



Acentech provides comprehensive consulting in acoustics, audiovisual systems, information technology systems, and noise and vibration mitigation to new, renovated, or retrofit healthcare projects. We work with clients' teams to create healing environments that improve patient outcomes and stakeholder satisfaction.

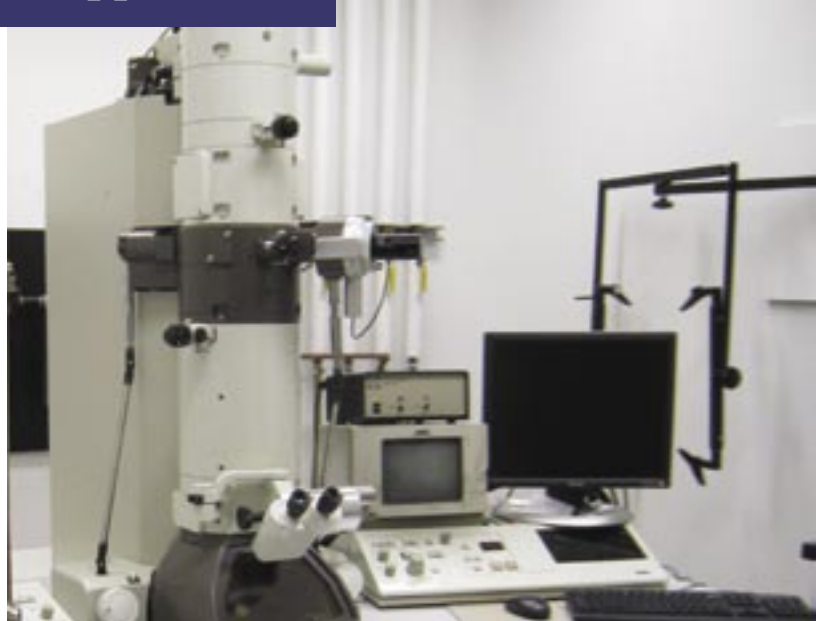


Studies show that the acoustical environment in healthcare facilities has a major impact on patient outcomes and staff satisfaction. And it is no secret that being on the cutting edge of technology is essential to providing best-in-class care. Our multi-disciplinary team of acoustics, technology, and vibration experts brings extensive experience, grounded in evidence based design, to every project. We use an integrated approach that results in cost-efficient solutions and streamlined execution. We listen carefully to our clients and collaborate effectively with the entire project team - architects, facility managers, HIPAA compliance officers, engineers, and specialty consultants - to develop sustainable spaces that fulfill their functions efficiently.

An Integrated Approach

Our recent projects include:

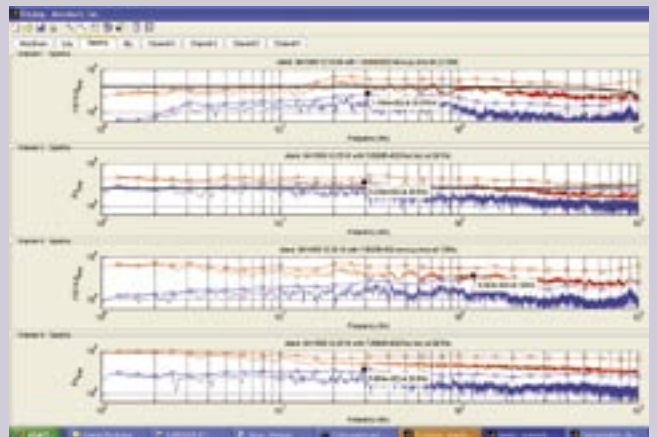
- Private, Non-profit and Teaching Hospitals
- Ambulatory Care Centers
- Surgical Suites
- MRI Centers
- ICUs
- Rehabilitation Centers
- Nursing Homes
- Long-term Care Facilities
- Academic Buildings
- Sustainable and LEED Certified Spaces



Remote Monitoring of Vibration and Noise

In health care facilities housing highly sensitive equipment and/or operations, construction vibration can cause significant disturbance at levels far below those traditionally associated with building damage. Typical construction monitoring programs are generally not sensitive enough to measure these low-level vibrations.

Acentech's remote monitoring systems provide administrators, managers, contractors and researchers with real-time notification and continuous access to critical vibration and noise information. Using an internet connection, monitors can be viewed, controlled and downloaded remotely, and can also send email and text alarm messages when pre-set limits are exceeded. These capabilities enable hospital personnel to anticipate problems, mitigate activities, schedule operations and document potential impacts and events.





Multi-disciplinary Services

Acoustics

- Acoustical finishes and materials recommendations that meet infection control guidelines
- Room shape and size recommendations
- Control of reverberation and sound build-up
- Sound isolation/acoustical privacy for HIPAA compliance
- Control of mechanical noise for appropriate background sound levels
- Control of exterior noise radiated from rooftop or exposed equipment
- Mitigation of exterior sound transmitted into sensitive interior spaces
- Interior and exterior noise survey, data analysis and reporting
- Three-dimensional acoustical modeling with audio demonstrations of virtual spaces

Audiovisual System Design & Information Technology

- AV and IT master planning
- Wired and wireless IT systems
- Data center design
- Cable distribution for patient entertainment systems
- Videoconferencing and boardroom systems
- Lecture/teaching systems
- Distance learning systems
- Digital signage and wayfinding
- Operating rooms connectivity
- Redundancy design of control systems for critical operations
- Infrastructure design for Picture Archiving and Communication (PAC) systems
- Simultaneous language interpretation systems and assisted listening
- Telecommunications, medical data storage, transport, and network backbone design

Noise & Vibration

- Evaluation and mitigation of intruding disturbances from external sources
- MRI sound isolation
- Mechanical system vibration control
- Helipad noise & vibration mitigation
- Isolation system design to protect sensitive equipment selection
- Measurement and analysis to assist in building site selection and foundation design
- Structural dynamics for sensitive areas including MRI and surgical suites
- Impact models of construction-related noise and vibration and real-time monitoring
- Structural design to limit footfall-induced vibration

Teaching Hospitals



Boston Medical Center | Boston, MA

Boston Medical Center (BMC) is a private, not-for-profit academic medical center and the primary teaching affiliate for Boston University School of Medicine. Acentech recently partnered with BMC on two new construction projects: an Intensive Care Unit and an Ambulatory Care Center.

Ambulatory Care Center

With construction planned for a new 245,000-square foot Ambulatory Care Center next to the existing hospital, BMC needed to ensure that construction-related vibrations would not disrupt ongoing hospital activities. Prior to construction, Acentech conducted a series of tests, representative of construction activities, to measure vibrations in sensitive areas of the hospital. The measured vibrations were compared to specific instrument criteria (MRI, CT scan) and to generic criteria for operating rooms, to help determine potential impacts. During construction, Acentech then utilized remote vibration monitoring systems to continuously measure the construction-related vibrations. Hospital personnel were alerted by trigger emails and text messages if any pre-set vibration limits were exceeded. This real-time monitoring and communication allowed hospital personnel to anticipate complaints from staff, and, if necessary, to mitigate the construction activity.

Intensive Care Unit

Acentech reviewed the design for the new Intensive Care Unit and made recommendations for sound isolation between patient rooms, for patient rooms in close proximity to the elevator shaft, as well as between rooms with dissimilar uses (e.g., a conference room and a consult room). Our team also provided guidance on room finishes and mechanical system noise and vibration control.



Women & Infants Hospital | Providence, RI

Women & Infants is the primary teaching affiliate of the Warren Alpert Medical School of Brown University for obstetrics, gynecology and newborn pediatrics. Acentech consulted on audiovisual system design and acoustics for this 140,000-square foot, four-story addition at the hospital that includes an expanded Neonatal Intensive Care Unit and expanded space for obstetrical patients. We designed a centralized, cost effective, and easy to operate AV systems for a large area that may be configured in multiple combinations to accommodate up to four simultaneous presentations and meetings. Each space is equipped with a lectern, wired and wireless microphones, high-definition video projector, motorized front projection screen, and ceiling speakers for speech reinforcement and audio playback. We also consulted on architectural acoustics and mechanical system noise control for the building and specific acoustics for the conference center.

“It has been great working with Acentech on this challenging, state-of-the-art, seven-star hospital project. CCAD is a project that requires innovative and top quality design solutions, which is what Acentech provided.”

— Phan T. Luc, AIA



Cleveland Clinic | Abu Dhabi | United Arab Emirates

Scheduled to open in 2011, the 360-bed Cleveland Clinic Abu Dhabi (CCAD) will include a multi-specialty tertiary center and adjacent clinic providing a spectrum of specialty services for the region. Both local and international patients will receive world-class care in a unique environment combining “seven star” amenities and service standards with the highest quality patient care. As an extension of the Cleveland Clinic in Cleveland, Ohio, medical professionals working at the Abu Dhabi site will receive on-going training directly from their colleagues in Ohio.

Acentech’s consulting services for CCAD include audiovisual system design to provide the remote learning needs of this distinctive facility. Our work encompasses a comprehensive package of component spaces: a 220-seat auditorium/multimedia room, a large divisible conference room, a training and simulation center, and care information and entertainment system. In addition to these primary components, audiovisual designs will be implemented for numerous seminar rooms, classrooms, labs, and public gathering spaces.

Regional Centers

Mugar Patient Addition | Cape Cod Hospital | Hyannis, MA

An acute care facility, Cape Cod Hospital is a not-for-profit regional medical center located on 38 acres in Hyannis, Massachusetts. The Mugar Patient Addition is a 102,000-square foot facility providing the hospital with 60 new private patient rooms. During the design and construction phases of the addition, Acentech made recommendations to achieve appropriate acoustical conditions for both patients and staff. These included solutions for sound isolation between patient rooms and other spaces, and acoustical finishes in public and private areas. Our team also reviewed the mechanical system design and recommended methods to reduce noise transmission to interior spaces. Outside of the hospital, we measured existing ambient sound levels in neighboring areas and advised on mitigation measures to control noise emission from the new mechanical equipment to the neighbors. Acentech also designed the audiovisual technology systems for the addition's L. Paul Lorusso Conference and Educational Center. Our design included multi-format presentation tools, videoconferencing, and distance learning capabilities to facilitate collaboration and education throughout the medical community.

In 2008 the Cape Cod Hospital's Mugar Patient Addition won a *Boston Society of Architects New England Healthcare Award for Design Excellence*.



“It was a great pleasure to work with the Acentech team. They did a tremendous job assisting us in designing a multi-functional, state-of-the-art AV system for the new conference center. And they provided good, cost-effective solutions to address several complex noise and vibration issues throughout the addition.”

— Gerard Georges, Associate, Architecture,
TRO Jung | Brannen



Fenway Health | Boston, MA

This new 10-story, 100,000-square foot health facility and research center is the largest Lesbian, Gay, Bisexual, Transgender oriented center in the world. Acentech designed the audiovisual systems that serve several conference rooms, a boardroom, a 3-segment divisible meeting space, and the 176-seat auditorium located on the top floor. The systems include digital signage, dual large-screen displays, videoconferencing, and room scheduling capabilities. With the architect's vision and the end-user in mind, all systems were designed to be seamlessly integrated into the building's architecture and easy to operate by staff and visiting lecturers. Our acoustics recommendations included measures for speech privacy in the patient registration and waiting areas, sound isolating constructions around clinical and administrative spaces, and room finishes for the auditorium and boardroom. We also advised on duct noise attenuation and vibration isolation to reduce mechanical system noise and vibration transmission to the building.



Skinner Nursing School Renovation | University of Massachusetts | Amherst, MA

Originally constructed in the 1940's, Skinner Hall was recently renovated to include modern classrooms, breakout rooms, and a clinical lab that simulates a hospital environment. A two-story addition was also built and contains new mechanical and electrical systems, wireless Ethernet, and fully-functional patient bed teaching labs. Acentech's acousticians consulted on room acoustics, sound isolation, and mechanical system noise and vibration control throughout the facility. Of particular importance, we provided recommendations to reduce the noise transmission from the main mechanical room to a horizontally adjacent classroom. Our audiovisual system designers focused on the simulation room, where student nurses practice medical examinations as part of their instruction. We designed video and audio connections to the central AV room, enabling observation and real time information transfer between the students working in the simulation room and students in the classrooms. We also designed wireless network access points and infrastructure.

MRI Suite



University of Wisconsin Hospital and Clinics | Madison, WI

Magnetic Resonance Imaging (MRI) systems produce considerable airborne sound and floor vibration that may adversely affect adjacent spaces. Furthermore, building vibrations may affect the operation of the MRI. The University of Wisconsin planned to replace a CT scanner by a 3T MRI system in a third-floor room and to install a 1.5T MRI in an area that was formerly shell space. Both of these locations had noise-sensitive adjacencies. The client engaged Acentech to determine whether the vibration environments at the planned MRI locations would meet the criteria for these systems and to assess the noise expected to occur in neighboring rooms when the MRI's are in use. By obtaining and analyzing various noise and vibration measurements, the team determined that the vibration environments in the new MRI areas would be acceptable for these systems. We advised on a high-frequency vibration isolation system for the MRIs to reduce the structure-borne noise to adjacent areas, and recommended partitions and architectural finishes to limit the airborne noise.



To learn more about Acentech's healthcare project capabilities and experience, contact Ben Davenny, Senior Consultant, at 617-499-8039 or bdavenny@acentech.

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