Sound Deterrence and Harassment

BASH Tools and Techniques Series

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Department of Defense
Partners in Flight

Our Mission

Providing expertise on the management and conservation of birds and their habitats to sustain and enhance the military mission

Sound Deterrence

Birds generally have a hearing range similar to humans, therefore, using sound is an effective tool to deter and disperse birds and wildlife from the airfield environment to protect flight safety and the mission. The use of sound deterrence techniques should be implemented only when complying with all required federal and state regulations. Many types of acoustical or sound devices are available to an installation's Bird/Animal Aircraft Strike Hazard (BASH) Program for mitigating hazardous species on an airfield.

Tools and Techniques

Proper uses of sound and acoustic tools are key for deterrence and dispersal success. No single BASH tool or technique alone can cure an installation's BASH issues, but each of these tools or techniques should be used as part of an Integrated Wildlife Damage Management strategy designed to minimize hazards identified in the airfield-specific Wildlife Hazard Assessment. Many technologies are available and should be vetted through research, the BASH community, the installation BASH Working Group, and BASH Program Guidance before acquisition to avoid poor use of mission funds.

Pyrotechnics

Pyrotechnics (pyros) can be an effective tool for bird dispersal. Many forms of pyros are available including what are commonly referred to as bangers, screamers, whistlers, and shell crackers. All of these items require training, protective gear, equipment to launch, and proper storage. Bangers generally have a straight flight path, ranging from 50 to 125 feet, and produce a loud bang (~120dB) at the end of their flight. Screamers and whistlers have an erratic flight path, a range of 250 to 300 feet, and produce a screeching noise (~130 dB) through the entire length of the flight.

Shell cracker usage for bird dispersal. Photo credit: Matt Klope.

Shell crackers are similar to bangers but have a range of 200 feet. Range extenders and CAPA rounds (~150 dB) can be used to increase the range of fire from 750 to 1,000 feet. All of these devices can be used to disperse perched, loafing, or flying birds, but like most BASH tools, habituation and loss of effectiveness can occur if pyros are used repetitively without other tools being mixed in. When using pyros on an airfield, dispersal activities should be coordinated with Air Traffic Control to avoid any unintended mission issues from dispersal into aircraft movement. Care should be taken during dry periods to avoid starting fires. All services should strictly adhere to their policies and guidelines for use of pyros.

Sound Cannons

Sound cannons are a common tool at airfields worldwide. Cannons operate using propane gas to produce a loud cannon-like bang (100 to 130 dB). Sound cannons can be placed in a problem location and moved as needed

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or set up as part of a multiple cannons systematic pattern on an airfield. They can be operated manually, remotely, or on a timer. Birds can easily become habituated to cannons through improper usages, such as leaving in one location and operating in a predictable and patterned schedule. To avoid this result, cannons should be used in combination with other BASH tools, used randomly, and/or only when birds are present and therefore, moved often. Proper protective gear is required if fired from and/or near personnel.

Remote operated propane sound cannon. Photo credit: Paul Block.

Biomimicry Sound

Biomimicry sound is the broadcast of alarm or distress calls recordings of a bird species. These calls are used naturally by birds to warn others of predators or as an alert when an individual is injured or imperiled. Each species has its specific vocalization that it recognizes and reacts to, though, in some situations, species may react to another species' calls if they are generally found in similar habitats or mixed flocks. These biomimicry sound systems are designed to use the bird's survival instinct to avoid predation or other peril causing the target bird or flock of birds to disperse. Many of these systems are available for use in an airfield environment. Since these systems are designed to use instinctive predation vulnerability, choosing the correct target, such as flocking species, is critical to success. Like many of the weaknesses of other devices, these systems are prone to habituation, so only using to target certain problematic species and avoiding repetitive patterned use is also important for success.

Other

Many other types of sound devices can be used to augment your BASH toolbox, such as vehicle horns, clapping, shouting, megaphones, sirens, cracking bullwhips, air horns, and others. Each of these tools can be deployed quickly and safely to react to a situation that requires quick dispersal, or in a sensitive location in which other sound deterrence tools are prohibited.

New Technologies

Many new technologies show promise as effective tools for dispersing and deterring birds from an airfield environment. Generally, unproven technologies should not be used, but for a promising new technology, a field demo or scientific trial may be appropriate. Results (positive and negative) from demos and trials should be shared with the BASH community. Many may require additional regulatory approval for use in an airfield environment. Below are a few emerging sound technologies that still require additional assessment.

Directional Sound Emitters

Directional sound emitters produce an extremely loud beam of sound that can be pointed at a distant bird or wildlife target to scare or annoy into dispersing. Sound beams decrease sound exposure in all areas except where it is pointed, due to limited sound leakage outside of the beam. These can be handheld or mounted. Proper protective gear is required during use.

Sound Projectiles

Sound projectiles are large systems that are incorporated into or pulled behind a vehicle that produce sound projectiles (e.g., a projected air vortex) that can be shot at a distant bird, wildlife, or location target to scare and disperse. These systems may be useful in situations with large congregations of birds, such as agricultural fields, landfills, roosts, and soaring raptors.

Audible Isolation

Audible isolation is a system that produces a sound "bubble" using a matrix of directional sound devices set to cover an area that is an attractant to birds. This "bubble" is a constant background noise that may affect birds by one or two processes. The first may be as simple as dispersal caused by annoyance. The second process of dispersal is the constant sound that disrupts intra-species communication and audibly isolates individual birds from their flock. This audible isolation may cause agitation and distress that produces dispersal. The sounds can be customized to species to find the most effective sound. Possible applications include ponds, abandoned buildings, and hangars.