



Temporary Management Instruction - 05/2019

TMI Title	NVIS Fixed Wing Firebombing
Associated Manual	Nil
Approver	Branch Manager Flight Standards
Effective Date	September 2019
Termination Date	September 2020

Purpose

This TMI specifies the CASA policy for processing AOC applications for Fixed Wing (Aeroplane) NVIS Firebombing that require the grant of an associated CAR 174B permission.

Feedback from users of this TMI on its effectiveness will be reviewed and considered with a view to developing appropriate NVIS firebombing legislative standards for incorporation into relevant CASR Parts.

Background and definitions

In 2007, CASA introduced Civil Aviation Order (CAO) 82.6 to provide a legislative framework for Night Vision Imaging System (NVIS) helicopter operations. CAO 82.6 also included NVIS pilot and aircrew member qualifications.

CAO 82.6 was originally designed to support a trial of NVIS use prior to permitting controlled broader use. As a result of a second trial conducted in 2010, NVIS fire mapping and incendiary dropping and other changes were made to CAO 82.6. This included the introduction of an NVIS special fire endorsement (SFE) applicable to NVIS incendiary dropping and fire mapping.

After an evaluation conducted by CASA of fire-bombing operations conducted in the USA, NVIS firebombing was designated a higher risk activity than incendiary dropping and mapping. The standards for firebombing operations have been included in CASA TMI 01/2017.

Industry recently requested CASA consider the utilisation of Fixed Wing (aeroplane) aircraft for the purpose of NVIS firebombing (in addition to helicopters).

Paragraphs 28 (1) (b) (iii) and (iv) of the Act outline that CASA must be satisfied that an organisation has a sufficient number of suitably qualified and competent employees to conduct or carry out the AOC operations safely and that key personnel in the organisation have appropriate experience in air operations to conduct or to carry out the AOC operations safely.

In developing this TMI, CASA Flight Standards Branch (FSB) has reviewed the risks associated with NVIS fire-bombing operations and the risk mitigations utilised by experienced overseas operators in this field.

Applies to

This TMI applies to all CASA Officers.

Instruction

The information contained in this TMI is to be used as guidance in the assessment process for a NVIS aeroplane firebombing operation.

Definitions

The following definitions, sourced from CAO 82.6, are relevant to NVIS Aeroplane Fire Bombing and have been modified to replace the use of “helicopter” with “aeroplane”.

Adverse event – means any event or incident in which life, health or property is:

- (a) Lost or damaged in, on or by an aeroplane in which NVIS are used; or
- (b) At significant risk of loss or damage in, on or by an aeroplane.

Note: The following are some examples of significant risks: a near miss; NVIS equipment failure, malfunction or abnormal operations; the failure, malfunction or abnormal operation of NVIS-related or affected equipment; unintentional I.M.C. penetration; inadvertent loss of visibility; abnormal degree or accelerated onset of fatigue.

NVIS Aeroplane Firefighting means an aeroplane operation using NVIS involving the application or dropping of water or fire retardant for the purposes of:

- (a) fighting, controlling or extinguishing a fire; or
- (b) a demonstration of fighting, controlling or extinguishing a fire.

Aided flight means a flight in which NVIS are used in an operational position by trained personnel to enhance night vision.

Note: Aided flight is associated with the procedure of goggle-up where the crew member places NVIS in the operational position.

Aircrew member means a crew member of an aeroplane (other than a supernumerary crew member or a person conducting flight engineer duties) assigned by the operator to assist the pilot(s) in the operation of the aeroplane.

Approved operator means an operator who has the approval mentioned in accordance with this TMI for aeroplane NVIS firebombing.

CAR 1988 means the *Civil Aviation Regulations 1988*.

CASR 1998 means the *Civil Aviation Safety Regulations 1998*.

De-goggle means the action of transferring from NVIS flight to non-NVIS (**unaided**) flight by removing the NVIS from a usable position.

Note: The expression is also used as a command and is opposite to goggle-up.

Devoid of surrounding cultural lighting means that at 500 ft above the terrain, and any object on it, in an area there is insufficient ground lighting to maintain an unaided visible horizon.

FAA means the Federal Aviation Administration of the United States.

GNSS means the Global Navigation Satellite System.

Goggle-up means the action of transferring to NVIS flight by placing the NVIS in a position where it may be used by the crew.

Note: The expression is also used as a command and is opposite to de-goggle.

Minimum Height Rules means the minimum height rules contained in CAR 174B (1) for the NVFR or CAR 178(1) and (2) for the IFR or CAR 157 for all operations.

Minimum NVIS crew means the minimum number of NVIS pilots and NVIS crew members required for a particular flight or operation.

Note: CASA approval is not required for a person to use NVIS only for observation or surveillance that is not the primary means of terrain avoidance for safe air navigation using visual surface reference external to the aircraft. However, a person engaged in such unapproved use is not part of the minimum NVIS crew.

Night Vision Goggles means a self-contained binocular night vision enhancement device that:

- (a) Is helmet-mounted or otherwise worn by a person; and
- (b) Can detect and amplify light in both the visual and near infra-red bands of the electromagnetic spectrum.

NVD, or **night vision device**, means night vision enhancement equipment fitted to, or mounted in or on, an aircraft, or worn by a person in the aircraft, and that can:

- (a) detect and amplify light in both the visual and near infra-red bands of the electromagnetic spectrum; or
- (b) provide an artificial image representing topographical displays.

NVFR means night visual flight rules.

NVIS, or **night vision imaging system**, means the system in which all of the elements required to operate an aircraft effectively and safely using NVG are integrated, including NVG and associated equipment, NVG compatible lighting, other associated aircraft components and equipment, associated training and recency requirements and continuing airworthiness.

NVIS aircrew member means a person who:

- (a) has successfully completed NVIS aircrew member training and is qualified in accordance with this Order; or
- (b) is an NVIS aircrew member instructor.

NVIS compatible lighting means aircraft interior or exterior lighting with spectral wavelength, colour, luminance level and uniformity, that has been modified, or designed for use with NVIS, and does not degrade or interfere with the image intensification capability performance of the NVIS beyond acceptable standards.

NVIS competency training means training undertaken by an NVIS pilot, or an NVIS aircrew member, for NVIS flight in accordance with the relevant training requirements and competency standards mentioned in this Order.

NVIS flight time means time spent in NVIS-aided flight by an NVIS aircrew member, an NVIS pilot or a person receiving NVIS flight training, during an NVIS operation.

Note: NVIS flight time should be logged in the specialist column of the aircrew flying log book.

NVIS flight means a flight under the NVFR or IFR (when VMC conditions exist) using NVIS.

NVIS operator means an operator approved by CASA under clause 2 of Appendix 1 to conduct NVIS flights and whose approval has not been suspended or surrendered.

NVIS pilot means:

- (a) a person who is the holder of an NVIS rating with an NVIS endorsement in accordance with Part 61 of CASR 1998; or
- (b) a pilot who is the holder of an equivalent qualification or authorisation issued by a recognised NAA flying an aircraft registered by that same NAA.

Operator means an AOC holder, a Part 141 operator or a Part 142 operator.

Resolution means the capability of NVIS to present an image that makes clear and distinguishable the separate components of a scene or object.

RTCA/DO-275 means the document titled *Minimum Operational Performance Standards for Integrated Night Vision Imaging System Equipment*, referenced RTCA/DO-275, dated 12 October 2001, of RTCA Inc., Washington, USA.

System, for NVIS, means the system in which all of the elements required to operate an aircraft effectively and safely using NVIS are integrated, including NVIS and associated equipment, NVIS compatible lighting, other associated aircraft components and equipment, associated training and recency requirements and continuing airworthiness.

Note: NVIS is synonymous with aviator night vision imaging systems, sometimes called ANVIS.

TSO means Technical Standard Order of the FAA.

unaided flight means the NVIS is in a non-operational position when night vision is not being enhanced by any other means.

Note: Unaided flight is associated with the de-goggle procedure where the crew member places the NVIS in the non-operational position.

use, in relation to NVIS, means use as the primary means of terrain avoidance for safe air navigation by means of visual surface reference external to the aircraft.

Operational Requirements

The following operational requirements are to be met in terms of aircraft, NVIS equipment, pilot qualifications, operations manual and operational procedures.

Aircraft Requirements

The aircraft is to meet the following requirements:

- Has a Type Certificate (TC) or Supplemental Type Certificate (STC) authorising NVIS modified aircraft lighting;
- Has a documented installation and maintenance program for NVIS modified lighting in accordance with CAO 82.6 Appendix 3 Part 3A;
- Is fitted with a serviceable radar altimeter that meets the requirements of CAO 82.6 Appendix 3 Part 2 s 4.2;

- Is to be certified in the transport category or restricted category; and
- Is equipped and certified for flight under the IFR.

Note: Lighting standards as outlined in CAO 82.6 Appendix 3 Part 2 may be considered a suitable modification standard by CASA.

NVIS Standard

NVGs are to meet either the standard specified in CAO 82.6 or TSO C164 technical standards.

Note: CASA may deem NVIS equipment standards as outlined in CAO 82.6 Part 2 s 3 as suitable for aeroplane firebombing operations. Specialist advice should be sought from the CASA Airworthiness and Engineering Branch where it is proposed to utilise NVGs that do not meet the prescribed standards.

Minimum crew requirements

The minimum crew for aeroplane NVIS firebombing is:

- 2 pilots meeting the minimums as outlined in crew qualifications and experience below, and
- Aircrew members / task specialist as required (Operator to determine).

Note This minimum crew requirement does not obviate or provide alleviation from any minimum crew specified in an aircraft flight manual.

Crew qualifications and experience

All flight crew members and aircrew members are to be current and qualified (as appropriate) on the relevant aircraft type for non-NVIS operations.

Pilots are to meet the following qualification and experience requirements:

- Hold a NVIS pilot aeroplane authorisation issued by a foreign National Airworthiness Authority (NAA) or the Australian Defence Force (ADF);
- Hold, or have held, authorisation to conduct aeroplane low altitude NVIS operations issued by a foreign NAA or the ADF;
- Hold an aerial application rating or equivalent foreign NAA or ADF experience;
- Hold day firebombing experience at a level acceptable to CASA*
- Hold an Instrument Rating with a valid Proficiency Check.
- Have 500 hours Pilot in Command (PIC) aeroplane (PIC only);
- Have 50 hours low level NVIS experience; and
- Have 50 hours type experience on the aircraft to be used for NVIS firebombing.

** It is expected the PIC would hold significant day firebombing experience prior to the progression to NVIS firebombing. The Operator is required to state minimum experience levels via a Risk Management Process and CASA is required to review and accept the stated minimums.*

Line training

The Operator is to outline line training requirements and assessment procedures to be conducted prior to NVIS aeroplane firebombing operations.

The line training syllabus is to contain:

- Area familiarisation,
- Lead-up training by day,
- Non-operational firebombing drops to confirm procedures, and
- Line assessment required by the operator.

Operations Manual Requirements

The operator's operations manual is to contain the information outlined in CAO 82.6 Appendix 2.

Note: The above reference contains reference to Helicopter Landing sites. This paragraph may be disregarded for NVIS aeroplane operations.

In addition to the operations manual content required by CAO 82.6 Appendix 2, the manual is to also contain the following information:

- NVIS aeroplane Training and Checking requirements
- Aircraft equipment requirements for NVG operations and MEL deferrals
- Flight planning procedures including hazard (obstacle) identification
- Processes for daytime surveys of the intended operating areas
- NVG visibility requirements, weather minimums and inflight assessment
- Departure aerodrome requirements and point of "goggle up" and procedure
- Light discipline (internal and external)
- Transit altitude to operational area and descent procedures to firebombing height
- Obstacle avoidance procedures
- Minimum safe altitude for NVIS operations
- Operational procedures associated with firebombing
- Climb out procedures and altitude requirements
- Loss of visibility procedures
- Emergency procedures for NVIS malfunctions
- Use of external lighting
- Return to base and "de-goggle" location and procedures
- Reporting of NVIS irregularities and discrepancies.
- The operator is to have checklists and procedures for non-NVIS operations including abnormal and emergency operations.

Risk Management Plan

The Operator is to provide a Risk Management Plan (RMP) for all aspects of NVIS aeroplane firebombing.

Risk controls are to be embedded into the Operators Operations Manual.

The RMP is to be reviewed by CASA to ensure all flight risks remain as low as reasonably practical.

Operational Restrictions

The following operational restrictions apply to NVIS aeroplane firebombing:

- NVIS are only to be used during the conduct of the actual firebombing operation, including the establishment of situational awareness and light level awareness during transit above minimum height. They are not to be used for the take-off and landing portion of the flight.
- Minimum altitude for areas that have not been surveyed by day is 400' AGL.

References

When assessing operators' applications, CASA Regional Offices should consider using the following reference document, which provides example risk assessments and checklists.

- a. Firescope Night Flying Guidelines (April 2013).
<https://firescope.caloes.ca.gov/ICS%20Documents/ICS-800.pdf#search=night%20flying%20guidelines>

Signed

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