



# This is AMCA

Introduction to Air Movement and Control Association International

# Lisa Cherney

## Education Manager, AMCA International

- Joined AMCA in February 2019
- Responsible for development of AMCA's education programs; staff liaison for the Education & Training Committee
- Projects include webinars, AMCA's online learning platform programming, presentations at trade shows, PDH/RCEP account management, and AMCA's Speakers Network
- Previous career in meeting, event, and incentive travel planning & management



# Introduction to AMCA

- Not-for-profit manufacturer association
- Established 1917 with six member companies in USA
- Now global with almost 400 companies

# The AMCA Mission:

To advance the knowledge of air systems and uphold industry integrity on behalf of AMCA members worldwide.



Advocacy



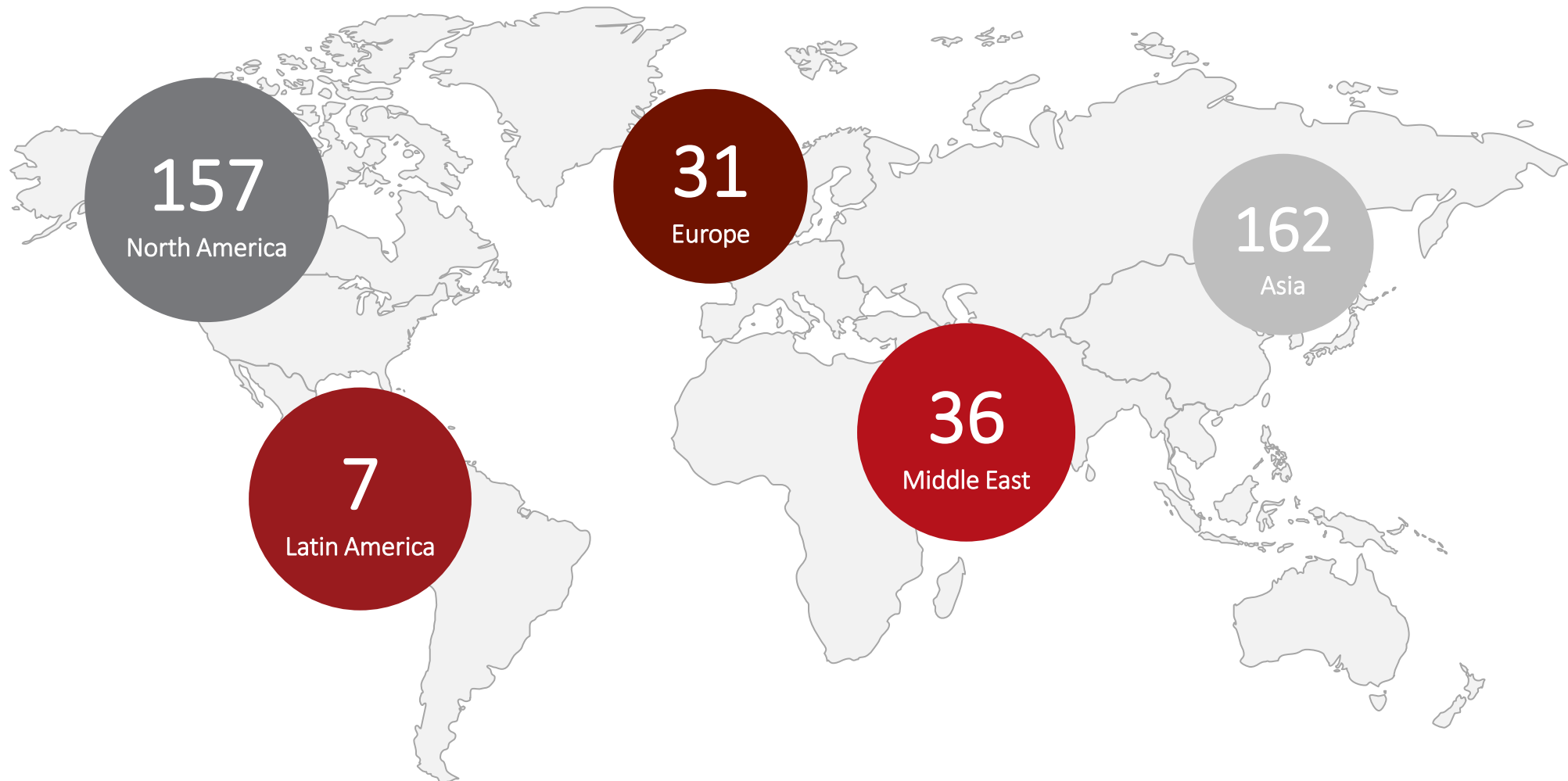
Certification



Education

# Global reach. Local touch.

Truly international membership – Nearly 400 members worldwide





# AMCA Scope of Products



# AMCA Value Chain

What AMCA provides members and the industry



# Certification

Why specify certified products?

Catalogs are up to date and accurate

Increased reliability of ratings

Apples-to-apples comparisons

“Check testing” ensures ratings are accurate over time.






# AMCA certifying test labs




www.amca.org



AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.


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# STAND FOR A HIGHER STANDARD


**AMCA 2022 IDEA EXCHANGE AND NORTH AMERICA REGION MEETINGS**  
MARCH 2-4, 2022 AT DISNEY'S CORONADO SPRINGS, WALT DISNEY WORLD® RESORT, FLORIDA




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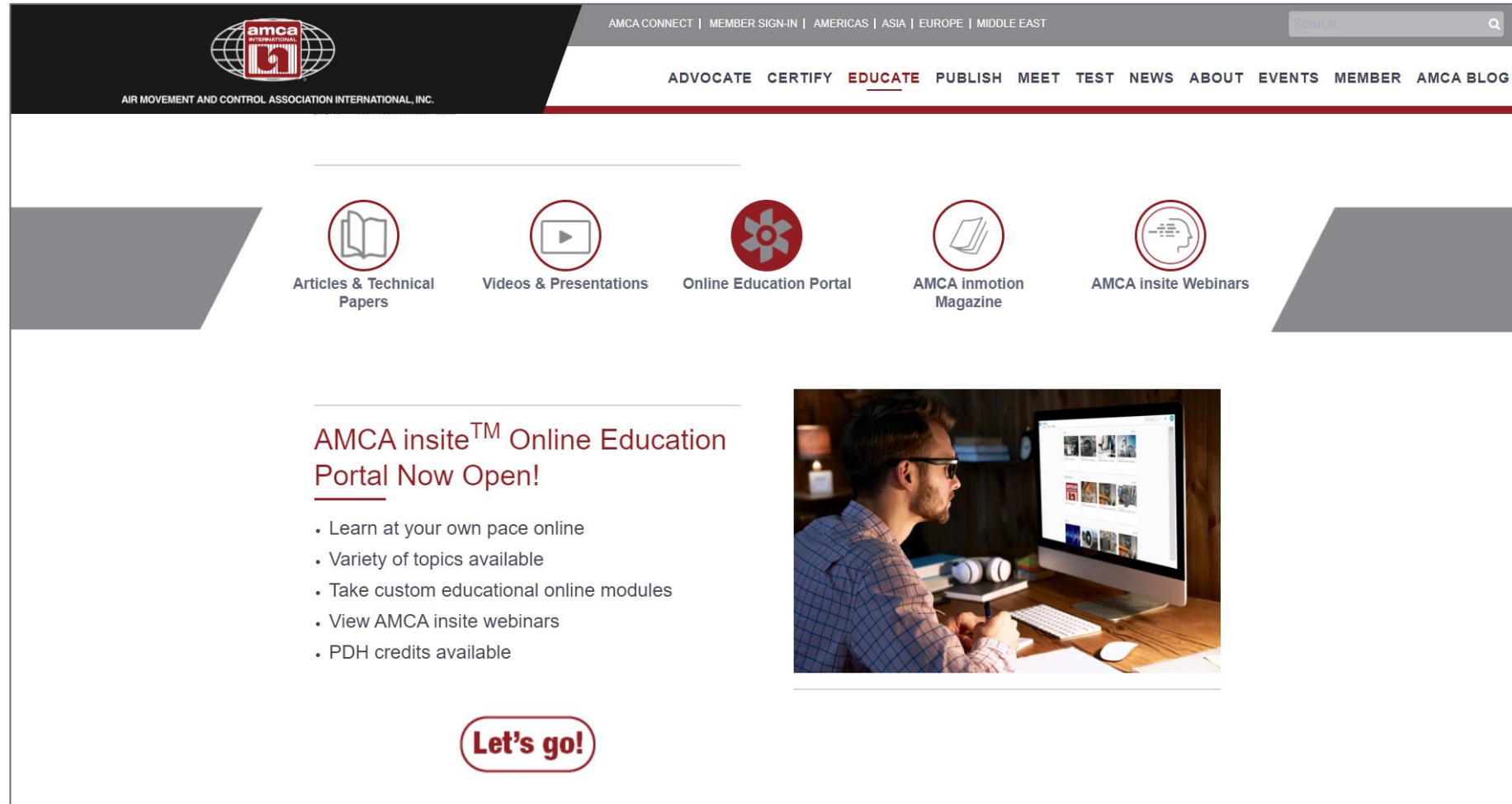


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# AMCA's Online Learning Platform



The screenshot displays the AMCA International website. The header features the AMCA logo and navigation links: AMCA CONNECT, MEMBER SIGN-IN, AMERICAS, ASIA, EUROPE, MIDDLE EAST, and a search bar. Below the header, a navigation menu includes ADVOCATE, CERTIFY, **EDUCATE**, PUBLISH, MEET, TEST, NEWS, ABOUT, EVENTS, MEMBER, and AMCA BLOG. The main content area highlights five educational resources with icons: Articles & Technical Papers, Videos & Presentations, Online Education Portal, AMCA inmotion Magazine, and AMCA insite Webinars. A section titled "AMCA insite™ Online Education Portal Now Open!" lists benefits: learning at your own pace, variety of topics, custom educational modules, AMCA insite webinars, and PDH credits. A "Let's go!" button is positioned below the list. An image of a man working on a computer is shown on the right.

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[www.amca.org/educate](http://www.amca.org/educate)



# Introduction to HVAC Noise Control

Kristen Neath

Canadian Nation Sales Manager – ICE Markets





# Kristen Neath

Canadian National Sales Manager –  
Commercial Industrial, Environmental  
Markets

Bachelors of Engineering in  
Mechanical Systems Engineering

Extensive knowledge of sheet metal  
design & fabrication

Expertise in reducing mechanical  
HVAC noise through design &  
application of noise control products



# Kinetics Noise Control

Established in 1958

Corporate office in Dublin  
OH with facilities in California,  
Ontario, and Hong Kong

Manufacturer of noise and  
vibration control products





# Market Divisions

1. **HVAC Vibration Isolation** - Mechanical Equipment Isolation
2. **Seismic and Wind Restraint** - Seismic/Wind engineered solutions and product
3. **Noise Control Building Materials** - Building Noise Separation, walls, floors, Ceilings, Track Slabs
4. **Room Acoustics** - Interior space reverberant and room tuning
5. **Industrial** In-Plant airborne noise and vibration control
6. **Environmental**- Outdoor airborne noise control, mechanical equipment, O & G
7. **Home & Pro Theatres**- High-end home theaters sound absorption, vibration isolation
8. **Airflow Attenuation**- vent/fan/duct silencers, acoustic louvers



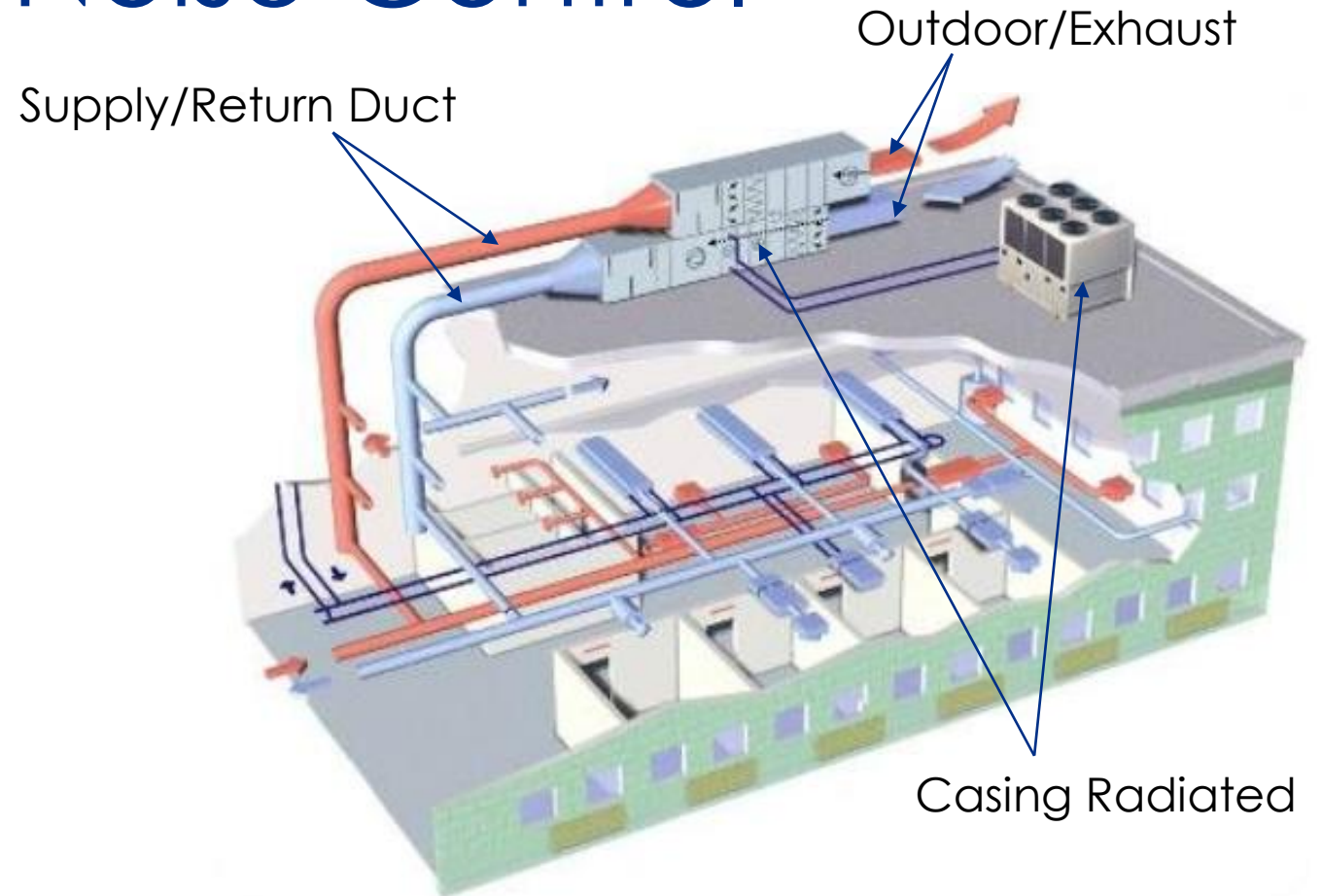
# Indoor/Outdoor Noise Control

## Indoor:

Noise travelling through supply and return duct work serving the inside of a building

## Outdoor:

Noise generated by HVAC equipment with a receiver and path outdoors



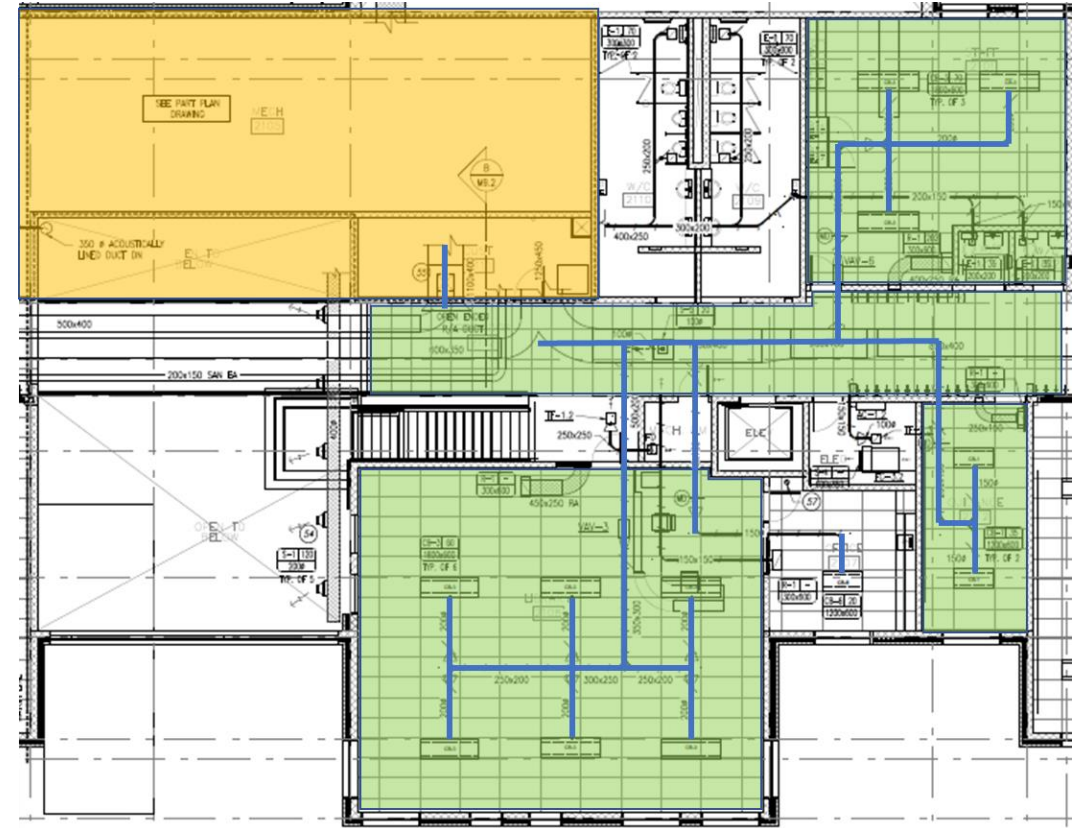
# Why Acoustics?

- ⌚ HVAC equipment is one of the major sources of interior noise in a building
  - ⌚ Contributes to the overall level of occupant satisfaction
- ⌚ HVAC equipment can also be a noise concern outside of the building
  - ⌚ Municipal by-laws for sound levels outside of the building
- ⌚ Incorrect selection of acoustic products will impact the performance of the HVAC system

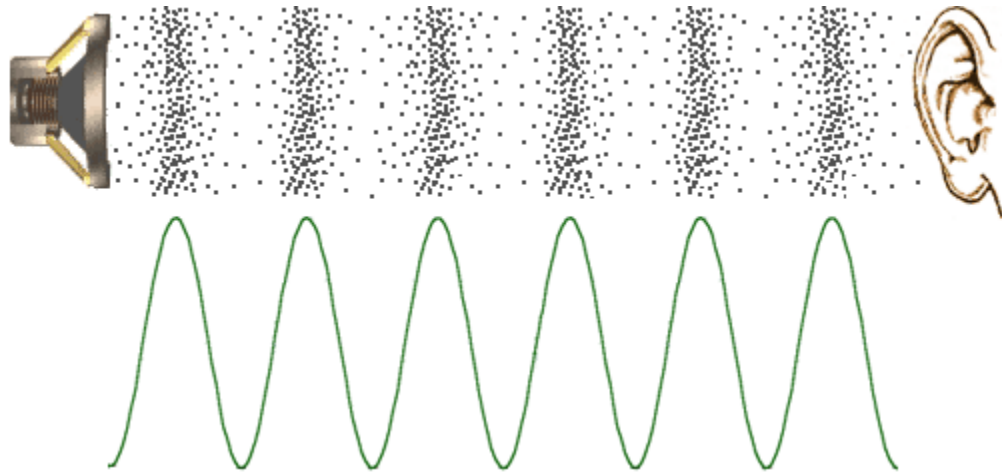


# HVAC System Noise

- Noise is unwanted sound
- Sound is energy (propagating as a wave) travelling through a fluid or solid
- In a solid, this can be noise transmitted through building partitions
- In a fluid, this can be noise transmitted through the HVAC system
- Source, Path, and Receiver



# HVAC System Noise: Source



- ~ Airborne sound is generated by a vibrating surface or by a turbulent fluid stream
- ~ Sound waves in air are variations in pressure above and below atmospheric pressure
- ~ Sound levels measured by the rate at which acoustical energy is released referred to as: **Sound Power Level**



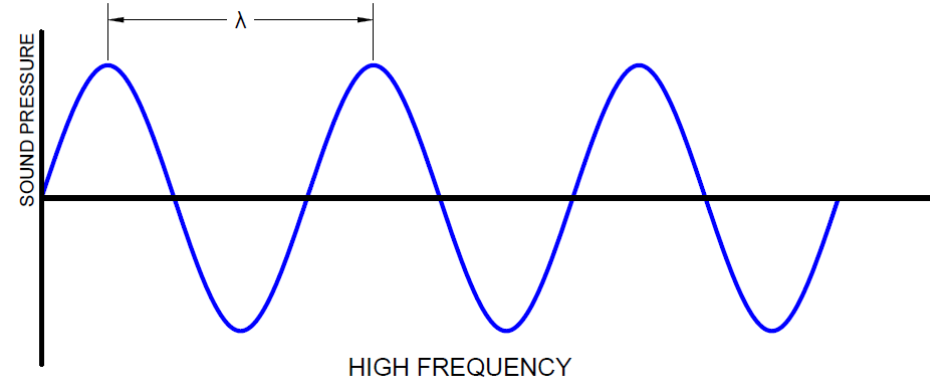
# Characteristics of the Sound Wave

## Frequency (Pitch)

Measured in Hertz (Hz)

For most HVAC noise control:

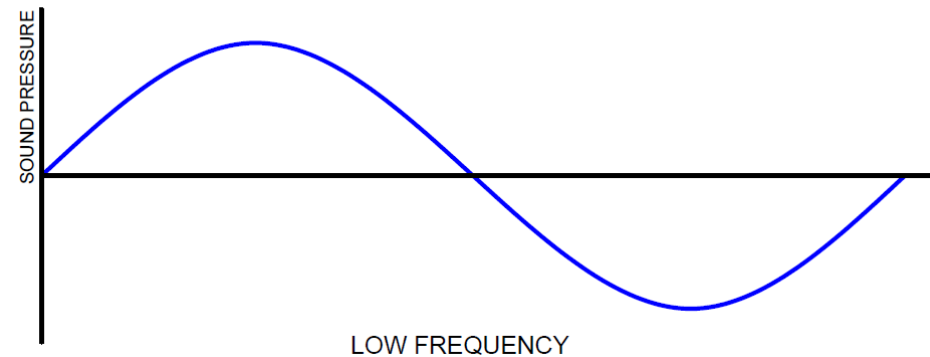
63/125/250/500/1k/2k/4k/8k



## Wavelength

Difference between successive peaks

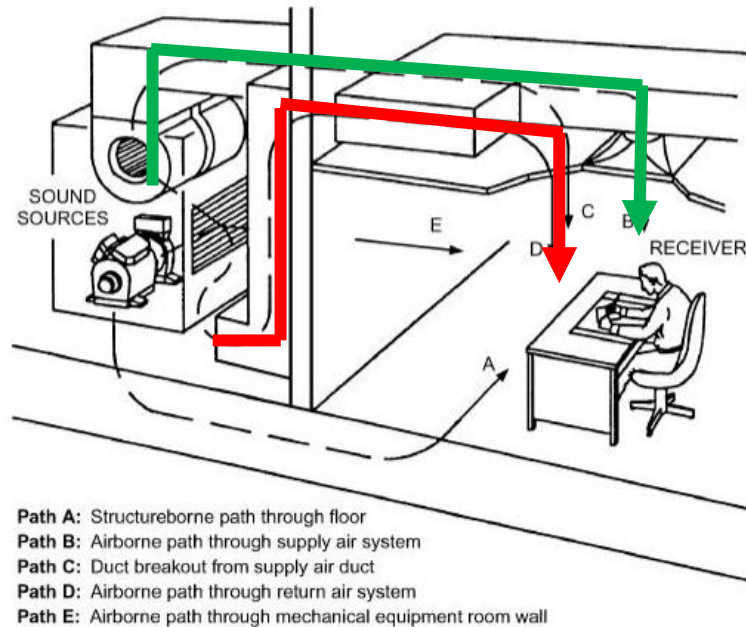
$$\lambda = c/f$$



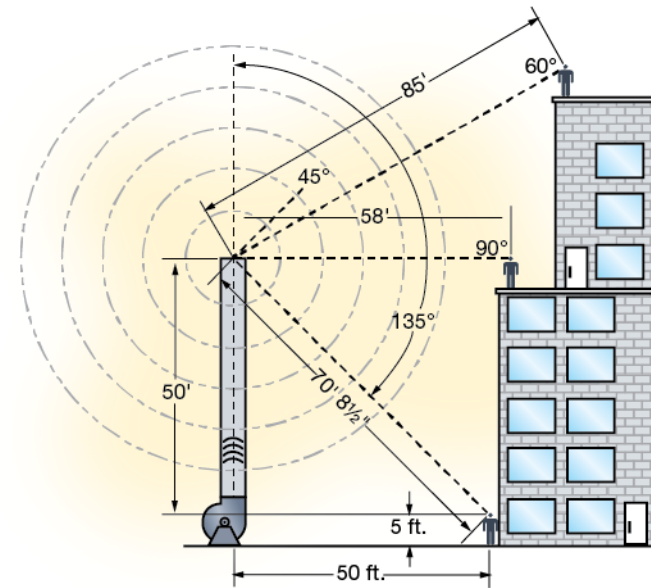


# HVAC System Noise: Path

## Indoor Noise Path



## Outdoor Noise Path



# HVAC System Noise: Receiver

- Sound Levels in the rooms are dependent on the size, number of sources, and acoustic properties of the space
- Sound Levels outdoors are dependent on where the receiver is standing relative to the source (distance and angle) nearby obstructions
- Measured as: **Sound Pressure**



# Noise Criteria (NC) Level

Indoor acceptable noise levels are usually classified as an NC level

Noise Criterion	Octave Band Center Frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
	Sound Pressure Levels (dB)							
NC-15	47	36	29	22	17	14	12	11
NC-20	51	40	33	26	22	19	17	16
NC-25	54	44	37	31	27	24	22	21
NC-30	57	48	41	35	31	29	28	27
NC-35	60	52	45	40	36	34	33	32
NC-40	64	56	50	45	41	39	38	37
NC-45	67	60	54	49	46	44	43	42
NC-50	71	64	58	54	51	49	48	47
NC-55	74	67	62	58	56	54	53	52
NC-60	77	71	67	63	61	59	58	57
NC-65	80	75	71	68	66	64	63	62
NC-70	83	79	75	72	71	70	69	68

Room Types		Octave Band Analysis <sup>a</sup>
		NC/RC <sup>b</sup>
Rooms with Intrusion from Outdoor Noise Sources <sup>d</sup>	Traffic noise	N/A
	Aircraft flyovers	N/A
Residences, Apartments, Condominiums	Living areas	30
	Bathrooms, kitchens, utility rooms	35
Hotels/Motels	Individual rooms or suites	30
	Meeting/banquet rooms	30
	Corridors and lobbies	40
	Service/support areas	40
Office Buildings	Executive and private offices	30
	Conference rooms	30
	Teleconference rooms	25
	Open-plan offices	40
Courtrooms	Corridors and lobbies	40
	Unamplified speech	30
Performing Arts Spaces	Amplified speech	35
	Drama theaters, concert and recital halls	20
Hospitals and Clinics	Music teaching studios	25
	Music practice rooms	30
	Patient rooms	30
	Wards	35
Laboratories	Operating and procedure rooms	35
	Corridors and lobbies	40
	Testing/research with minimal speech communication	50
	Extensive phone use and speech communication	45
Churches, Mosques, Synagogues	Group teaching	35
	General assembly with critical music programs <sup>e</sup>	25
Schools <sup>f</sup>	Classrooms	30
	Large lecture rooms with speech amplification	30
	Large lecture rooms without speech amplification	25
Libraries		30
Indoor Stadiums, Gymnasiums	Gymnasiums and natatoriums <sup>g</sup>	45
	Large-seating-capacity spaces with speech amplification <sup>h</sup>	50

# A-Weighted Response (dBA)

Filters the spectrum to simulate the frequency response to sound by the human ear

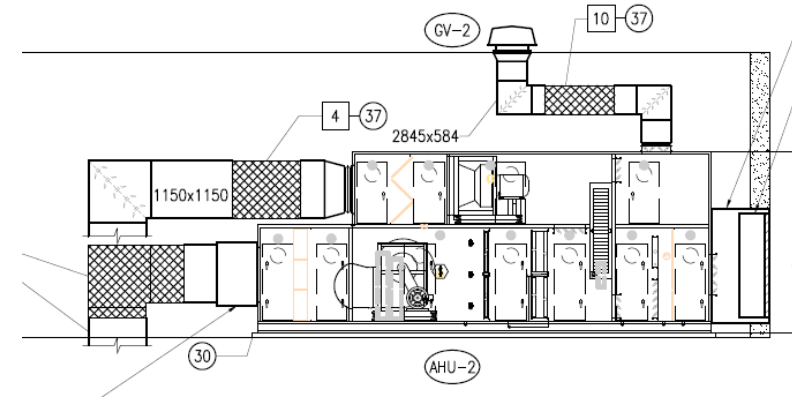
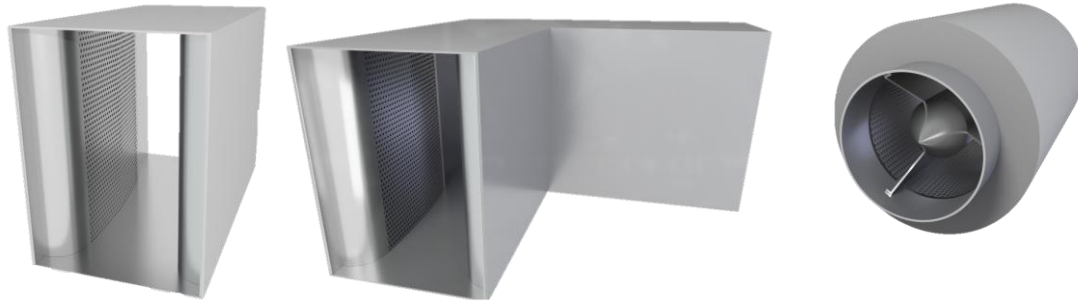
Deemphasizes the low frequencies, compensating for the lower sensitivity of the human ear to low frequency

Typically used for environmental/ outdoor noise design criteria

Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	dBA
PWL	95	94	89	84	80	74	69	68	
A-Weighting filter	-26	-16	-9	-3	0	1	1	-1	
PWL A-weighted	69	78	80	81	80	75	70	67	<b>86</b>

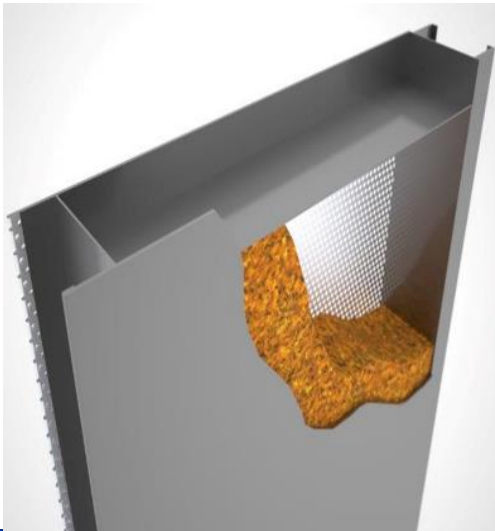
# The Silencer/Attenuator/Sound Trap

- ~ Ducted, replaces section of ductwork
- ~ Used for indoor and outdoor noise control – Supply, return, outdoor, and exhaust air



# NOISEBLOCK™ Acoustic Panels

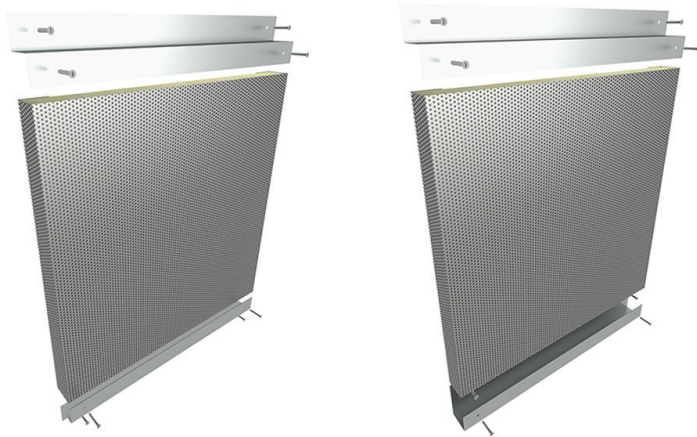
Used for acoustic plenums,  
equipment enclosures,  
barrier walls





# KNP Acoustic Panels

- Attached to existing structure for noise absorption
- Equipment yards, mechanical/generator rooms

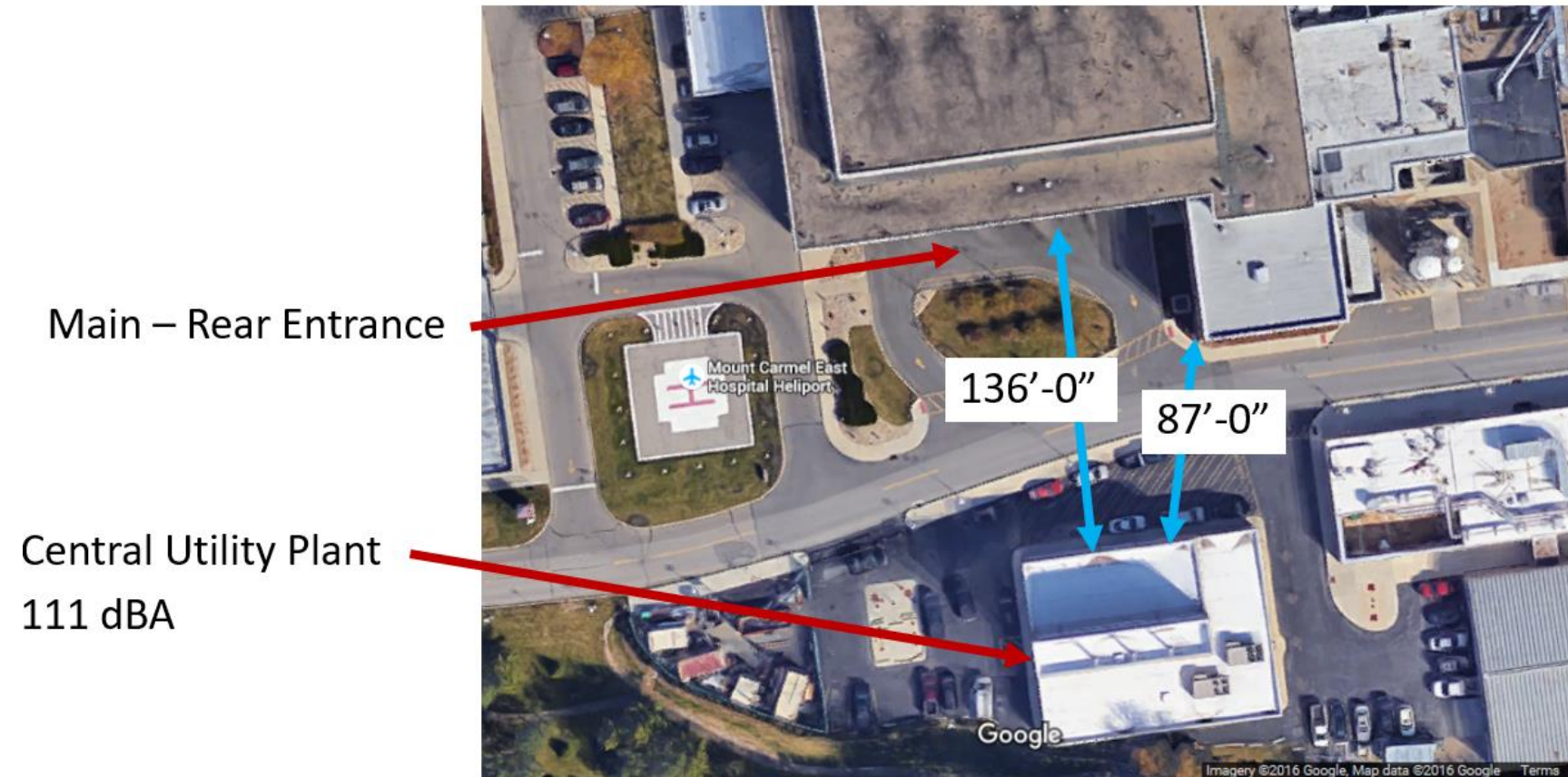


# Acoustic Louvers

- ~ Control noise travelling through building envelope
- ~ Used for outdoor/exhaust air and equipment enclosures



# Applications Example #1

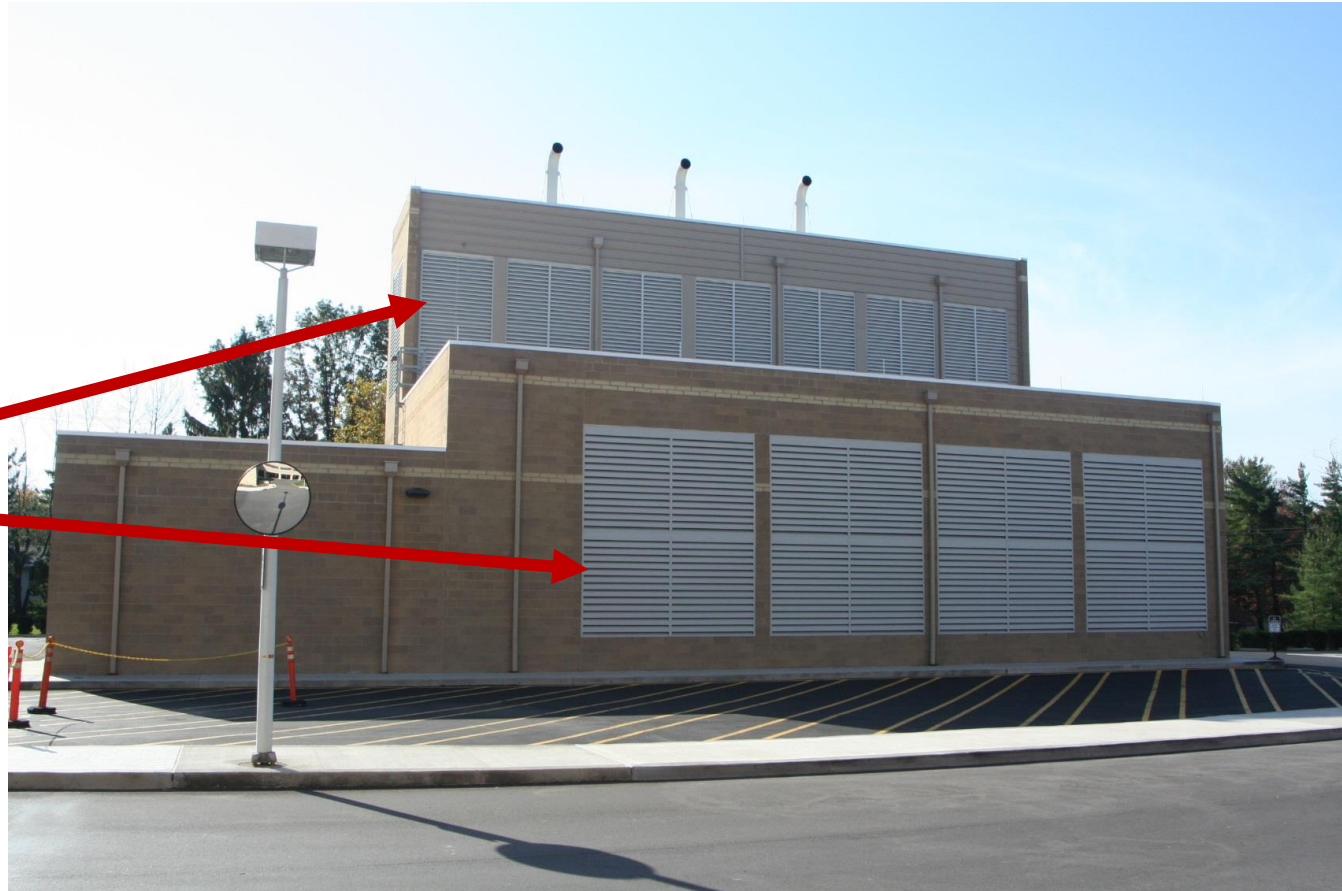




# Applications Example #1



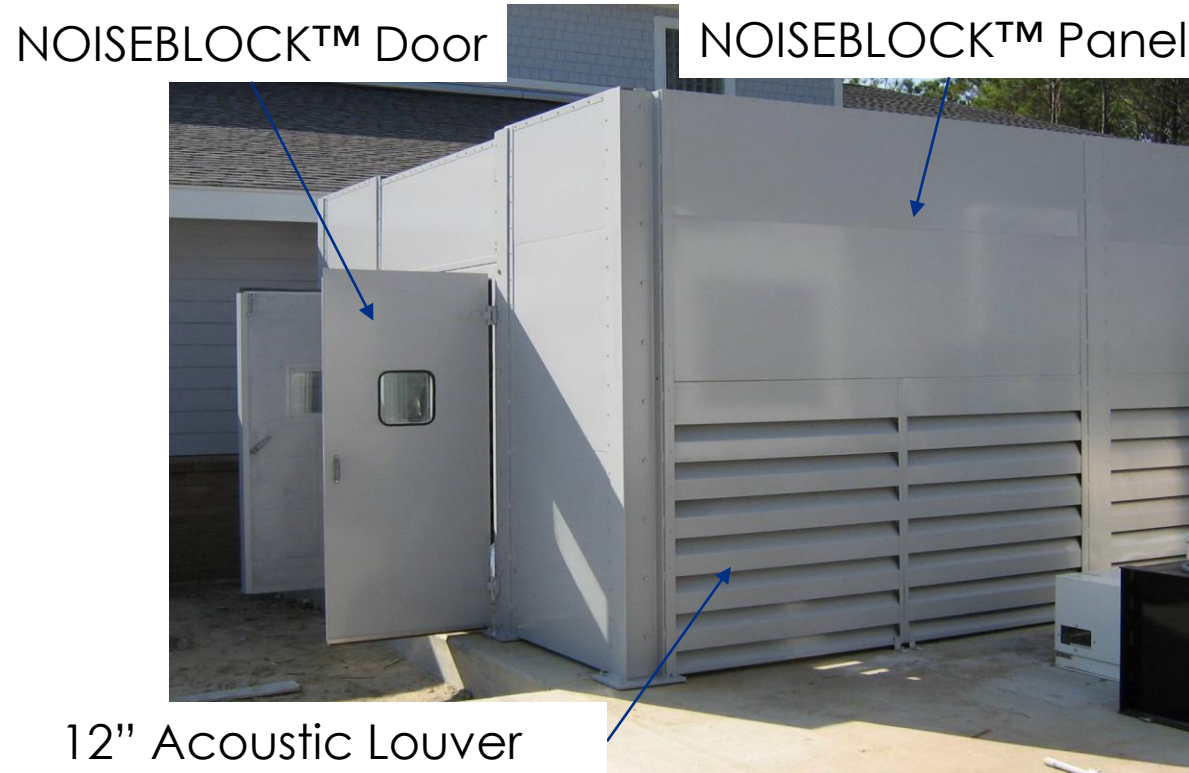
- Acoustic Louver
- 24" thickness
- No line of sight (security)
- Maximum attenuation



# Applications Example #2



# Applications Example #2





# Questions?

Survey QR code/link:



[https://www.surveymonkey.com/r/AMCA\\_WHVACR\\_Webinar\\_Feb18\\_2022](https://www.surveymonkey.com/r/AMCA_WHVACR_Webinar_Feb18_2022)

*We Create Quiet that  
Improves the Quality of Life*

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