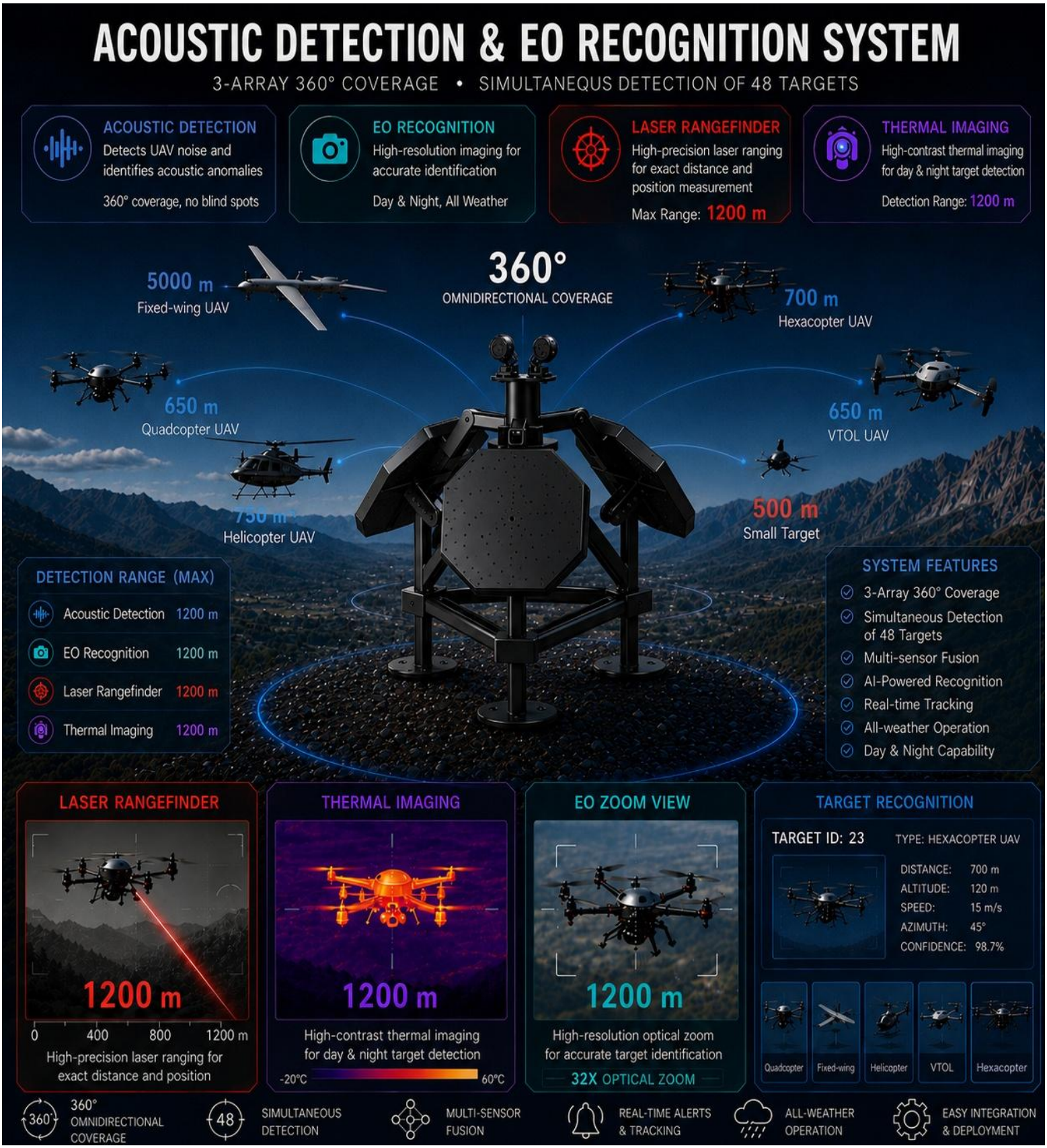
Acoustic Detection & Tracking + EO AI Recognition System



LS8118F Acoustic Localization Microphone Array + CGTX80A Tactical Miniature Electro-Optical Gimbal Product Specification

1. Product Overview

This specification details the technical parameters, functional characteristics, application scenarios, and environmental adaptability of the LS8118F high-performance acoustic localization microphone array and the CGTX80A tactical miniature three-axis four-optical inertial stabilized gimbal. It serves as the official standard for product design, production, inspection, and application. The two products can operate independently or collaboratively to form an integrated "acoustic + optical + electrical" positioning and detection solution, which is widely used in security, military, airport control, emergency rescue, and other fields, with core advantages of high precision, all-weather operation, and high reliability.

2. Product Details

2.1 LS8118F High-Performance Acoustic Localization Microphone Array

The LS8118F is a high-performance acoustic localization microphone array designed specifically for scenarios such as acoustic imaging, mechanical anomaly detection, human voice positioning, and drone detection/UAV sound positioning. The product consists of a maximum 192-channel MEMS array board, a MEMS acquisition board, and a USB camera, which transmits data to the host computer for real-time processing via Gigabit UDP/RJ45/USB/Serial Port, featuring passive detection, high concealment, and high-precision positioning.

2.2 CGTX80A Tactical Miniature Electro-Optical Gimbal

The CGTX80A is a tactical miniature three-axis four-optical inertial stabilized gimbal, integrating a long-wave uncooled infrared camera, a 13-megapixel high-definition visible light wide-angle camera, a 2-megapixel starlight telephoto visible light camera, a laser rangefinder, and a gyro-stabilized platform. It can be mounted on micro unmanned aerial vehicles, with a long observation distance for drones, personnel,

and vehicles, realizing real-time visible light video transmission. It has the ability of all-weather and all-time observation and detection, target locking and tracking, and target positioning and guidance, suitable for tactical reconnaissance and security monitoring needs.

3. Detailed Technical Parameters

3.1 Parameters of the LS8118F Acoustic Localization Microphone Array

Parameter Category	Parameter Item	Parameter Value
Microphone Array Parameters	Number of Microphones	64 channels (max expandable to 192 channels)
	Array Dimensions	460×460×20mm
	Arrangement Pattern	Multi-arm spiral
	Frequency Range	20 Hz–80 kHz
	Recording SPL	30 dB SPL ~ 120 dB SPL
	Microphone Model	Infineon IM72D128V01
	Signal-to-Noise Ratio (SNR)	72 dB
	Sensitivity	-36 dBFS
USB Camera Parameters	Sensor Model	IMX298
	Video Format	1080P@30fps
Acquisition Board Parameters	Interface Type	USB/Gigabit Ethernet UDP
	Sampling Rate	192K
	Bit Width	16bit

	Data Format	PCM
	Sampling Method	Synchronous sampling
Core Performance Parameters	Audio Performance	20 Hz–20 kHz frequency bandwidth
	Detection Range	⩾500m for multi-rotors, ⩾1200m for fixed-wings; single unit transmission: 0–500m. Networked multi-array acoustic fence: 2–5km transmission, expandable to thousands of km for border applications.
	Positioning Time	100ms
	Max Tracking Targets	Single array: up to 16 targets, 3-Array 360° system: up to 48 targets, 4-12-array 360° system: up to 192 targets
	Positioning Accuracy	±3°
	Azimuth / Elevation Angle	360° omnidirectional / -20°~90° (max 80°)
	3-array Collaboration Accuracy	10 m or 10% of the maximum value
	Processing Frame Rate	25 fps
	Drone Location Frequency	1 kHz – 20 kHz

	Acquisition Frequency Range	20 Hz – 20 kHz
	Beamforming Algorithm	BF, Optimized Delay-Sum + MVDR (Focusing & Localization)
AI Recognition Performance	False Alarm Rate	<10%
	Recognition Rate	>90%
Physical & Environmental Parameters	Dimensions/Weight	460×460×20mm, <3.5kg
	Package Size/Weight	51×51×16cm, 4.0kg (No Battery), PCBA net weight 1.0kg
	Operating Temperature	-40°C–70°C (fanless)
	Storage Temperature	-20°C–60°C
	Humidity	10%–90% (non-condensing)
	Power Supply	USB 2.0 / DC 5V
Communication Interface Parameters	Interface Type	USB / RJ45 / Serial Port
	Data Transmission	Gigabit UDP high-speed transmission, supports real-time data processing
Ingress Protection	IP65 / IP66	The materials are provided to the customer, who then completes the finished product production.
System Integration	Compatible with EO/IR, radar, RF, and C2 system integration	Client self-integration or customized integration available

3.2 Parameters of the CGTX80A Tactical Miniature Electro-Optical Gimbal

Parameter Category	Parameter Item	Parameter Value
Visible Light Camera Parameters (Dual Cameras)	13MP HD Wide-Angle Camera - Sensor	1/3" 13M CMOS
	13MP HD Wide-Angle Camera - Lens Focal Length	3.5mm
	13MP HD Wide-Angle Camera - Field of View (FOV)	63.5°(H) × 38.5°(V) (±5%, 1080P)
	13MP HD Wide-Angle Camera - Photo Resolution	4K, 1920×1080
	13MP HD Wide-Angle Camera - Video Resolution	4K@50fps, 1920×1080@50fps
	13MP HD Wide-Angle Camera - Recognition Distance	Under daytime visibility ⩾8 km: Recognition range ⩾ 500 m for human targets, ⩾800 m for vehicles, ⩾400 m for multi-rotor UAVs, ⩾ 1200 m for fixed-wing UAVs.
	2MP Starlight Telephoto Camera - Sensor	1/2.8" CMOS
	2MP Starlight Telephoto Camera - Lens Focal Length	16mm

	2MP Starlight Telephoto Camera - Field of View (FOV)	19.0°(H) × 11.2°(V) (±5%, 1080P)
	2MP Starlight Telephoto Camera - Video Resolution	1920×1080@50fps
Infrared Camera Parameters	Detector Response Band	8–14μm, Long Wave
	Field of View (FOV)	17.5°(H) × 14.0°(V) (±5%, 1080P)
	Infrared Photo Resolution	640×512
	Optical Focal Length	25mm
	Infrared Video Resolution	640×512@50fps
	Recognition Distance	Under night visibility ⩾8 km, relative humidity ≤60%, and background temperature difference ⩾ 5 K, the target recognition distance is ＞400 m
Laser Rangefinder Parameters	Laser Wavelength	905 nm (Class I laser, meeting safety requirements)
	Ranging Range	10 m - 1200 m
	Ranging Accuracy	±1m
	Measurement Frequency	4Hz
Basic Performance Parameters	Stabilization Accuracy	≤0.02° (disturbance 0.5°@ 1 Hz)
	Gimbal/AI Module Weight	250g ± 5g / 42g ± 2g
	Frame/Control Azimuth	±110° / -90°~+90°

	Angle	
	Gimbal Volume	80.0mm×91.0mm×120.0 mm
	Frame/Control Elevation Angle	±140°~+95° / -90°~+30°
	Roll Angle	-60°~+60°
	Frame Angle Measurement Threshold	2 mrad
	Target Positioning Accuracy	CEP 10 meters
Interface & Environmental Parameters	Video Output	Network, HDMI
	Control Interface	TTL Serial Port, Network, SBUS
	Storage	Max support 512G Micro SD card
	Operating/Storage Temperature	20°C~+55°C / -45°C~+60°C
	Power Supply/Power Consumption	DC10.8V~26.4V@3A, Steady-state ≤12W

4. Core Functions

4.1 Core Functions of LS8118F

- Data Transmission: Transmit MEMS data to the PC via USB or UDP, and transmit video data to the PC via USB simultaneously; the PC locates the signal source through algorithms and overlays it on the video screen.
- Drone Acoustic Localization: Supports centimeter-level drone acoustic localization, 500m altitude acoustic localization, and acoustic localization under urban multipath interference. Passive detection without signal transmission ensures higher concealment.
- Multi-Target Tracking: Stably tracks 12–15 drones simultaneously; up to 16

drones in an ideal low-noise environment, with fast positioning response (100 ms) and high accuracy (±3°).

- Multi-Scenario Adaptation: Supports various applications such as acoustic imaging, mechanical anomaly detection, human voice positioning, and drone detection; it can expand the detection range through multi-array networking.
- AI Recognition: Features a high recognition rate (>90%) and a low false alarm rate (<10%), improving detection reliability.
- Software Secondary Development Support: The product supports secondary development, providing standard API interfaces to facilitate integration with third-party systems and customized functional development according to user needs.

4.2 Core Functions of CGTX80A

- Multi-Optical Fusion Imaging: Integrates three types of cameras (infrared, high-definition wide-angle, starlight telephoto) to achieve all-weather and all-time observation and detection, adapting to different lighting environments.
- Laser Ranging and Positioning: Equipped with 10–1200 m laser ranging capability with an accuracy of ±1 m, which can measure target position information and realize target positioning and guidance.
- Target Tracking: Supports detection, recognition, locking, and tracking of targets such as drones, personnel, and vehicles, suitable for tactical reconnaissance needs.
- Stabilization Function: A three-axis gyro-stabilized platform with stabilization accuracy ≤0.02°, ensuring stable and clear images when mounted on drones.
- Video Transmission and Storage: Supports network and HDMI video output, can store data via a Micro SD card, and supports real-time video transmission.
- Software Secondary Development Support: The product supports secondary development, providing standard API interfaces to facilitate integration with third-party systems and customized functional development according to user needs.

5. Core Technology

5.1 Core Technology of LS8118F

- Passive Drone Acoustic Localization Technology: No signal transmission, high concealment, suitable for military, security, and other confidential scenarios.
- Multi-Channel Array Signal Processing Technology: 64-channel (expandable to 192-channel) microphone array with a multi-arm spiral arrangement, improving positioning accuracy and coverage.
- Advanced Beamforming Algorithm: Adopts BF, Optimized Delay-Sum + MVDR algorithms to achieve signal focusing and precise positioning with strong anti-interference ability.

- Multi-array networking technology: Enables coordinated operation of multiple arrays, expanding the detection coverage of acoustic electronic fences to 2–5 km and boosting large-scale monitoring capacity. Border networking can be extended to thousands of kilometers.

5.2 Core Technology of CGTX80A

- Three-Axis Four-Optical Inertial Stabilization Technology: Integrates four imaging modules with a gyro-stabilized platform to achieve high-precision stabilization, adapting to reconnaissance tasks in complex environments.
- Multi-Target Intelligent Recognition Technology: Can independently recognize targets such as personnel, vehicles, and drones with high recognition accuracy and fast response speed.
- Laser Ranging and Positioning Technology: 905nm Class I laser ranging with a wide ranging range and high accuracy, enabling precise measurement and guidance of target positions.
- All-Weather Imaging Technology: The combination of an infrared camera and a starlight camera breaks through lighting limitations, realizing stable detection during the day, night, and harsh weather.

6. Application Scenarios

6.1 Common Application Scenarios

- All-Weather Urban Security and Anti-Terrorism Monitoring: Realizes dual acoustic + optical detection, accurately locates abnormal targets, and improves security levels.
- Emergency Rescue and Disaster Response: In disaster scenarios such as fires and earthquakes, quickly locks targets such as trapped personnel and drones to assist rescue decisions.
- Industrial and Infrastructure Inspection: Detects abnormal equipment sounds and images, realizing 24-hour unattended inspection and reducing labor costs.
- Power and Energy Facility Maintenance: Investigates hidden dangers such as line abnormalities and drone intrusions to ensure facility safety.
- Border Patrol: Passive detection + high-definition imaging realizes all-round monitoring of border areas, preventing illegal intrusions and drone harassment.
- Military Terrain Reconnaissance and Long-Distance Target Reconnaissance: Concealed detection and precise positioning provide intelligence support for military operations.

- Target Guidance and Strike: Precisely locates target positions to provide data support for guided strikes.

6.2 Exclusive Application Scenarios of LS8118F

- Anti-Drone Acoustic System: Full-coverage anti-drone acoustic early warning, real-time positioning of drone positions, and early warning.
- Airport Drone Control: Acoustic detection of drones in airport areas to ensure airport flight safety and prevent low-altitude drone harassment.
- Forest Fire Rescue: Quickly locks drones in fire areas through drone sound positioning to assist fire reconnaissance and rescue.
- Mechanical Anomaly Detection: Detects equipment operation abnormalities through acoustic analysis to achieve early warning and maintenance.
- Human Voice Positioning: Precisely locates human voice positions in complex environments, suitable for security search and rescue, meeting positioning, and other scenarios.

7. Notes

- Both products must be used within the specified temperature and humidity range to avoid equipment damage caused by extreme environments.
- The LS8118F adopts a fanless design; avoid long-term operation in a closed high-temperature environment to prevent overheating affecting performance.
- When the CGTX80A is mounted on a drone, ensure it is installed firmly; when using the laser rangefinder, follow safety specifications to avoid direct irradiation of the human body.
- During data transmission, ensure a stable interface connection to avoid data loss or transmission delay caused by poor contact.
- Regularly inspect the equipment appearance and interfaces to prevent dust and water from entering the equipment, which may affect the service life of the equipment.
- The storage medium (Micro SD card) should be a high-speed and high-reliability product to avoid abnormal data storage.

8. Supplementary Provisions

The content of this specification is the factory standard of the product. If parameters change due to technological upgrading, we will notify you separately; otherwise, no further notice will be given. The final interpretation right of this specification belongs to our company.

9. Product Customization

Both the LS8118F acoustic localization microphone array and CGTX80A tactical miniature electro-optical gimbal support product customization. We can provide customized solutions according to the specific needs of users, including but not limited to parameter adjustment, functional expansion, interface adaptation and appearance design, to meet the diverse application requirements of different scenarios.