SONĀRE

The Environmental Acoustics Magazine

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Premiere Issue

Q&A

with Niklas Moeller

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40 YEARS OF SOUND THAT WORKS

For the last forty years, KR Moeller Associates Ltd.'s main focus has been the design and manufacture of sound masking systems. In 2003, the company revolutionized the industry with the launch of the LogiSon Acoustic Network, the world's first networked sound masking system. In our IoT-driven era, that might just seem like common sense, but at that time, it was a bold move—a from-the-ground-up re-envisioning of masking technology that opened up new possibilities for their clients and set the tone for future developments in their field. And the company hasn't looked back since...

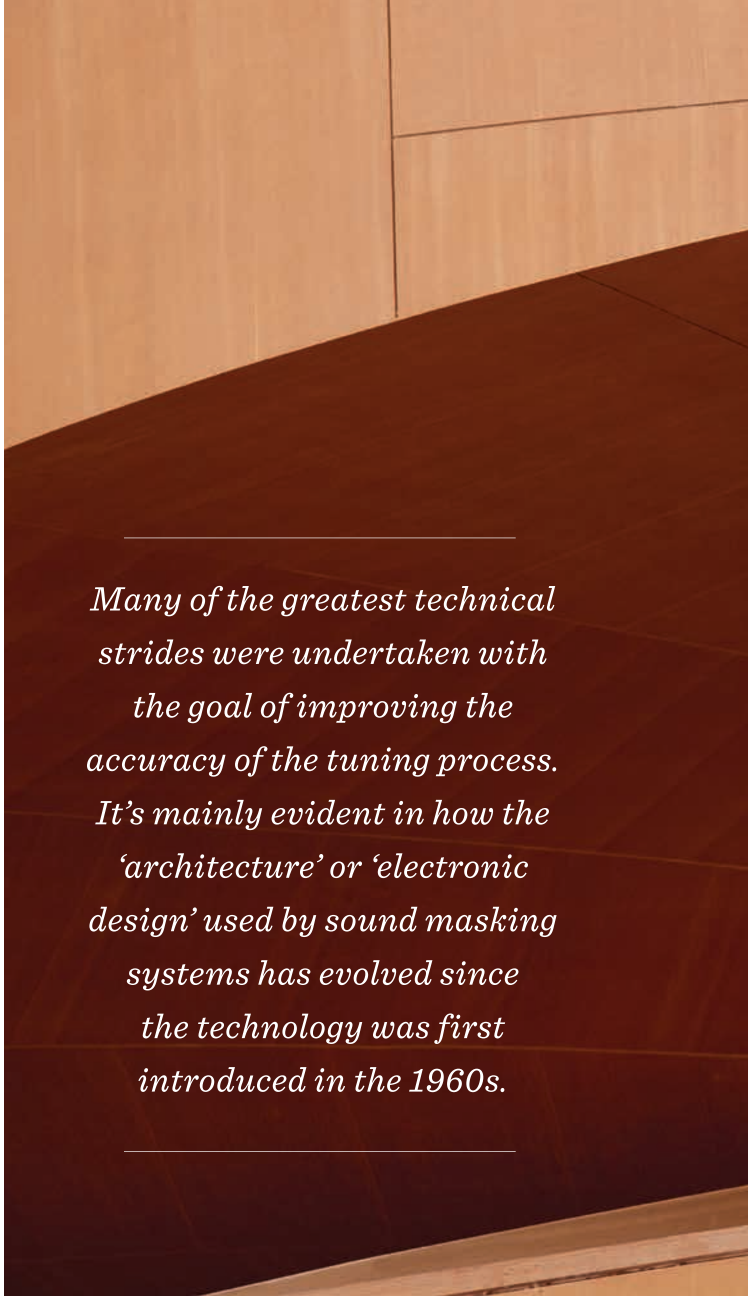
Niklas Moeller, Vice President, talks about the evolution of sound masking technology and why post-installation volume and frequency adjustments are an essential part of the commissioning process.

What kind of acoustic issues does masking address?
When asked to picture a 'noisy' space, many of us imagine loud factories or busy restaurants. But we also tend to use the same word to describe a completely opposite environment—one with really low background sound levels. Here, the lack of ambient sound means we can practically hear a pin drop and easily understand a conversation from across the floor. While we label them 'noisy,' these spaces are actually too silent. And that's where sound masking comes in. Taking steps to reduce, absorb and block noise are essential, but effective acoustics won't be achieved without masking because the ambient—or background—sound needs to be at a functional level. By increasing it in a controlled way, you improve speech privacy, support focus and enhance comfort.

How effective is masking at managing acoustics?
Masking is a key contributor to the overall acoustic performance of both open and closed spaces. When handled properly, it means the difference between being able to concentrate on a task or have a private conversation—and not being able to do so.

How do you determine what spectrum to use?
People often use the terms 'white' or 'pink' noise to describe this type of sound, but these have a very specific frequency mix—and because they tend to be uncomfortable, neither is used by modern masking systems. The ideal masking sound balances effectiveness and occupant comfort. The spectrum—or 'curve'—is usually specified by an acoustical engineer or referenced from a credible third party such as the National Research Council. Successfully delivering the masking effect across a client's space is only possible if the sound is professionally adjusted or 'tuned' to meet that curve.

What steps are involved with achieving the curve in the client's space?
To begin with, the system's electronics, zones and loudspeaker placement have to be designed so that the sound can be precisely adjusted throughout the space. The exact layout is unique to each facility, but in order to provide a solid foundation for the tuning process, there are a few basic rules we follow. The first is to limit the size of control zones—groups of loudspeakers for which we can adjust both volume and frequency settings. In open areas, we use no more than two to three loudspeakers per zone, covering roughly 225 to 675 ft^2 (21 to 63 m^2). We also provide an independent control zone per closed room. Beyond size limits, each zone offers precise volume and frequency control over the entire masking spectrum. Getting the system's design right enables the sound to be accurately tuned.



Many of the greatest technical strides were undertaken with the goal of improving the accuracy of the tuning process. It's mainly evident in how the 'architecture' or 'electronic design' used by sound masking systems has evolved since the technology was first introduced in the 1960s.

What happens during tuning?

Traditionally, a technician measures the sound, examines the results, and adjusts the volume and frequency settings in that zone until the curve is met, within an allowable tolerance. But this is a time-consuming and challenging process, especially if you've installed a flexible system with a lot of small zones. Manually tuning with precision can take a half hour per zone, even for an experienced person. This is why we developed our TARGET software—to automate the tuning process. TARGET allows us to tune each zone in a couple of minutes, and with a previously impossible level of precision. The more precisely and consistently the curve is met, the better the masking result for the client.

Why is zone size so important to this process?

Small zones offer a greater number of adjustment points, allowing us to accurately achieve the specified spectrum throughout the installation. We're aiming to keep deviations from the curve to a minimum. If larger zones were used, any changes affect large areas—and, therefore, large numbers of people. For example, if we adjusted the volume or frequency to fix a problem in a particular location, that change would occur across the entire zone, bringing the sound out of spec in areas where the adjustment wasn't required. Avoiding those conflicts and compromises is why zone size is the first thing you should discuss with your vendor. With small zones you can set tight tolerances—and meet them.

Are there guidelines governing how the results are measured?

When it comes to measuring masking results, there's only a voluntary American Society for Testing and Materials (ASTM) standard. In large part, the LogiSon approach mirrors that of ASTM. We use precision sound analyzers meeting Type 1 standards, and measure in third-octave frequency bands at about seated ear height. Where we exceed ASTM is by measuring, tuning and reporting each small zone—every 225 to 675 ft^2 (21 to 63 m^2) in open space and each closed room. Currently, the ASTM standard only requires a test every 1000 ft^2 (90 m^2) of open areas and about half of the closed rooms, which unfortunately leaves room for variation and much of the space untested.

What happens if the tuning process isn't handled well?

A sound masking system's value lies in its effectiveness. If it's not delivering on its core function, all the other great features that you could take into consideration—network integration, monitoring, timer scheduling, paging and music distribution, appearance—are reduced to the status of bells and whistles. The biggest potential cost to a client isn't the purchase price, but lost productivity due to a poorly performing system.

Are the differences really that substantial?

More than you'd think. A poorly-designed or poorly-tuned system may actually yield areas that are barely better than having no sound masking system at all. In order to be consistently effective, masking volume should vary no more than ±0.5 dBA at tuning points across the entire installation and frequencies should be consistent, with outliers being no more than 2 decibels from the target. A TARGET-tuned LogiSon system can achieve these goals. By contrast, the tolerance typically provided for larger-zoned, less flexible systems is ±2 dBA, giving an overall range of 4 dBA across the space. Frequency variations will be even larger. And the impacts are significant. Occupants can usually expect a 10 percent reduction in speech privacy performance for each decibel below the target volume. In other words, a wide tolerance can lead to a 40 to 60 percent performance loss in unpredictable locations.

Can occupants tell the difference?

It's hard to subjectively assess masking performance,

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but this doesn't mean it's not important. It's equally difficult to subjectively gauge indoor air quality—including the presence of pollutants—but, clearly, it's still vital to have it tested. The same is true for masking. Occupants' attention is usually only drawn to the sound in extreme cases—when it's either so loud or poorly tuned that it's causing discomfort or so low that it's providing no effect whatsoever. In between, there's a large range over which people aren't likely to complain, but the system still isn't doing what it should and occupants are living with speech privacy and productivity levels that aren't what they could be. So, ask for a detailed report of the tuning results—one that clearly indicates the curve has been met throughout the workplace and identifies the few areas that might remain outside spec and why, such as excessive noise from HVAC.

Does the tuning process ever need to be repeated?
If changes are made to the space—furnishings, partitions, ceiling, flooring—or to occupancy, such as relocating sales functions to an area formerly occupied by accounting staff, our technician should return to measure and adjust the zones that no longer meet the specified curve. It's not advisable for clients to handle these changes themselves because specialized training and equipment are needed. The likelihood that changes will occur during a masking system's 10- to 20-year lifespan is almost certain. Therefore, organizations simply can't take a 'set-it-and-forget-it' approach when it comes to the sound delivered within their space. By the same token, be wary of claims that masking systems don't need to be adjusted when they're first installed.

With today's more open designs, it's vital that the masking sound perform to the highest level.

Your company has been in the masking business for over 40 years and you've been working in the field for 25—how has the technology changed during that time?
Many of the greatest technical strides were undertaken with the goal of improving the accuracy of the tuning process. It's mainly evident in how the 'architecture' or 'electronic design' used by sound masking systems has evolved since the technology was first introduced in the 1960s. We, in particular, have sought to reduce zone size and find ever more precise methods of adjusting volume and frequency.

What types of masking architecture are there?
There are three main types: centralized, decentralized and networked, which is short for the more tongue-twisting 'networked-decentralized.' Some might argue that there's a fourth type—desktop devices—but they shouldn't be considered commercial workplace solutions.

How do they differ from one another?
There's a lot to cover here, but I'll try to be brief...

Centralized architecture originated in the 1960s. The sound generation, volume and frequency control equipment are typically located in a room and connected to a large number of loudspeakers—typically from dozens to hundreds—forming a zone. The facility is divided into basic categories such as open plan, closed room, corridor and reception, and a zone is created for each type, based on the belief that they have the same or similar acoustics. Each zone is then set to a 'best average' level, with substantial inconsistencies.

In order to address these tuning challenges, engineers in the mid-1970s moved the electronics used for sound generation, volume and contour control into 'master' loudspeakers, forming a decentralized architecture. Each master can be connected to up to two 'satellites', creating much smaller zones of only 1 to 3 loudspeakers. Each zone offers fine volume control, but frequency adjustment is limited and the technician has to access each master in order to make changes, using a screwdriver or remote control.

In 2003, we introduced the first networked system: the LogiSon Acoustic Network. It leverages the benefits of decentralized electronics and smaller zones, but networks the system's components together so they're fully controllable from a central location. Its digital backbone provides a more practical and precise way of adjusting the sound, and also opened the door to automated computer-tuning, reducing the time spent on this process by 90 percent.

Some vendors have since tried to water down the networked approach by combining architectures, providing smaller zones for closed rooms and larger ones across open plans. The problem is that grouping rooms together in a zone makes them untunable and while open spaces appear homogenous with their rows of bench seating or workstations, their acoustic conditions are usually anything but. If the zones are too large, technicians aren't able to adjust for acoustical variations across the floor plate, which can be considerable—sacrificing control in exactly the type of area where you need it the most. With today's more open designs, it's vital that the masking sound perform to the highest level.

Are any of the older architectures still in use?
Yes—the sound masking industry is somewhat unique in having both modern and 40-year-old technologies available at the same time. It's crucial to be able to identify them, because it tells you a lot about the performance you can expect. Being able to properly categorize a product won't tell you everything about what it can or can't do, but it's the best place to start.

What's the next step in this technology's evolution?
The future is networked—something we believe so strongly that we retired our traditional decentralized system. Advances in electronics and computing have not only allowed us to take masking technology in a new direction, but to better understand what it takes to ensure peak effectiveness. In fact, our research into the impacts of masking consistency led us to the indisputable conclusion that all older architectures should be shelved. Any small upfront savings they offer are quickly overtaken by the greater, ongoing costs of performance sacrifices. Moving forward, our R&D team will continue translating our industry-leading research into innovative new features that truly benefit our clients and help them reach their acoustic goals. We're always aiming for better, not just different.

Any final words of advice for organizations looking to implement this technology?
Sound masking isn't a commodity purchase. Take the time to fully understand the role it will play in your facility, as well as how to specify and verify high performance levels. Whereas we'd all be shocked to read a specification that says 'provide HVAC' or 'provide lighting,' over the years I've seen many that simply say 'provide a sound masking system.' People are undoubtedly your organization's greatest asset and sound masking's value comes from its positive impact on their productivity and comfort—which quickly erodes with declining system performance. It's a key design choice, for which you don't want to leave a lot of room for interpretation. Make sure you're getting the effect, not just the equipment.

KR MOELLER ASSOCIATES LTD.

A HISTORY OF INDUSTRY FIRSTS...

1978

The company begins by offering the SCAMP® Sound Masking System, a decentralized architecture with a single type of self-contained device offering pseudo-random sound generation, a choice of two fixed frequency curves, and basic volume control in ten 1.5 dBA steps.

scamp® SOUND MASKING SYSTEMS

Over the next 25 years, adds new features to the Scamp System, including random masking sound generation—for which the company secures its first patent—Master/Satellite devices, stepless volume adjustment, centralized zone volume control, a continuously adjustable masking spectrum, and a programmable timer.

2003

The R&D team returns to the drawing board. Their goal? To leverage emerging technologies in order to provide clients with more flexibility and ease-of-use, as well as even greater speech privacy, noise control and comfort.

LogiSon® ACOUSTIC NETWORK ©

Launches the world's first networked sound masking system, the LogiSon® Acoustic Network, cementing the company's status as the industry gamechanger.

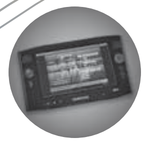
The system offers an unprecedented level of control and features benefiting all stakeholders: auto-addressed networked masking devices, centralized control of individual loudspeakers via hardware and software, third-octave frequency adjustment for small zones, independent digital zoning of masking/paging/timer functions, multiplexed digital paging/music, integrated paging amplifiers, separate masking and audio volume/frequency controls, monitoring and diagnostics for decentralized components, loudspeaker ping, priority page override, connector-based cabling and attractive components for open ceilings.

2005

The company continues to support its large SCAMP client base by releasing a modernized version of that system.

AccuMask® SCAMP® SOUND MASKING

Introduces the AccuMask® Sound Masking System, a re-engineered decentralized architecture featuring digital control and IR remote adjustment, as well as integrated ramp-up function and paging mute/volume control.



And also continues to add new features to the LogiSon Acoustic Network, maintaining its leadership position. Here are a few highlights...

2004

Programmable Keypad, the first customizable room occupant control for masking, paging and music.

2005

Low-Profile Loudspeaker for shallow plenums and Chicago Loudspeaker for regions requiring installation in conduit.

2006

Page Director, allowing users to create and change custom page zones on demand.

2009

Acoustic Network Supervisor, a Windows Service that monitors system operation and sends email notifications.

2012

Unique loudspeaker detection and monitoring functions, as well as voltage level monitoring, truly random digital sound generation, and a Fail-Safe Power Solution.

2014

Room Manager, providing on-demand control of masking and paging volume in individual rooms, from a PC.

2014

The company re-engineers the equalizer within the LogiSon hub in preparation for the release of a revolutionary new software.

Introduces TARGET, a unique application that third-octave tunes small zones of one to three loudspeakers to the desired curve far faster and more precisely than formerly achievable, even by expert technicians. TARGET reduces tuning time by 90 percent or more, while achieving the specified curve within ±0.5 dBA.

The following year, the company discontinues the AccuMask System, signalling to the industry that, in a post-TARGET world, the time has come for all products based on older masking architectures—centralized and decentralized—to be shelved.

2017

Installing their technology in patient rooms highlights how it not only improves privacy, but also helps occupants sleep. That attention to slumber brings the company into the hospitality field.

MODIO
By LogiSon
GUESTROOM ACOUSTIC CONTROL

Launches MODIO® Guestroom Acoustic Control, the first commercial-grade masking device specifically designed for hotels, allowing occupants to adjust the level of noise control in their room the same way they set temperature and lighting. The following year, MODIO picks up several awards: Best of BD West, HiP Award Honoree, HD Award Finalist, Buildings Product Innovations and Money Saving Products Awards.

2018

The company celebrates its 40th year.

YEARS OF SOUND THAT WORKS

Looks forward to ongoing research and continuous product innovation, intending to further advance sound masking technology and understanding of its role within the built environment.

NOW

Today, the company's products are available globally and installed in many hundreds of millions of square feet for clients ranging in size from small business to Fortune 100. They've attained over 25 patents relating to masking technology, authored more than 175 articles and CEUs, and are currently working together with such notable organizations as ASTM, ASA, CAA, GBI, FGI, and WELL to advance acoustic best practices and industry standards.

...AND ACCOLADES

Since launch, the LogiSon Acoustic Network has won over 20 awards, including:

Best of NeoCon
Five-Time Winner

NSCA Innovations in Technology Award

IIDEX / NeoCon Canada
Three-Time Winner

Symposium Distinction Award

Buildings Top 100 Products
Two-Time Winner

Buildings Innovation Award
Three-Time Winner

Buildings Money Saving Product

Building Operating Management Top Product Award

Nightingale Award
Three-Time Winner

CELEBRATING 40 YEARS OF SOUND. THAT WORKS.

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