

# PILAR MK-IIw

Surveillance and Threat Detection System



# PILAR MK-IIw

## Acoustic Gunshot Detection and Localisation System



**PILARw** is an acoustic information system for the automatic detection and localisation of small calibre gunshots, mortars, (RPG) rockets and missiles. Two versions are available: The Ground Version and the Vehicle-mounted Version. **PILARw** displays and records gunshots, the origin of which is pinpointed both in 3D and in real time.

The system relies on state-of-the-art signal processing techniques to detect and accurately localise this fleeting and potentially lethal event.

**PILARw** can operate under any circumstances, even harsh environmental conditions, including urban, tropical, snowy or very noisy situations, such as those encountered aboard vehicles or within a city.

**PILARw** is designed for the information and the protection of both military and civilian security forces.

## System Description

The **PILARw** system consists of 3 main components that are combined to create a number of different configurations, each presenting specific features:

1. A foldable acoustic sensor array with embedded sensors and electronics.
2. A Data Interface Acquisition Module (DIAM) for real-time processing of the signal originating from the array(s).
3. A rugged or military standard PC (CPU) to control the system and view the results using **ShotGuard**, the **PILARw** operating software.

In addition, a Pilar Versatile Observation Turret (**PIVOT**) can be connected to the PC to provide, with an extremely short response time, a picture or a film of the shot origin. This turret can also be used for visual surveillance of the threatening zone





## Multiple Applications

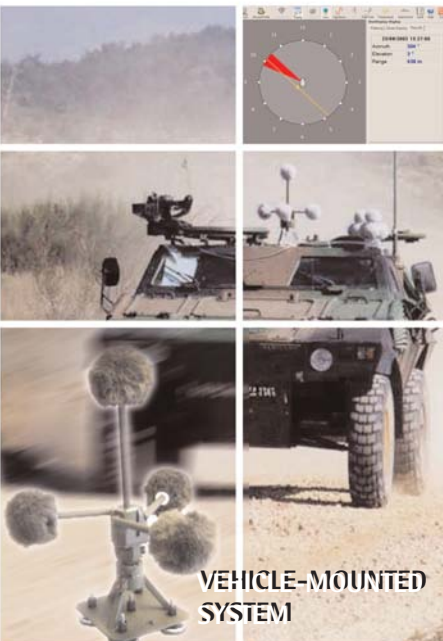
PILARw is designed to meet many operating requirements: protection of personnel, installations (campground, building, sensitive site), single vehicle or convoy, air base. PILARw is suitable for the detection of both small calibre gunshots and mortars or RPG with checked performances. This flexibility makes it a valuable tool for peacekeeping missions and on the theatre of operations. As for civilian surveillance, PILARw is particularly suited for the protection of public events and VIPs and to the surveillance of borders and sensitive zones.

## A Modular Design

Aiming at purchase and maintenance cost-effectiveness, O1dB-Metravib paid particular attention to designing a modular system while avoiding single-purpose components. For instance, the acquisition module DIAM includes the different basic algorithms used in ground or vehicle-mounted operations, which are automatically selected by the software through the operator. This architecture allows for system customisation to meet different operational requirements with the same equipment and allows for the definition of configurations suited to integration on, e.g., a vehicle (use of an existing PC, simplified mechanical interfaces, etc.).

## A Single Interface

Whatever the application - ground or vehicle - and the configuration - one or several arrays - the operating software ShotGuard is the only user interface. ShotGuard includes all possible configurations so that simple selection of the current configuration displays the appropriate interface on screen and launches the corresponding process. Training and operating are thus much easier.



## More than a Detection System

PILARw is stand-alone instrument but can also be used with, e.g., PIVOT, in order to built up a surveillance and threat detection system. PILARw can also be coupled with other equipment, using the coordinates of the origin of the threat provided by PILARw.

# PIVOT

## Surveillance System



*PIVOT (Pillar Versatile Observation Turret) is a rapidly deployable and man-portable surveillance system. It consists of a high-speed pan-and-tilt turret equipped with a Day Dawn Camera driven by a Control Unit with a high-resolution and high-brightness LCD screen.*

*The deployment of PIVOT fulfils two missions:*

- *As a stand-alone instrument, PIVOT is an automatic surveillance system with scanning and recording functions;*
- *Coupled with PILARw, the PIVOT control unit processes azimuth and elevation data provided by PILARw to rotate and tilt the PIVOT turret in the proper direction and provide, in real time, a picture of the threat's point of origin.*

## Multiple Applications

PIVOT greatly enhances observation, target acquisition and threat identification capabilities, making it ideal for a variety of applications and environments, including infantry units, special forces, forward observers, reconnaissance patrols, peacekeeping forces, security forces and surveillance of sensitive sites.

PIVOT allows for automatic or manual scanning of a user-defined potential threat area, making it easier to survey this area. In case a gunshot is detected by PILARw, the PIVOT turret is automatically cued to the localised position and then manually scanned and zoomed to perform a detailed investigation of the area.

## Simple to Operate

Intuitive and easy to use, PIVOT is operated through user-friendly menus and controls.

The PIVOT system is passive and does not require full-time attention from the user. It acquires images day and night (night camera not supplied), under any weather conditions. Images recorded by PIVOT cameras can be transferred to a Digital Video Cassette Recorder and/or to an external PC (optional).

## Custom Platform Integration

PIVOT functions can be extended to other sensors: possible integration of goggles, cameras and other sensors via the RS-232 interface. PIVOT, PILARw and additional sensors can operate in network mode and make up a complete area and border surveillance system, thus contributing to localisation, reconnaissance and identification of threats (gunshots, intrusion of personnel, vehicle, helicopter, ship, etc.).



# Main Specifications

## PILARw Acoustic System:

- Fully passive
- Field of view: 360°x90°
- Detects and localises any calibre from 5.45 to 20 mm, RPG and mortars
- Single and burst shots, with or without suppressor
- Response time: 3 s (from triggering of system by shot up to onscreen display of shot origin)
- Localisation:
  - Azimuth:  $\pm 2^\circ$  using 1 or 2 sensor arrays  
 $\pm 5^\circ$  when vehicle in motion  
 $\pm 10^\circ$  using the dome array
  - Elevation:  $\pm 5^\circ$
  - Distance: Typically  $\pm 10\%$  to  $\pm 20\%$  depending on configuration
- Detection range: 0 to 1500 m
- Power requirement (DIAM and array): DC 10 V to 30 V, 50 W
- Environmental conditions:
  - Night and day, urban, forest, mountains, desert, etc.
  - DIAM and sensor array:  $-40^\circ\text{C}$  ( $-40^\circ\text{F}$ ) to  $50^\circ\text{C}$  ( $+122^\circ\text{F}$ ) operating  
 $-40^\circ\text{C}$  ( $-40^\circ\text{F}$ ) to  $70^\circ\text{C}$  ( $+158^\circ\text{F}$ ) in storage
- Foldable sensor array: 2 kg (4.4 lbs)  
50 cm folded, 80 cm unfolded
- DIAM: 3.6 kg (7.9 lbs)  
21 x 29 x 7 cm



## PIVOT Surveillance System:

### Turret:

- Payload Dual with a payload capacity of 9 kg (20 lbs)
- Pan/Tilt Positioner
  - Angular speed (max):  $60^\circ/\text{sec}$  ( $\pm 10\%$ ) with 9 kg (20 lbs) payload balanced on dual shelves
  - Operating angles ( $^\circ$ ): Pan ( $360^\circ$  with stop position), tilt ( $-30^\circ/+90^\circ$ )
  - Torque on each axis:  $5\text{ Nm} \pm 10\%$
  - Standard precision:  $0.3^\circ \pm 0.1^\circ$
  - Zero backlash
- Dimensions and weight 45 (H) x 26 (L) x 27.5 (P) cm, 9 kg (20 lbs)



### Day Camera:

- Type 5" colour CCD camera
- Resolution 480 television line PAL
- Focus control Auto or Manual
- Wide FOV  $41^\circ\text{H} \times 28^\circ\text{V}$
- Narrow FOV  $2.6^\circ\text{H} \times 2.0^\circ\text{V}$
- Dimensions and weight 42 (L) x 15 (l) x 13 (H) cm, 4.8 kg (10.6 lbs)

### Control Unit:

- Screen 15" high-brightness LCD colour monitor
- Controls Keyboard and joystick
- Interfaces Analogue/Digital video, RS-232
- Power requirement (with turret and day camera): DC 10 V to 30 V
- Dimensions and weight 62.5 (L) x 49 (l) x 22 (H) cm, 22 kg (49 lbs)
- Option Digital Video Cassette Recorder





## References

Australia  
France  
Indonesia  
Italy  
United Kingdom  
United States

### Testimony from US Army in External Operations:

*"One week after the PILARw training, the unit had the system set up in an operational high risk area. Rounds were fired by insurgent snipers at our soldiers. The PILARw performed as advertised and identified distance and bearing of fire. Search of location resulted in capture of insurgents and weapons. No soldiers were injured. The unit is very pleased with the performance. They are looking forward to using the vehicle mounted version. Thanks so much for getting this system and training to our Soldiers. Catching the bad guys equates to saving lives."*



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