

## TECHNICAL SPECIFICATIONS AND BASIC CHARACTERISTICS

### LASER RADAR DETECTING WARNING SYSTEM (LARDESYS)

**Laser Radar Detecting Warning System – LRDWS (LARDESYS) is a distributed modular detection system used for the protection of mobile or stationary ground, airborne and naval objects against laser rangefinders, target designators, beam riders as well as radar exposure.**



#### 1. PRODUCT DETAILS AND SPECIFICATIONS:

Combined Laser & Radar detection system LARDESYS of a modular architecture with the capability to provide rapid alerting against the principal threats guided by laser or radar beams in most of the key areas: detection of rangefinders, designators and beam riders, consistent with low false alarm rate, parametric measurement for threat discrimination and ambiguity resolution, scalability through modular addition of sensors for coverage of larger objects where a full hemispherical coverage around the stationary or mobile ground, airborne or naval object can be provided.

#### 2.1 SYSTEM TECHNICAL DESCRIPTION:

The detection system of laser and radar exposure is primarily aimed at the protection of small and medium-size stationary or mobile objects against warfare devices that use laser beams for aiming, designation or recognition or radar scanning. The complete integrated system consists of a central unit and detection head/heads or individual modules installed around the vehicle hull/chassis.

Central unit mounted inside the protected platform processes incoming information from the detection modules or head/heads, evaluates them, and then offers the operator a summary about the laser and radar activities (for the combined models equipped with radar detector) of the enemy. It also sends an audio signal indicating a threat to the intercom. Central unit indicates the actual state in real time and sends this information through the serial link to the superior vehicle control system (e.g. Fire Control System). Simultaneously it suggests a counter measurement which in semi-automatic mode waits for the operator's confirmation and in automatic mode directly executes the smoke grenades launching to

defeat enemy activities and hide the vehicle behind the smoke cloud.

Detection modules or head/heads are installed on convenient locations on the exterior of the protected platform - armoured vehicle, small naval object or light-weight aircraft so that they do not interfere with other functional onboard systems (sight & observation systems, weapon systems etc.).

1. Central detection head LWSC-8D and LRWSC-8D containing either only laser sections with 8 oriented IR receivers, or a combination of radar sections with 4 radar detection modules and 8 spatially oriented IR receivers. This model of one detection head is suitable for protection of smaller platforms (e.g. smaller-sized armoured vehicles) due to its limited coverage. Technical manual and brochure are available.
2. Detection distributed modular system is also available in two types of detection modules, contain either only a laser or a combination of laser and microwave (radar) detectors. For a small armoured vehicle (such as 4x4 Iveco LMV, BRDM-2, Toyota Land Cruiser V8 etc.), the standard configuration is 4 pcs of laser or 4 pcs of combined laser/radar modules. For a bigger armoured vehicle (e.g. APC, IFV etc. of 6x6 and 8x8 wheeled configuration or full-tracked chassis) a combination of 4 pcs of laser/radar modules situated on the front, back and sides of the object complemented by 2 pcs of laser modules on sides for larger objects are recommended. Usually, modules are installed in the approximate middle of the platforms' height, evenly distributed around their periphery so that it does not conflict with other functional systems. This configuration enables thorough coverage of the object in terms of detection. Technical brochure is available. Technical manual and brochure are available.

## 2.2 SYSTEM CONFIGURATION:

The following options concerns to sensors configuration, system sensitivity and number of the sensors required to provide high probability of detection for laser guided weapons targeting at any point on a armored vehicle and exposure by the radar irradiation and targeting – systems consist of these parts:

### Option 1: LWS-4D (4 detectors/modules brick system):

- Four (4 pcs) of LWS detection brick system modules of laser irradiation installed around the hull
- One (1 pc) of internal vehicle Control Unit
- Resolution in azimuth:  $15^\circ$ , FOV =  $360^\circ$ ,
- Resolution in elevation: 3 sectors:  $-20^\circ \div +35^\circ$ ,  $+35^\circ \div +60^\circ$ ,  $+60^\circ \div +95^\circ$ , FOV= $115^\circ$  (x2)

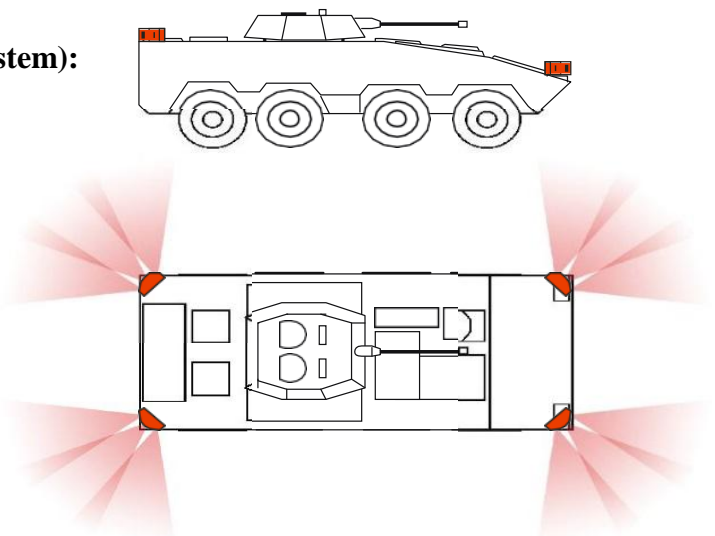


Fig. 1 Scheme of vehicle laser irradiation detection coverage for LWS-4D system

**Option 2: LRWS-6D (6 detectors/modules brick system):**

- Six (6 pcs) of LRWS detection brick system modules of laser & radar irradiation (4 pcs of laser and radar detection modules and 2 pcs of laser detection modules installed around the hull)
- One (1 pc) of internal vehicle Control Unit
- Resolution in azimuth: 15°, FOV = 360°,
- Resolution in elevation: 3 sectors: -20° ÷ +35°, +35° ÷ +60°, +60° ÷ +95°, FOV=115° (x2)

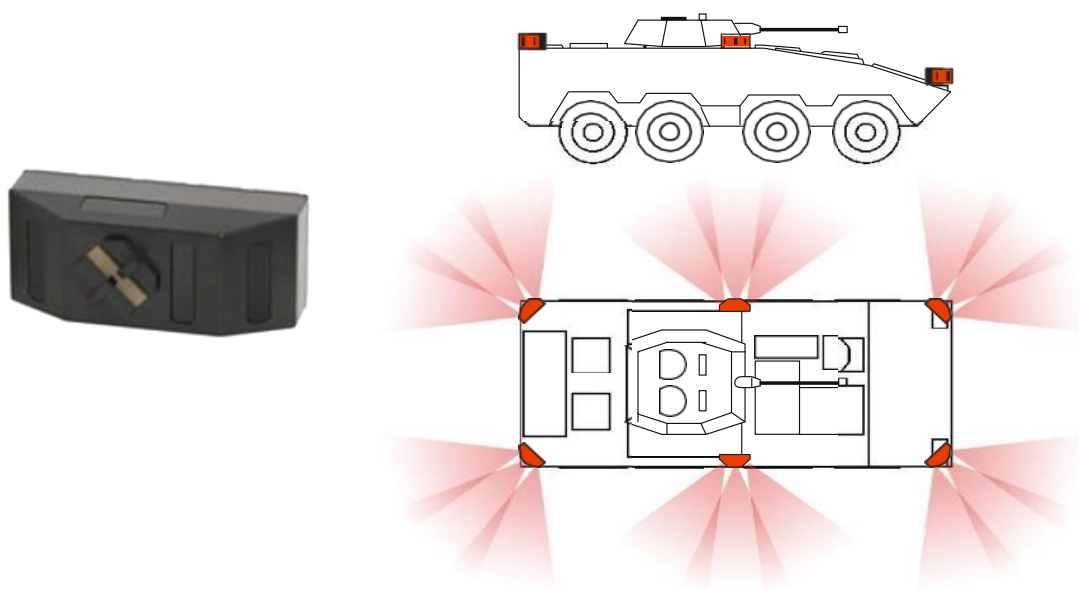


Fig. 2 Scheme of vehicle laser & radar irradiation detection coverage for LRWS-6D system

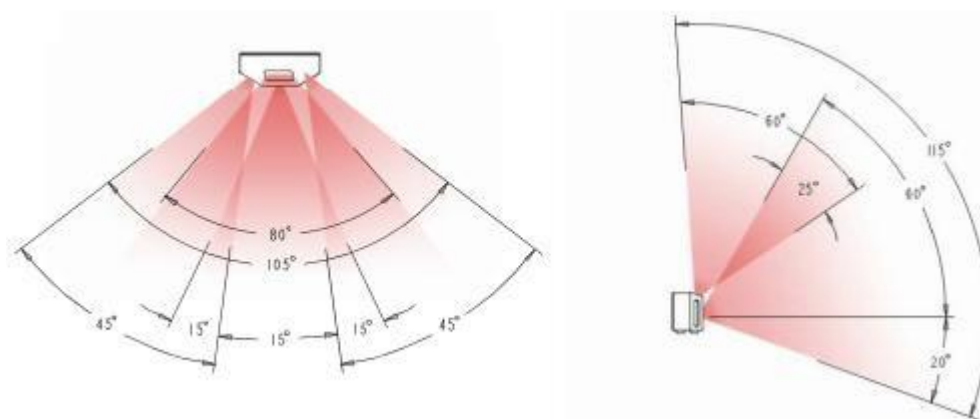


Fig. 3 Azimuth and Elevation detection Coverage of LWS-4D/LRWS-6D one Detection Module

**Option 3: LWSC-8D (8 detectors head system):**

- One (1 pc) of LWSC detection central head system of laser irradiation (8 pcs of laser detectors around the detector head perimeter)
- One (1 pc) of internal vehicle Control Unit
- Resolution in azimuth:  $22,5^\circ$ , FOV =  $360^\circ$ ,
- Resolution in elevation: 1 sectors:  $-20^\circ \div +60^\circ$ , FOV =  $80^\circ$

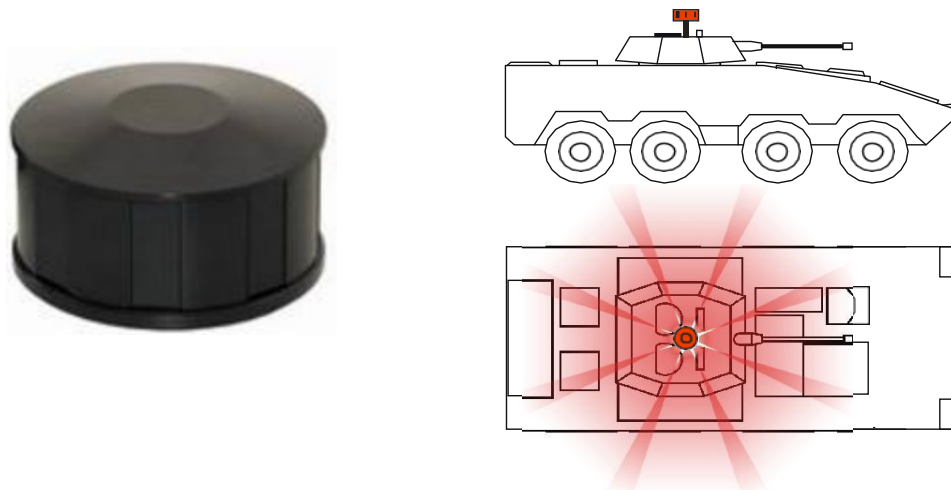


Fig. 4 Scheme of vehicle laser irradiation detection coverage for LWSC-8D system

**Option 4: LRWSC-12D (12 detectors head system):**

- One (1 pc) of LRWSC detection central head system of laser & radar irradiation (8 pcs of laser detectors and 4 pcs of radar detectors around the detector head perimeter)
- One (1 pc) of internal vehicle Control Unit
- Resolution in azimuth:  $22,5^\circ$ , FOV =  $360^\circ$ ,
- Resolution in elevation: 1 sectors:  $-20^\circ \div +60^\circ$ , FOV =  $80^\circ$

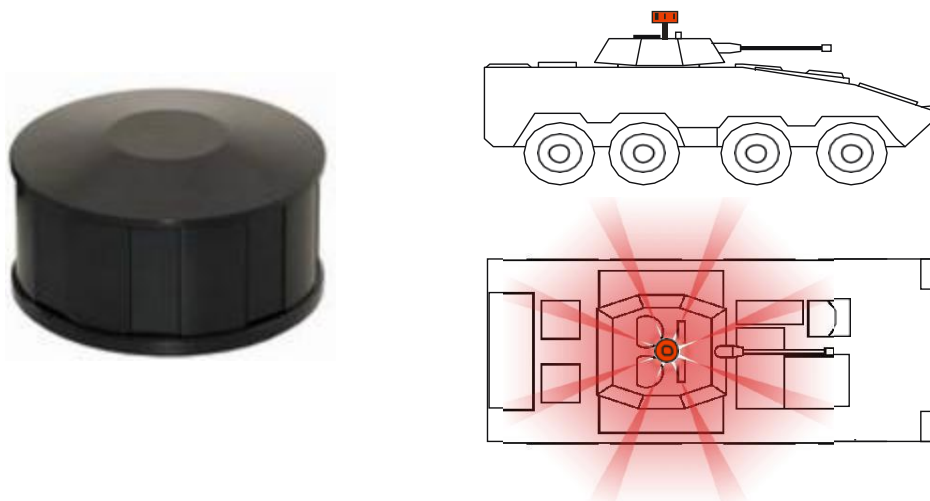


Fig. 5 Scheme of vehicle laser &amp; radar irradiation detection coverage for LRWSC-12D system

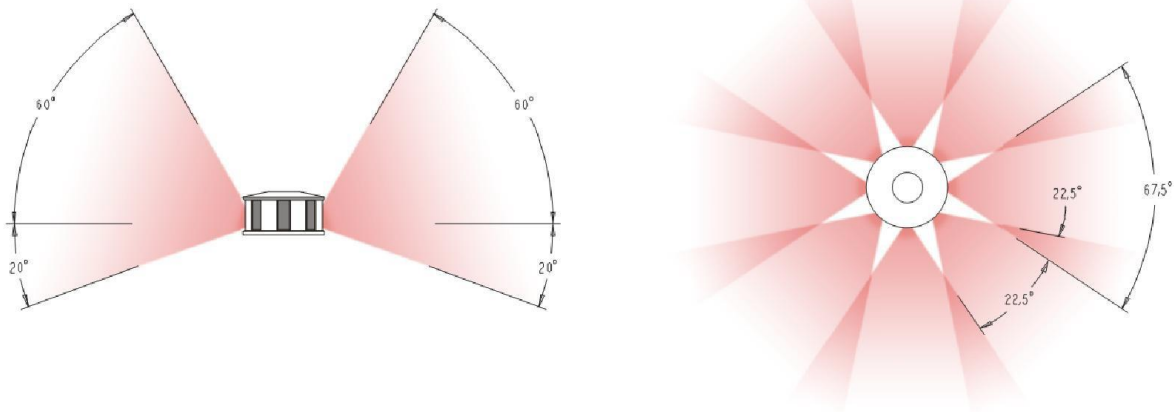


Fig. 6 Azimuth and Elevation detection Coverage of LWSC-8D/LRWSC-12D central Detection Head

### 2.3 OPTIONAL SYSTEM ACCESSORIES:

Combined Laser & Radar detection system is of a distributed modular brick architecture which enables the Smoke grenades (from various producers) launching in cooperation with already on the armored vehicle originally installed Smoke grenade launch system up to 8 pcs of smoke grenades (launcher tubes). In the case that on armoured vehicle is installed more smoke grenade launchers we can provide also integrated so called EGLAC Module - External Smoke Grenade Launcher Controller which is designed for the connection of central Control Unit and more than 8 pcs of Smoke Grenade launchers. Launchers are located on the mutually moving parts of the platform. A typical example of the use is an Armoured Personnel Carrier, Infantry Fighting Vehicle or Light Tank where the Smoke Grenade Launchers are located on the moving part (turret) and the Control Unit with the detection modules are located on the stationary part (hull/chassis) in the case of brick modules system usage or on the moving part (vehicle turret) as well in the case of central head system utilization.



Fig. 7 The auxiliary enhanced EGLAC Module - External Smoke Grenade Launcher Controller