

# NVT

## Tester of night vision goggles/monoculars

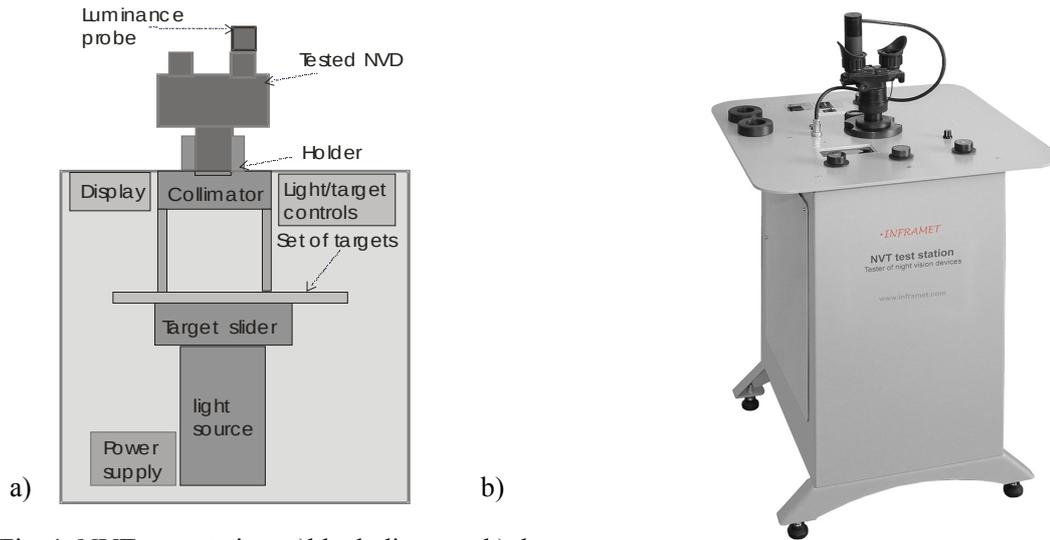


Fig. 1. NVT test station: a) block diagram, b) photo

### BASIC INFORMATION:

Night vision devices present on the market can be divided into two basic groups: A) short range night vision devices (binocular goggles, monocular goggles, monoculars) of wide field of view about  $40^\circ$ ; B) long range night vision devices (night vision sights/binoculars) of narrow field of view below about  $12^\circ$ . Short range night vision devices (goggles/monoculars) are the most numerous group (over 80% of the market).

NVT station is a compact, user friendly test station optimized for testing night vision goggles/monoculars. 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) and 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.

### TEST CAPABILITIES:

- Optimized for testing night vision devices of wide FOV (from about  $30^\circ$  to  $45^\circ$ ): monocular night vision goggles (cyclop type), monoculars, binocular night vision goggles
- Compact, stand alone, user friendly test station optimized for maintenance tests of night vision devices
- Wide range of performance tests: focus, resolution (center, peripheral, high level), screen quality (dark spots), brightness gain, field of view, distortion, collimation error of two channels, gain disparity, magnification, Minimal Resolvable Contrast (resolution tests for variable contrast USAF1951 targets).
- Maintenance 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) according to ASAM recommendations
- Built using dual switch-able light source (switchable polychromatic 2850K color temperature source or monochromatic LED source)
- Optional adapters that enable simplified testing of image intensifier tubes (measurement of resolution and luminance gain)
- Available in form of a series of versions optimized for different applications

### SPECIFICATIONS

Modules

NVT base module (different versions), LPN1 luminance probe, set of ex-

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Light Sources	changeable adapters, PS1 power supply, OB12 optical bridge, OB21 optical bridge Option for testing II tubes: RM module, MM microscope Dual switchable light source: 1) 2850K color temperature halogen source, 2)LED 590 nm (or 660 nm) monochromatic LED source
Illuminance range of light sources	at least continuous 0.1 mlx to 1lx and step 200 lx
Regulation resolution	0.05mlx (at low intensity range)
Regulation mechanism	manual
Regulation stability	better than 1% of the set value
Aperture of built in collimator	At least 30 mm
Collimator resolution	at least 25 lp/mrad
Type of tube holders	exchangeable holders for different types of NVDs
Targets	Set of exchangeable targets
Range of luminance probe	0.01-100 cd/m <sup>2</sup>
Output readout	internal digital screen
Control method	two manual Light knobs
Power	230 /110VAC 50/60 Hz
Operating temperature	-5°C to 40°C
Photometric units	metric (US - option)
Mass	22 kg
Dimensions	380×610×440 mm

### VERSIONS

NVT station is offered in form of a set of different versions optimized for different applications.

Version code	Measurement capabilities	Modules	Recommendations
NVT-A	focus (infinity checking), resolution (center, peripheral, high light level), screen quality (dark spots), brightness gain, FOV	NVT-A base module, standard set of targets, LP1N luminance probe, set of exchangeable adapters, PS1 power supply	standard testing monocular night vision devices
NVT-B	focus (infinity checking), resolution (center, peripheral, high light level), screen quality (dark spots), distortion, system gain, FOV, collimation errors, gain disparity	NVT-B base module, standard set of targets, LP1N luminance probe, set of exchangeable adapters, PS1 power supply, DCP dual cross projector, OB21 optical bridge	standard testing of both monocular and binocular night vision devices
NVT-C1	focus (infinity checking), resolution (center, peripheral, high light level), screen quality (dark spots), distortion, system gain, FOV, MRC, halo, diopter range	NVT-C1 base module, LP1N luminance probe, expanded set of targets, set of exchangeable adapters, PS1 power supply	extended testing monocular night vision devices
NVT-C2	focus (infinity checking), resolution (center, peripheral, high light level), screen quality (dark spots), distortion, system gain, FOV, collimation errors, gain disparity, MRC, diopter range	NVT-C2 base module, expanded set of targets, LP1N luminance probe, set of exchangeable adapters, PS1 power supply, DCP dual cross projector, OB21 optical bridge, DRM diopter range meter	extended testing monocular/binocular night vision devices

All versions enable also to carry out checks of operational defects (shading, edge glow, flashing,/flickering/intermittent operation, emission points).

### Options:

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1. Measurement of resolution of image intensifier tubes. RM resolution module and MM microscope are delivered. Code: additional letter R.
2. Measurement of luminance gain of image intensifier tubes. LG module is delivered. Code: additional letter G.
3. Measurement of magnification of tested NVD. Additional MTT magnification test tool block is delivered. Code: additional letter M.

### COMPARISON TO OTHER COMMERCIAL TEST STATIONS

There are other commercially available test stations that can be used for testing night vision goggles/monoculars. 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. Due to use of polychromatic 2850K color temperature (recommended by MIL standards) the calibration of NVT is valid for any type of night vision device (any spectral sensitivity). Calibration of typical stations is valid only for one type of NVD of specified spectral sensitivity.
- Inframet can deliver tools and know how to enable for user to do recalibration locally.
- 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 night vision device to the holder and carry out tests. Typical test stations require additional table.

Version 5.1

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