

The New American Public Address Infrastructure

Long Range Speech Communication Systems
For Public Early Warning & Emergency Response

*Advanced New Sound Technology for
Homeland Security and First Responders*

A White Paper

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Executive Summary

America faces many threats. Terrorism, criminal activity, mother nature, and accidents occurring in our energy, transportation and business infrastructures all impose a constant danger. The totality of these threats and their potential consequences for human life is now so great that it has become imperative that state, local, and federal emergency responders have **THE ABILITY TO EFFECTIVELY ADDRESS THE PUBLIC AT A MOMENT'S NOTICE** with information that is critical to protecting and preserving lives. America's current public address capabilities fall well short of delivering the needed infrastructure. That infrastructure must 1.) Be economically feasible, 2.) Provide for much greater range/coverage than existing systems, 3.) Enable law enforcement, first responders, emergency managers and federal agencies to speak clearly and understandably to all of the affected public at one time.

Existing early warning systems are one-dimensional in that they are primarily designed as signal generators for tornado/weather emergencies. Sirens typically have a useful range of .875-1.5 miles and a coverage area from 3-5 square miles. These systems must rotate on top of poles adding cost for mechanical apparatus and maintenance. For speech, many sirens must be rotated at intervals with the message repeated at each new position. Speech is difficult to hear or understand clearly which creates confusion with the public. A typical 400 square mile county might require well over 130 such rotating sirens. Even that amount of sirens would not cover many sparsely populated or commercial areas at required decibel levels for signals let alone deliver intelligible speech. Many rural areas are not covered at all.

Power Sonix, Inc. of Martinsburg, WV has new technology available to project intelligible speech and signal sound over vastly greater areas. A single installation of this technology can deliver a coverage area of approximately 27 square miles with simultaneous speech/sound in all directions. This is an area almost NINE times greater than a typical siren system. This new technology can be implemented for a fraction of the cost of the 5 to 9 siren installations it would replace. Emergency managers can reach more citizens with fewer installations and they can speak to everyone in the listening zone at once. The capital investment required is about a third of that of existing systems and maintenance costs are lowered as well. This gives the American taxpayer an emergency communication system they can actually hear and understand for less money than what is being installed today.

Homeland security objectives, as they relate to communicating directly with the public, should take into consideration this technological development. Authorities from state, local and federal levels can now have access to this advanced public address capability. Federal leadership to promote the development and implementation of this technology into a New American Public Address Infrastructure will ensure improved protection for the public and enable clear and coherent emergency public address communications nationwide.

The Problem:

The ability of terrorists or rogue states to inflict massive damage onto US soil and to kill Americans as they go about their daily lives has been clearly demonstrated. September 11th revealed many inadequacies in the technology our emergency responders use to communicate with each other and to the affected public. Radio systems failed. Bad information was transmitted that cost people their lives. There was no way for responders with better information to get it to those who needed it.

The threat of chemical, biological and nuclear weapons is very real. If such an event were to occur, it is clear that more lives would be in danger during the aftermath than at the initial event itself. The best way for first responders to save the lives of unwitting citizens is to audibly instruct them to take appropriate action or to warn them before they get into harm's way. Emergency managers and first responders must have access to public address systems that have enough power to reach several miles in all directions simultaneously and the capability to project clearly understandable speech over that distance. Only with this technology can they best manage the emergency scene and prevent further loss of life.

Dangerous weather conditions and natural disasters demand the public be warned in a timely manner. Nearby neighbors of a nuclear power plant that is leaking radiation need information quickly. Areas downstream from swollen rivers need time to evacuate. Sirens systems accomplish an elementary warning need however they do not enable the dissemination of more specific verbal instructions when the situation demands it. If a primary evacuation route is blocked, how do those unfamiliar with the local roads escape? The guiding voice of an emergency manager could save them if the appropriate infrastructure is in place.

Most current public address systems are sirens designed to warn the public of a pending weather condition such as a tornado. These systems evolved from the air raid warning systems of the 50's and 60's cold war era. The range of these systems is limited. More importantly, their ability to transmit intelligible speech is grossly inadequate. In addition to the low quality of speech sound, these systems are often mechanically rotated. This requires that the speaker horns be rotated in short intervals until a 360° sweep has occurred so that the message can be transmitted in different directions. This takes valuable time when every second counts. The mechanical apparatus that rotates the system adds to both the cost of the original installation and to routine maintenance. Omni-directional siren systems available today typically have even less power, range and coverage area than the rotational sirens.

A typically siren installation has a useful range of one mile and covers an area of about 3 square miles once a full rotation is completed. It can take well over a hundred of these sirens to cover much of the populated areas of a typical county. But with costs upwards of \$15,000 per installation, many less populated or rural areas are left uncovered. The budgetary cost-benefit analysis leaves these citizens out of the reach of warning signals or public address. *Figure 1* shows an actual siren network deployed in suburban Columbus, Ohio. The high cost and short range of sirens makes decisions on their placement agonizing for emergency managers and unfair to many citizens who live outside it's reach.

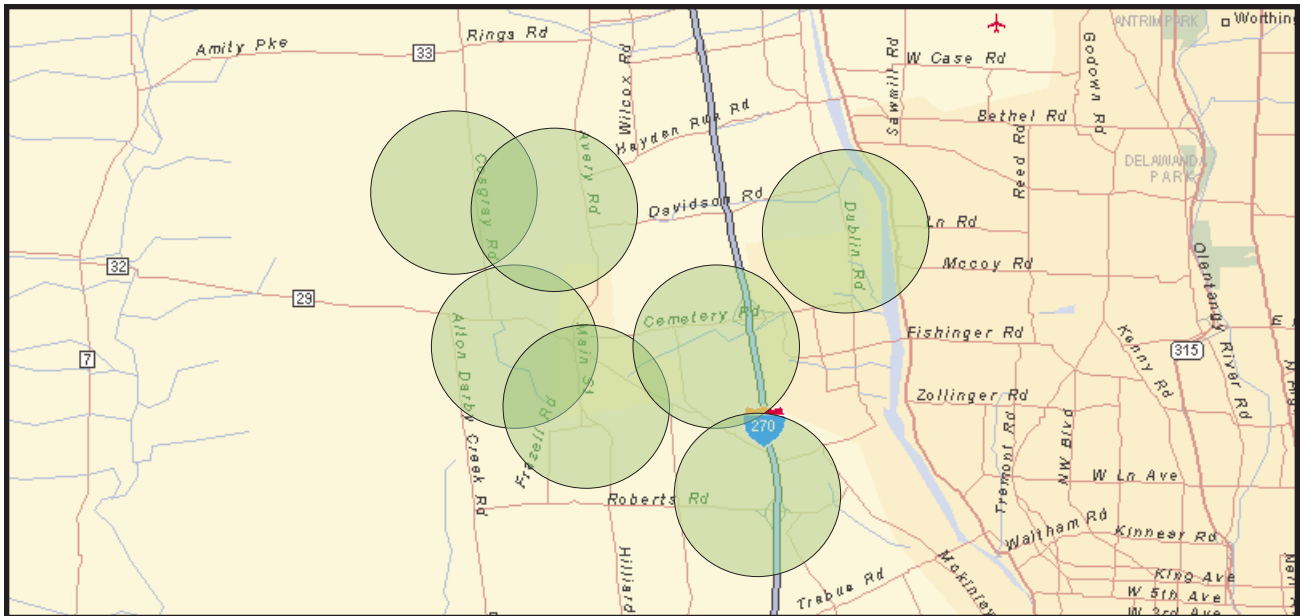


Figure 1. A typical suburban siren network. Each system has just under a one-mile radius at 70 db. These 7 installations alone represent a capital investment of nearly \$100,000. Franklin County, OH has approximately 130 sirens representing an investment of \$1.8 million!

Each siren installation includes items such as a pole, mounting brackets, rotation mechanism, security box, battery and/or solar power supplies, AC power connection, AC/DC power converters, remote control devices, antenna, amplifiers, speaker drivers and speaker horns. The cost of multiple installations of these components is eliminated when a single high-powered installation yields a greater coverage area. Table A below gives an example of the how a single high-powered sound system with a 3 mile radius compares to 9 sirens each with a 1 mile radius.

Table A. - Sample Comparison of Equipment Requirements and Costs To Achieve 27 Square Miles Coverage - Power Sonix Speech Projection vs. Existing Sirens

	1 Power Sonix System	9 Existing Sirens
Area Covered	Approx. 27 Sq. Mi.	Approx. 27 Sq. Mi.
Radius Of Sound Projection	Approx. 3 Mi.	Approx. 1 Mi. ea.
Number of Installations	1	9
Number of Poles Needed	1	9
Rotation Mechanism	NOT NEEDED	9
Speaker/Driver Arrays	1	9
Security Cabinets	1	9
Remote Control Units	1	9
Antennae	1	9
Battery (DC) Power	1	9
AC Power Supply	1 (optional)	9
AC/DC Power Converter	1 (optional)	9
Solar Power	1 (optional)	9 (optional)
Estimated Taxpayer Investment	\$42,000	\$126,000
Estimated Annual Maintenance	\$0	\$9,000

Fiscally, this technology is a great relief for those counties or municipal entities considering implementing or upgrading a siren network. Budgetary constraints are cutting many programs. The Power Sonix system will enable them to implement advanced technology to cover more area with better sound capabilities for much less money per square mile. These savings will free up dollars for other key Homeland Defense initiatives.

As shown in Table A previously, a siren network with limited range has many parts that must be present at each installation. Annual maintenance costs are directly affected by the sheer volume of installations that must be tested and maintained. The savings in annual maintenance costs could range from \$20,000 to \$100,000 for a county depending upon the size of their network and whether the maintenance is done with internal staff and equipment or outsourced to a service provider.

For counties with an investment in an existing siren network, the maintenance savings combined with the dramatically lower capital investment for additional systems as their communities grow, is compelling enough to fund the replacement of the older sirens immediately. The greater range and better voice intelligibility for less investment and upkeep gives emergency management executives great fiscal leverage to install these systems sooner rather than later when adding on to their existing networks. Eventually, the public will demand the replacement of the older technology because they will insist on getting a clearly understandable warning or message. Power Sonix is simply making it prudent to do so today.

The potential users of an intelligible public address system include:

<u>Federal</u>	<u>State</u>	<u>Local</u>
Dept. of Homeland Security	National Guard	Police
FEMA	Highway Patrol	Fire/Rescue
DOD	Governor	County Sheriff
National Weather Service	State EM	County EM
Dept of Interior/Parks Service		Amber Alert

For multiple agencies at each level to access the Public Address system, a detailed protocol would have to be established to ensure that system security and public safety priorities are maintained. The process for achieving these protocols and procedures should be spearheaded by the federal government. The Department of Homeland Security could achieve this in coordination with the state and local authorities who are usually the first to respond to emergency situations. In this way, all authorized agencies could have immediate access to the system in times of emergencies. Anything less risks the lives of our citizens.

In light of the threats we face as a nation, a New Public Address Infrastructure utilizing the technology of Power Sonix will provide a communications safety net over America. We seek your support in making this a reality for the safety and welfare of all Americans.

Please send and coments or inquiries to:

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