

A decorative graphic consisting of overlapping geometric shapes in shades of green and blue. It contains two grayscale photographs: one of a crowd of people walking and another of hands writing on a document.

Temporary Management Instruction- 2019/05

TMI Title	NVIS Fixed Wing Firebombing
Associated Manual	Nil
Approver	Branch Manager Flight Standards
Effective Date	12/2021
Termination Date	12/2022

Purpose

This TMI specifies the CASA policy for processing applications for Fixed Wing (Aeroplane) NVIS Firebombing that require the grant of an exemption from Part 91.277 of CASR (NVFR minimum height rules).

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

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 Rotorcraft firebombing operations were included into TMI 01-2017.

In 2019, Industry requested CASA consider the utilisation of Fixed Wing (aeroplane) aircraft for the purpose of NVIS firebombing (in addition to helicopters).

Subparagraphs 28 (1) (b) (iii) and (iv) of the Act outline that CASA must be satisfied that an organisation has sufficient 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.

As of 2 December 21, the flight standards for NVIS rotorcraft firebombing were incorporated into the Chapter 16 of the CASR Part 138 MOS.

Note: As at the time of the review of this TMI in December 2021, CASA has not received an application for FW NVIS firebombing.

Applies to

This TMI applies to all CASA Officers assessing NVIS fixed wing firebombing applications.

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 CASR Part 138, 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 firebombing means an NVIS operation, in an operational area for a fire, to fight the fire using water, fire retardant, or a similar substance, that is dropped from an aircraft equipped with a belly tank.

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.

Air crew member has the meaning given by Part 1 of the CASR Dictionary

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.

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 minimum height rules outlined in CASR Part 91 MOS Chapter 12.

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 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
- (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 air crew member for a particular NVIS operation, means an air crew member:

- (a) of an NVIS operator who holds an aerial work certificate that includes the NVIS operation
- (b) who is qualified (however described) to carry out the person's assigned functions as an air crew member for the operation in accordance with CASR Part 138 MOS Chapter 12.

NVIS competency training means training undertaken by an NVIS pilot, or an NVIS air crew member, for NVIS flight in accordance with the relevant training requirements and competency standards mentioned in the NVIS multi-part AC.

NVIS flight time means time spent in NVIS-aided flight by an NVIS air crew 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 logbook.

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

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 a Part 138 certificate holder, a Part 133 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 the use of NVIS, means used for safe air navigation by means of visual surface reference external to the aircraft conducting the operation.

Operational Requirements

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

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 CASR Part 91 MOS Chapter 26.78
- is fitted with a serviceable radar altimeter that meets the requirements of CASR Part 91 MOS Chapter 26.79
- is to be certified in the transport category or restricted category
- is equipped and certified for flight under the IFR.

Note: Lighting standards as outlined in CASR Part 91 MOS Chapter 26.76 may be considered a suitable modification standard by CASA.

NVIS Standard

NVGs are to meet either the standard specified in CASR Part 91 MOS Chapter 26.77 or TSO C164 technical standards.

Note: CASA may deem NVIS equipment standards as outlined in CASR Part 91 MOS Chapter 26.77 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 paragraph 6.4 below
- air crew 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 air crew 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, an 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 Instrument Proficiency Check and meet the recency requirements for instrument flight as required by CASR Part 61
- have 500 hours flying experience as Pilot in Command (PIC) of aeroplanes (PIC only)
- have 50 hours flying experience conducting low level NVIS operations
- have 50 hours flying experience on the type of 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
- line assessment required by the operator.

Operations Manual Requirements

The operator's operations manual is to contain the information outlined in the CASA NVIS multi-part Advisory Circular (AC), Appendix A.

In addition to the operations manual content outlined in the NVIS AC, 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.

Alternate aerodrome lighting requirements

The operator and pilot in command are to comply with the NVIS alternate aerodrome lighting requirements outlined in CASR Part 138 MOS Chapter 12.08.

No formation flights

The pilot in command of an aircraft for a NVIS operation must not engage in formation flight with another aircraft.

Weather Requirements – cloud

The operator and pilot in command are to comply with the minimum NVIS weather requirements - cloud, outlined in CASR Part 138 MOS Chapter 12.11.

Use of a belly tank

The operator and pilot in command are to comply with the requirements for the use of a belly tank outlined in CASR Part 138 MOS Chapter 16.07.

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 ft AGL.

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

[Firescope Night Flying Guidelines \(April 2013\).](#)

Signed

Roger Crosthwaite
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Flight Standards
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