NVS

Tester of night vision sights

Fig. 1. Photo of the NVS test station

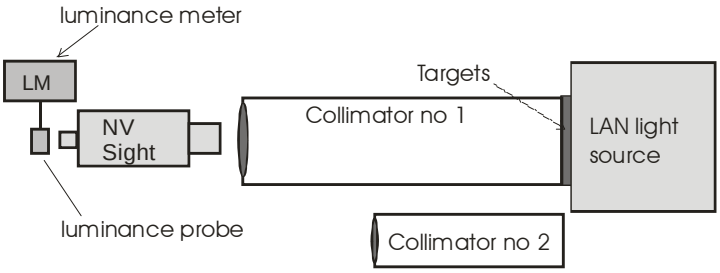

Fig.2. Block diagram of the NVS measuring station

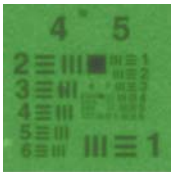

Fig.3.Image of USAF1951 target generated by NVS station

BASIC INFORMATION:

Night vision devices present on the market can be divided into two basic groups: A) surveillance night visions devices (binocular goggles, monocular goggles, monooculars) of wide field of view (from about 30º to 50 º); B) night vision sights of narrow field of view below about 12º (magnification over 3x). There are also some night vision devices of field of view that can be varied using optical adapters.

The NVS station is a test system optimised for testing night vision sights (night vision devices of narrow field of view and magnifications over three) but surveillance mono/binocular night vision devices can be tested, too.

The station projects images of some standard targets into direction of tested night vision fixed horizontally. The user can control light intensity and type of target to be projected using two knobs. The tested NVD generates distorted copies of the projected standard images. Images generated by tested NVD are evaluated by human observer or with help of some measuring tools (luminance probe) important parameters of night vision devices are determined.

Big advantage of NVS test station is ability to test all types of night vision devices. This universality was achieved by using several refractive collimators and a set of targets. To start tests we must prepare proper collimator, exchange target, and align tested NVD.

The test procedures used by the NVS station are based on recommendations of MIL series military standards.

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FEATURES:

- Optimized for testing night vision sights (night vision sights of narrow field of view below about 12º)
- Optionally surveillance night vision devices of field of view over 30º can be tested, too.
- Range of tests: focus, resolution, screen quality (dark spots), brightness gain, field of view, Minimal Resolvable Contrast (resolution tests for variable contrast USAF1951 targets), collimation errors of two channels, gain disparity
- Optional video eye module to record images generated by tested night vision devices and for support during resolution measurement and to enable image magnification measurement. Possible MTF and magnification measurement of a complete NVD.
- Optional boresight to a reference mechanical axis.
- Maintenance level checks: Operational defects (shading, edge glow, flashing,/flickering/intermittent operation, emission points); Cosmetic defects (Dark Spots, Bright Spots**,** Fixed-Pattern Noise, Chicken Wire**,** Image Disparity, Output Brightness Variation, Image Distortion)
- Optional video eye module to record images generated by tested night vision devices and for support during resolution measurement and to enable image magnification measurement. Possible MTF measurement of a complete NVD.
- Ability to test II, II+, III and IV generation night vision devices
- Regulation of light intensity in ultra-wide band (ability to test performance of tested NVD at both low and high illumination levels

SPECIFICATIONS

Modules	LAN light source, set of targets, set of refractive collimators, LM3 luminance probe (standard version) Optional modules: VE10 video eye module, frame grabber, PC, TAS-N software
Maximal optical diameter of tested NVD	150 mm
Light Sources	dual: switch-able 2850K color temperature polychromatic source or 590 nm(or 680 nm) monochromatic source
Illuminance range	from 2 10^{-5} lx to 2lx
Regulation resolution	1 µlux (at low intensity range)
Regulation type	continuous (any value can be set within the regulation range)
Regulation mechanism	Manual
Regulation stability	better than 2% of the set value
Luminance range	0.01-100 cd/m^2
Targets	Set of five exchangeable targets
Output readout	internal digital screen
Control method	manual: Light knobs, Target knob
Power	230 VAC 50/60 Hz
Operating temperature	5°C to 40°C
Average life time of a set of light sources	>10000 hours
Units	Metric (US - option)
Mass	22 kg
Dimensions	1380×370×270 mm

*specifications are subject to change without prior notice

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VERSIONS

Version code	Measurement capabilities	Recommendations
NVS-A	focus (infinity checking), resolution (center, peripheral, high light level), screen quality (dark spots), brightness gain, FOV of night vision sights	Version optimized for standard testing night vision sights
NVS-B	focus (infinity checking), resolution (center, peripheral, high light level), screen quality (dark spots), system gain, FOV, MRC, distortion of night vision sights	Version optimized for extended testing night vision sights
NVS-C	focus (infinity checking), resolution (center, peripheral, high light level), screen quality (dark spots), system gain, FOV, collimation errors, gain disparity, MRC of night vision sights/surveillance night vision devices	Version optimized for extended testing night vision sights and surveillance night vision devices
NVS-D	focus (infinity checking), resolution (center, peripheral, high light level), screen quality (dark spots), system gain, FOV, collimation errors, gain disparity, MRC, MTF, magnification, ability to record digital images of night vision sights/surveillance night vision devices	Computerized version optimized for extended testing all types of night vision devices. This version is recommended for manufacturers of night vision devices.
NVS-G	brightness gain of night vision sights	Simplified version for brightness gain measurement
NVS-R	focus (infinity checking), resolution (center, peripheral)	Simplified version for resolution measurement of night vision sights

The versions A-D enable also to carry out, at maintenance level, checking of the following parameters.

1. Operational defects (shading, edge glow, flashing,/flickering/intermittent operation, emission points)
2. Cosmetic defects (Dark Spots, Bright Spots**,** Fixed-Pattern Noise, Chicken Wire**,** Image Disparity, Output Brightness Variation, Image Distortion)

COMPARISON TO OTHER COMMERCIAL TEST STATIONS

There are other commercially available test stations that can be used for testing night vision. Here we will present advantages of the NVS station in comparison to other commercially available test systems.

- Much wider test capabilities, especially in case of expanded versions. More parameters can be measured.
- NVS station is built using dual switch-able light source (polychromatic 2850K color temperature or monochromatic light source) in situation when typical stations are built using only a monochromatic light source.
- Optional computerized version optimized for production line is also available.
- Night vision sights of big apertures up to 150mm can be tested.
- Unique possibility of measurement of MRC characteristic. Detection, recognition, identification ranges of most targets of interest can be calculated when MRC characteristic is known.

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