CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Memorandum

TO: HONORABLE MAYOR AND CITY COUNCIL

FROM: Anthony Mata

SUBJECT: **ACOUSTIC HAILING DEVICES**

DATE: August 30, 2022

Approved

Date: 09/30/22

INFORMATION

BACKGROUND

On June 21, 2022, the Police Department presented the Military Equipment Use Policy and Inventory to the Mayor and City Council.[1] The Military Use Policy was accepted with staff direction to "follow-up with Council on specific limitations regarding the use of the Long-Range Acoustic Device (LRAD) via an informational memorandum." The Police Department developed an addition to the Duty Manual entitled *Acoustic Hailing Devices*. A copy of the memorandum establishing this Duty Manual section is included as Attachment A.

ANALYSIS

An acoustic hailing device (AHD) is a high-power loudspeaker whose primary purpose is to project sound over long distances, through ambient noise, or through barriers. The most common use of an AHD is to provide intelligible notifications, instructions, or information. Some AHDs have the capability of being used as a sonic weapon, producing a non-lethal, non-kinetic tone or sound designed to irritate or incapacitate subjects. In all cases, AHD sound levels are scalable and controllable.

An AHD is similar to a loudspeaker in that it projects sound. However, an analogy would be that of a lightbulb and a flashlight. A loudspeaker is like a lightbulb, projecting sound in all directions in front of the speaker. An AHD is like a flashlight, projecting sound in a directed cone. This makes the sound clearer and able to be projected over greater distances.

Inventory

The Genasys LRAD[2] is one brand of AHD. The City currently has three types of AHDs from Genasys in its inventory.

[1] Details from this meeting may be found here: https://sanjose.legistar.com/MeetingDetail.aspx?ID=980797&GUID=15E52BAD-B60D-4CDC-8522-CF23FA24E5FC

[2] https://genasys.com/lrad-products/

Figure 1: LRAD 100X

The description of the 100X from the Genasys product guide[3] reads: "*The LRAD 100X is 20 - 30 decibels louder than bullhorns and vehicle P.A. systems and up to 6X louder than systems of comparable size and weight. Live or recorded audible voice broadcasts are clearly heard and understood over background noise, and inside vehicles and buildings*." The 100X has a range of 600 meters in a cone as small as 30° and has a maximum volume limit of 140 decibels (dB). The 100X datasheet is included as Attachment B.

The Police Department has one (1) Genasys LRAD 100X and the Office of Emergency Management has three (3) LRAD 100Xs, purchased with general funds. The deterrent tone is only available on the Police Department's 100X. The Office of Emergency Management has this tone disabled.

Figure 2: LRAD 500X

The description of the 500X from the Genasys website[4] reads: "*Compact, lightweight and designed for applications ranging from fixed security installations to mid-sized vehicles and vessels, the LRAD 500X-RE easily mounts and transports to provide law enforcement, homeland security, and defense personnel unparalleled long-range communication and safe, scalable non-kinetic escalation of force*." The 500X has a range of 2,000 meters in a cone as small as 30° and has a maximum volume limit of 154 decibels. The 500X datasheet is included as Attachment C.

The Police Department has one (1) Genasys LRAD 500X. The deterrent tone is available on the 500X.

Figure 3: LRAD 360XT

The description of the 360XT from the Federal Resources website[5] reads: "*The Genasys LRAD 360XT Mobile Mass Notification System (MNS) delivers LRAD's renowned, highly intelligible voice and alert tone broadcasts with uniform 360° coverage. The LRAD Mobile MNS is an integrated, fully self-contained, ruggedized trailer featuring securely mounted, lockable electronics and equipment enclosures, amplifier modules, battery pneumatic system, and a rapidly deployable, telescoping 30 ft. mast. The Mobile MNS comes standard with a LRAD 360X dual emitter configuration that provides up to an 850-meter radius of communication coverage*." The 360XT has a range of 850 meters in 360° and has a maximum volume limit of 137 decibels. The 360XT datasheet is included as Attachment D.

[3] https://genasys.com/wp-content/uploads/LRAD-Product-Guide-Final-PRINT.pdf
[4] https://genasys.com/lrad-products/
[5] https://www.federalresources.com/product/360xt-trailer/

The Office of Emergency Management has two (2) Genasys LRAD 360XTs, purchased with Urban Area Security Initiative (UASI) Grant funds. The deterrent tone is not available on the 360XTs.

Uses

During the floods in 2017, the Office of Emergency Management did not have a mobile mass notification system for notifying the public of evacuations. Immediately following the floods, the Office of Emergency Management obtained one 360XT LRAD and three 100X LRADs. Later in 2017, via a mutual aid request, the City brought the 360XT LRAD trailer to Santa Rosa to assist with returning evacuees to their homes following the Tubbs fire, by providing translated messages to the public on how to enter safely and where to get resources. [6]

The LRAD was included in the City's Emergency Operations Plan in 2018[7] and was reported to the Public Safety, Finance, and Strategic Support Committee on August 16, 2018[8]. The second 360XT LRAD trailer was purchased in 2020, using UASI grant funds.

The Police Department has two LRADs, one 500X in MERGE that was acquired in 2007 and one 100X in Metro that was acquired in 2019. The LRADs are used on barricaded subjects in homes and during the service of search warrants as a public address system because of the system's ability to provide long range communication. They have been deployed at First Amendment activities and civil disturbances as a public address system. The systems' tone capabilities were not used until the first night of the protests in 2020 following the death of George Floyd. On that night, the tone was used intermittently to disperse the crowd. It has not been used in this manner since then.

The tone may be used on barricaded subjects and during the service of search warrants, particularly when the subject is uncooperative and does not immediately surrender to the officers outside. There is no record of the tone utilized in this manner, however, the attached policy will ensure any use of the AHD as a sonic weapon will be considered a use of force. As such, it will be documented and investigated in accordance with existing Department policy.

A review of IA Pro[9] discovered there have been no complaints or allegations associated to the Department's use of AHDs.

Case Law[10]

In 2014, the New York Police Department used an LRAD to disperse crowds during protests in Manhattan. Specifically, the LRAD was used on six individuals who were non-violently gathered at the protest. The six individual plaintiffs alleged that Lieutenant John Maguire and Officer Mike Poletto ("defendants") violated their Fourteenth Amendment rights by using an LRAD to compel them to exit the street. The District Court held that the plaintiffs adequately alleged an excessive force violation and, accepting the allegations as true, that the defendants were not entitled to qualified

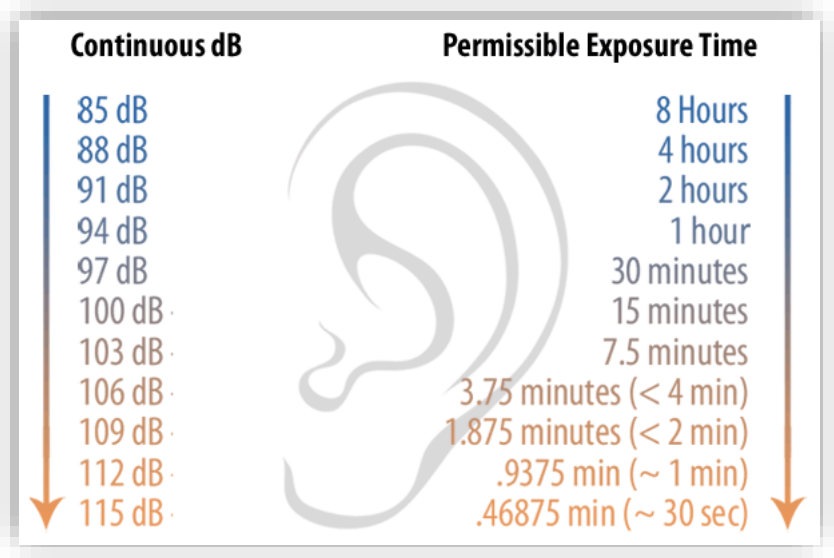
[6] https://www.ktvu.com/news/new-lrad-emergency-alert-system-tested-in-san-jose-8-months-after-coyote-creek-floods
[7] https://www.sanjoseca.gov/home/showpublisheddocument/42015/637078733008730000
[8] https://www.sanjoseca.gov/Home/ShowDocument?id=43941
[9] IA Pro is a software solution used by Internal Affairs to track complaints and allegations, their status, disposition, and documentation.
[10] Edrei v. Bratton, 892 F.3d 525 (2d Cir. 2018); cert. denied, Maguire v. Edrei, 139 S.Ct. 2614 (May 20, 2019)

immunity. This case went to the U.S. Court of Appeals for the Second Circuit. The Second Circuit upheld the District Court's decision holding that purposefully using a LRAD in a manner capable of causing serious injury to move nonviolent protesters to the sidewalks violates the Fourteenth Amendment under clearly established law. As a result of this decision, the use of an AHD as a sonic weapon is considered a use of force.

Physical Effects

There are three key features used to measure sound that may affect hearing: volume level, exposure time, and proximity to the source. Using sirens as an example, if a subject is standing beside or near a siren (proximity), at 120 dB (volume), pain and ear injury may occur.[11] According to the American Speech-Language-Hearing Association, sound starts to be painful if heard steadily (time) at 120 dB.[12] Sounds above 140 dB are painful if heard intermittently.

The following graphics illustrate exposure times and sounds associated with decibel levels.[13]



[11] https://www.cdc.gov/nceh/hearing_loss/what_noises_cause_hearing_loss.html
[12] https://www.asha.org/public/hearing/Loud-Noise-Dangers/
[13] http://dangerousdecibels.org/education/information-center/decibel-exposure-time-guidelines/

Knowing volume level, exposure time, and proximity to the source to be the key factors in hearing damage, AHD operators are trained to balance each of them in real time. The closer subjects are to the AHD, the lower the volume level is set. Volume levels are raised and lowered according to the intended purpose with thoughtful consideration for potential hearing damage. The volume control knob on an AHD is labeled with color-coded intensity indicators .

Figure 4: LRAD 500X Control Panel

Each AHD has its own set of manufacturer's specifications for recommended usage. For example, the LRAD 100X recommends not using the device at maximum volume when someone is within 10 meters. The LRAD 500X increases that distance to 75 meters. For that reason, the policy was produced with the requirement that the devices always be positioned at a safe distance, used at a safe volume level, and used for a safe duration, per the manufacturer's specifications. This requires the trained operator to ensure the safety of the public for each use of the AHD.

CONCLUSION

The Police Department Administration will monitor the use of AHDs to ensure they are being used properly and in the best interest of the public. The Department will report back to City Council on the use of AHDs at the Public Safety, Finance, and Strategic Support Committee meeting on April 20, 2023, during the Military Equipment Annual Report.

/s/
Anthony Mata
Chief of Police

AM:SD:SL

Attachments:

A: Memorandum #2022-043 Duty Manual Addition: L 2703 Acoustic Hailing Devices
B: Genasys LRAD 100X Datasheet
C: Genasys LRAD 500X-RE Datasheet
D: Genasys LRAD 360XT Datasheet

For questions regarding Police Department AHDs, please contact Captain Stephen Lagorio, Special Operations Division, San José Police Department, at stephen.lagorio@sanjoseca.gov.

For questions regarding Office of Emergency Management AHDs, please contact Raymond Riordan, Director, San José Office of Emergency Management, at ray.riordan@sanjoseca.gov.

Attachment A:
Memorandum #2022-043 Duty Manual Addition: L 2703 Acoustic Hailing Devices

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Memorandum

TO: **ALL DEPARTMENT PERSONNEL** **FROM:** Anthony Mata
Chief of Police

SUBJECT: **DUTY MANUAL ADDITION: L 2703 ACOUSTIC HAILING DEVICES** **DATE:** August 29, 2022

APPROVED Memo #2022-043

BACKGROUND

An acoustic hailing device (AHD) is a high-power loudspeaker whose primary purpose is to project sound over long distances, through ambient noise, or through barriers. The most common use of an AHD is to provide intelligible notifications, instructions, or information. Some AHDs have the capability of being used as a sonic weapon, producing a non-lethal, non-kinetic tone or sound designed to irritate or incapacitate subjects. In all cases, AHD sound levels are scalable and controllable.

There are several types of AHDs on the market. The Genasys Long Range Acoustic Devices (LRADs) owned by the Police Department and the Office of Emergency Management are one type of AHD. Each AHD has its own set of manufacturer's specifications for recommended usage. For example, the LRAD 100X recommends not using the device at maximum volume when someone is within 10 meters. The LRAD 500X increases that distance to 75 meters. For that reason, the policy is being produced with the requirement that the devices always be positioned at a safe distance, used at a safe volume level, and used for a safe duration, per the manufacturer's specifications.

ANALYSIS

The Duty Manual has been revised to reflect changes described below. Additions are shown in *italics and underlined*.

L 2703 ***ACOUSTIC HAILING DEVICES:***
Added 08-29-22

An acoustic hailing device (AHD) is a high-power loudspeaker designed to project sound over long distances, through ambient noise, or through barriers. Events where an AHD may be used include, but are not limited to, First Amendment activities, civil disturbances, active shooter events, tactical events, evacuations, and natural disasters. Department members may use AHDs in the following applications:

- *When necessary to provide notifications, instructions, or information.*

- *When necessary to remove individuals from an area.*

- *When necessary to deny access to an area that is currently unoccupied.*

AHDs may only be used under the following circumstances:

- *When the device is used to provide notifications, instructions, or information, the use is authorized by an on-duty lieutenant or higher.*

- *When a tone or sound is used to remove individuals from an area or deny access to an unoccupied area, the use is authorized by a Deputy Chief or higher.*

- *The operator has completed an approved training course taught by a qualified Department member or representative of the manufacturer of the AHD.*

- *The device is positioned at a safe distance from the intended recipients, per manufacturer's specifications.*

- *The device's volume is set at a safe level for the intended recipients, per the manufacturer's specifications.*

- *The device is used for a safe duration for the intended recipients, per the manufacturer's specifications.*

- *When a tone or sound (not speech) is used to move individuals from an area or used to deny access to an area, identification and verbal warning shall be given pursuant to Duty Manual section L 2601.1 IDENTIFICATION AND VERBAL WARNING or L 2312 DISPERSAL ORDER, as applicable.*

- *When a tone or sound (not speech) is used to move individuals from an area or used to deny access to an area, the use shall be documented on a General Offense report as a use of force pursuant to Duty Manual chapter L 2600 USE OF FORCE. The report shall include a description of the tone or sound, the volume setting, the approximate distance to the intended recipients, and the duration of use.*

- *When a tone or sound (not speech) is used to move individuals from an area or used to deny access to an area, consideration should be given for the environment and/or individuals behind the intended recipients (i.e., the background). The necessity or benefits of using the device should be weighed against the potential effect it may have on uninvolved individuals.*

- *When used to move individuals from an area, AHDs will be used intermittently to allow the individuals an opportunity to vacate the area, absent any incapacitating effects of the AHD.*

AHDs may not be used under the following conditions:

- *When used to move individuals from an area, AHDs may not intentionally be used against children, the elderly, or pregnant individuals.*

- *When used to move individuals from an area, AHDs may not be used at a distance, sound level, or for a duration likely to cause injury, per the manufacturer's specifications.*

ORDER

Effective immediately, all Department personnel shall adhere to the above Duty Manual section.

Anthony Mata
Chief of Police

AM:SD:MZ

Attachment B:
Genasys LRAD 100X Datasheet

Genasys

LRAD® 100X

Lightweight, Portable, Long Range Communication

LRAD

ORDERING INFORMATION

LRAD-100X-BLK® BASE SYSTEM	LRAD 100X battery powered portable long range communication system
LRAD-100X-BLK-MAG	LRAD 100X system includes magnetic base and accompanying mounting yoke to secure the LRAD to metallic surfaces including vehicle roofs
LRAD-100X-BLK-STUD	LRAD 100X system includes yoke for mounting on tripod (purchased separately)

INCLUDED ACCESSORIES

MP3 Player	MP3 player records/plays up to 2GB of messages and tones
Record on the Fly Mic	Microphone with record and playback feature for immediate playback
MP3 Auxiliary Cable	Allows connection to any audio device with a headphone jack
USB Cable	USB cable for downloading files to the MP3 player
Li-Fe-PO4 Battery	8-Hour Lithium Iron Phosphate rechargeable battery
Battery Charger	AC powered battery charger with LED battery charge status display
Hard Case	Watertight, dust proof, rugged enclosure for storage and transport

OPTIONAL ACCESSORIES

Wireless Kit	Wireless operation of LRAD systems over ranges up to 300 meters, 35mm phone jack connects to a standard MP3 audio device (UHF, US only). Lightweight hypercardioid headset microphone is included
HD Action Camera	During LRAD operation, record High Definition, date/time stamped video and audio with this compact, rugged digital camera
AC Power Supply	Can be powered by a standard AC source in place of the battery
Cigarette lighter/plug cable	Cigarette lighter/plug cable powers LRAD through 12 VDC cigarette lighter
Stud Mount	Mounting yoke kit for LRAD-100X, compatible for LRAD tripods (tripod not included)
Stud Kit	Weldment Stud Kit
Medium-Duty Tripod Kit	Includes reusable hard case
Table Mount Kit	Fixed mount for flat surfaces
Tactical Pack	Rugged backpack for operation of the LRAD 100X within the pack or on the move
Front Carry Pack	For mobile or stationary operation of the LRAD 100X

DIRECTIONALITY, POWER & RANGE

- Powerful, intelligible voice communications up to 600 meters
- Focused, directional broadcasts for targeted communication
- Safely communicate beyond standoff distances
- Create instant acoustic standoff perimeter
- Deliver clearly heard and understood communications into buildings & vehicles

FEATURES

- 8-hour rechargeable battery
- Operate easily with gloves or MOPP gear
- Optional power sources
- Simple operator interface
- Water-resistant
- HD Camera (optional) - Quick connect/disconnect camera and mount for recording video and audio during LRAD operation. Includes 4GB micro SDHC for up to 210 minutes of date and time stamped recordings

MARKETS SERVED

- Law Enforcement
- Defense
- Commercial Security
- Critical Infrastructure Security
- Maritime
- Homeland Security
- Fire Rescue & Incident Management
- Port & Border Security
- Emergency Warning
- Mass Communication
- Wildlife Preservation & Control

Genasys

LRAD® 100X

Lightweight, Portable, Long Range Communication

SELF-CONTAINED, PORTABLE COMMUNICATION SYSTEM

The LRAD 100X is a self-contained, portable communication system for on-scene and tactical communication.

With unparalleled vocal clarity and up to 30db louder than bullhorns, megaphones, and vehicle P.A. systems, the LRAD 100X is also four to six times louder than other acoustic hailers of comparable size and weight. LRAD's optimized driver and waveguide technology ensures every message is clearly broadcast, heard and understood, even above engine, crowd, siren, and background noise.

The LRAD warning tone commands attention to the voice messages that follow and provides a safer alternative to non-lethal and kinetic measures for changing behavior.

ACOUSTIC PERFORMANCE

Maximum Peak Output	140dB SPL @ 1 meter, C-weighted
Maximum Continuous Output	137db SPL @ 1 meter, A-weighted
Sound Projection	+/- 15° @ 1kHz/-3dB
Communication Ranges	Maximum range up to 600 meters in ideal conditions. Operational range up to 250 meters over 88dB of background noise. Ranges based on continuous output.

ENVIRONMENTAL PERFORMANCE[1]

NTS

Hot Operating Temperature	MIL-STD-810G, Method 501.5, Procedure II, Design type Hot, 60°C
Cold Operating Temperature	MIL-STD-810G, Method 502.5, Procedure II, Design type Basic Cold, -33°C
Hot Storage Temperature	MIL-STD-810G, Method 501.5, Procedure I, 70°C
Cold Storage Temperature	MIL-STD-810G, Method 502.5, Procedure I, -40°C
Operating Humidity	MIL-STD 810G, Method 507.5, Procedure II – Aggravated Cycle
Rain	MIL-STD-810G, Method 506.5, Procedure I, Blowing rain
Salt Fog	MIL-STD-810G, Method 509.5
Shipboard Vibration	MIL-STD-167-1A
Shipboard Shock	MIL-S-901D, Class I, Shock grade B
Random Vibration	MIL-STD-810G, Method 516.6, Procedure I, (Functional shock)

[1]TESTED BY NATIONAL TECHNICAL SYSTEMS (NTS) FOLLOWING MIL-STD-810G, MIL-STD-167-1A & MIL-S-901D.

MECHANICAL

Dimensions	14" W x 14" H x 6.5" D (35.6 x 35.6 x 16.5 cm)
Weight	15 lbs.(6.8 kg) with battery, accessories and cables
Construction	Injection molded, impact resistant polymer, 6061 Aluminum

ELECTRICAL REQUIREMENTS[2]

Power Consumption	Typical Power consumption 85 Watts (With tone) Normal power consumption 20 Watts (With voice content)
Power Input	10.8 to 16.8 VDC, Included rechargeable 13.2VDC Li-Fe-PO battery for up to 2 hours of continuous operation at maximum volume on a full charge.

[2]BATTERY LIFE UP TO 2 HOURS OF CONTINUOUS OPERATION AT MAXIMUM TONE ON A FULL CHARGE. ADAPTERS AVAILABLE FOR AUTO CIGARETTE LIGHTER AND FOR 2590 RECHARGEABLE MILITARY BATTERY.

SAFETY[3]

	MIL-STD-1474D

[3]MIL-STD-1474D STANDARD ESTABLISHES ACOUSTICAL NOISE LIMITS AND PRESCRIBES TESTING REQUIREMENTS AND MEASUREMENT TECHNIQUES FOR DETERMINING CONFORMANCE TO THE NOISE LIMITS SPECIFIED THEREIN.

ELECTROMAGNETIC COMPATIBILITY (EMC)[4]

CE

	FCC Part 15 class A radiated emissions, CE

[4]REQUIREMENTS FOR THE CONTROL OF ELECTROMAGNETIC INTERFERENCE CHARACTERISTICS OF SUBSYSTEMS AND EQUIPMENT.

Genasys - A Critical Communications Company

Genasys Inc. is the global leader in Long Range Voice Broadcast systems and advanced Public Safety Notification and Emergency Warning solutions. The Company's LRAD systems are in service in 72 countries and in more than 450 U.S. cities, counties, and states in diverse applications, including public safety mass notification, law enforcement defense, border and homeland security, critical infrastructure protection, fire rescue and emergency management, maritime and port security, and wildlife control and preservation.

For more information, please visit: **genasys.com**

SCAN FOR VIDEO

FEMA GSA Advantage! RKB US

LRAD products are available for purchase through multiple channels including: GSA Advantage, Federal and State grants, FEMA RKB Standardized Equipment List (SEL), and others. More information: sales@genasys.com

genasys.com

TEL: 858-676-1112 | +1 855 GENASYS | SALES@GENASYS.COM
16262 WEST BERNARDO DRIVE · SAN DIEGO, CA 92127 USA

Attachment C:
Genasys LRAD 500X-RE Datasheet

LRAD CORPORATION

LRAD® 500X-RE

Rugged, Long Range Communication

Dash Mount Control Module (MP3 Player)

ORDERING INFORMATION

LRAD-500X-RE	LRAD 500X-RE remote electronics long range communications system

INCLUDED ACCESSORIES

Control Module	Remote MP3 control module with 2GB onboard storage memory
Record on the Fly Mic	Microphone with record and playback feature for immediate playback
USB Cable	USB cable for downloading files to the MP3 player
Soft Cover	Protective soft cover
Tripod	Rugged aluminum tripod is easily transported and quickly sets up for rapid deployment, with carrying bag
MP3 Auxiliary Cable	Auxiliary audio cable for connecting to any audio device with a headphone jack
Normalizer Software	Audio Normalizer software for creating audio recordings on a PC

OPTIONAL ACCESSORIES

Wireless Kit	Wireless operation of LRAD systems at ranges up to 300 meters, 3.5 mm phone jack connects to a standard MP3 audio device (UHF, US only), lightweight hyper-cardioid headset microphone included
Maxabeam Kit	12 million candlepower in a lightweight, mounted searchlight, illuminates targets up to 3,500 meters away
Power Supply Module	External AC to DC power supply, 100-220VAC to 28VDC
Power Pack	Portable power pack with internal battery, charger, 24VDC, 21AH
GPK Mount	Mounts to Objective Gunner Protection Kit (OGPK) for vehicle mounted operations
Hitch Mount	Vehicle Mount attaches to standard 2" trailer hitch receiver
Ship Rail Mount	Stainless steel rail mount
Hard Case	Watertight and dust proof rugged enclosure for storage and transport

DIRECTIONALITY, POWER & RANGE

- Powerful, intelligible communication up to 2,000 meters
- Safely communicate beyond stand-off distances to determine intent
- Variable beam width for extended coverage
- Clear, long-range directional communication
- Creates instant acoustic standoff perimeter

FEATURES

- Rugged military tested construction
- Low power requirements
- All-weather use
- Scalable, lightweight & portable
- Simple to operate - Increased coverage with single operator
- Safe alternative to non-lethal deterrent options

MARKETS SERVED

- Law Enforcement
- Defense
- Commercial Security
- Critical Infrastructure Security
- Maritime
- Homeland Security
- CBRNE Incident Management
- Port & Border Security
- Emergency Warning
- Mass Communication
- Wildlife Preservation & Control

GSA Advantage! FEMA RKB US.

LRAD products are available for purchase through multiple channels including: GSA Advantage, Federal and State grants, FEMA RkB Standardized Equipment List (SEL), and others. More information: info@LRADx.com

Product Sheet: LRAD 500X-RE

COMPACT FOR FIXED INSTALLATIONS & SMALL / MEDIUM-SIZED VEHICLES & VESSELS

The LRAD 500X is compact, lightweight and designed for applications ranging from fixed security installations to small/medium-sized vehicles and vessels. It can be easily transported to provide security and defense personnel a highly effective communication, hailing and warning capability.

The LRAD 500X has been selected as the U.S. Navy and U.S. Army's AHD (acoustic hailing device) for small vessels and vehicles. LRAD 500X operators have the capability to issue clear, authoritative verbal commands, followed with powerful deterrent tones to modify behavior, enhance response capabilities and provide more time to scale the use of force if required. The extended frequency range of the LRAD 500X ensures voice commands will be clearly heard and understood.

ACOUSTIC PERFORMANCE

Maximum Continuous Output	149dB SPL @ 1 meter, A-weighted
Sound Projection	+/- 15° at 1 kHz/-3dB
Communications Range	Highly intelligible voice messages over distances up to 2,000 meters; max range of 650 meters over 88 dB of background noise. 6+ dB above background noise is based on field trials conducted by independent sources.

ENVIRONMENTAL PERFORMANCE[1]

Hot Operating Temperature	MIL-STD-810G, Method 501.5, Procedure II, Design type Hot, 60°C
Cold Operating Temperature	MIL-STD-810G, Method 502.5, Procedure II, Design type Basic Cold, -33°C
Hot Storage Temperature	MIL-STD-810G, Method 501.5, Procedure I, 70°C
Cold Storage Temperature	MIL-STD-810G, Method 502.5, Procedure I, -40°C
Operating Humidity	MIL-STD 810G, Method 507.5, Procedure II – Aggravated Cycle
Rain	MIL-STD-810G, Method 506.5, Procedure I, Blowing rain
Salt Fog	MIL-STD-810G, Method 509.5
Shipboard Vibration	MIL-STD-167-1A
Shipboard Shock	MIL-S-901D, Class I, Shock grade B
Random Vibration	MIL-STD-810G, Method 514.6, Wheeled vehicles
SRS Shock	MIL-STD-810G, Method 516.6, Procedure I, (Functional shock)

[1]Tested by National Technical Systems (NTS) following MIL-STD-810G, MIL-STD-167-1A & MIL-S-901D.

MECHANICAL

Dimensions	25" W x 25" H x 12" D (63.5cm x 63.5cm x 30.5cm)
Weight	44 lbs. without accessories (19.96kg)
Construction	Molded cross-linked polyethylene, 6061 Aluminum, Stainless Steel connectors available as an option.

ELECTRICAL REQUIREMENTS[2]

Power Consumption	Typical Power consumption 265 Watts (With tone) Normal power consumption 60 Watts (With voice content)
Power Input	12 - 28VDC

[2]Typical Power with warning tone. Normal power consumption with voice content, sound projection is wide and voice boost is off.

SAFETY[3]

MIL-STD-1474D

[3]MIL-STD-1474D standard establishes acoustical noise limits and prescribes testing requirements and measurement techniques for determining conformance to the noise limits specified therein.

ELECTROMAGNETIC COMPATIBILITY (EMC)[4]

FCC Part 15 class A radiated emissions, CE

[4]Requirements for the control of electromagnetic interference characteristics of subsystems and equipment.

Tel: 858.676.1112 | Fax: 858.676.1120
16990 Goldentop Road, STE A
San Diego, CA 92127 USA

www.LRADX.com
sales@LRADX.com

Attachment D:
Genasys LRAD 360XT Datasheet

LRAD® 360XT

Mobile Critical Mass Notification & Public Safety System

ORDERING INFORMATION

LRAD-360X Trailer	Dual axle trailer with telescoping/folding mast (30ft. / 9.4m maximum height) and rechargeable battery bank for 24 hours of continuous operation.

OPTIONAL ACCESSORIES

Conventional/Digital Radio
WiFi connection
Satellite receiver for wide range communication controls (separate subscription plan required)
Solar Panel
GSM/GPRS Cell phone activation

WIRELESS OPTIONS MAY NOT BE AVAILABLE IN ALL AREAS.

DIRECTIONALITY, POWER & RANGE

- Over 850 meter audio coverage radius
- 360° uniform sound coverage
- Powerful, highly intelligible voice communications
- Clearly communicate lifesaving information over large areas

FEATURES

- Ruggedized, space saving amplifier modules
- Standard recording microphone and MP3 player for local playback of live voice and pre-recorded messages and sounds
- Battery powered with low power consumption for extended operation
- Fully operational in extreme temperatures, driving rain, high winds, salt spray and solar radiation

MARKETS SERVED

- Emergency Warning & Mass Notification
- Large Indoor & Outdoor Events
- Campuses & Schools
- Healthcare Facilities
- Industrial Facilities
- Military Giant Voice
- Mobile & Permanent Tower Installations
- Municipality Emergency Warning
- Tsunami Early Warning
- Area Communication for Disaster Response & Humanitarian Assistance

LRAD® 360XT

Mobile Critical Mass Notification & Public Safety System

MASS NOTIFICATION AND PUBLIC SAFETY

The LRAD 360X Mobile Mass Notification System (MMNS) delivers LRAD's world renowned, highly intelligible voice and warning tone broadcasts with perfect 360° coverage on wheels.

The LRAD MMNS is integrated with a fully self-contained, ruggedized trailer and features lockable electronics and equipment enclosures containing the amplifier modules and battery pneumatic systems. The LRAD MMNS battery bank can be charged using the built-in AC powered battery charger or optional solar panel.

Standard configuration of a dual stack 360X emitter provides an 850 meter radius of clear communication coverage. Each system can be customized with different color schemes.

STANDARD FEATURES

2⅝in (5.87cm) ball hitch with surge brakes

Dual Torsion Axles	Extended temperature zero maintenance batteries
Spare Tire	Black powder-coated frame with white upper enclosures
Battery charger	Rated for permanent outdoor use and installation in all climactic conditions

ENVIRONMENTAL

Temperature	-40°C to +60°C

PHYSICAL/MECHANICAL

Length	225in (571.5cm)
Width	90.5in (229.9cm)
Height with Mast Stowed	64in (162.5cm)
Height with Mast Extended	36ft, 4in (11.07m)
Weight	4,400 lbs. (1996kg)
Windload	45mph without guy-wires; 70mph with guy-wires.

OPTIONAL REMOTE ACTIVATION

LRAD Command and Control Software with Graphical User Interface
Desktop PC preinstalled with Windows 7 and LRAD Controller Software
- Displays location of trailers on user configured overhead map
- Displays health status of each trailer
- Select and send audio to one or multiple trailers simultaneously

Desktop gooseneck microphone for voice recording and live broadcasting
Audio can be sent via prerecorded messages or live from a local or remote microphone
Wireless local microphone module for public address and event speaking

OPERATOR INTERFACE

Built in local control interface with handheld recording microphone and ruggedized MP3 player/control unit.

ELECTRICAL

CE

LRAD-360X High efficiency class "D" Amplifiers compact, for 19in (48.3cm) rack, 320W output

Two battery compartments
<1 second amplifier powerup time for fast activation
Continuous health and fault monitoring
Battery charger (universal AC input 90-230 VAC 50/60 Hz)
450 Amp-hour total capacity 24VDC nominal output
Optional solar panel unit

LRAD 360XT IS AVAILABLE WITH AN OPTIONAL SOLAR PANEL FOR REMOTE CHARGING CAPABILITY

SPECIFICATIONS

	TWO EMITTER
Maximum SPL @ 1 Meter	137 dBA
70 DB Coverage Radius	850 m
Acoustic Array Dimensions	Dia = 24 in / 60.8 cm H = 27.7 in / 70.2 cm
Acoustic Array Weight	80 lb / 36.2 kg
Acoustic Array Conduit Inlet* (US Threads)	1" NPT
Audio Input	320 W / 4 ohms
Temperature	-40° C to +60° C
Hazardous Substances	RoHS Compliant
Environmental Requirements	Fully sealed system designed for permanent outdoor installation. Impact and wind resistant for mobile installations.

FEMA GSA Advantage!™ RKB US

LRAD products are available for purchase through multiple channels including: GSA Advantage, Federal and State grants, FEMA RKB Standardized Equipment List (SEL), and others. More information: info@LRAD.com.

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