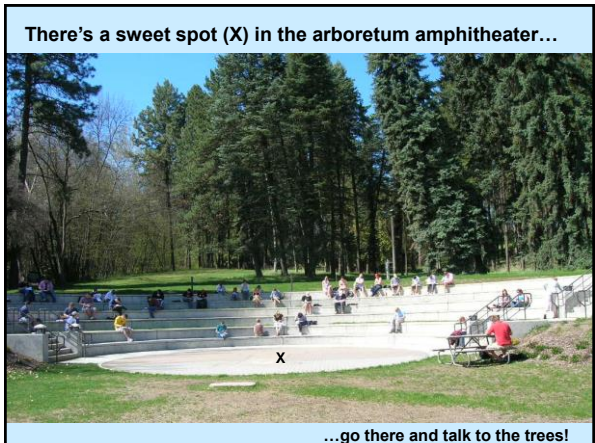
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### Noise Attenuation Strategies (for sites and rooms)

- Distance
- Zoning
- Barriers
- Surface Absorption
- Isolation
- Masking



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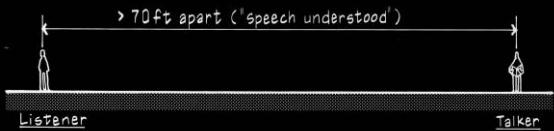
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# Distance



In a free field sound diminishes by 6dB each time the distance is doubled.  
In the real world?

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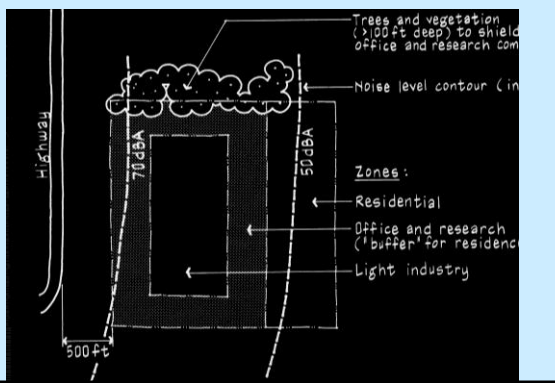
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# Distance can create acoustic zones




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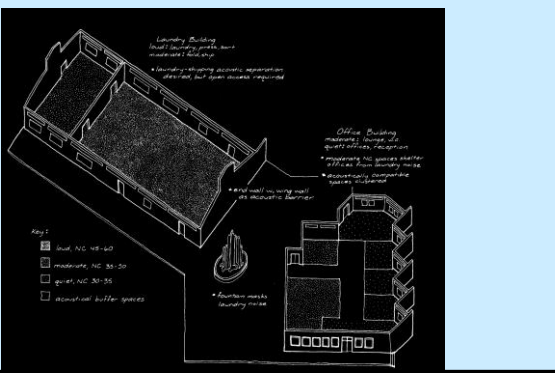
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# Zoning... separate noisy factory from quiet office




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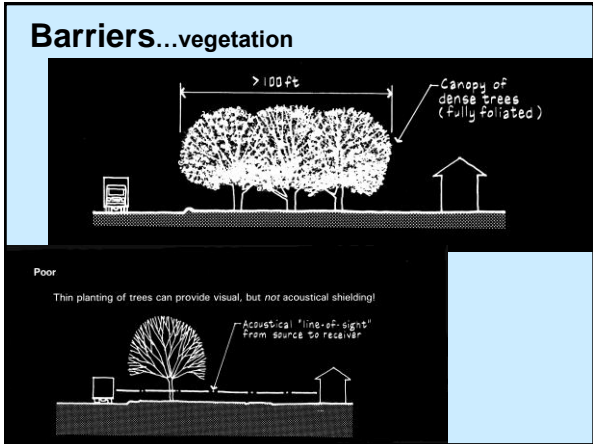
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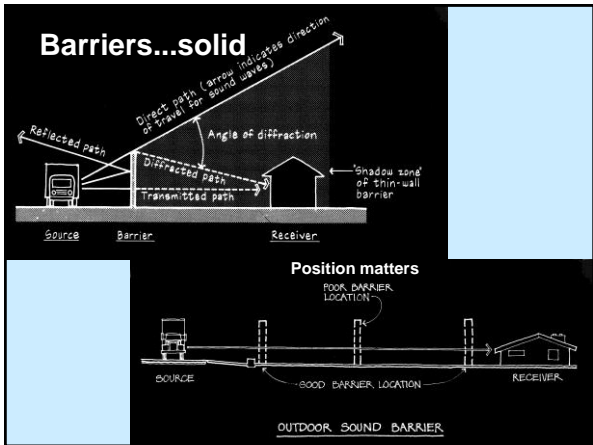
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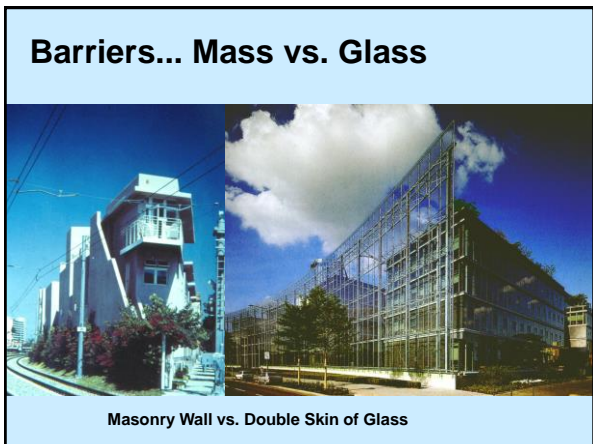
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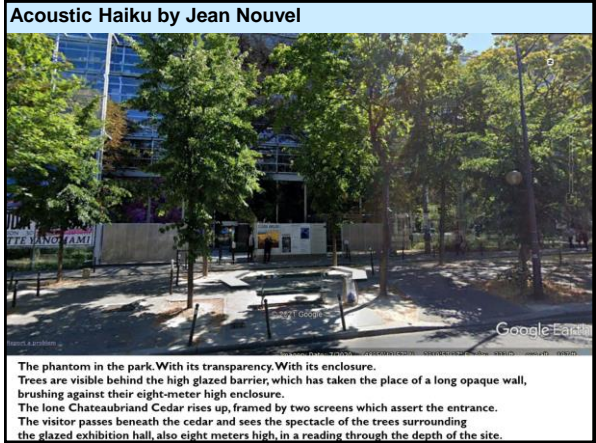
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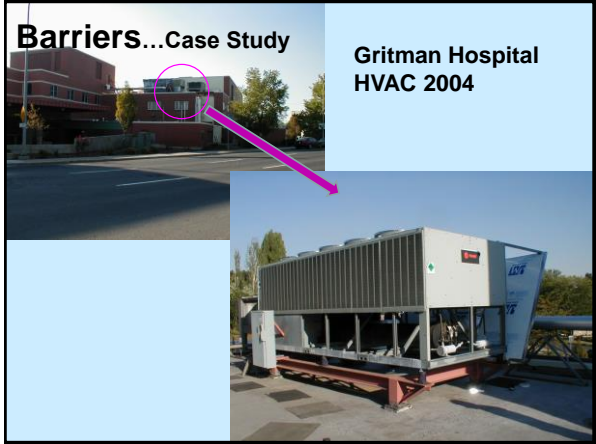
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New wing w/helo pad  
August 2013 v

^ May 2005

April 2006 v

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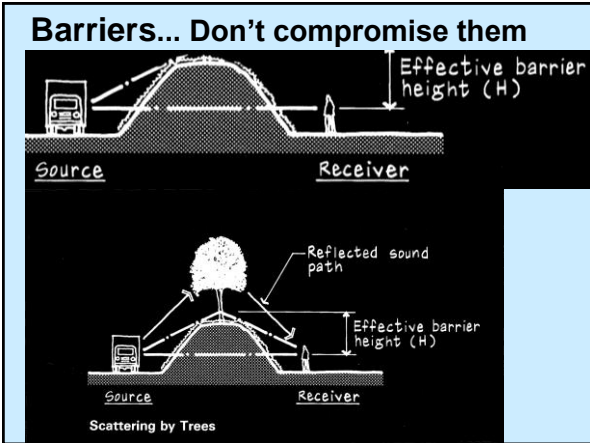
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California Freeways

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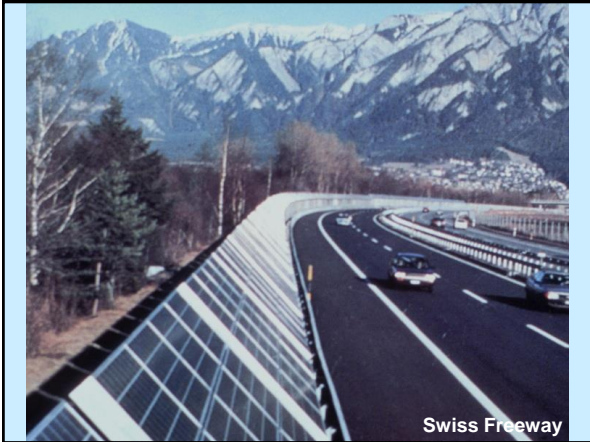
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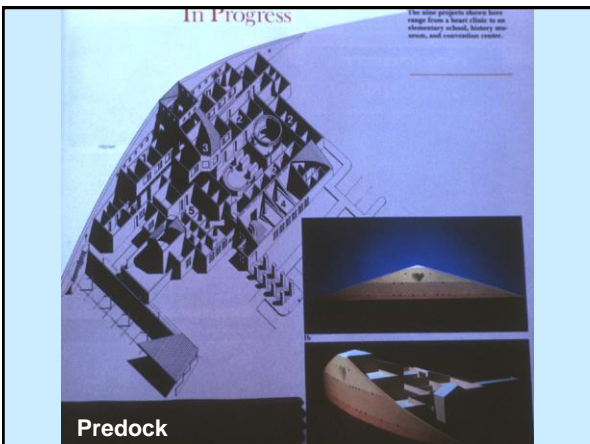
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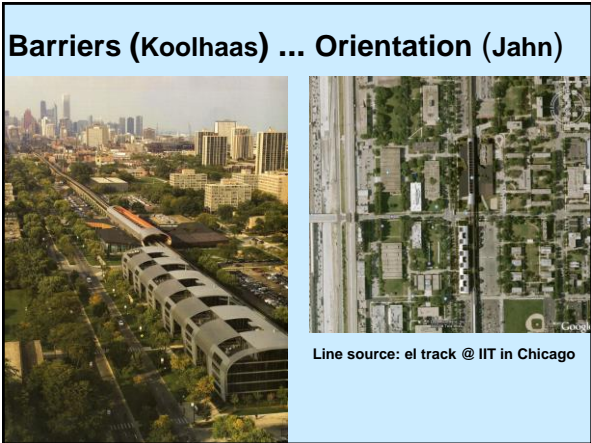
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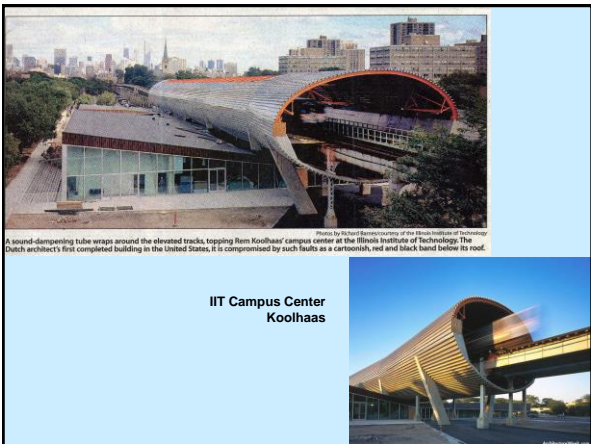
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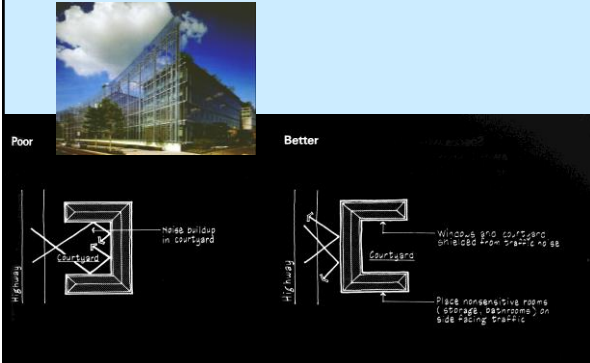
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# Barriers...

## Open courtyards away from noise source



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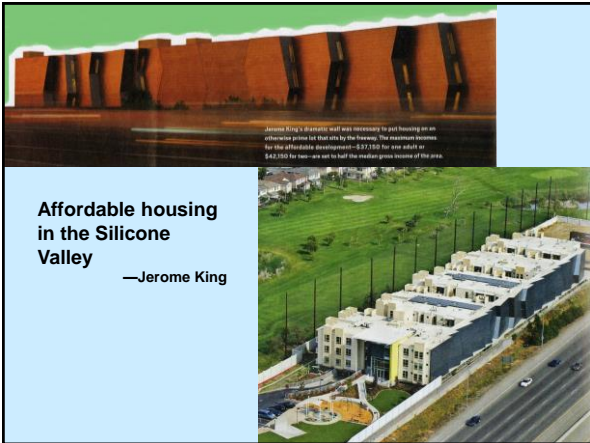
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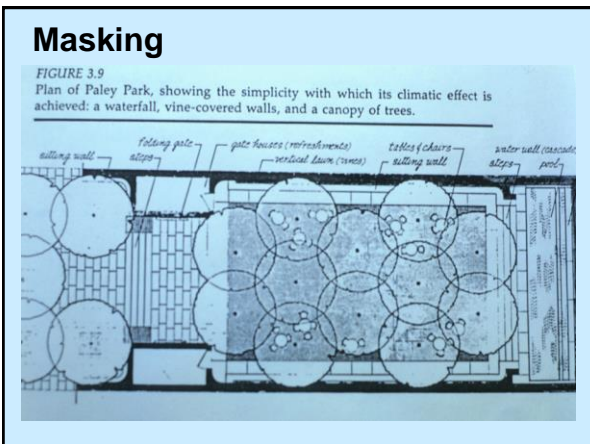
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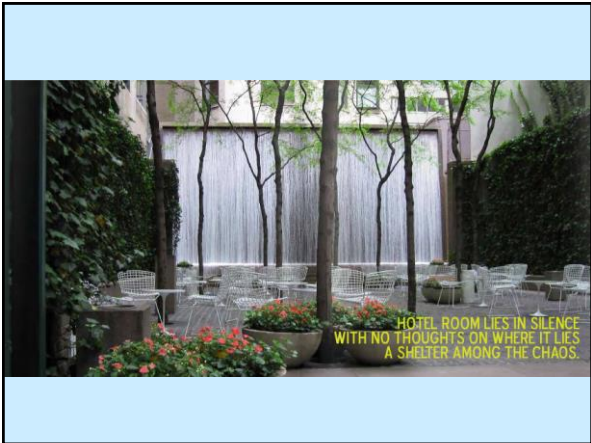
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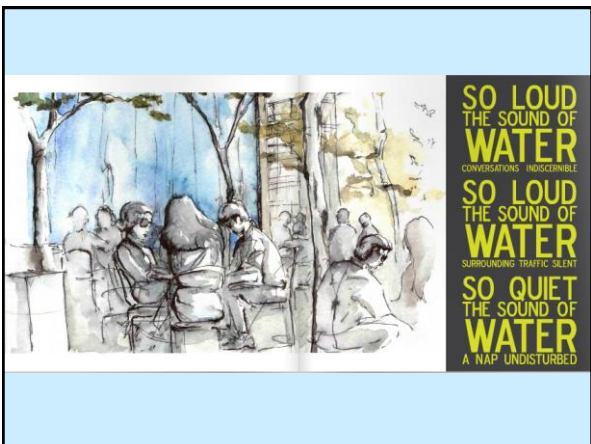
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Pump Room! What Pump Room?



Sooner or later in planning a fountain, reality sets in. I need a pump room! Where do I put it? How big is it? How do I specify it? Maybe I need help. Kim Lighting just relieved you of the worry and responsibility by making the pump room a known quantity, supplied by us as part of a fountain fountain package. All mechanical and electrical fountain components are factory installed in a connected, corrosion proof fiberglass vault. It even includes a ventilation system, room lighting, hatch and ladder. Your client saves on overall installed cost and we relieve you of a big headache. Ask for conference, 50 years of engineering and design expertise stand behind the Kim name.



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 1000 East 10th Avenue • Post Office Box 107  
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**Receiver Isolation**

**Simple Problem,  
Simple Idea,  
Simple Solution**

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**Why the most respected name in sound is also the most respected name in silence.**

**At** Bose, we've spent decades researching and developing innovative acoustic technologies, so it's not surprising our name is associated with high quality sound. But you may not know about our patented Acoustic Noise Cancelling headset technology. It's used by the U.S. Air Force, U.S. Army and pilots around the world. And now it's available to you in our new QuietComfort headset.


**Reduce noise. Increase pleasure.**  
Once you try our latest innovative headset, you'll understand why Airfax.com said, "You will not regret one penny spent on Bose." With the click of a button, airplane engine noise and background sounds are virtually eliminated, allowing music, an in-flight movie or your thoughts to come through loud and clear. The QuietComfort headset actively monitors and counteracts

**Introducing the Bose® QuietComfort™ Acoustic Noise Cancelling™ headset.**

**Try them risk free and make your world quieter.**

unwanted noise and reduce it before it reaches your ears. So you're left with what you want to hear — CDs, DVDs, movie dialogue or silence itself. Wherever you are, you'll enjoy the unmatched noise reduction and sound quality you expect from Bose.

**BOSE**  
Better sound through research.



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