Australian Government
Civil Aviation Safety Authority

TEMPORARY MANAGEMENT INSTRUCTION

NVIS Fixed Wing Fire Bombing - 2019-05

August 2024

Contents

References

Acronyms

The acronyms and abbreviations used in this Temporary Management Instruction (TMI) are listed in the table below.

Table 1. Acronyms

Acronym and abbreviation	Description
CAR	*Civil Aviation Regulations 1988*
CASA	Civil Aviation Safety Authority
CASR	*Civil Aviation Safety Regulations 1998*
FAA	Federal Aviation Administration of the United States
GNSS	Global Navigation Satellite System
NVIS	Night Vision Intensification System
NVD	Night vision device
NVFR	Night visual flight rules
TSO	Technical Standards Order of the FAA

Definitions

Terms that have specific meaning within this TMI are defined in the table below and are sourced from CASR Part 138, are relevant to NVIS Aeroplane Fire Bombing and have been modified to replace the use of “helicopter” with “aeroplane”. Where definitions from the Regulations have been reproduced for ease of reference, these are identified by shading. Should there be a discrepancy between a definition given in this AC and the Regulations, the definition in the Regulations prevails.

Table 2. Definitions

Term	Definition
aided flight	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	An operator who has the approval mentioned in accordance with this TMI for aeroplane NVIS firebombing.
de-goggle	The action of transferring from NVIS flight to non-NVIS (unaided) flight by removing the NVIS from a usable position.

Term	Definition
	Note: The expression is also used as a command and is opposite to goggle-up.
foreign registered aircraft	means an aircraft registered: a. in a foreign country; or b. under a joint registration plan or an international registration plan.
goggle-up	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.
low-level operation	means an operation below 500 ft AGL, other than the following: c. climbing from take-off d. descending for the purpose of landing e. an aerial application operation.
Minimum Height Rules	The minimum height rules stated in section 9.02 of the Part 138 MOS.
minimum NVIS crew	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	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	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.
NVIS, or night vision imaging system	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 aeroplane firebombing	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.
NVIS air crew member	For a particular NVIS operation, means an air crew member:

Term	Definition
	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	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	Means a flight conducted using a night vision imaging system.
NVIS flight time	Time spent in 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 pilot	Is: a. for an aircraft registered under Part 47 of CASR, a person who is the holder of an NVIS rating with an NVIS endorsement in accordance with Part 61 of CASR; or b. for a foreign registered aircraft, a pilot who is the holder of an equivalent qualification or authorisation, or who meets equivalent requirements, of the NAA of the aircraft's State of registry, relevant to the activity being conducted. **Note:** This definition is a modified version of the definition in Chapter 12 of the Part 138 MOS.
operator	A Part 138 certificate holder, a Part 133 AOC holder, a Part 141 operator or a Part 142 operator.
resolution	The capability of NVIS to present an image that makes clear and distinguishable the separate components of a scene or object.
RTCA/DO-275	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
State of registry	For a foreign registered aircraft, means the foreign country on whose register the aircraft is entered.
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.
unaided flight	The NVIS is in a non-operational position when night vision is not being enhanced by any other means.

Term	Definition
	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.

Revision history

This version of the TMI is approved by the Branch Manager, Flight Standards.

Revisions to this TMI are recorded below in order of most recent first.

Table 3. Revision history

Version number	Date	Parts and sections	Details
3.0	August 2024	All	TMI reviewed and updated to better explain the application of the Part 138 rules to aeroplane NVIS operations.
2.0	May 2022	All	Update to include new legislation references
1.0	2019	All	Initial issue

Introduction

Purpose

This TMI specifies the CASA policy for processing applications for Fixed Wing (Aeroplane) NVIS Firebombing that require the grant of an:

- approval under regulation 138.025 of CASR for the purposes of paragraph 16.05(2)(c) of the Part 138 MOS; and
- exemption from regulation 91.277 or 91.305 of CASR (the night VFR, and the IFR, minimum height rules).

This TMI will remain in force until the OPS.05 Night Vision Imaging Systems protocol, principle and worksheet documents are published.

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 firebombing 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 safety 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 firebombing air operators.

As of 2 December 2021 and the commencement of the flight operations regulations, the standards for NVIS rotorcraft firebombing were fully incorporated into Chapter 16 of the Part 138 MOS, but the standards for aeroplane NVIS firebombing have not yet been incorporated and Chapter 9 of the Part 138 MOS does not contain any alleviation from CASR 91.277 and 91.305 for aeroplane NVIS firebombing operations - thereby requiring exemptions if operations below the height specified in these 2 regulations are to be conducted.

> **Note:** As at the time of the review of this TMI in August 2024, 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 assessment policy for a NVIS aeroplane firebombing operation.

Inspectors are to advise aerial work operators applying for the approval under regulation 138.025 of CASR for the purposes of paragraph 16.05(2)(c) of the Part 138 MOS that they will also need to apply for an exemption from either, or both (as relevant to the operator's intended operational model), of regulation 91.277 and 91.305 of CASR. The operator should read the CASA webpage on exemptions (https://www.casa.gov.au/rules/regulatory-framework/exemptions-explained).

Assessment policies

Equipment (aircraft and NVIS) requirements

The requirements of Division 26.17 of the Part 91 MOS must be met. Amongst other matters, this includes the aircraft:

- having a Type Certificate (TC) or Supplemental Type Certificate (STC) authorising NVIS modified aircraft lighting (see subsection 26.76(1) of the Part 91 MOS)
- has a documented installation and maintenance program for NVIS modified lighting (see section 26.78 of the Part 91 MOS)
- is fitted with a serviceable radar altimeter (see section 26.79 of the Part 91 MOS)

In addition to the requirements of the Part 91 MOS, the aircraft is to be:

- certified in the transport category or restricted category
- equipped and certified for flight under the IFR.

NVGs must meet the requirements of section 26.77 of the Part 91 MOS.

Airworthiness and Engineering Branch NVIS specialists are the only persons that should grant the approval mentioned in paragraph 26.77(1)(b) of the Part 91 MOS. These approvals are an authorisation for the purpose of Part 11 of CASR and are therefore subject to the requirements of that Part.

Minimum crew requirements

The minimum crew requirements for aeroplane NVIS firebombing are:

- 2 NVIS pilots meeting the minimum crew qualifications and experience requirements outlined below
- the number of air crew members and/or task specialists as determined by the aerial work operator.

> **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 crew members are to be current and qualified (as appropriate) on the relevant aircraft type for non-NVIS operations. For example, if the aerial work operator does not require any task specialist to be carried on this type of aeroplane conducting day firebombing operations, but they do require a task specialist to conduct NVIS firebombing, then the task specialist would not need to be qualified to conduct day firebombing.

Pilots are to meet the following minimum 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 an aeroplane low-level operation using NVIS 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 (see Note below)
- hold an Instrument Rating with a valid Instrument Proficiency Check and meet the recency requirements for instrument flight as required by CASR Part 61 (or equivalent foreign authorisations if the aircraft is a foreign registered aircraft)
- have 500 hours flying experience as Pilot in Command (PIC) of aeroplanes (PIC only)

- have 50 hours flying experience conducting low-level operations using NVIS
- have 50 hours flying experience on the type of aeroplane to be used for NVIS firebombing.

> **Note:** It is expected the PIC would hold significant day firebombing experience prior to the progression to NVIS firebombing, with the aerial work operator proposing minimum experience levels accompanied by an appropriate Risk Assessment.

Line training

The aerial work 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 at least the following:

- area familiarisation
- lead-up training by day
- non-operational firebombing drops to confirm procedures
- line assessment required by the aerial work operator.

Operations manual requirements

The aerial work operator's operations manual is to contain the information outlined in Appendix A to Multi-Part AC 91-13, 133-09 and 138-06 *Night vision imaging - helicopters*.

In addition to the operations manual content outlined in the NVIS Multi-Part AC the manual is to also contain at least 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.

Risk management plan

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

Risk controls are to be embedded into the aerial work operator's 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 restriction outcomes are to be included as conditions on any 138.025 approval granted for the purposes of paragraph 16.05(2)(c) of the Part 138 MOS and exemption from regulation 91.277 or 91.305 of CASR under this TMI:

- For the avoidance of doubt, section 12.08 of the Part 138 MOS is not to apply to an aeroplane NVIS firebombing operation (this relates to alternate aerodrome lighting).
- 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. Pilots are to be de-goggled for the take-off and landing portions of the flight.

> **Note:** This restriction has the outcome that an aeroplane in an NVIS operation must only take-off or land on runways with operational non-NVIS compatible runway lights (as an example, typically a runway would have operative white lights).

- Minimum altitude for areas that have not been surveyed by day is 400 ft AGL.

Inspectors are to review the requirements applicable to rotorcraft IFR flights, and VFR flights at night.

When assessing aerial work operators' applications, CASA officers should review the following requirements and documents to determine appropriate safety controls that should be embedded within an approval or exemption as conditions:

- Section 9.04 of the Part 138 MOS (this contains the requirements for rotorcraft IFR flights and night VFR flights below the minimum heights specified in regulations 91.277 and 91.305 of CASR)
- Firescope Night Flying Guidelines (April 2013) (this document provides example risk assessments and checklists).

Signed

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Branch Manager Flight Standards

Flight Standards

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