

AVIATION LIGHTING FOR USE WITH NIGHT VISION GOGGLES & AVIATOR NIGHT VISION IMAGING SYSTEMS

Point Lighting Corporation has developed heliport lighting products and systems that are compatible with Night Vision Goggles (NVG) for civilian and military use. Typical Aviator Night Vision Imaging Systems (ANVIS) use so-called "Generation 3" technology which is the current military standard sensing infrared (IR) light in the 600 to 900 nanometer (nm) wavelength range. It is used by military and commercial pilots. Point Lighting IR LEDs emit at 850 nm which is outside the unaided human visual range. Therefore, certain products are intended for use under unaided VFR with NVG compatibility and others are for tactical use with NVG only. The latter will not be visible to unaided eyes. The background information below is partially adapted from the Aviation Research Report B2004/0152 *Night Vision Goggles in Civil Helicopter Operations* by the Australian Transport Safety Bureau.

Night Vision Goggles (NVG) for helicopter pilots use both thermal-imaging (infrared light generated by a heat source) and image-enhancement (boosting of existing low-level light both visible and infrared) technologies. NVG will "see" both normally visible and infrared (IR) light. Compared with unaided night vision, NVG increase a pilot's ability to see the horizon, terrain, observe meteorological conditions and to identify objects. NVG assist a pilot to maintain spatial orientation, to avoid hazards and to visually navigate. NVG do not have the ability to turn night into day or to replicate the colors, field of view and level of visual acuity possible in daylight. US Army operators have reported NVG as being an invaluable aid for navigation, situation awareness and obstruction avoidance at enroute heights of around 1,500 feet above ground level (AGL) and even useful as high as 8,000 feet AGL. In general, the lower and slower the flight, the better is the NVG image.

Night Vision Imaging Systems (NVIS) consist of all the elements necessary to safely operate an aircraft while using NVG. NVIS is useful to a wide range of helicopter operations including emergency medical services (EMS), search and rescue, fire fighting and law enforcement. NVIS consists of all the elements necessary to successfully and safely operate an aircraft while using NVG. This includes the NVG, compatible cockpit lighting, compatible aircraft and heliport lighting, other required aircraft components and equipment, training requirements, operating procedures, and procedures for maintaining the airworthiness of the system.

The pilot can look unaided at the flight instruments by looking under the goggles. To look outside without the aid of NVG, a pilot can either look under the goggles or flip the goggles up. The NVG image is presented in shades of green which can degrade a pilot's ability to recognize objects and perceive depth. Light can be both beneficial and detrimental to the operation of NVG which require some light to operate and provide no benefit in extremely low ambient light conditions. This situation may occur on a clouded night where there is little or no artificial light from the ground. Conversely, direct bright light will decrease the quality of the image. Direct bright light can also result in halo effects around the light source. External lighting can also cause a reduction in the quality of the NVG image. For example, strobe lighting may cause the NVG to rapidly modify the gain causing rapid changes in the NVG image which may be disorientating for the pilot.

It is beneficial to consider these facts in the design and specification of lighting encountered by NVG pilots including heliport and helideck lighting. Incandescent heliport lighting will be visible using NVG, but may be more compatible by reducing the intensity of the lights consistent with the NVIS or install dual use LED lighting including IR LED's.

The aircraft's pilot may operate using NVG and the copilot without NVG using other visual cues and to prevent complacency. Pilots can overestimate the capabilities of NVG and fly into IFR conditions inadvertently. The pilot may use NVG to acquire the heliport at a distance and switch to unaided vision for landing or may use NVG throughout the flight. Under normal operations, the military will use NVG in a similar manner to commercial aircraft. During tactical operations, the military wants "lights out" and IR sources only. Some highly sensitive military systems may require IR sources only at all times.

Note: Point Lighting Corporation offers infrared LED lights in several forms including infrared only, visible + IR together and visible + IR switchable. Products include heliport perimeter lights and aviation obstruction lights.

