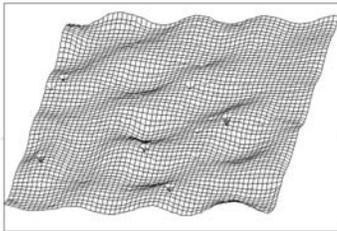


From: Kenneth Roy, Sr. Res. Scientist

AN-105

## How Distributed Mode Loudspeakers (DML) Work

Armstrong i-ceilings speaker panels incorporate distributed mode loudspeaker (DML) technology. While the application of DML technology is still relatively new, it is being increasingly adopted by licensees (e.g. Armstrong) of NXT and SLAB. The result is a growing number and variety of applications from consumer to commercial markets. This application note will outline the basics of how DML technology works, and why it might be right for you on your next masking, paging or music installation. In a nutshell, it allows you to drive sound across a large vibrating surface (not in-phase) as opposed to a small cone acting as a piston (in-phase), and this has particular advantages. For more information, talk to your Armstrong representative, or go to the web links below.



*DML-driven vs piston:*



### Key Features:

1. Broad sound dispersion pattern over wide frequency range with little high frequency focusing
2. An inherently non-coherent surface vibration which results in minimal phasing issues
3. Direct radiating speaker that can combine various audio program materials

### Key Benefits:

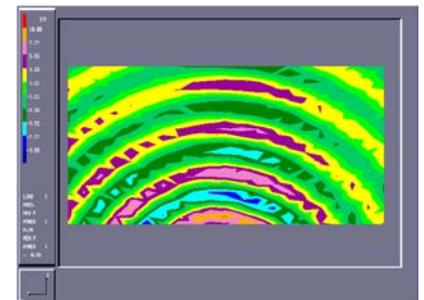
1. With broader sound dispersion, fewer speakers may be needed for coverage, or you can achieve better uniformity with the same number of speakers
2. More resistant to phasing (same source), and microphone feedback
3. Since direct radiating, can effectively combine paging and music with masking sound

### Drawbacks:

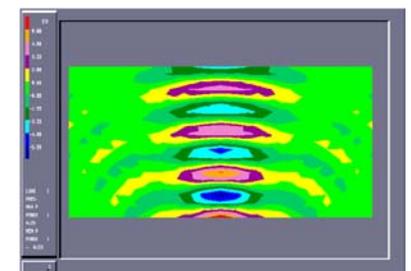
1. Application limited to low-to-medium power applications

### Common Misperceptions:

1. *They defy the laws of physics...*no, it's a different principle
2. *They can't be uniform...* spacing guidelines available from Armstrong let you decide what variation is appropriate, starting at +/- 1 dB
3. *They sound bad...*you may be amazed at how good they sound, try them in your next installation.



**Figure 1:**  
*Typical dispersion pattern of DML speaker*



**Figure 2:**  
*Typical dispersion pattern of cone speaker*

### Useful Web Links:

[Nxtsound.com](http://Nxtsound.com)  
[Slabsound.com](http://Slabsound.com)