LISTEN. FIND. PROTECT.

SONICEYE™

Passive Acoustic Array Surveillance System

ASTER

PRODUCT OVERVIEW.

SONICEYE™, an innovative, portable and passive volumetric surveillance device based on acoustic array technology.

SONICEYE™ combines selective audio listening and acoustic pulse detection techniques to provide complete scene control to security operators in both indoor and outdoor operations. It performs automatic real-time detection of threats in presence of high background noises, while enabling real-time selective listening with adaptive graphic equalizer. Full recording & off-line re-processing and playback are also provided.

APPLICATIONS.

SONICEYE™, is the new compact surveillance solution for Security Authorities and Police Forces involved in:

- **URBAN AREA PROTECTION**
- **ANTI-TERRORISM**
- **TACTICAL INTELLIGENCE**
- **FORENSICS**
- **FIRST RESPONSE SUPPORT**

URBAN AREA PROTECTION

Detection, localization and tracking of blasts, gunfire, crashes and explosions in crowded area.

ANTI-TERRORISM

Situational Awareness in public places (squares, ports, stations, airports, malls, stadiums).

TACTICAL INTELLIGENCE

Indoor & Outdoor selective remote listening with real time filtering optimization.

FORENSICS

Permanent acoustic crime scene recording and adaptive off-line reprocessing.

FIRST RESPONSE SUPPORT

Selective remote detection and localization of survivors in disasters aftermath.

BENEFITS.

INNOVATIVE

Automatic real-time acoustic detection of threats in presence of high background noises.

EFFECTIVE

Real-time listening with audio equalization of sources of interest.

PASSIVE

No radiation in respect of citizen health and safety, reducing operations and maintenance costs.

EVENT DETECTION AND GEO-LOCALIZATION ON MAP

REAL-TIME AUDIO STREAMING OF TARGET

REMOTE LISTENING, AUDIO FILTERING AND EQUALIZATION

CAMERA POINTING AND ZOOM AT EVENT DIRECTION

FLEXIBLE

Modular architecture for a fast integration with Control Rooms and other surveillance systems.

PORTABLE

Wi-fi connection, reduced size and weight for a fast installation on indoor and outdoor urban elements.

CAPABILITIES.

REMOTE LISTENING

The SONICEYE™ system allows remote listening thanks to microphones array technology. People talking up to 50 m far, depending on background noise, can be intercepted and listened in real-time exploiting spatial and frequency filters.
Beamforming processing generates spatial filters providing pointing beams and notches to enhance signals coming from desired directions while killing those coming from disturbances. Up to 4 pointing beams and 4 notch beams can be generated at same time.

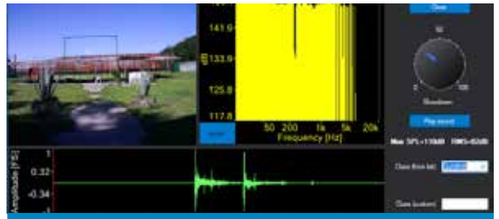
Frequency processing allows setting: notches, low-pass, high-pass, band-pass or custom shape filters, along the sampling band from 20 Hz to 25 KHz.
To ease the pointing of moving subjects, targets can be video tracked to enslave acoustic pointing/notching beams.
Tracking Algorithm allows listening with moving sensor and/or moving target.

ACOUSTIC MAPPING

The SONICEYE™ system generates real-time acoustic power map and superimposes it on the video. This function allows operator to quickly find any sources of noise on the scene.

BLAST DETECTION AND LOCALIZATION

The SONICEYE™ system implements innovative algorithms for acoustic blasts detection and localization in urban environment.
The system can detect in real-time shootings, car crashing, explosions, glass breakings, shouts and any other impulsive sounds in a sever noisy environment like the urban one. Detections are then localized and shown on map and video as well as in a dedicated track-bay.
Detection range depends on the SPL level of the blast with respect to the SPL level of the noise. Shootings can be detected up to several hundred meters within highly noisy environment and up to several Km in low noise environment.

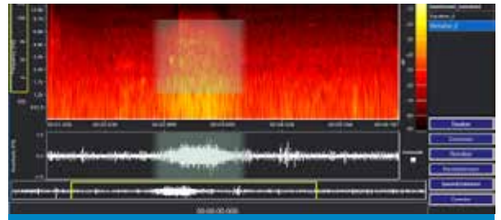


BLAST CLASSIFICATION

The SONICEYE™ provides operator facilities to help classifying detections. Once detection takes place, system records sound and pictures to further show to operator. Recordings can be played at different speeds to allow operator classifying or deleting them in case of false alarms.

RECORDING & PLAYBACK

The SONICEYE™ records all the microphones streams and video stream. Moreover, system records the spatially-frequency filtered stream.
All the recorded streams can be played in playback mode on the real-time interface allowing processing them delayed.



POST PROCESSING AND ANALYSIS

The SONICEYE™ opens to integrate acoustic analysis tools (e.g. iZotope RX 7) for post-processing and speech enhancement. The system provides .wav interface of the spatially filtered stream allowing combining the power of the array processing with the latest and most sophisticated single-stream processing.

PRODUCT AT HAND.
S-EYE40™

MICROPHONES ARRAY

Array of 40 MEMS microphones integrated in hard structure. Element dimension is 40 x 40 cm and weight is 3.5 Kg. Can be shielded to operate in outdoor (up to IP66).

GEOLOCATION UNIT

Unit includes: high-end GPS sensor for positioning, 3D compass for orientation w.r.t. North and 3D/ Triaxial gyroscope and accelerometer for tilt sensing.
Can be shielded to operate in outdoor (up to IP66).

PROCESSING UNIT

Server computer with processing software installed. It can be a NUC Intel solution or an industrialized solution fanless in order to enhance robustness - Shock: operating 50 Grms, Half-sine 11 ms duration (w/SSD, according to IEC60068-2-27), Vibration: operating, 5 Grms, 5-500 Hz, 3 Axes (w/ SSD, according to IEC60068-2-64).
Can be shielded to operate in outdoor (up to IP66).

COMMAND AND CONTROL SOFTWARE

SW for the real-time visualization and control of the system. Can be installed on Windows OS (v. 7 or later). Minimum HW requirements: 4GB DDR3 RAM, 1 TB HDD, processor at least i-5 6th generation 4-threads (or analogous), GbE Ethernet interface.

S-EYE 40™		
Featuring	**Base**	**Optional**
Real-Time Video-Acoustic Interface	•	
Client Server Architecture	•	
Recording & Playback	•	
Sensor Localization	•	
Automatic Real-Time Blast Detection and Localization	•	
Post-Processing Integration	•	
Server Wireless Connection	•	
Encryption for storage and trasmission	•	
Extended Temperature Range Array		•
IP66 outdoor case		•
Camouflaging case		•
Wide angle camera		•
Infrared camera		•
External camera		•
Techniques		
Array Beamforming Processing	•	
Multi-Array Beamforming Processing		•
Frequency Filtering Processing	•	
Video Tracking	•	
Blast Detection Processing	•	
Blast DOA Search	•	
Blast Map Localization	•	
Frequency Band		
	20 Hz to 25 KHz	
Number of Microphones		
	40	
Antenna Dimensions		
Surface	40 x 40 cm	
Weight	3.5 Kg	
Signal Dynamics		
Array Maximum SPL	112 dB	
Array ENL	16 dB	
Dynamic	96 dB	
Listening Range		
Low Noise (40 ÷ 50 dB SPL)	20 m	
High Noise (70 ÷ 80 dB SPL)	10 m	
Blast Detection Range		
Strong Blasts (gunshots, explosions) – Low Noise	3 Km	
Strong Blasts (gunshots, explosions) – High Noise	500 m	
Medium Blasts (car crashing, shouts, glass breakings) – Low Noise	500 m	
Medium Blasts (car crashing, shouts, glass breakings) – High Noise	30 m	
Detection Angular Resolution		
	1.5°	
Acoustic Separation		
	3°	

SONICEYE™ IS AVAILABLE FOR

- **END USERS:**
  Police Forces, Law Enforcement and Counter-Terrorism departments, Private Security Agencies

- **RESELLER/DISTRIBUTORS:**
  promoting SONICEYE™ sales on the base of partnership agreements over specific business segments and/or territories

- **SERVICE PROVIDERS:**
  exploiting SONICEYE™ features to expand/ complete their security services catalog

- **SYSTEM INTEGRATORS:**
  interested in the supply of SONICEYE™ within their complex systems solutions while maintaining branding and design authority

Via Tiburtina, 1166
00156 Roma (Italy)

+39 06 94 533 950
+39 06 94 533 951

www.aster-te.it
soniceye@aster-te.it

ASTER