LWAL

System for testing laser warning systems

Fig. 1. LWAL test system

1 What is laser warning system?

A laser warning systems (LWS) is a warning system that detects and optionally locates directions of incoming laser emissions from potentially dangerous laser systems (laser designators, laser range finders, laser pointers). LWS are used in big numbers as a crucial part of active protection systems of military targets (aircraft, helicopters, ships, vehicles) or important civilian infrastructure. In detail, LWS is to activate various countermeasures like smoke, laser dazzlers, or weapons that enable protection of important military or civilian targets.
Laser warning systems offered on market vary a lot due to different optical spectral band, sensitivity, types of lasers that can be detected, frequency band, ability to determine direction of incoming laser beam, and ability to detect direct/dispersed laser light.

2 What is LWAL system?

LWAL is a system for testing laser warning system. Single LWAL module (Fig. 1) enable to carry out tests of LWS at one specified wavelength in range from 500nm to 1600nm. However, LWAL can be delivered in so called quadro form when four modules are integrated to enable carry out tests at four most popular wavelengths: 1060nm, 1550nm, 905nm, and 880nm (different wavelengths possible too).
From design point of view LWAL can be treated as calibrated directional light source capable at irradiate LWS at specified mode of laser light (CW or pulse), irradiance level, wavelength, direction, pulse width, and pulse repetition frequency.

3 How tests are done?

Tests using LWAL are carried out by illumination of tested LWS from specified distance (typical range is from 2m to 5m) at variable intensity, PRF, pulse width of laser beam and recording reactions of tested LWS. Later, tests are repeated for different wavelengths and different directions. Tests using LWAL enable to obtain valuable information about real capabilities of tested laser warning systems (answer to questions what types of dangers can be detected).
Due to compact design and small mass LWAL can be used both at lab and field conditions.

4 Test capabilities

LWAL enables measurement of a series of parameters of LWS: minimal detectable irradiation, accuracy of detection direction of incoming laser beam at specified wavelength and PRF of laser light. Measurement data can be used to calculate maximal operational range of simulated laser system (LRF/designator) that can activate laser warning system.

5 Technical specification

Parameter	Value
Spectral band of laser sources	500 –1600nm
Maximal number of laser sources of different wavelength	up to 4
Typical wavelength	1060nm, 1550nm, 905nm, 880nm
Diameter of laser beam	at least 300mm
Optimal work distance	2 – 5m
Dynamic of regulation of light source intensity	at least 400 x
Typical simulated irradiance range	10 – 1000 W/m

6 Versions

LWAL can be delivered in form of different versions of different design, test capabilities and price. Most common division is:

1. number of wavelengths to be simulated (practically number of laser sources in LWAL system),
2. type of simulated pulsed laser systems: mono pulse (high power/low PRF) or multi pulse (low power/high PRF)

Coding concept as below:

Code	Number of wavelengths	Type of pulsed laser sources
1	1	Mono pulse lasers
2	2	Mono pulse lasers and multi pulse
3	3	
4	4	

Code LWAL42 means LWAL capable to work at four different wavelengths and simulate both monopulse and multipulse lasers.

Version 1.4

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