

Inno word



Night Vision Goggles Application Trial.

Introduction

In October 2008, the State Aircraft Unit was asked to prepare a position paper on the suitability of Night Vision Goggles (NVG) for fire operations in Victoria.

A component of the position paper was to gain “hands on” experience with NVG technology to enable a more considered decision to be made. Exposure to NVG technology was gained via an approved NVG helicopter training organisation and involved completing a ground school, written exam and an operational flight.

This Innovation Note provides summary information for the interest of Agency personnel.

Observations

The operational NVG flight was conducted in December 2008 between 2230 and 2400 hrs. NVG flights are conducted under the Night Visual Flight Rules.

Having had little “night” flying experience, the author was comfortable adapting to night flying and navigation using NVG. Confined area landings were more challenging in learning to adjust to the loss of depth perception when judging slope and the closeness of “close in” objects.

Identifying and then navigating long distance to prominent features up to 20 km away was conducted with little difficulty. Vehicles were easy to see on roads and the pilot reported that flashing lights on emergency service vehicles can be seen from long distances, though reflected /strobing lights can be a problem when landing at an accident scene.

The terrain encountered during the flight varied between sea level and 1400 ft. Whilst not significantly high, the terrain was very broken with steep treed gullies/valleys. It became apparent how easy it could be, to become over confident, go up a valley, become task orientated and have weather/cloud/smoke come in behind and create an Instrument Meteorological Conditions (IMC) situation.

It also became obvious during the flight how important it was to have a pilot familiar with the flight area. The workload level is reduced and while confidence grew as the flight progressed, the pilot demonstrated situations which showed how easily spatial disorientation could set in for both pilot and flight crew.

During the flight a major power transmission line crossed the flight line in undulating forest terrain. The power line was marked on the map but the easement was cut into the trees facing away and downslope. This required finding the towers as the wires were almost impossible to see with the NVG. This scenario highlighted the dangers which powerlines present for any night operation, especially if outlandings are considered for refuelling or fireground liaison with Divisional Supervisors/Operations Officers.

Operational Considerations

Outside of the initial set up and training costs, there are a number of significant considerations and factors Agencies must accept which will affect the performance of the NVGs and the viability and effectiveness of any NVG operation.

- Night operations will require extensive flight crew, maintenance, and logistical support. The logistical issues are compounded for operations conducted away from the aircraft's base and the location of the Incident Control Centre.
- Aircraft and pilot availability may be more difficult for the Agencies to manage at an incident if day and night operations are required.
- NVG aircraft can only fly below the Lowest Safe Altitude (1000 ft above highest object) if operationally necessary – terrain avoidance of 500 ft above ground level (AGL) is recommended to be the minimum operational height for tasks, except for winching / rappelling / fire bombing operations.

A risk analysis would be required to be prepared if low level reconnaissance was required.

- NVG missions will be subject to Visual Meteorological Conditions (VMC) with regards to weather and visibility.
- There are a significant number of human and environmental factors which Agencies must consider.

Findings

Any fire Agency considering NVG must accept that the integration and application of this technology is a large commitment both financially and operationally.

NVG operations require a very disciplined approach which must be maintained throughout all facets of the program.

NVG technology is not something a fire Agency can pick and choose and do in a half hearted or undisciplined manner, especially in the training of pilots /personnel and the purchasing of equipment. NVG flight operations require rigid planning which must be adhered to.

- NVGs will enable a fire Agency to extend the operating hours of certain flight operations past last light ie. aerial reconnaissance, FLIR, medivac and limited fire crew transport.
- Night aerial fire reconnaissance operations can be conducted using 2 NVG crew (pilot plus 1). NVG will permit good vision for navigation and object definition. NVG would enable an air observer to detect and plot fire edge using the reflected light from the edge. (NVG has no effective infra red capability).
The planning of such a mission has to consider the potential of smoke obscuring the target and or surrounding terrain and more importantly the potential for non VMC to be encountered forcing the flight to be aborted.
- Whilst CASA will permit NVG bellytank firebombing operations under specific criteria, the significant risks to flight crew and ground personnel associated with low level firebombing operations at night in smoke, may outweigh the benefits. Turnaround times, dictated by the requirement to hover refill only at a lit helipad, will increase significantly, potentially making a firebombing operation ineffective.

- At the time of the trial, NVG aerial ignition operations were not approved by the Civil Aviation Safety Authority (CASA), but it is hoped it may be added to the list of approved operations shortly. If approved, NVG would enable some aerial incendiary operations (not aerial driptorch) to be conducted past last light.
- Apart from the mandatory CASA currency requirements there is no doubt that to get the most out of NVG, pilots and flight crew must be thoroughly trained with the devices and use them regularly. An anecdotal comment from the pilot/instructor was that it takes up to 50 hrs flight experience for a pilot to learn all the techniques to maximise the system i.e. judging light and terrain, using external aircraft lighting to get best effect etc.
- Recent pilot and flight crew daylight knowledge of the terrain and flight hazards to be encountered during night operations is crucial. Pilots and flight crew should not be expected to fly at night in terrain that they are not intimately familiar with.
- A fire Agency would need to evaluate their need to fly at night. Whilst the CASA requirements for NVG are very definite, they are not overly prohibitive for an organisation to adhere to. If night flying operations can be justified, then the tools and procedures can be developed to meet the requirements.

If any fire Agency is to embrace NVG, then it must do so with a solid, long term program plan. Anything less would be a waste of time and money and be unsafe for those involved.

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