

# NV20

## Field tester of binocular night vision goggles



Fig. 1. Photo of the NV20 test station

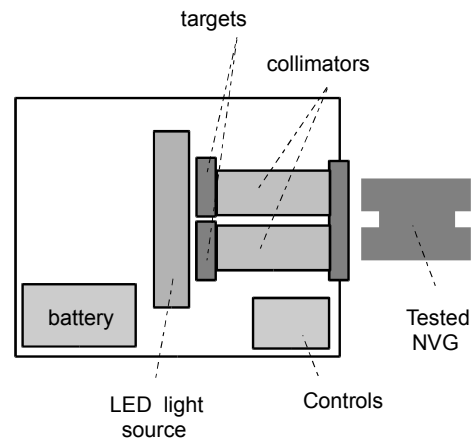


Fig. 2. Block diagram of NV20 test station

### BASIC INFORMATION:

Military forces, paramilitary organizations, and civilian organizations have suffered losses due to accidents at night conditions. It has been proved that performance defects of binocular goggles or improper settings are one of main reasons of accidents during night missions. Due to this reason it is recommended to carry out mission readiness tests.

NV20 station is a test station optimized to carry out basic tests of binocular NVGs before important missions. The task of NV20 station is to help to optimize focus of oculars and objectives of the night vision goggles, check image resolution and to detect NVGs with serious operational defects that can endanger mission success. The station due to its compact size, small mass, battery power and simple operation can be used at field conditions as part of support equipment for night operations.

### TEST CONCEPT

NV20 station works as a dual channel image projector. The station projects an image of a resolution target on an uniform background into direction of tested NVG located opposite to station optics. Light intensity of can be regulated at several steps to simulate typical light conditions that can be met during missions. The target is typically USAF1951 resolution target recommended by majority of military and civilian standards. However, Snellen scale resolution target (popular at air force community) can optionally replace USAF1951 target.

Step regulation of distance to simulated target is possible. Two distances are typically simulated: optical infinity (distance over 1km) and distance about 20m. Most advanced version enables also to check collimation errors.

### USER TASKS

Typical tasks of user of NV20:

1. to focus properly both objectives and oculars of tested NVGs,
2. to check if image resolution is better than specified limits at different operational light conditions, including high light level conditions,
3. to check if image generated by NVGs is free from operational defects (shading, edge glow, flashing/flickering/intermittent operation, emission points)
4. to check if collimation errors between two channels are within accepted limits.

Proper focus – situation when NVGs generate sharp image of all targets located at typical operational range from about 20 m to infinity without necessity to do any refocusing.

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### VERSIONS

There versions of NV20 station of different design and different test capabilities are offered: NV20A, NV20B and NV20C. All three versions externally look similar.

NV20A can be treated as equivalent to simple mission readiness test stations offered on international market. NV20B and NV20C stations significantly exceed performance of typical test stations.

NV20A station is basically a tool to check resolution at night conditions and to check focus for target located at infinity.

NV20B station enables additionally to check performance at high illumination conditions (flare or other artificial sources) and to check full focus for typical operational range from about 20 m to infinity.

NV20C is practically NV20B station with additional ability to check if collimation errors between two channels are within accepted limits.

Detail differences between these versions are listed below. Detail specifications of NV20C is not presented because parameters of NV20C are practically the same as for NV20B station but NV20C enables also to check collimation errors.

Table 1. Main design differences between NV20A and NV20B

Parameter/feature	NV20A	NV20B
Number of illuminance levels of simulated scenery	two	Four (including bright level 200lx)
Type of simulated scenery	Bright USAF1951 target on black uniform background	Dark USAF1951 target on bright large uniform background that fill FOV
Number of simulated distances	One (optical infinity)	Two (optical infinity and about 20 m)

Table 2. Differences in test capabilities between NV20A and NV20B

Test capability	NV20A	NV20B
Focusing of objectives and oculars	Yes (but at single distance equal to infinity)	Yes (but for two distances: about 20m and infinity)
Checking center resolution	Yes. Bright resolution target on black background. Negative contrast.	Yes. Dark resolution target on bright background (positive target contrast according to recommendations of most standards)
Checking bright level resolution (simulation of flare conditions)	No.	Yes. Resolution tests at 200lx illumination.
Checking operational defects	No. Dark background makes difficult to detect operational defects	Yes. Bright background enables easy detection of operational defects

### NV20A SPECIFICATIONS

Modules	Modules: NV20A base block, PS12/3 external AC power supply, battery set, wall adapter, tripod, transport box
Light Source	Monochromatic area LED source calibrated to simulate 2856K color temperature polychromatic light source
Number of optical channels	2 (user can see image in two eyes if using binocular NVGs)
Aperture of built in collimators	at least 35 mm
Collimator resolution	at least 10 lp/mrad
Simulated scenery	Bright USAF1951 target on black background
Spatial frequency range of resolution	At least from 0.5 lp/mrad to 1.78 lp/mrad

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target	
Distance to simulated target	Fixed: optical infinity (distance over 200m)
Simulated illuminance levels	Two switchable levels: Low: 2 mlx, High: 64 mlx
Power	1)Internal battery, 2)230/110 VAC 50/60 Hz
Positioning	NV20A can be located on a table, on tripod or fixed to wall
Operating temperature	-5°C to 40°C
Average life time of LEDs source	>10000 hours
Mass of NV20A base module	<8kg
Dimensions NV20A block	353x195x263mm (without handles) 401x195x263mm (including handles)

### NV20B SPECIFICATIONS

Modules	Modules: NV20B base block, PS12/3 external AC power supply, battery set, wall adapter, tripod, transport box
Light Source	Monochromatic area LED source calibrated to simulate 2856K color temperature polychromatic light source
Number of optical channels	2 (user can see image in two eyes if using binocular NVGs)
Aperture of built in collimators	at least 35 mm
Collimator resolution	at least 10 lp/mrad
Simulated scenery	Dark USAF1951 target on uniform bright background
Spatial frequency range of resolution target	At least from 0.5 lp/mrad to 1.78 lp/mrad
Distance to simulated target	Variable: optical infinity (distance over 2 km) or 20m
Simulated illuminance levels	Four switchable levels: Low: 2 mlx, Medium: 16 mlx, High: 128 mlx, Bright level: 200lx
Power	1)Internal battery, 2)230/110 VAC 50/60 Hz
Positioning	NV20A can be located on a table, on tripod or fixed to wall
Operating temperature	-5°C to 40°C (option -25°C to 40°C)
Average life time of LEDs source	>10000 hours
Mass of NV20B base module	<8kg
Dimensions NV20B block	353x195x263mm (without handles) 401x195x263mm (including handles)
Accessories	wall adapter, tripod

### CALIBRATION

Calibration of NV20 station is done using meters traceable to EU metrology system. Recommended recalibration interval is at least once per three years.

\*specifications are subject to change without prior notice

*Version 3.3*

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