nerej
CELEBRATING 55 YEARS

Acentech awarded U.S. Navy contract

April 21, 2009 - Front Section

Acentech Inc. has been awarded a contract by the U.S. Navy, Office of Naval Research, to develop "metamaterials" that provide acoustic cloaking of underwater objects. Acentech's RH Lyon Division, one of the most experienced groups of product noise and product sound quality specialists in the U.S., was awarded the project through the government's Small Business Innovation Research (SBIR) program.

"Metamaterials" with highly unusual properties, such as simultaneous very low density and high stiffness, may provide acoustic "cloaking" of underwater objects. An acoustic cloak absorbs sound waves that would otherwise fall onto and reflect off an object, and traps them into the cloak, where they are guided around the object and emerge on the other side as if they had not encountered any disturbance. The cloaked object is thereby rendered invisible to sonar.

Within the last few years, experimental cloaks for electromagnetic waves (e.g., microwaves, radar) have been successfully built and demonstrated.

Theoretical studies indicate that similar acoustic-wave cloaking devices should be possible, and the Navy has begun to evaluate their potential to make underwater objects invisible to sonar in the current SBIR program. Acentech is tasked with determining proof of principle: finding materials and structures that together have the unusual dynamic properties called for by these theoretical calculations so the Navy can evaluate the potential for developing practical cloaks.

"The prospect for cloaking is the most interesting concept in the area of low observables since radar-evading stealth," states Dr. Steven Africk, Supervisory Consultant and principal investigator at Acentech. "While it has been shown that acoustical cloaks are theoretically possible, the challenge is to develop materials and structures with highly unusual properties, including a requirement for mechanical properties that differ with direction to coax the waves to bend in just the right way. We are optimistic that this can be done with the approach we have taken, but we recognize it may be very difficult and that altogether novel types of composite structures may be required."