

Annex A

Proposed Civil Aviation Order (CAO 82.6) – Use of Night Vision Goggles (NVG) in Helicopter Operations

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Australian Government

Civil Aviation Safety Authority

I, WILLIAM BRUCE BYRON, Director of Aviation Safety, on behalf of CASA, make this instrument under paragraph 28BA (1) (b) of the *Civil Aviation Act 1988* and subregulations 5 (1), 207 (2), 215 (3), 217 (1) and 308 (1) of the *Civil Aviation Regulations 1988*.

Bruce Byron
Director of Aviation Safety and
Chief Executive Officer

2007

Civil Aviation Order 82.6 Instrument 2007

1 Name of instrument

This instrument is the *Civil Aviation Order 82.6 Instrument 2007*.

2 Duration

This instrument:

- (a) commences on 1 July 2007; and
- (b) stops having effect at the end of 30 June 2008.

Note The temporary nature of this instrument is to facilitate a controlled trial of night vision goggles by approved operators.

3 Transitional

- (1) Each approval to use night vision goggles (*NVG*) that was issued before 1 July 2007 is revoked.
- (2) Despite subsection (1), if, on 1 July 2007, an operator has an approval to use *NVG* that was issued before 1 July 2007, the operator may continue to use *NVG* in accordance with the approval until the end of 30 September 2007.

Note On commencement of this instrument, pre-existing *NVG* approval holders have 3 months to apply for, and obtain, approval to use *NVG* under this instrument.

4 Civil Aviation Order 82.6

Schedule 1 makes Civil Aviation Order 82.6.

Schedule 1 Civil Aviation Order 82.6

Night vision goggles — helicopters

Part 1 — Preliminary matters

1 Definitions

In this Order:

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

- (a) lost or damaged in, on or by a helicopter in which NVG are used; or
- (b) at significant risk of loss or damage in, on or by a helicopter.

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

aerial fire fighting means an operation in an operational area for a fire to fight the fire from the air using only the following:

- (a) a multi-engine helicopter equipped with a belly tank that:
 - (i) is capable of being filled and refilled while the helicopter is on the ground; and
 - (ii) during the operation, is only filled or refilled while the helicopter is on the ground;
- (b) a flight crew of at least 1 pilot and 1 aircrew member.

aerial fire fighting support means an operation for:

- (a) the tactical insertion or extraction of firefighting crews in an operational area for a fire; or
- (b) the carriage of persons to map, locate or observe fires, or to control or direct firefighting operations.

Note In this Order, aerial fire fighting support does not include aerial fire fighting in the form of, for example, water bombing.

aided flight means a flight in which NVG 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 NVG in the operational position.

aircrew member means a crew member of a helicopter (other than a supernumerary crew member) assigned by the operator:

- (a) to assist the pilot in the operation of the helicopter; or
- (b) to operate the winch on the helicopter; or
- (c) to supervise rappelling or sling load operations; or
- (d) to supervise or assist a medical, paramedical or rescue crew member in the performance of his or her duties on the helicopter.

approved NVG flight simulator means a flight simulator approved by CASA for NVG initial qualification training by a trainee who holds an endorsement for the aircraft which is simulated.

approved operator means an operator who has the approval mentioned in subparagraph 1 (c) (iii) of Appendix 1 to use NVG for the trial.

CAR 1988 means the *Civil Aviation Regulations 1988*.

de-goggle means the action of transferring from NVG flight to non-NVG (*unaided*) flight by removing the NVG 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.

emergency medical services means an operation where transportation is required to facilitate emergency or medical assistance by an aircraft carrying 1 or more of the following:

- (a) medical personnel;
- (b) medical supplies (including equipment, blood, organs or drugs);
- (c) ill or injured persons, and other persons directly involved in, or associated with, their retrieval or care.

goggle-up means the action of transferring to NVG flight by placing the NVG 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.

HLS means a helicopter landing site.

HLS-NVG basic means a HLS that:

- (a) does not conform to the guidelines contained in CAAP 92-2 (1) for standard HLS night operations; and
- (b) is unlit or unprepared.

HLS-NVG standard means a HLS that:

- (a) conforms to the guidelines contained in CAAP 92-2 (1) for NVG standard HLS night operations; and
- (b) is unlit; and
- (c) does not require a windsock.

HLS operations for a helicopter means:

- (a) take off or landing at a HLS; or
- (b) operations at a HLS that do not involve a landing on skids or wheels; or
- (c) HLS similar operations:
 - (i) that are approach to the hover, winching, sling load operations, rappelling, hovering, deplaning, emplaning or similar types of operations; and
 - (ii) for the conduct of which each relevant crew member is qualified.

law enforcement, for an operation, means an operation for the enforcement of the laws applying in Australian territory, including, customs, waterways or border protection laws.

LSALT, or **lowest safe altitude**, means not less than 1 000 feet above the highest obstacle located within 10 miles of the helicopter in flight, except when take-off or landing is necessary.

marine pilot transfer means an operation, in accordance with Civil Aviation Order 95.7.3, to transfer a marine pilot from:

- (a) land to ship; or
- (b) ship to land or
- (c) ship to ship.

minimum NVG crew means the minimum number of NVG aided and NVG qualified crew members required for a particular flight or operation.

Note CASA approval is not required for a person to use NVG 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 NVG crew.

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.

NVG, or **night vision goggles**, means a self-contained binocular night vision enhancement device, usually helmet mounted or otherwise worn by a person that can detect and amplify light in both the visual and near infra-red bands of the electromagnetic spectrum.

NVG aircrew member means a person who:

- (a) has successfully completed NVG aircrew member training and is qualified in accordance with this Order; or
- (b) is an NVG aircrew member instructor; or
- (c) is an NVG pilot, an NVG flight instructor, an NVG FOI or an NVG testing officer who has complied with the aircrew member training and competency requirements of Appendix 3.

NVG aircrew member instructor means a person qualified in accordance with this Order to instruct air crew members.

NVG CCF, or **NVG capability check flight**, means:

- (a) if carried out by a TCO — an NVG proficiency check flight to test aeronautical skills and knowledge for use of NVG, carried out in accordance with:
 - (i) the requirements of this Order for an NVG CCF; and

- (ii) the operator's training and checking manual; and
- (b) otherwise — an NVG base check flight to test aeronautical skills and knowledge for use of NVG, carried out in accordance with:
 - (i) the requirements of this Order for an NVG CCF; and
 - (ii) Part C of the operator's operations manual.

NVG 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 NVG, and does not degrade or interfere with the image intensification capability performance of the NVG beyond acceptable standards.

NVG flight instructor means an NVG pilot who is a flight instructor qualified in accordance with this Order and approved in writing by CASA to conduct NVG training.

NVG flight time means the flight time gained by an NVG aircrew member or pilot, or a person receiving NVG flight training, or during an NVG operation.

Note NVG flight time must be logged in the specialist column of the aircrew flying log book.

NVG FOI means a CASA flying operations inspector appointed to carry out some, or all, of the duties of an NVG FOI or an NVG testing officer.

NVG initial training means training to qualify a person for an NVG pilot or NVG aircrew member qualification.

NVG operation means a permitted NVG operation under subclause 5.1 of Appendix 1.

NVG operator means an operator approved by CASA under clause 2 of Appendix 1 to conduct NVG operations.

NVG pilot means a person who:

- (a) has successfully met the requirements of this Order for the issue of an initial NVG endorsement and had his or her log book endorsed accordingly; or
- (b) is an NVG flight instructor, an NVG training and checking pilot, an NVG FOI or an NVG testing officer.

NVG testing officer means a person appointed in writing by CASA to be an NVG testing officer to:

- (a) conduct NVG flight tests; and
- (b) issue endorsements for NVG qualifications based on those flight tests.

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

NVG training and checking pilot means an NVG pilot who is a training and checking pilot for a TCO, qualified in accordance with this Order and approved in writing by CASA to conduct training and checking.

NVG training provider means:

- (a) a training organisation in Australia approved by CASA to provide NVG initial training for this Order; or
- (b) a training organisation outside Australia approved by the relevant national aviation authority, recognised by CASA, to provide NVG initial training.

Note The national aviation authorities, recognised by CASA, are listed in CAAP 174-1.

NVG trial means the controlled trial of NVG in accordance with this Order by NVG operators approved by CASA to participate in the trial.

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.

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

resolution means the capability of NVG 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.

search and rescue means an operation by an aircraft to search, locate, rescue, or provide immediate assistance to, a person threatened by a grave and immediate danger or a hostile environment.

TCO, or **training and checking organisation**, means a training and checking organisation approved by CASA under subregulation 217 (1) of CAR 1988 for this Order.

unaided flight means the NVG 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 NVG in the non-operational position.

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

Part 2 — Directions and exemptions

2 Direction — instruments and equipment

Under subregulation 207 (2) of CAR 1988, for a helicopter in any class of operation permitted under this instrument to use NVG, CASA approves NVG that comply with all of the requirements of this Order and directs NVG use only in accordance with this Order.

3 Direction — operations manual

Under subregulation 215 (3) of CAR 1988, CASA makes the directions that appear in this Order.

4 Specified operators — provision of a TCO

Under subregulation 217 (1) of CAR 1988, CASA specifies that each NVG operator must provide a TCO for NVG initial training unless the training is provided by an NVG training provider.

5 Direction — operations manual

If an operator does not have, or use, a TCO or NVG training provider for training, the operator may only conduct training, other than initial training, if the operations manual specifies the line and role training requirements in Part C of the operations manual.

6 Exemption — minimum height for V.F.R. flights at night

Under subregulation 308 (1) of CAR 1988, the pilot in command of a helicopter is exempt from compliance with subregulation 174B (1) of CAR 1988 if:

- (a) he or she is engaged in conducting an operation that is 1 of the following permitted NVG operations:
 - (i) search and rescue, law enforcement, emergency medical services or aerial fire fighting;
 - (ii) NVG training for an operation mentioned in subparagraph 6 (a) (i);
 - (iii) an NVG positioning flight for an operation mentioned in subparagraph 6 (a) (i);
 - (iv) NVG initial training by a TCO or NVG training provider; and
- (b) he or she uses NVG for the operation in accordance with this Order and the operator's operations manual; and
- (c) it is operationally necessary to fly below the relevant LSALT that would apply but for this exemption.

7 Exemption — navigation lights

Under subregulation 308 (1) of CAR 1988, the operator and the pilot in command of a helicopter in an NVG operation are each exempt from compliance with subregulation 195 (1) of CAR 1988 for a navigation lighting requirement of Part 13 of CAR 1988 if he or she is complying with a lighting requirement of this Order that is at variance with the requirement of Part 13.

Note The pilot in command should put a note in the free text section of the flight notification to advise air traffic control that he or she is goggle equipped and may be operating without displaying lights.

Part 3 — Conditions on each air operator's certificate

8 AOC condition

- 8.1 For paragraph 28BA (1) (b) of the Act, an AOC is subject to the condition that the AOC holder must comply with this Order for the use of NVG.
- 8.2 This Order does not affect the operation of any other Civil Aviation Order.

9 Conditions for use of NVG by an AOC holder

- 9.1 An AOC holder (the *holder*) may only use a night vision device that is in the form of NVG and the use may only be in accordance with this Order and the holder's operations manual.
- 9.2 If a TCO, or an NVG training provider, is approved by CASA to use NVG for NVG initial training, the TCO or the training provider must also have an AOC that authorises NVG flying training.

Appendix 1

Use of NVG

1 Restricted use of NVG

NVG may only be used in an operation:

- (a) in accordance with this Order; and
- (b) by an operator who has prepared a risk assessment for operations using NVG; and
- (c) if the operator:
 - (i) complies with the directions in Appendix 2, or with any other directions issued by CASA under subregulation 215 (3) of CAR 1988, about the information, procedures and instructions to be included, revised or varied in the operator's operations manual; and
 - (ii) ensures compliance with the operations manual; and
 - (iii) has the written approval of CASA to use NVG for the NVG trial in accordance with clause 2 and the approval has not been suspended or revoked under clause 3.

Note 1 Directions are set out in this Order. CASA may issue other directions under subregulation 215 (3) of CAR 1988 to individual operators of its own volition or on request.

Note 2 Under subregulation 215 (9) of CAR 1988, each member of an operator's operations personnel must comply with all instructions in the operations manual in so far as they relate to the person's duties and activities.

Note 3 The NVG trial is defined in subsection 1 of this Order.

2 Approval to use NVG for the trial

- 2.1 An operator may apply to CASA in writing for approval to use NVG in accordance with this Order.
- 2.2 CASA may issue the approval only if the operator demonstrates that it complies with the requirements of this Order.
- 2.3 An approval may be issued subject to conditions that are necessary in the interests of safety.

3 Suspension, revocation or variation of approval

- 3.1 An approval stops having effect if:
 - (a) it is suspended or revoked by CASA; or
 - (b) the operator tells CASA in writing that the operator wants to surrender the approval.
- 3.2 If the approval is revoked or surrendered, the operator must return the approval instrument to CASA within 14 days.

- 3.3 CASA may vary, suspend or revoke an approval if:
- (a) the operator does not comply with:
 - (i) this Order, including any conditions mentioned in the operator's approval under clause 1A; or
 - (ii) the operations manual; or
 - (b) CASA is refused access to the operator to assess its continued compliance with this Order or with the conditions of its approval.
- 3.4 To avoid doubt, in this clause revoke has the same meaning and effect as cancel.

4 Reporting for NVG trial

- 4.1 At intervals not exceeding 3 months, each approved operator must report to CASA in writing, and on the approved form:
- (a) the number and nature of NVG operations conducted in the preceding 3 months, including if no operations were conducted; and
 - (b) on any matter mentioned in subclause 4.4.
- 4.2 If, during an operation under the NVFR or the I.F.R., an adverse event occurs (with or without NVG), the operator must ensure that the pilot in command of the helicopter completes and submits to CASA, within 24 hours of completion of the operation, the web based or other approved reporting form.
- 4.3 The operator must complete his or her investigation into an adverse event as soon as possible and report the results to CASA immediately after that.
- 4.4 Without affecting any requirement to report to the Australian Transport Safety Bureau (ATSB), each approved operator must report to CASA any Immediately Reportable Matters and any Routinely Reportable Matters involving the use of NVG which it reported to the ATSB.
- 4.5 Each approved operator must report to CASA details of any unusual or abnormal operation of its NVIS.

Note The ATSB reporting format is acceptable as a form for this report.

5 Permitted NVG operations

- 5.1 NVG as the primary means of terrain avoidance for safe air navigation by means of visual surface reference external to an aircraft may only be used in the following helicopter NVG operations (*permitted NVG operations*):
- (a) search and rescue;
 - (b) law enforcement;
 - (c) aerial fire fighting;
 - (d) aerial fire fighting support;
 - (e) emergency medical services;
 - (f) marine pilot transfer;
 - (g) provision of:
 - (i) NVG initial training; or

- (ii) NVG training for 1 or more of the operations mentioned in paragraphs (a) to (f); or
- (iii) NVG CCF or NVG flight tests;
- (h) positioning flight for an operation mentioned in paragraphs (a) to (f), inclusive;
- (h) NVG flight for demonstrating NVG technology.

5.2 A permitted NVG operation under the V.F.R. must be conducted at, or above, LSALT unless permitted otherwise in accordance with subsection 6 of this Order.

5.3 A permitted NVG operation may only be conducted in a helicopter that is at least equipped and maintained for NVFR.

Note NVG operations are an adjunct to flight under the NVFR. It is intended that the flight crew in an I.F.R.-capable aircraft may derive an operational advantage from NVG use if they so chose and hold the appropriate approvals. Therefore, before commencing an approved NVG operation in an I.F.R.-capable helicopter, the pilot in command must change from flight under the I.F.R. to flight under the NVFR.

5.4 A pilot who manipulates the flight controls of a helicopter may only use NVG in accordance with this Order and the operator's operations manual.

5.5 An aircrew member who is directly involved in an air navigation or terrain avoidance function of a helicopter may only use NVG in accordance with this Order and the operator's operations manual.

Note This requirement does not apply where NVG are used by an appropriately trained person for observation or surveillance which is not the primary means of terrain avoidance for safe air navigation using visual surface reference external to the aircraft.

6 NVG qualifications

6.1 NVG qualifications are as follows:

- (a) NVG pilot;
- (b) NVG chief pilot;
- (c) NVG testing officer
- (d) NVG flight instructor;
- (e) NVG training and checking pilot;
- (f) NVG aircrew member instructor;
- (g) NVG aircrew member.

6.2 Only an NVG flight instructor may instruct a pilot for initial NVG pilot qualification.

6.3 Only an NVG aircrew member instructor may instruct an aircrew member for initial NVG aircrew member qualification.

Note See Part 4 of Appendix 3 for the requirements to be met to hold an NVG qualification.

7 Prerequisites for training

Before commencing NVG training with an operator, a person must meet the prerequisite requirements mentioned in Part 6 of Appendix 3 of this Order.

8 Training requirements

NVG training by an operator must:

- (a) for initial training — be conducted by a TCO or NVG training provider; and
- (b) for other training — be conducted by:
 - (i) an TCO or NVG training provider; or
 - (ii) an NVG flight instructor or other person approved by CASA and acting in accordance with the line and role training requirements in Part C of the operator's operations manual; and
- (c) meet the requirements of:
 - (i) Part 6 of Appendix 3 of this Order; and
 - (ii) the operator's operations manual.

Note Training guidelines and an example of a syllabus that would meet the requirements for CASA approval are set out in CAAP 174-1 (0).

9 NVG endorsements

- 9.1 An applicant may obtain an NVG pilot qualification only by a log book endorsement entered by CASA or an NVG testing officer.
- 9.2 An applicant may obtain an NVG aircrew member qualification only by a log book endorsement entered by CASA or an authorised person.

Note This log book entry must be in a form other than an authorised person's "sticky label".

- 9.3 Subject to clause 10, the log book endorsement of an NVG aircrew member qualification may only be made after the applicant has successfully completed the training and competency assessment for the qualification in accordance with the requirements of an NVG training syllabus approved by CASA.
- 9.4 The applicant for endorsement of an NVG qualification must be eligible for the qualification in accordance with the eligibility and prerequisite requirements in this Order.
- 9.5 The log book endorsement must specify 1 or more NVG qualifications.

Note The CASA Flight Crew Licensing Procedures Manual contains further information about the log book endorsement.

10 Endorsements based on recognition of training and experience

- 10.1 CASA may issue a person with a log book endorsement for a particular NVG qualification if, having taken into account the interests of the safety of air navigation, CASA is satisfied that:
 - (a) the person has training and experience comparable to the requirements of the competencies detailed in this Order for the particular NVG qualification; and
 - (b) the person can demonstrate that he or she has completed, and been examined on, the regulatory component of an NVG ground training course approved by CASA; and

- (c) in a flight test, conducted by an NVG testing officer or an NVG FOI, the person has demonstrated competency in each of the matters mentioned in paragraphs 31 (a) to 31 (l) of Appendix 3.

Note Guidelines on the restricted circumstances in which CASA may issue a log book endorsement under subsection 10 are set out in CAAP 174-1 (0) and in the Flight Crew Licensing Procedures Manual.

- 10.2 CASA may accept that a flight test conducted outside Australia by an NVG training provider meets the requirements of subparagraph 10.1 (c) if the person gives CASA persuasive written evidence that the competencies mentioned in the subparagraph have been demonstrated in the flight test.

Note 1 See the requirements for such a provider in subparagraph (b) of the definition of *NVG training provider*.

Note 2 Persuasive evidence is normally a signed statement by a person approved by the relevant NAA for NVG testing, recording for each of the competencies that it has been demonstrated.

11 Endorsement and experience requirements for operations

- 11.1 Before commencing a permitted NVG operation, a pilot must meet the endorsement and experience requirements of this Order.
- 11.2 Unless otherwise approved by CASA, before an NVG pilot may use NVG for the first time in a helicopter for which he or she holds a type endorsement, he or she must, within the preceding 4 weeks, have had an NVG CCF in the helicopter type.

12 Competency, recency and NVG CCF capability

For an operation requiring a person to have a particular NVG qualification, the person must have competency, recency and capability in terms of NVG CCF in accordance with the requirements of this Order and the operator's operations manual.

13 NVG capability check flights

NVG CCF may only be conducted for an operator by the following:

- (a) for an NVG pilot:
 - (i) an NVG FOI; or
 - (ii) an NVG testing officer; or
 - (iii) if the operator has a TCO — an approved NVG training and checking pilot employed by the TCO; or
 - (iv) otherwise — the operator's NVG qualified chief pilot or another approved senior NVG pilot;
- (b) for an NVG aircrew member:
 - (i) if the operator has a TCO — an NVG aircrew member instructor appointed by the TCO; or
 - (ii) otherwise — an approved senior aircrew member appointed by the operator.

14 Flight testing and issuing endorsements

- 14.1 Only an NVG FOI, or an NVG testing officer appointed by CASA specifically for the purpose, may conduct an NVG flight test or issue an NVG endorsement for the following:
- (a) an initial NVG pilot qualification;
 - (b) an NVG flight instructor qualification;
 - (c) an NVG training and checking pilot qualification;
 - (d) recognition of training and experience for clause 10 of this Appendix.
- 14.2 An NVG aircrew member qualification may only be awarded in accordance with the procedures set out in the operator's operations manual by an NVG aircrew member instructor approved for training and checking by:
- (a) CASA; or
 - (b) the operator's TCO.

Appendix 2

Directions under subregulation 215 (3) of CAR 1988 about the information, procedures and instructions in an operator's operations manual

Part 1 — Preliminary

1 Scope and structure

- 1.1 NVG operations are to be controlled primarily through the operator's operations manual which must:
 - (a) contain information, procedures and instructions as directed by CASA under subregulation 215 (3) of CAR 1988; and
 - (b) contain information, procedures and instructions about the matters set out in Part 2 of this Appendix; and
 - (c) be accepted by CASA, and varied or amended only with CASA's agreement.
- 1.2 Before an operator conducts an NVG operation, the matters provided for in Appendix 3 must be complied with.

Note Guidelines on how the requirements of Appendix 3 may be met in a way acceptable to CASA are set out in CAAP 174-1 (0).

2 Directions apply

- 2.1 The directions in Part 2 of this Appendix apply to each operator who conducts a permitted NVG operation unless other directions are issued to the operator in substitution for, or in addition to, these directions.
- 2.2 An operator's operations manual must contain, as a minimum, the information, procedures and instructions required by Part 2 of this Appendix in the detail, and to a standard, acceptable to CASA.

Note The effect of these directions is that the operations manual must contain the information, procedures and instructions directed by this Appendix. The information, procedures and instructions contained in the operations manual must be complied with. Guidelines on how the requirements of Part 2 may be met in a way acceptable to CASA are set out in CAAP 174-1 (0).

Part 2 — Directions about information to be contained in an operations manual for NVG operations.

3 Operations manual

For subregulation 215 (3) of CAR 1988, CASA directs that the operations manual of an NVG operator must address, as a minimum, the matters listed in clause 4 in the detail, and to a standard, acceptable to CASA.

4 Operations manual directions

4.1 NVG training

- 4.1.1 Detailed training programs for any initial qualification training to be carried out, including the following:
 - (a) pre-course qualification requirements;

- (b) ground and flight training syllabus;
 - (c) risk management plan;
 - (d) training facilities;
 - (e) equipment requirements;
 - (f) competency outcomes;
 - (g) adequate numbers of qualified training personnel;
 - (h) crew resource management;
 - (i) fatigue management training, including in human factors limitations and physiological limitations in NVG flight, for the following:
 - (i) the chief pilot responsible for NVG operations or the approved NVG senior pilot appointed to carry out the duties of chief pilot for NVG operations;
 - (ii) the operator's safety manager (however described);
 - (iii) each member of a flight crew for an NVG operation.
- 4.1.2 Ongoing training programs for all NVG flight crew ensuring the following is maintained:
- (a) NVG recency including regaining lapsed recency;
 - (b) NVG CCF.
- 4.1.3 Qualifications for the pre-flight and post-flight inspection procedures and standards that are to be used by the flight crew to establish whether the relevant NVG are serviceable for use before and after a flight.
- 4.1.4 Procedures to be followed for introducing new aircraft or personal equipment to ensure compatibility with the NVG environment.
- 4.1.5 Procedures to be followed when introducing new crew, passengers or patients and their equipment and baggage to the NVG environment to ensure NVG compatibility.
- 4.1.6 Procedures to be followed to prevent, or address the incidence of, overconfidence or complacency in any member of an NVG flight crew.
- 4.2 Airworthiness and maintenance of night vision equipment and aircraft
- 4.2.1 Aircraft and NVG pre-flight and post-flight procedures including:
- (a) equipment checks; and
 - (b) procedures, including aircraft and NVG equipment, inspection criteria; and
 - (c) storage; and
 - (d) quarantine; and
 - (e) logging of defects.
- 4.2.2 Manufacturer's inspection criteria to be kept in the company technical library with copies accessible for ready reference to all NVG crew.
- 4.2.3 MEL related to lighting systems.

Note If an operator does not have an existing approved MEL, the requirement in paragraph 4.2.3 may be met by incorporating the MEL in the operations manual.

- 4.2.4 Mounting system requirements for handling by pilots and other crew members.
- 4.2.5 Stowage and use procedures for crew members not using head mounted attachments.
- 4.2.6 Procedures that ensure NVG operations are only conducted in a helicopter that is equipped and maintained for NVFR.
- 4.2.7 Manufacturer's requirements for the maintenance and modification of aircrew flying helmets for NVG use.

4.3 NVG flight operations

4.3.1 *Procedures and plans*

Operational procedures and risk management plans (including fatigue awareness and management) for all intended NVG flight profiles including over water and shipboard operations.

4.3.2 *Post-NVG endorsement requirements*

- (a) Post-NVG endorsement experience required before a person may be a pilot in command.
- (b) NVG capability check flights required for an NVG pilot using NVG for the first time in a helicopter for which he or she holds a type endorsement.

4.3.3 *Equipment*

Equipment to be carried and used on NVG flights or operations and associated limitations and serviceability.

4.3.4 *NVG flight crew composition, roles and responsibilities*

- (a) Minimum NVG crew composition, qualifications, and experience requirements for each intended NVG flight profile.
- (b) Crew stations, duties and responsibilities for all crew in all phases of NVG flight.
- (c) Procedures, crew duties, crew co-ordination and phraseology for transition between flight under the I.F.R. and flight under the NVFR.
- (d) Logging of NVG flight time.

4.3.5 *Weather and environment*

- (a) Minimum weather conditions and alternate aerodrome requirements at departure, en route and at the destination or area of operations.
- (b) Thunderstorm avoidance instructions.
- (c) Guidance material on other operational environment conditions that may affect NVG flight, including smoke, snow and dust haze, atmospheric moisture, predicted moon data, for example, moon rise and set times, elevation, ambient illumination and similar matters.

4.3.6 Dissimilar NVG

- (a) Where dissimilar NVG are to be used:
 - (i) a hierarchical list of the various NVG in terms of level; and
 - (ii) a statement requiring the pilot in command to wear the highest level of NVG.
- (b) A specific risk management plan for resolving any human factor or risk issues resulting from the differences between the dissimilar NVG.

4.3.7 NVG flight

- (a) Pre-flight preparation, briefing, procedures and documentation.
- (b) Minimum NVG flight altitudes and requirements and limitations on flight below LSALT if such flight is permitted in accordance with this Order.
- (c) Crew goggle up and de-goggle procedures and the procedures to ensure the delineation of aided and unaided flight.
- (d) Procedures for the use of aircraft landing lights and searchlights when below LSALT for descent, approach, landing or take off, including procedures for wire and obstacle detection and avoidance using white light (for example from a steerable searchlight or night sun).
- (e) Restrictions on in-company and formation NVG flights.
- (f) Advice and guidance on the fatigue issues of NVG operations and the physiological stressors of NVG operations.
- (g) Flight and duty times.
- (h) Guidance for NVG operations over low contrast terrain.
- (i) Limitations and requirements for the carriage of passengers.

4.3.8 HLS operations

- (a) Register for HLS-NVG standard operations (as per CAAP 92-2 (1)) and HLS-NVG basic operations.
- (b) HLS procedures for HLS-NVG basic and HLS-NVG standard operations.

4.4 Phraseology

4.4.1 The operations manual must provide for standard crew phraseology for all phases of NVG flight and must, at a minimum, contain phraseology for:

- (a) informing or advising of terrain or other obstructions when operating below LSALT; and
- (b) aircrew members providing “the con” for the flying pilot, i.e. verbal corrections to rates of closure, movement, climbs and descents and verbal means of creating accurate mental pictures of the obstacle environment; and
- (c) transition between flight under the I.F.R. and flight under the NVFR; and
- (d) ensuring scan sector observation responsibility; and
- (e) informing crew of emergency situations; and

- (f) NVG single tube failure and double tube failure and for selection of back up power; and
 - (g) informing or advising of obstacles or terrain, or of hazards such as whiteout, brown out, wires or other obstructions;
 - (h) flight into deteriorating in-flight visibility situations or loss of visual reference (including brownout or whiteout) and
 - (i) for multiple-crew NVG operations — for “eyes in” and “eyes out” of the cockpit or the aircraft, including to ensure that at all times when the aircraft is below LSALT at least 1 crew member is conducting an NVG scan outside the front of the aircraft.
- 4.4.2 For single crew NVG operations, the operations manual must contain procedures to remind a single crew member to maintain a vigilant scan outside the helicopter.
- 4.5 Emergency procedures
- 4.5.1 The operations manual must provide for procedures, crew duties and crew co-ordination in the event of the following:
- (a) in-flight serviceability issues of NVG equipment including:
 - (i) single tube failure; and
 - (ii) double tube failure (unit failure); and
 - (iii) equipment malfunctions (for example, causing “chicken wire”); and
 - (b) NVG flight into deteriorating weather and visibility or complete loss of visibility conditions (including brownout or whiteout) including:
 - (i) when visibility is inadvertently lost on departure from, or arrival at, or over, a HLS; and
 - (ii) when in-flight “turn back” procedures, precautionary landings or reversion to unaided flight and flight rules are needed; and
 - (c) recovery to V.M.C. flight after inadvertent I.M.C. penetration; and
 - (d) aircraft malfunctions and emergencies.

Appendix 3 NVG equipment, operations, qualifications and training

Part 1 — Scope and structure

1 Matters to be complied with

The requirements of this Appendix for NVG equipment, operations, qualifications and training must be complied with for an NVG operation.

Part 2 — Minimum equipment and aircraft standards for NVG operations

2 Aircraft lighting standards

- 2.1 Before an aircraft can be used in an NVG operation, the aircraft lighting systems must be:
 - (a) NVG compatible; or
 - (b) if not compatible — modified to be compatible.
- 2.2 The design of an aircraft lighting modification for NVG operations must be based on the requirements of RTCA/DO-275, unless an alternative suitable design is demonstrated and acceptable to CASA.
- 2.3 The requirements of MIL-STD-3009 aircraft, NVIS compatible lighting may also be used if appropriate.
- 2.4 Before an NVG operation may commence with aircraft lighting modified to be NVG compatible, an advice about the design of the modification must be:
 - (a) submitted to CASA or an authorised person appointed for regulation 35 of CAR 1988; and
 - (b) accepted by CASA.
- 2.5 If an operator does not modify exterior helicopter lighting, he or she must prepare a risk management plan to support this outcome.
- 2.6 If the helicopter's exterior lighting adversely affects NVG performance, the pilot in command must:
 - (a) if he or she is satisfied there is no risk of collision with another aircraft — turn off the exterior lighting; or
 - (b) if he or she considers there is such a risk — immediately cease NVG operations.
- 2.7 An operator intending to conduct NVG operations must have an approved system of maintenance which includes procedures to ensure that the ongoing maintenance, inspection, and serviceability standards for the incorporated NVG system (including the NVG itself) will be met.
- 2.8 The approved procedures mentioned in subclause 2.7 must include a method for assessing NVG compatibility with any subsequent aircraft modification, equipment introduction, or repair.
- 2.9 Maintenance of NVG must be carried out by an organisation that:
 - (a) complies with regulation 30 of CAR 1988 as if the regulation applied to the organisation for the maintenance of NVG and its related equipment; and

- (b) is endorsed by the original equipment manufacturer (*OEM*) of the NVG as an appropriate organisation to carry out maintenance on the NVG.

3 NVG equipment and maintenance standards

3.1 The minimum operational performance specification for NVG equipment for use by flight crew in NVG operations is:

- (a) that defined in RTCA/DO 275, as modified by column 3 of the Table in Attachment 1 to this Appendix; or
- (b) a CASA approved equivalent in terms of resolution, acuity, gain and reliability.

3.2 Each NVG image intensifier tube and associated NVG equipment must be certified by the manufacturer as being for aviation use.

3.3 NVG must be maintained, stored, and checked for serviceability before an NVG operation, in accordance with the manufacturer's requirements and procedures.

3.4 If dissimilar NVG are used in an NVG operation, the pilot in command must wear the highest level of NVG in terms of resolution, gain and acuity.

Note Use of dissimilar NVG does not remove the requirement that the minimum standard of any set used must be in accordance with subclause 3.1.

3.5 An NVG pilot who occupies a control seat of a helicopter during an NVG operation must use the NVG manufacturer's approved head mounted attachment device for the NVG and must have both hands free for the flight control manipulation during aided flight.

4 Minimum equipment for NVG aircraft in NVG operations

4.1 The operator and the pilot in command of an NVG operation must ensure that the aircraft carries:

- (a) at least the minimum equipment required for the category of operation; and
- (b) any additional equipment needed to meet the requirements of NVFR, or I.F.R. if used.

4.2 The operator and the pilot in command must ensure that the helicopter has a serviceable radio altimeter that:

- (a) displays:
 - (i) an instantaneous impression of absolute height; and
 - (ii) the rate of change of height in a form which requires minimal interpretation; and
- (b) incorporates:
 - (i) a system of audio and visual warning to the occupant of each control seat if the aircraft descends below a height previously selected in flight by the pilot in command; or
 - (ii) a visual and audible height warning system at least equivalent to the system mentioned in subparagraph (i) and is acceptable to CASA.

- 4.3 The operator and the pilot in command must ensure that the helicopter has a serviceable pilot-steerable searchlight, adjustable in both pitch and azimuth from the flight controls.
- 4.4 The operator and the pilot in command must ensure that, in an NVG operation below 500 ft AGL or from a HLS-NVG basic using a searchlight with an NVG compatible IR filter, the risk of an adverse event as a result of NVG failure at low altitude is countered by:
- (a) the aircraft's capacity to revert immediately to a non-filtered search or landing light; or
 - (b) the presence of 2 NVG pilots, each of whom is NVG equipped and has access to dual flight controls.

Part 3 — Operational limitations for NVG operations

5 Minimum altitude for NVG operations

- 5.1 The pilot in command of a helicopter in an NVG positioning flight that is a permitted NVG operation may fly below the relevant LSALT only if it is operationally necessary to do so and the flight is in accordance with this Order.
- 5.2 However, the pilot in command in an NVG positioning flight must not fly:
- (a) over a city, town or populous area — at a height lower than 1 000 ft AGL; or
 - (b) over any other area — at a height lower than 500 ft AGL.

Note Paragraph 5.2 (b) does not apply if through stress of weather, or any other unavoidable cause, it is essential that a lower height be maintained.

6 HLS-NVG basic and HLS-NVG standard operations

NVG operations to, or from, a HLS-NVG basic or a HLS-NVG standard are permitted in accordance with this Order.

7 Carriage of persons

The pilot in command of a helicopter in an NVG operation, including an NVG training, qualification or proficiency flight, may only carry the following categories of persons:

- (a) members of the flight crew;
- (b) members of the aircrew;
- (c) any supernumerary crew members;
- (d) persons undergoing NVG training;
- (e) appropriately qualified maintenance personnel who are present to ensure that the NVIS equipment is, and remains, serviceable;
- (f) other persons whose presence is necessary for the success or completion of the operation;
- (g) if the operation is an NVG flight to demonstrate NVG technology — a passenger acceptable to CASA to observe the demonstration.

Note For paragraph 7 (f), examples of a person whose presence may be essential include police, fire fighting, rescue or medical personnel, marine pilots in transfer, and persons who are apprehended, evacuated, rescued or being transported as an integral part of the operation.

8 Minimum crewing for NVG operations

- 8.1 The minimum NVG crew for an NVG operation must be not less than the highest requirement for NVFR, or I.F.R. if used, that is specified in:
- (a) the aircraft's flight manual; or
 - (b) the operator's operations manual acceptable to CASA; or
 - (c) Australian civil aviation legislation, including this Order, that applies to the aircraft.
- 8.2 The minimum NVG crew must include any additional qualified crew required by:
- (a) the type or class of helicopter; or
 - (b) the nature of the operation.
- 8.3 Subject to subclauses 8.1 and 8.2, a single NVG qualified pilot is the minimum NVG crew only if the NVG operation is:
- (a) to, and from, a HLS-NVG standard; and
 - (b) except for take-off and landing, flown at, or above, LSALT.
- 8.4 Subject to subclauses 8.1 and 8.2, if an NVG operation is not covered by subclause 8.3, the minimum NVG crew is:
- (a) single NVG qualified pilot; and
 - (b) at least 1 of the following using NVG, on intercom, and positioned to be able to provide assistance to the pilot in command:
 - (i) an NVG qualified aircrew member; or
 - (ii) a second NVG qualified pilot.
- 8.5 The position and duties of the NVG aircrew member must be set out in the operator's operations manual.

9 Minimum crewing for NVG training operations

- 9.1 If an NVG flight is for initial NVG pilot training or qualification, the minimum NVG crew is the trainee pilot and a single NVG flight instructor.
- 9.2 If an NVG flight is for an NVG pilot to regain lapsed recency or undergo a check flight in the form of an NVG CCF, the minimum NVG crew is the NVG pilot and a single NVG pilot qualified to conduct the check flight.
- 9.3 During a training flight for NVG aircrew member qualification or an NVG check flight in the form of an NVG CCF, the minimum NVG crew is the aircrew member receiving the training or undergoing the check flight, an NVG aircrew member instructor and the NVG pilot.

10 NVG flight planning for weather minima, alternate aerodromes and fuel requirements

- 10.1 Each NVG flight must be planned to comply with NVFR weather minima, and alternate aerodrome and fuel requirements.
- 10.2 An operator may apply in writing to CASA proposing amendments to the operations manual for reduced flight planning weather parameters specific to an NVG operation.
- 10.3 An amended operations manual may only be used if CASA:
 - (a) considers that the proposed amendments, or the proposed amendments as varied by CASA, preserve or enhance the safety of the NVG operation; and
 - (b) directs that the information, procedures and instructions in the operations manual be revised or varied in accordance with the proposed amendments, or the proposed amendments as varied by CASA.

11 Visibility

For an NVG operation, if in-flight visibility of 5 000 m cannot be maintained at, or above, 500 ft above terrain or obstacles, the pilot in command must:

- (a) alter the flight path direction if this would:
 - (i) avoid low visibility areas; and
 - (ii) maintain the minimum visibility of 5 000 m; or
- (b) climb to at least the LSALT and revert to use of NVFR or I.F.R. procedures instead.

12 Close proximity flights

12.1 In this subsection:

close proximity for a flight, means a minimum separation of:

- (a) 250 metres horizontally; and
- (b) 500 ft vertically.

12.2 The pilot in command of a helicopter conducting an NVG operation may only fly in close proximity to another aircraft if the flight is:

- (a) in accordance with the operator's operations manual; and
- (b) arranged and discussed with the pilot in command of the other aircraft before the close proximity flight begins.

Note The separation minima do not apply for the pilot during the take-off or landing phase of flight with respect to aircraft already on the ground or during take-off or landing.

Part 4 — Recognised NVG qualifications for NVG operations

13 Chief pilot

An NVG operator's chief pilot must hold:

- (a) an NVG pilot qualification and be a pilot in command; or
- (b) a CASA instrument of approval stating that a named NVG senior pilot appointed by the operator is approved by CASA to carry out the duties of chief pilot for NVG operations.

Note Before CASA issues an instrument of approval of a senior pilot for this purpose, CASA will assess the senior pilot to the chief pilot level for the NVG elements of the operator's operations.

14 NVG testing officer

- 14.1 An NVG testing officer must hold at least an initial NVG pilot qualification in accordance with this Order and an instrument of appointment from CASA.
- 14.2 CASA may appoint an NVG testing officer only after an NVG flight test conducted by an NVG FOI or other person approved by CASA.

15 NVG flight instructor

- 15.1 Only an NVG flight instructor, approved by CASA on application, may instruct a pilot for initial NVG pilot qualification.
- 15.2 An NVG flight instructor may not award, or renew, an NVG endorsement unless he or she is also an NVG testing officer.
- 15.3 CASA may issue an NVG flight instructor approval only after a flight test.
- 15.4 A person must, as a minimum, have the following qualifications and experience for eligibility to be approved as an NVG flight instructor:
 - (a) the minimum qualification requirements of an NVG pilot in command;
 - (b) a current grade 1 or grade 2 flight instructor (helicopter) rating;
 - (c) a night training approval (or recognised overseas equivalent);
 - (d) an NVG training approval issued by CASA;
 - (e) at least 250 hours of helicopter flight instruction;
 - (f) after receiving an NVG qualification — at least 40 hours of NVG flight as 1 or more of the following:
 - (A) an NVG pilot in command;
 - (B) an NVG pilot in command under supervision (known as ICUS);
 - (C) an NVG pilot under post initial qualification dual instruction by an NVG flight instructor;
 - (g) the minimum experience requirements of the Civil Aviation Orders to give flight instruction on the relevant aircraft type;
 - (h) successful completion of an NVG flight instructor flight test conducted by an NVG testing officer, or an NVG FOI, appointed to conduct such tests.

Note Aircrew members are currently used in a large variety of ways by operators and there is no existing standardisation regarding their qualifications. Accordingly, guidance for the qualifications of NVG aircrew member instructors is set out in CAAP 174-1 (0).

16 NVG qualified pilot

A person must, as a minimum, hold the following qualifications and experience for eligibility to be an NVG qualified pilot:

- (a) a current commercial helicopter pilot licence;
- (b) a night V.F.R. rating;

- (c) successful completion of NVG pilot qualification training and testing under this Order, or its equivalent based on recognition of training and experience under clause 10 of this Appendix;
- (d) an appropriate endorsement for the relevant aircraft type;
- (e) a total of 20 hours night V.F.R. (unaided) as a helicopter pilot;
- (f) a total of 10 hours as pilot in command at night (unaided) post-NVFR rating (for command pilots) or at least 10 hours night (unaided) experience (for co-pilots).

17 NVG training and checking pilot

- 17.1 Unless CASA approves otherwise in writing, a person must, as a minimum, hold the following qualifications and experience for eligibility to be an NVG training and checking pilot:
- (a) the minimum qualifications required of an NVG pilot or NVG flight instructor;
 - (b) 40 hours NVG flight time as a pilot in command after obtaining his or her NVG pilot qualification;
 - (c) a night checking and training approval in accordance with the training and checking manual.
- 17.2 CASA may issue an NVG training and checking pilot approval only after a flight test unless CASA considers that a flight test is not required.
- 17.3 An NVG training and checking pilot may give NVG flight instruction to a non-NVG endorsed pilot only if he or she is approved by CASA as an NVG flight instructor.

18 Aircrew members and aircrew member instructors

- 18.1 Unless CASA otherwise directs in writing, eligibility for NVG qualifications for an aircrew member, or an aircrew member instructor, must be set out in the operator's operations manual accepted by CASA.
- 18.2 An operator may only use an NVG aircrew member to fulfil the minimum NVG crew requirements if the person's duties and position are formally recognised in the operator's operations manual.
- 18.3 An operator must establish in the operations manual qualification and proficiency requirements for aircrew members and aircrew member instructors, using at least the minimum competencies established by this Order.

Part 5 — Recency requirements for NVG operations

19 General requirements

Before commencing an NVG operation, each NVG pilot and NVG aircrew member must meet the requirements of:

- (a) this Part; and
- (b) for an NVG pilot — subsection 9 of Civil Aviation Order 40.2.2; and

- (c) any requirements in the operator’s operations manual for the relevant NVFR operation.

20 I.F.R. requirements

Before commencing a flight under the I.F.R., with the intention of changing to flight under the NVFR for an NVG operation, each NVG pilot and NVG aircrew member must meet:

- (a) the requirements of this Part 5; and
- (b) all I.F.R. recent experience requirements (*currencies*) for the relevant flight, including approach currencies in accordance with subsection 11 of Civil Aviation Order 40.2.1.

21 Minimum recency requirements — NVG pilot

An NVG pilot must meet the following minimum recency requirements or an NVG CCF must be undertaken:

Table 21.1 — Minimum NVG pilot recency requirements

	Less than 100 hours NVG flight time as a pilot	More than 100 hours NVG flight time as a pilot
NVG flight time	3 hours for command pilots, 1 hour for co-pilots incorporating 3 take-offs, circuits and landings in last 3 months or NVG CCF in last 3 months	3 hours incorporating 3 take-offs, circuits and landings in last 6 months or NVG CCF in last 6 months
NVG CCF	6 monthly	annually
For additional tasks or roles specific to a permitted NVG operation	NVG recency requirements in accordance with the operator’s operations manual and acceptable to CASA	NVG recency requirements in accordance with the operator’s operations manual and acceptable to CASA

Note For these recency requirements, the pilot must be using NVG (i.e. be goggled-up).

22 Minimum recency requirements — NVG aircrew member

An NVG aircrew member must meet the following minimum following recency requirements or an NVG CCF must be undertaken:

Table 22.1 — Minimum NVG aircrew member recency requirements

	Less than 50 hours NVG flight time	More than 50 hours NVG flight time
NVG flight time	performing the duties of an NVG aircrew member, 2 hours in last 3 months or NVG CCF in last 3 months	performing the duties of an NVG aircrew member, 2 hours in last 6 months or NVG CCF in last 6 months
NVG CCF	6 monthly	annually
For additional tasks or roles specific to a permitted NVG operation	NVG recency requirements in accordance with the operator's operations manual and acceptable to CASA	NVG recency requirements in accordance with the operator's operations manual and acceptable to CASA

Note For these recency requirements, the aircrew member must be using NVG (i.e. goggled-up).

23 NVG CCF

23.1 The requirements for an NVG CCF may be met:

- (a) for an NVG pilot — by 1 of the following:
 - (i) an initial endorsement of the NVG qualification;
 - (ii) a successful NVG CCF;
 - (iii) an NVG flight instructor flight test;
- (b) for an NVG aircrew member — by an initial endorsement of the NVG qualification or a successful NVG CCF.

23.2 An NVG CCF for an NVG pilot must:

- (a) be conducted in accordance with clause 13 of Appendix 1; and
- (b) involve an NVG flight that is representative of the operator's typical NVG mission profile; and
- (c) be a minimum of 1 hour NVG flight time; and
- (d) require the candidate to demonstrate competency in all of the following:
 - (i) NVG unit failure for each of the crew members;
 - (ii) NVG single tube failure for each of the crew members;
 - (iii) procedures for utilising backup power to the NVG;
 - (iv) circuit operations to HLS-NVG basic located in areas devoid of HLS lighting or surrounding cultural lighting;

- (v) procedures for loss of visual reference (for example, brownout or whiteout) when visibility is inadvertently lost on departure or arrival to, or over, a HLS;
- (vi) procedures for in-flight deteriorating visibility situations;
- (vii) inadvertent I.M.C. penetration and recovery to V.M.C. flight;
- (viii) procedures for wire and obstacle detection and avoidance using white light (for example, from a steerable searchlight or night sun).

23.3 An NVG CCF for an NVG aircrew member must:

- (a) be conducted in accordance with clause 13 of Appendix 1; and
- (b) involve an NVG flight that is:
 - (i) of at least 1 hour duration; and
 - (ii) representative of the operator's typical NVG mission profile; and
- (c) as a minimum, require the candidate to demonstrate competency in all of the following:
 - (i) NVG unit failure for each of the crew members;
 - (ii) NVG single tube failure for each of the crew members;
 - (iii) procedures for utilising backup power to the NVG;
 - (iv) circuit operations to HLS-NVG basic located in areas devoid of HLS lighting or surrounding cultural lighting;
 - (v) procedures for loss of visual reference (for example, brownout or whiteout) when visibility is inadvertently lost on departure or arrival to, or over, a HLS;
 - (vi) procedures for deteriorating in-flight visibility situations;
 - (vii) recovery to V.M.C. flight after inadvertent I.M.C. penetration;
 - (viii) procedures for wire and obstacle detection and avoidance using white light (for example, from a steerable searchlight or night sun).

Note An NVG CCF for an NVG aircrew member may only be conducted by an NVG pilot if he or she is an NVG training and checking pilot who is also an NVG aircrew member instructor. An NVG CCF for an NVG aircrew member may only be conducted in accordance with the operator's operations manual.

Part 6 — Minimum requirements for NVG qualification training

24 Requirements for training courses

An NVG initial qualification training course must:

- (a) be approved by CASA; and
- (b) be conducted by a TCO or NVG training provider and
- (c) as a minimum, meet the requirements of this Part.

Note Operators should build extra requirements into training syllabuses to satisfy any advanced operational sequences relevant to their operation, for example, specialised coastal rescue, winching, rappelling.

25 NVG pilot training course approval

- 25.1 CASA may only approve an NVG pilot training course which is designed to achieve at least the competency outcome described in subclause 25.2.
- 25.2 At the end of the course, the trainee is able to perform the duties of an NVG pilot to safely and effectively take off, fly and navigate en route across country, and descend, reconnoitre and land or hover to a HLS-NVG basic devoid of HLS lighting or surrounding cultural lighting using NVG.

Note 1 Although some operators may not require NVG operations to HLS-NVG basic, this remains a basic competency requirement of any qualification course to meet the contingency of having to use NVG to force-land en route in the event of deteriorating in-flight conditions or emergency malfunctions.

Note 2 An example of an NVG pilot training course meeting this competency is provided in CAAP 174-1 (0).

26 NVG aircrew member training course approval

- 26.1 CASA may only approve an NVG aircrew member training course which is designed to achieve at least the competency outcome described in subclause 26.2.
- 26.2 At the end of the course, the trainee is able to perform the duties of an NVG aircrew member to safely and effectively assist an NVG pilot to take off, fly and navigate en route across country and descend, reconnoitre and land or hover to a HLS-NVG basic devoid of HLS lighting or surrounding cultural lighting using NVG.

Note 1 It is recognised that many operators will have a requirement for the aircrew member to fulfil other duties outside the provision of basic scan sector observation, for example, aided winching, or advanced cockpit duties (as detailed in the CAAP) while aided. As these competencies are not covered by the stated training competency outcome above, those operators should add instructional sequences and flight time to these basic minimums to achieve those competencies.

Note 2 An example of an NVG aircrew member training course meeting this competency is provided in CAAP 174-1 (0).

27 Ground training

- 27.1 Before any NVG initial flight training may commence, initial NVG qualification training must include a CASA approved NVG ground theory training course of at least 6.5 hours followed by a written examination to certify competency.
- 27.2 NVG ground theory subjects must, as a minimum, cover the following:
- (a) applicable CAO, CAAP and operations manual contents that relate to NVG regulations, limitations and flight operations;
 - (b) NVG system technical description, functions, limitations and maintenance, including normal, abnormal and emergency operations;
 - (c) aero medical and human factors considerations with NVG, including limitations, spatial and vision illusions, eye adaptation, perception limitations, stressors and fatigue;
 - (d) environmental considerations, including moon data, illumination, atmospheric, weather, shadow and moisture;

- (e) NVG navigation and flight planning including terrain interpretation and obstacle avoidance;
- (f) crew co-ordination principles, procedures and phraseology for NVG operations;
- (g) risk management awareness based on the Australian Standard AS/NZS 4360:2004.

28 NVG flight training qualifications

- 28.1 NVG flight training for initial NVG pilot and initial NVG aircrew member qualifications must be approved by CASA.
- 28.2 Initial NVG pilot training may be conducted concurrently with NVG aircrew member training if proper allowance is made for time lost to individual trainees on the same flight.

29 Initial NVG pilot flight training — prerequisites

Before commencing NVG training for an initial NVG pilot qualification, a trainee pilot must, as a minimum, meet the following requirements:

- (a) hold a current commercial pilot (helicopter) licence or air transport pilot (helicopter) licence;
- (b) hold a current night V.F.R. rating for helicopters;
- (c) have logged at least 250 hours of aeronautical experience as a helicopter pilot of which no more than 50 may be in an approved flight simulator representative of the aircraft category that will be used for NVG operations;
- (d) be appropriately endorsed on the aircraft type intended for training;
- (e) have logged at least 10 hours as pilot in command at night (unaided) post NVFR rating (for command pilots) or at least 10 hours at night (unaided) experience (for co-pilots) and, in either case, ensured that 3 of the hours are in the 3 months immediately before the initial award of the NVG endorsement;
- (f) either:
 - (i) hold a current command helicopter instrument rating; or
 - (ii) have completed at least 10 hours of dedicated dual instrument training of which:
 - (A) not more than 5 hours may be in a synthetic flight trainer; and
 - (B) at least 3 hours must be completed in a helicopter in the 3 months immediately before commencing NVG training, to a degree which ensures proficiency in the requirements specified in paragraphs 2.1 (a) and (c) of Appendix 1 in CAO 40.2.2, to the standard specified in clause 2.2 of that Appendix; and
 - (C) some time must be spent to a degree which ensures proficiency in recovery to V.M.C. flight after inadvertent I.M.C. penetration;

- (g) if undergoing NVG training for an advanced operational sequence, for example, winching — be qualified and certified for the advanced operational sequence unaided before undergoing the NVG training;
- (h) if the trainee pilot, during or after training, is to conduct low flying — have successfully completed low flying training and had his or her log book endorsed accordingly.

30 Initial NVG pilot flight training — requirements

30.1 NVG flight training for the initial NVG pilot qualification must include at least 5 hours of NVG flight time, exclusive of the NVG flight test mentioned in paragraph 14 (1) (a) of Appendix 1.

30.2 Flight training must:

- (a) be conducted in at least 4 separate flights; and
- (b) expose the trainee to at least 1 flight in low illumination conditions, for example, with little or no moon in an area devoid of surrounding cultural lighting.

Note The requirement for separate flights is to emphasise the importance of the pre-flight planning and goggle adjustment phases.

30.3 NVG flight training may be conducted in an approved Level D NVG flight simulator.

Note 1 The flight test is not NVG training. The flight test may not be conducted in a flight simulator.

Note 2 Instrument rating credits for approved flight simulators are set out in Part 1 of Appendix II in CAO 40.2.1.

30.4 Flight training must include development of competency in at least the following subjects:

- (a) preparation and use of internal and external aircraft lighting systems for NVG flights and operations;
- (b) pre-flight preparation of NVG, planning considerations, and appropriate route selection for NVG flights and operations;
- (c) correct piloting techniques (during normal, abnormal and simulated emergency aircraft operations) while using NVG during the take off, climb, en route, descent and landing phases of flight;
- (d) normal, abnormal and emergency operations of the NVG during flight;
- (e) loss of visual reference procedures on landing and take off;
- (f) procedures for deteriorating in-flight visibility situations;
- (g) in-flight simulated recovery to V.M.C. with sole reference to the aircraft instruments after inadvertent I.M.C. penetration;
- (h) sound crew co-ordination;
- (i) procedures for wire and obstacle detection and avoidance using white light (for example, from a steerable searchlight or night sun).

31 NVG pilot — flight testing

A flight test for the initial NVG pilot qualification must be at least 1.5 hours in duration and the candidate must, as a minimum, demonstrate competency in the following:

- (a) mission planning and flight planning for the flight including a sound knowledge of the rules, regulations and operations manual instructions relating to NVG;
- (b) determining the serviceability of NVIS equipment, including aircraft components;
- (c) performing cockpit drills including switch selection and goggle/de-goggle procedure;
- (d) performing hover, taxi and transit procedures;
- (e) performing crew resource management appropriate to NVIS operations;
- (f) performing NVIS practice malfunctions and emergency procedures;
- (g) performing NVIS departure and navigation;
- (h) performing circuit operations to HLS-NVG basic located in areas devoid of HLS lighting or surrounding cultural lighting using NVG;
- (i) performing loss of visual reference procedures on landing and take off;
- (j) performing procedures for flight into deteriorating in-flight visibility situations;
- (k) performing procedures for safe recovery to V.F.R. flight following inadvertent entry to I.M.C.;
- (l) performing a selection of practice aircraft emergency procedures under NVIS conditions applicable to the aircraft type;
- (m) performing wire and obstacle detection and avoidance procedures using white light (for example, from a steerable searchlight or night sun).

32 NVG aircrew member flight training — prerequisites

Before commencing NVG training leading to the award of an operator specific NVG qualification, the trainee aircrew member must have the following minimum qualifications and experience:

- (a) the experience, recency, and qualifications stipulated in the relevant operator's operations manual for day and night (unaided) operations for the relevant crew position and aircraft type;
- (b) the physical and medical standards stipulated by the operator's operations manual;
- (c) at least 50 hours flight time as an aircrew member in a form that is acceptable to the operator as set out in the operator's operations manual;
- (d) at least 5 hours helicopter night (unaided) flight time as an aircrew member in the 3 months leading up to commencement of the training;
- (e) the qualifications and certification required, in accordance with the operator's operations manual and any relevant Civil Aviation Order, for any

advanced operational sequences, for example, winching, before undergoing NVG training for that sequence.

33 NVG aircrew member flight training — requirements

33.1 NVG flight training for the initial NVG aircrew member qualification must include at least 2 hours of NVG flight time.

33.2 Flight training must:

- (a) be conducted in at least 2 separate flights; and
- (b) expose the trainee to at least 1 flight in low illumination conditions, for example, with little or no moon in an area devoid of surrounding cultural lighting; and
- (c) take into account the requirements of paragraph 8 in Part 3 of Appendix 3 of CAAP 174-1 (0).

Note The requirement for separate flights is to emphasise the importance of the pre-flight planning and goggle adjustment phases.

33.3 Flight training may be conducted in an approved NVG flight simulator.

Note The competency assessment flight test is not training and may not be conducted in a flight simulator.

33.4 Flight training must include development of competency in at least the following subjects:

- (a) preparation and use of internal and external aircraft lighting systems for NVG flights and operations;
- (b) pre-flight preparation of NVG and an understanding of planning considerations and appropriate route selection for NVG flights and operations;
- (c) the rules, regulations and operations manual instructions relating to NVG;
- (d) using NVG to accurately recognise, identify, announce and provide verbal correction (“the con”) to the pilot for drift, rates of climb and descent, obstacle avoidance and ground hazards, including dust or debris, during NVG take off and landing phases;
- (e) loss of visual reference procedures on take off and landing;
- (f) procedures for flight into deteriorating in-flight visibility situations;
- (g) assisting the pilot during in-flight safe recovery to V.F.R. flight following simulated inadvertent entry to I.M.C.;
- (h) sound crew co-ordination;
- (i) procedures for wire and obstacle detection and avoidance using white light (for example, from a steerable searchlight or night sun).

34 NVG aircrew member — flight testing

In a flight test for the initial NVG aircrew member qualification, the candidate must, as a minimum, demonstrate competency in the following:

- (a) assisting the pilot in mission planning and flight planning;

- (b) determining the serviceability of NVIS equipment, including aircraft components;
- (c) performing cockpit drills including switch selection and goggle/de-goggle procedure;
- (d) performing crew resource management appropriate to NVIS operations;
- (e) performing NVIS practice malfunctions and emergency procedures;
- (f) performing aircrew member duties for descent, reconnaissance and circuit operations to HLS-NVG basic located in areas devoid of HLS lighting or surrounding cultural lighting using NVG;
- (g) providing a timely and accurate “con” to the pilot for drift, rates of climb and descent, obstacle avoidance and ground hazards, including dust and debris;
- (h) assisting the pilot during procedures for flight into deteriorating in-flight visibility situations;
- (i) assisting the pilot during in-flight safe recovery to V.F.R. flight following simulated inadvertent entry to I.M.C.;
- (j) performing wire and obstacle detection and avoidance procedures using white light (for example, from a steerable searchlight or night sun).

Attachment 1 to Appendix 3

Performance Standards for Night Vision Imaging Systems

Modifications of RTCA/DO 275

In this Attachment, each item in column 3 of the Table shows how a relevant operational performance specification in the corresponding paragraph of RTCA/DO-275 mentioned in column 1 and summarised in column 2 is modified.

List of modifications to RTCA/DO-275

RTCA/DO-275		Amended performance requirement
Para 2.2.1.1 System Resolution	1.0 cycles per milliradian (cy/mr). At 14° off axis = 0.81 cy/mr With a variable focus @ through infinity = 0.49cy/mr	1.3 cy/mr
Para 2.2.1.2 System Luminance Gain	= 2,500 foot-Lamberts (fL) per fL at an input light level of 1×10^{-4} fL	= 5 500 foot-Lamberts (fL) per fL at an input light level of 1×10^{-4} fL
Para 2.2.1.3 Field-of-View	38° vertical and horizontal	40°
Para 2.2.1.4 Magnification	1:1 +/- 2%	1:1
Para 2.2.1.7.1 Spectral Transmission	Meet Class B filter requirements	Class A/B filter
Para 2.2.1.10 Eyepiece Diopter Range	Adjustable +1.0 to -2.0, or Fixed -0.5 and -1.0	+2 to -6
Para 2.2.1.12 Objective Focus Range	Adjustable from beyond infinity to no greater than 45 cm close range	25 cm close
Para 2.2.1.13 Exit Pupil/Eye Relief	Type I – 25 mm, Type II – 20mm	25 mm
Para 2.2.2.3 Flip-Up/Flip Down	Required capability	Push button
Para 2.2.2.4 Fore-and-Aft Adjustment	Sufficient to align with users eyes	27 mm total
Para 2.2.2.4 Tilt Adjustment	Sufficient to align with users eyes	10°
Para 2.2.2.5 Interpupillary Adjustment	Desired but not required. If not installed, exit pupil must be large enough to see full FOV	51 to 72 mm
Para 2.2.2.6 Voltage Required	2.7 – 3.0 V DC 50mA nominal Backup power supply required	2.7 – 3.0 V DC 50mA nominal Backup available
Technology	Intensifier tubes not specified	GEN III Image intensifier tubes or equivalent
Photosensitivity	Not specified	1800 uA/lm
Tube Resolution	Not specified	64 line pairs per millimetre (lp/mm)
Signal to Noise Ratio	Not specified	21:1