

NVT

Tester of surveillance night vision devices

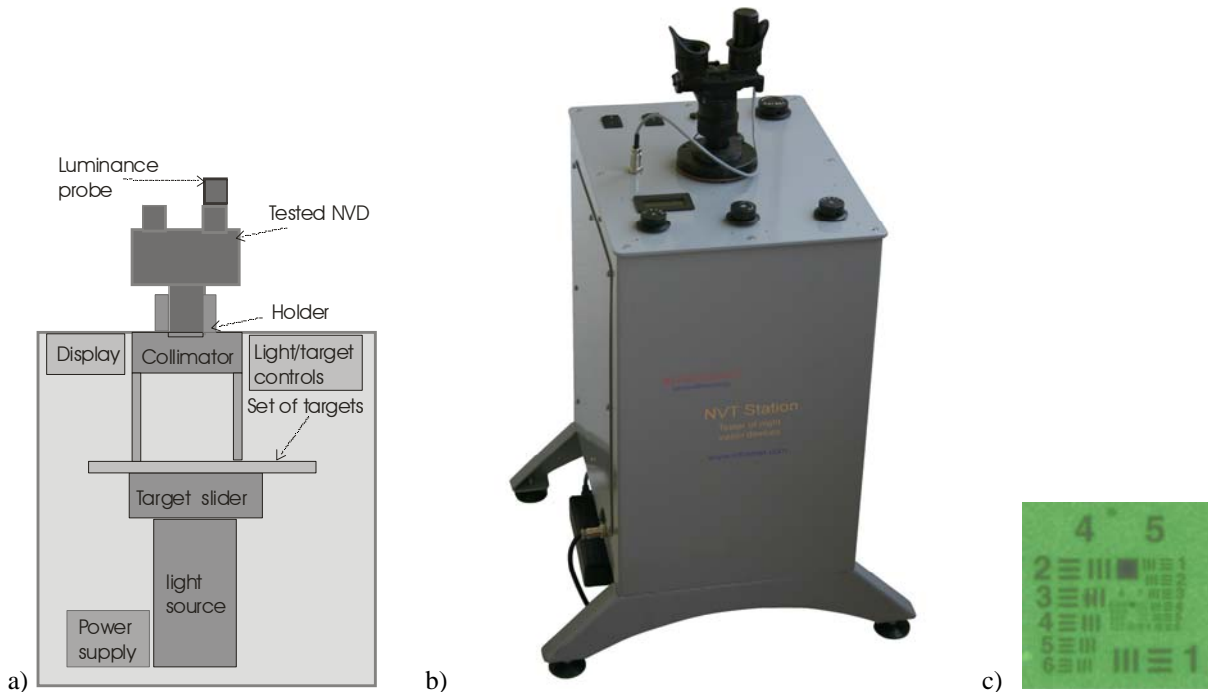


Fig. 1. NVT test station: a) block diagram, b) photo, c) image of USAF1951 target generated by tested NVD

BASIC INFORMATION:

Night vision devices present on the market can be divided into two basic groups: A) surveillance night vision devices (binocular goggles, monocular goggles, monoculars) of wide field of view about 40°; B) night vision sights of narrow field of view below about 12°. There are also some night vision devices of field of view that can be varied using optical adapters. Surveillance night vision devices are the most numerous group (over about 75% of the market). NVT test station is a compact, user friendly test station optimized for high speed testing of surveillance night vision devices.

The station projects images of some standard targets into direction of tested night vision device fixed on the

upper wall and looking down. 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. Both acceptance tests and maintenance tests can be carried out.

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

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FEATURES:

- Optimized for testing night vision devices surveillance night vision devices of wide FOV (from about 30° to 50°): night vision goggles cyclop type, night vision binoculars, monoculars
- 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 error of two channels (ability to detect boresighting errors), 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.
- 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)
- Stand alone, compact design. User friendly test procedures. 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	BM-N base module, LP luminance probe, set of exchangeable holders, PS1 power supply (basic version) Optional modules: VE10 video eye module, frame grabber, PC, TAS-N software
Light Sources	dual: switch-able 2850K color temperature polychromatic source or 590 nm(or 680 nm) monochromatic source
Illuminance range	from at least $2 \cdot 10^{-5}$ lx to 2 lx
Regulation resolution	1 μ lux (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
Type of tube holders	exchangeable holders for different types of NVDs
Targets	single multi-pattern target
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	580×270×370 mm

*specifications are subject to change without prior notice

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VERSIONS

Version code	Measurement capabilities	Recommendations
NVT-A	focus (infinity checking), resolution (center, peripheral, high light level), screen quality (dark spots), brightness gain, FOV	Version optimized for standard testing monocular night vision devices
NVT-B	focus (infinity checking), resolution (center, peripheral, high light level), screen quality (dark spots), system gain, FOV, collimation errors, gain disparity	Version optimized for standard testing both monocular and binocular night vision devices
NVT-C1	focus (infinity checking), resolution (center, peripheral, high light level), screen quality (dark spots), system gain, , FOV, MRC, halo, distortion	Version optimized for extended testing monocular night vision devices
NVT-C2	focus (infinity checking), resolution (center, peripheral, high light level), screen quality (dark spots), system gain, FOV, collimation errors, gain disparity, MRC, distortion	Version optimized for extended testing monocular/binocular night vision devices
NVT-D	focus (infinity checking), resolution (center, peripheral, high light level), screen quality (dark spots), system gain, FOV, collimation errors, gain disparity, MRC, distortion, halo, MTF, ability to record digital images	Computerized version optimized for extended testing monocular/binocular night vision devices. This version is recommended for manufacturers of night vision devices.
NVT-G	brightness gain	Simplified version for brightness gain measurement
NVT-R	focus (infinity checking), resolution (center, peripheral)	Simplified version for resolution measurement

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 NVT station in comparison to other commercially available test systems.

- Much wider test capabilities, especially in case of expanded versions. More parameters can be measured.
- NVT 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.
- Stand-alone and ergonomic design. No tables are needed to use NVT station. The station is put on a floor. The user can sit on a chair, insert vertically tested NVD to the holder and carry put tests. Typical station require additional table.
- Computerized version optimized for production line is also available.

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