Law Enforcement Solutions

一、Background of demand

In law enforcement scenarios such as mass incidents, illegal gatherings, and terrorist attacks, law enforcement agencies face a dual challenge of "non lethal control requirements and complex conflict environments". They need to conduct targeted deterrence against leading troublemakers and breakthrough points to avoid indiscriminate deterrence of unrelated personnel by conventional means, while also meeting the needs of balancing sound and light interference and physical protection in close range confrontations. At the same time, they also need to quickly establish warning lines with mobile equipment to achieve large-scale area control. The

directional sound wave technology, with its characteristics of "non lethal, precision, and multi device collaboration", suppresses conflicts through directional sound pressure and sound light coordination, and forms a "warning disposal control" loop in conjunction with monitoring systems and command centers. It effectively solves the problems of delayed information transmission and limited deterrence range in traditional law enforcement methods under noisy environments and building obstructions, and has become the core solution for balancing safety and efficiency in modern law enforcement scenarios, meeting the precise control needs of special police in dealing with complex situations such as high-risk searches, hostage negotiations, and illegal protest dispersal.

二、Core equipment

1. Portable directional sound wave device

The equipment adopts advanced directional sound wave emission technology, which can accurately focus sound pressure with an acoustic beam angle of ± 15 °, forming a controllable "acoustic barrier". This directional sound wave coverage avoids energy loss caused by sound wave diffusion, and can concentrate high-intensity sound pressure on the target area,

accurately targeting law enforcement targets and avoiding interference with unrelated personnel in the surrounding area.

The device can emit various sounds that alert or obey the target group. On the one hand, through a high-definition voice broadcasting system, law enforcement officers can use handheld microphones to transmit instructions in real time. The sound is optimized in the 250Hz-7000Hz frequency band, ensuring voice clarity even in noisy environments, allowing instructions to be quickly conveyed to target groups 1000 meters away, such as clearly informing evacuation requirements in crowd control scenarios. On the other hand, the device can emit deterrent sound waves of specific frequencies, such as simulated alarm sounds or high-frequency warning sounds, which trigger the human body's instinctive alert response and form psychological deterrence without causing harm, prompting the target group to quickly move away from the sound source area. In the process of law enforcement, the device can build a sound warning line

within a range of hundreds of meters, and use directional sound pressure to make illegal intruders or unauthorized gatherings actively evacuate, creating a safe and controllable disposal space for law enforcement actions, effectively improving law enforcement efficiency and on-site order maintenance capabilities.

The device has the characteristics of mobility and rapid deployment, which can be operated by a single person or installed on the vehicle through accessories. It is lightweight, with RP10D weighing only 4.8kg, making it convenient for law enforcement personnel to carry and able to flexibly respond to the needs of different law enforcement scenarios. At the same time, the device supports multiple power supply methods, which can be powered by its own battery or the vehicle's DC power supply, ensuring rapid deployment and deployment in various environments, and providing timely acoustic support for law enforcement actions.

2. Strong sound shield

The equipment adopts advanced directional sound wave emission technology, which can emit strong sound forward at a beam angle of 30 °, forming a controllable "acoustic barrier"

in front of law enforcement personnel. This directional sound wave coverage avoids the ineffective diffusion of sound wave energy and can 145dB@1m The peak sound pressure is accurately projected onto the target area, effectively deterring violators within a range of 20 meters, while minimizing interference with unrelated groups in the surrounding area.

The device can emit various sounds that alert or obey the target group. On the one hand, through a high-definition voice broadcasting system, law enforcement officers can transmit warning instructions in real time. After optimizing the frequency band of sound waves, even in noisy environments, it can ensure that people 500 meters away can receive information clearly. For example, in group protest scenes, it can clearly

inform gatherings of evacuation routes and legal consequences. On the other hand, the device can emit deterrent sound waves of specific frequencies, such as high-frequency warning sounds or pulse like noise, which can trigger the human body's instinctive stress response, causing auditory discomfort within a range of 20 meters, creating psychological pressure without causing physical harm, and prompting the target group to actively retreat. When facing a crowd of rioters, multiple acoustic shields can work together through the synchronized array function of sound waves to construct a continuous sound wall warning line on site. This not only provides physical protection for law enforcement personnel, but also can use directional sound pressure to make radical elements give up confrontational behavior, achieving "non-contact" on-site control and effectively balancing law enforcement efficiency and humanistic care.

3. Vehicle mounted directional sound wave equipment

The equipment is centered around mobility and precise acoustic deterrence, and through deep adaptation with law enforcement patrol vehicles, it achieves flexible and efficient on-site control functions.

This device can flexibly adjust the direction and intensity of sound wave emission according to the law enforcement route and the gathering situation of the target group, achieving directional projection of strong sound during movement. When illegal gatherings or riots are detected, patrol vehicles can quickly arrive at the scene. Operators can control the equipment to move to the appropriate angle according to the location and movement of the crowd, accurately project high-intensity sound pressure to the target area, and form an effective deterrent within 500 meters, quickly disperse the gathered crowd, and improve the flexibility and timeliness of on-site disposal.

The equipment is mounted on law enforcement vehicles and powered by a 24V on-board DC power supply to ensure long-term

stable operation during patrol missions. Its main structure includes a high-precision directional sound wave transmitter and a rotatable acoustic module, with beam angles controlled within ± 15 ° range, which can quickly adjust the sound wave coverage range according to actual needs. When faced with violent resistance or illegal crossing of boundaries, the device can emit high-frequency warning sounds or pulse like noise, triggering the body's instinctive stress response and prompting the target group to quickly evacuate; In addition, the device supports intelligent adjustment of sound wave frequency and intensity according to law enforcement scenarios, achieving efficient control while minimizing unnecessary interference to the surrounding environment, balancing law enforcement effectiveness and humanistic care.

三、 Implementation of the plan

1. Point planning

◆ Portable directional sound wave device

At personnel flow hubs such as square entrances, commercial street intersections, and subway station passages, patrol officers deploy handheld devices at the forefront of a 500 meter warning circle, using a ± 15 ° beam angle to emit directional warning sounds and form a forward sound wave warning line. The device's 250-7000Hz frequency band optimization ensures clear voice within 300 meters in noisy environments, and can broadcast real-time commands such as "no gathering" to intervene in small-scale gathering behavior in advance.

◆ Sound and light shield

The assault team (5-8 people per group) is equipped with a strong sound shield as standard. For close range scenarios such as hallway intrusion and door and window demolition (within a range of 10-20 meters), directional strong sound and light modules with a 30 ° beam angle are used to form a "sound pressure+visual" dual suppression in a narrow space. The shield is lightweight and suitable for fast movement of individual soldiers. It can be used in conjunction with tactical flashlights and demolition tools to achieve multi scene law enforcement.

◆ Vehicle mounted directional sound wave equipment

The riot control convoy is divided into grids according to urban functional areas (with a radius of 1.5 kilometers per grid), and each vehicle is equipped with a vehicle mounted directional sound device to ensure that it arrives at the scene of the incident within 3 minutes after receiving an alarm. It is powered by a 24V vehicle mounted DC power supply to ensure that the equipment runs stably for a long time during patrol tasks, achieving continuous mobile control. Its main structure includes a high-precision directional sound wave transmitter and a rotatable acoustic module, with beam angles controlled

within ± 15° range, which can quickly adjust the sound wave coverage range according to actual needs.

2. Partition control mechanism

◆ Core disposal area (0-200 meters)

Using an array of sound and light shields (spaced 5-10 meters apart) as a linear barrier, combined with portable directional sound wave equipment to implement close range sound pressure suppression, the sound wave frequency is automatically matched to the 250-7000Hz human voice optimization frequency band to ensure clear command broadcasting. Synchronize the use of thermal imaging cameras and sound pickup devices within the area, transmit real-time target dynamics to the command center, and support dynamic adjustment of shield formations.

◆ Peripheral warning zone (200-1000 meters)

Relying on the high ground directional sound wave equipment and vehicle mounted directional sound wave equipment to form a circular blockade. The fixed point equipment emits warning sounds (85dB coverage of 950-1700 meters), and the vehicle mounted equipment patrols along a grid route to quickly detect and track moving targets, locking the sound pressure beam to

the center of the crowd and blocking the reinforcement path of peripheral personnel with strong light.

3. Scenario based application mode

◆ Daily law enforcement

Partition broadcasting of public security notices, promotion of laws and regulations, and support for wireless microphone on-site shouting;

◆ Emergency response

One click start of "sound and light combination mode": remote warning of vehicle mounted equipment+directional sound wave suppression of core targets+sound and light shield group breakthrough, forming a three-layer disposal system of "far medium near".

四、Advantages of the plan

Non lethal deterrence: The sound wave intensity is controlled within a safe threshold to avoid fatal injuries and comply with law enforcement regulations;

Efficient collaborative response: Multiple devices are interconnected through IP protocol to achieve second level

instruction transmission, which is four times more efficient than traditional methods;

Adaptation to complex environment: weatherproof and mechanical noise resistant design (IP56 protection level), stable operation in rainstorm, factory and other scenarios;

Cost intensification: A system covers functions such as shouting, dispersal, and protection, reducing duplicate equipment procurement and lowering operation and maintenance costs by 30%.