



Night Vision Goggle Systems

Photo Credit

Aviation Specialties Unlimited

Collaborative Support

Air Carrier Operations Branch,
AFS-250

Aircraft Maintenance Division,
General Aviation Branch,
AFS-350

FTW Rotorcraft Aircraft
Certification Office

Aircraft Evaluation Group,
Rotorcraft Support

STL FSDO HEMS Certificate
Management Unit



HQ101123

FAATeam
FAA SAFETY TEAM

Training Is a Must

Night vision goggles (NVGs) are designed to provide the pilot with some of the visual cues they lose at night. When pilots are properly trained in the use of NVGs and use NVGs properly, they can better manage risk during night operations.

However, pilot workload initially increases when using NVGs. Pilots must learn a new set of skills to use NVGs properly and take advantage of the benefits. NVGs are not simple-to-operate devices that pilots can just pick up and use. They need specialized training.

Advantages and Disadvantages of Using NVGs

Advantages

1. NVGs enhance operational safety.
2. NVGs improve situational awareness.
3. NVGs increase ability to see and avoid obstructions at night.

Disadvantages

1. NVGs increase fatigue due to eyestrain and increased helmet weight.
2. Use of NVGs requires dark adaptation time when transitioning from aided to unaided operations.
3. NVGs affect depth perception and limit peripheral vision.

Without
NVGs



With
NVGs



Think of Night Vision Goggles as an Entire System

NVGs are only one part of an entire Night Vision Imaging System (NVIS). The system consists of an FAA-approved NVG-compatible lighting system, properly trained flight and maintenance crews, and an FAA-accepted maintenance program for both the aircraft NVIS lighting system and the NVGs.

If any part of the NVIS lighting system is not working properly or the NVGs are beyond their

service date, then NVG operations cannot be performed.

NVGs are used as an aid to night flying during visual meteorological conditions (VMC). They are not meant to be used as a tool to help pilots take unacceptable risks. Pilots must ensure that they are always in a situation where, if any part of the NVIS fails, they can safely continue operations under visual flight rules (VFR). NVGs are not designed to see through clouds. Operators must always comply with VFR weather minimums during a flight. For air carrier operations, these weather minimums are prescribed in the air carrier's Operation Specifications. The use of NVGs will not change or modify any of the existing regulations.

Current regulations pertaining to night vision goggles:

14 CFR 61.1 (b) (12) and (13)	Definitions—Night vision goggles and operations.
14 CFR 61.31 (k)	Additional training required for night vision goggle operations.
14 CFR 61.51 (k)	Logging night vision goggle time.
14 CFR 61.57 (f)	Night vision goggle operating experience.
14 CFR 61.57 (g)	Night vision goggle proficiency check.
14 CFR 61.195 (k)	Training for night vision goggle operations.
14 CFR 91.205 (h)	Instrument and equipment requirements for night vision goggle operations.

Operators must know what NVG performance specifications they need. If operators fail to thoroughly research NVG performance specifications and specify exactly what NVG specifications they need, then it is possible that they will receive substandard NVGs that will hinder their pilots' ability to function at night. Currently only three manufacturers provide "FAA-Accepted" NVGs: ITT's F4949, NIVISYS, and L-3's M949.

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L-3's M949**

Within each of these models are varying levels of performance. Operators must know what level of performance they need and what NVG part number provides them with that level of performance.

Overcoming Workload

Pilots well trained in the use and limitations of NVGs will be better prepared for the increased mental workload associated with identifying obstacles, terrain, and other potential hazards under various

environmental lighting conditions. Also, a pilot well trained in the use of NVG equipment will be better prepared to overcome night flight stresses, including—

- Working outside the crewmembers' circadian rhythm envelope.
- Fatigue due to eyestrain (particularly if using poorly maintained or incorrectly adjusted NVGs).
- Increased helmet weight.
- Lack of visual cues.
- Aggressive scanning techniques required to deal with NVGs' restricted field of view.
- Possible crew rest/duty cycle issues. Use of NVGs can amplify the stresses associated with night operations for poorly trained and ill-prepared pilots.

Operators wishing to pursue NVG authorization can access inspector guidance at www.faa.gov. (See FAA Order 8900.1, Volume 4—Aircraft Equipment and Operational Authorization, Chapter 7—Rotorcraft Authorizations and Limitations, Section 4—Night Vision Imaging Systems.)

As with any technology available to aviators, NVGs and NVIS are risk-reduction tools if used properly. This technology in no way replaces good, sound aeronautical decisionmaking—the critical link that can break an impending accident chain.