# SECTION 5 OPERATIONAL RATING AND ENDORSEMENT STANDARDS

## INSTRUMENT RATING

## CIR Conduct an IFR flight

### 1 Unit description

This unit describes the skills and knowledge required to conduct a flight in an aircraft under the IFR.

### 2 Elements and performance criteria

2.1 **CIR.1 – Plan a flight under the IFR**

(a) determine aircraft is properly equipped and serviceable for IFR flight;

(b) possess and use all the required documentation that is current to plan an IFR flight;

(c) prepare an accurate flight plan that ensures all applicable operational requirements are met;

(d) make flight notification;

(e) check navigation system database is current;

(f) initialise navigation system (as applicable);

(g) conduct navigation system validity check (as applicable);

(h) conduct RAIM check if required;

(i) select, load, check and activate the flight plan (as applicable).

2.2 **CIR.2 – Perform an instrument departure**

(a) prepare aircraft and aircraft systems for departure;

(b) demonstrate consideration of and planning for non-normal and emergencies during departure;

(c) demonstrate adequate knowledge of both of published and cleared and non-published and non-cleared instrument departures;

(d) establish lowest take-off minima required considering aircraft performance, aerodrome, available instrument approaches and environmental conditions;

(e) conduct instrument departure to comply with obstacle clearance requirements.

2.3 **CIR.3 – Conduct a published instrument departure (all engines)**

(a) perform a SID or other published departure;

(b) maintain assigned SID, including all tracks, headings, altitudes and speeds;

(c) perform a cleared departure safely and maintain tracks, headings, altitudes and speeds within specified tolerances.

2.4 **CIR.4 – Conduct an instrument departure (1 engine inoperative) – simulated IMC**

(a) for single-engine aircraft instrument endorsements:

(i) following engine failure establish optimum flight path and manoeuvres aircraft towards most suitable terrain considering conditions;

(ii) time permitting conduct checklists and radio calls.

(b) for multi-engine aircraft instrument endorsements:

(i) during departure manages aircraft following a simulated 1 engine inoperative event;

(ii) maintain aircraft flight path within published tolerances;

(iii) conduct checklists and radio calls;

(iv) maintain terrain clearance;

(v) assess condition and decide to continue or return to aerodrome.

2.5 **CIR.5 – Navigate aircraft under the IFR using ground-based and satellite-based navigational systems**

(a) demonstrate adequate knowledge of the published procedures associated with navigating an aircraft under the IFR using ground-based and satellite-based navigational systems;

(b) navigate aircraft under the IFR in accordance with published procedure using ground-based and satellite-based navigational systems;

(c) position fix is determined with reference to navigation aid and systems using ground-based and/or satellite-based navigational systems;

(d) tracks are intercepted to and from stations and way points with reference to navigation aids/systems using ground-based and satellite-based navigational systems;

(e) perform ground-based and satellite-based navigational systems confidence and integrity checks;

(f) requirement for an unplanned diversion is recognised and confirmed;

(g) route to alternate aerodrome, navigation aid and revised track is determined;

(h) planned route maintains height above the LSALT;

(i) flight planned route is diverted to track to alternate aerodrome, navigation aid or aerodrome;

(j) operational information for alternate aerodrome(s) is reviewed and applied according to published procedures;

(k) fuel plan is reviewed and amended according to published procedures;

(l) hazardous weather conditions are identified and avoided;

(m) procedures for penetration of hazardous weather are demonstrated and explained;

(n) aircraft systems are employed to mitigate the effects of hazardous weather;

(o) aircraft is configured to comply with turbulence penetration procedures;

(p) passenger and crew are restrained;

(q) procedures for penetrating turbulence are explained and demonstrated;

(r) identify and manage non-normal and emergency events.

2.6 **CIR.6 – Perform a descent and arrival under the IFR**

(a) demonstrate adequate knowledge of the published procedures for the conduct of a descent and arrival to an aerodrome;

(b) perform a descent and published arrival procedure to an aerodrome.

2.7 **CIR.7 – Perform a published holding procedure**

(a) demonstrate adequate knowledge of a published holding procedure;

(b) track aircraft to the holding fix and performs holding procedure (entry, full holding pattern and exit) safely.

2.8 **CIR.8 – Perform an instrument approach 2D or 3D**

(a) demonstrate adequate knowledge of published procedures associated with an instrument approach;

(b) perform an instrument approach unique to the instrument approach type;

(c) maintain a stabilised flight path within specified tolerances during the approach procedure.

2.9 **CIR.9 – Perform an instrument approach 1 engine inoperative (multi-engine aircraft only) – simulated IMC**

(a) at or before the FAF, identify, control and establish aircraft flight path within specified tolerances following an engine failure;

(b) complete checklists and radio calls;

(c) from the missed approach point conducts a missed approach whilst maintaining flight path within specified tolerances.

2.10 **CIR.10 – Perform visual approach operations (includes visual circling where applicable)**

(a) demonstrate adequate knowledge of published procedures for the conduct of a visual approach;

(b) conduct a visual circling approach requiring at least a 90° change of heading to establish the aircraft onto the final approach leg to the specified runway whilst maintaining a stabilised flight path.

**3 Range of variables**

(a) element CIR.9 only applies to the multi-engine aeroplane, multi-engine helicopter and powered-lift aircraft instrument endorsements;

(b) for the single-engine aeroplane instrument endorsement, the aircraft must be a single-engine aeroplane;

(c) for the multi-engine aeroplane instrument endorsement, the aircraft must be a multi-engine aeroplane;

(d) for the single-engine helicopter instrument endorsement, the aircraft must be a single-engine helicopter;

(e) for the multi-engine helicopter instrument endorsement, the aircraft must be a multi-engine helicopter;

(f) for the powered-lift aircraft instrument endorsement, the aircraft must be a powered-lift aircraft;

(g) for the gyroplane instrument endorsement, the aircraft must be a gyroplane;

(h) for the airship instrument endorsement, the aircraft must be an airship;

(i) activities are performed in accordance with published procedures;

(j) IMC or Simulated IMC conditions;

(k) aircraft or approved synthetic training device;

(l) turbine or piston power plants;

(m) day and night;

(n) analogue or digital flight decks;

(o) autopilots and flight management systems;

(p) CTA and OCTA airspace;

(q) RVSM or non-RVSM airspace;

(r) AIP, Jeppesen or other approved IAL plates;

(s) approved checklists;

(t) FMS.

**4 Underpinning knowledge of the following:**

(a) full panel instrument manoeuvres;

(b) limited and partial panel instrument manoeuvres;

(c) AIP and published regulations;

(d) PBN procedures;

(e) approved aircraft flight manual;

(f) relevant sections of published regulations;

(g) airspace requirements and procedures under IFR conditions;

(h) IFR route planning requirements;

(i) use of the navigational computer;

(j) aircraft fuel planning, including holding, alternate, fixed reserve and usage rates;

(k) visual and instrument flight rules and procedures;

(l) factors affecting en route performance, range and endurance;

(m) critical point and point of no return;

(n) meteorological considerations for an IFR flight;

(o) icing conditions and hazards;

(p) requirements for an alternate aerodrome;

(q) determine take-off minima for single and twin engine aircraft at aerodromes with and without suitable departure or instrument approach procedures;

(r) conditions for take-off if a forecast cannot be obtained;

(s) departure procedures;

(t) transponder codes;

(u) when departure track must be established;

(v) contents of airborne and departure reports, and when these must be made;

(w) pilot's responsibility in an IFR visual departure;

(x) procedures for loss of radio communication;

(y) procedures for abnormal operations and emergencies;

(z) aerodrome and en route holding procedures;

(za) IFR cruising levels, selection and hazards;

(zb) operations, functions, modes, limitations and errors of navigations aids and systems;

(zc) instrument approach procedure chart;

(zd) instrument approach procedures and limitations, including the minimum system components required to conduct an approach;

(ze) correct sector entry join for entering the holding pattern of the approach procedure;

(zf) tracking tolerance and altitude limitations for flying a published arc of the approach procedure;

(zg) approach procedure applicable minima for aircraft;

(zh) conditions under which a circling approach must be discontinued and a missed approach initiated;

(zi) circling area applicable to the aircraft performance category being flown;

(zj) when an aircraft may descend below the MDA (day and night);

(zk) procedure to conduct a missed approach from any nominated point within a circling area on a specified approach;

(zl) read and interpret a STAR chart;

(zm) STAR procedures and limitations;

(zn) pilot's responsibilities when STAR clearance is given or cancelled;

(zo) applicable instrument approach procedure or visual approach at end of STAR;

(zp) knowledge of STAR radio procedures;

(zq) procedures for loss of radio communication during STAR;

(zr) procedures for abnormal operations and emergencies during STAR, including navigation aid failure;

(zs) conditions permitting descent below minima;

(zt) procedure for joining the circuit from an approach procedure;

(zu) approach procedure missed approach procedure;

(zv) minimum obstacle clearance criteria during an approach procedure missed approach procedure;

(zw) knowledge of approach procedure radio procedures;

(zx) procedures for loss of radio communication during an approach procedure;

(zy) procedures for abnormal operations and emergencies during an approach procedure, including navigation aid failure, loss of signal integrity and disparity between aids.

# IAP2 Conduct an instrument approach 2D

## 1 Unit description

This unit describes the skills and knowledge required to perform a 2D instrument approach operation.

## 2 Elements and performance criteria

### 2.1 IAP2.1 – Prepares for approach

(a) review latest available information for destination;

(b) conduct navigation system validity check (as applicable);

(c) conduct RAIM check if required;

(d) select, load, check and activate the flight plan (as applicable);

(e) select and brief current approach chart for the approach to be flown;

(f) check and confirm navigation aid required for the approach is serviceable.

### 2.2 IAP2.2 – Conducts initial approach

(a) set altimeter QNH correctly;

(b) manoeuvre aircraft to the holding fix.

### 2.3 IAP2.3 – Conducts a holding pattern

(a) from the holding fix enter and perform a holding pattern;

(b) fly aircraft in accordance with procedure.

### 2.4 IAP2.4 – Conducts an approach

(a) update and set Altimeter QNH;

(b) use automation appropriately;

(c) approach performed correctly and within published tolerances;

(d) navigation aid signal integrity monitored during approach;

(e) from the final approach fix to minima aircraft is flown to a stabilised descent profile;

(f) after establishing visual reference, a visual circling or runway approach is conducted for a landing on the selected runway.

### 2.5 IAP2.5 – Conducts a missed approach

(a) conditions requiring a missed approach are recognised and missed approach is initiated;

(b) aircraft is manoeuvred to MAPt;

(c) missed approach procedure is conducted in accordance with the IAL chart;

(d) obstacle clearance in IMC or simulated IMC is maintained.

## 3 Range of variables

(a) activities are performed in accordance with published procedures;

(b) tasks may be undertaken in:

  (i) IMC;

  (ii) VMC with simulated IMC conditions;

(c) performance may be demonstrated in:

  (i) single-engine aircraft;

  (ii) multi-engine aircraft;

  (iii) approved flight simulation training device;

  (iv) variable air traffic conditions;

(v) variable weather conditions;
(vi) variable flight situations;
(vii) abnormal situations;
(viii) differing classes of airspace;

(d) aircraft may include:
(i) fixed wing;
(ii) helicopter;
(iii) other commercial or military aircraft;

(e) crew may include:
(i) single pilot;
(ii) multi-crew;

(f) instruments may be:
(i) fitted flight instruments suitable for instrument flight;
(ii) head up display suitable for instrument flight;

(g) performance must be demonstrated using azimuth guidance and CDI guidance in the following:
(i) tracking;
(ii) holding pattern;
(iii) approach operations;
(iv) missed approach operations;

(h) limitations may be imposed by:
(i) local noise abatement requirements and curfews;
(ii) airspace endorsements;

(i) conditions may include:
(i) a method of simulating IMC;
(ii) simulated icing conditions;
(iii) moderate turbulence;
(iv) simulated hazardous weather;
(v) autopilot and flight director;
(vi) FMS and other NAV system;
(vii) simulation of emergency and abnormal procedures;

(j) one of the following kinds of 2D instrument approach procedures:
(i) NDB;
(ii) VOR and LOC;
(iii) DGA (DME/GNSS Arrival);
(iv) RNP-LNAV (RNAV/GNSS) and RNP-LP (WAAS required)

(k) approaches may include:
(i) NDB;
(ii) VOR;
(iii) DME or GNSS arrival procedure;
(iv) RNP APCH LNAV and RNP APCH LP [charted as RNAV-(GNSS)];
(v) LLZ;

(l) for an approach — NDB private instrument endorsement, competency must be demonstrated using a non-directional beacon navigation system;

(m) for an approach — VOR/LLZ private instrument endorsement, competency must be demonstrated using a VHF omni-range/localiser navigation system;

(n) for an approach — DME or GNSS private instrument endorsement, competency must be demonstrated using distance measuring equipment or a global navigation satellite system;

(o) for an approach — Approach – RNP APCH-2D private instrument endorsement, competency must be demonstrated using:

(i) a global navigation satellite system; or

(ii) another kind of area navigation-based system.

**4 Underpinning knowledge of the following:**

(a) instrument approach procedures and limitations;

(b) sector entry join procedures for entering a holding pattern;

(c) tracking tolerance and altitude limitations for flying the published approach procedure;

(d) procedure for joining the circuit from an approach procedure;

(e) minimum obstacle clearance criteria during a approach procedure and missed approach procedure;

(f) missed approach procedure for an approach;

(g) radio procedures during an approach;

(h) loss of radio communication during an approach procedure;

(i) abnormal operations and emergencies procedures during an approach, including navigation aid failure;

(j) GNSS system fundamentals and principles of operations;

(k) requirements applicable to pilots and equipment for GNSS operations;

(l) cause and magnitude of typical GNSS errors;

(m) human factors limitations associated with the use of GNSS equipment;

(n) operating procedures which provide safeguards against GNSS navigational errors;

(o) GNSS operating procedures for navigation tasks;

(p) GNSS operational and serviceability checks;

(q) GNSS warnings and messages;

(r) tracking tolerances, automatic Way-point sequencing, CDI sensitivity and RAIM availability parameters for entry, RAIM availability and approach segments;

(s) mode of operation required during each segment of a GNSS/NPA;

(t) conditions required to transition to and operate in that mode of operation for the GNSS/NPA, and the associated CDI sensitivity and RAIM protection provided;

(u) parameters applicable to RAIM warnings in the en route, terminal and approach modes;

(v) effects of availability or otherwise of barometric altimeter-aiding on RAIM availability and prediction;

(w) effects of satellite unserviceability on the reliability of each type of prediction;

(x) effect of each type of RAIM prediction on operational requirements;

(y) prediction limitations that apply to availability of approach RAIM at the destination or alternate aerodrome;

(z) operational requirements which apply to planning a flight on the basis of conducting a RNAV (GNSS) procedure at the destination;

(za) factors that adversely affect the conduct of a GNSS/NPA, and suitable pilot procedures to minimise such effects;

(zb) operating procedures for GNSS equipment which reduce or eliminate errors.

# IAP3 Conduct an instrument approach 3D

## 1 Unit description

This unit describes the skills and knowledge required to perform a 3D instrument approach procedure.

## 2 Elements and performance criteria

### 2.1 IAP3.1 – Prepares for approach

(a) review latest available information for destination;

(b) conduct navigation system validity check (as applicable);

(c) conduct RAIM/SBAS check if required;

(d) select, load, check and activate the flight plan (as applicable);

(e) select and brief current approach chart for the approach to be flown;

(f) check and confirm navigation aid required for the approach is serviceable.

### 2.2 IAP3.2 – Conducts initial approach

(a) set altimeter QNH;

(b) manoeuvre aircraft to the holding fix.

### 2.3 IAP3.3 – Conducts a holding pattern

(a) from the holding fix enter and perform a holding pattern;

(b) fly aircraft in accordance with procedure.

### 2.4 IAP3.4 – Conducts an approach

(a) update and set altimeter QNH;

(b) uses automation appropriately;

(c) navigation aid signal integrity monitored during approach;

(d) vertical and lateral path flown within published tolerances;

(e) specified altitude check on glide slope is performed;

(f) from the final approach fix to minima aircraft is flown to a stabilised descent profile;

(g) after establishing visual reference, a visual circling or runway approach is conducted for a landing on the selected runway.

### 2.5 IAP3.5 – Conducts a missed approach

(a) conditions requiring a missed approach are recognised and missed approach is initiated;

(b) aircraft is manoeuvred to MAPt;

(c) missed approach procedure is conducted in accordance with the IAL chart;

(d) obstacle clearance in IMC or simulated IMC is maintained.

## 3 Range of variables

(a) activities are performed in accordance with published procedures;

(b) tasks may be undertaken in:

(i) IMC;

(ii) VMC with simulated IMC conditions;

(c) performance may be demonstrated in:

(i) single-engine aircraft;

(ii) multi-engine aircraft;

(iii) synthetic training device approved by the relevant authority;

(iv) variable air traffic conditions;
(v) variable weather conditions;
(vi) variable flight situations;
(vii) abnormal situations;
(viii) differing classes of airspace;

(d) aircraft may include:
(i) fixed wing;
(ii) helicopter;
(iii) other commercial or military aircraft;

(e) crew may include:
(i) single pilot;
(ii) multi-crew;

(f) instruments may be:
(i) fitted flight instruments suitable for instrument flight;
(ii) head up display suitable for instrument flight;

(g) limitations may be imposed by:
(i) local noise abatement requirements and curfews;
(ii) airspace endorsements;

(h) conditions may include:
(i) a method of simulating IMC;
(ii) simulated icing conditions;
(iii) moderate turbulence;
(iv) simulated hazardous weather;
(v) autopilot and flight director;
(vi) FMS other NAV system;
(vii) simulation of emergency and abnormal procedures;

(i) one of the following kinds of 3D instrument approach procedures:
(i) ILS and MLS and GLS;
(ii) RNP-LNAV/VNAV (Baro) and RNP-LPV (WAAS required);

(j) Reserved

(k) for an approach — Approach – RNP APCH-3D private instrument endorsement, competency must be demonstrated using barometric-aided vertical guidance;

(l) for an approach — ILS private instrument endorsement, competency must be demonstrated using:
(i) an instrument landing system; or
(ii) a microwave landing system; or
(iii) a global navigation satellite system with ground-based augmentation.

**4 Underpinning knowledge of the following:**

(a) types of approach lighting systems;

(b) use of and precautions with approach slope indicators;

(c) low-visibility operations and environmental limitations (where applicable);

(d) contaminated runway operations;

(e) runway markings and lighting;

(f) temperature effects on altimeter;

(g) adjustment to Baro determined minima for temperature effect;

(h) automation and FMS management for low-visibility operations (where applicable);

(i) equipment redundancy during low-visibility operations (where applicable);

(j) RVR versus SVR.

# PRIVATE IFR RATING

## PIF Conduct a private instrument flight rules flight

### 1 Unit description

This unit describes the skills and knowledge required to conduct of a Private IFR flight.

### 2 Elements and performance criteria

2.1 **PIF.1 – Plan a flight under the IFR**

(a) determine aircraft is properly equipped and serviceable for IFR flight;

(b) initialise navigation system (as applicable);

(c) conduct navigation system validity check (as applicable);

(d) conduct RAIM/SBAS check if required;

(e) select, load, check and activate the flight plan (as applicable);

(f) use all the required documentation that is current to plan an IFR flight;

(g) prepare an accurate flight plan that ensures all applicable operational requirements are met;

(h) make flight notification;

(i) check navigation system database is current.

2.2 **PIF.2 – Conduct a visual departure**

(a) conduct a visual departure until reaching the LSALT;

(b) ensure terrain clearance is maintained visually at all times during departure until reaching LSALT;

(c) for the night endorsement, comply with requirements for conducting a circling approach at night.

2.3 **PIF.3 – En route IFR operation**

(a) use navigation systems to maintain en route navigation;

(b) perform en route procedures;

(c) comply with en route procedures in applicable types of airspace;

(d) ensures aircraft separation standards are maintained;

(e) recognise and confirm requirement for an unplanned diversion;

(f) determine route to alternate aerodrome, navigation aid and revised track;

(g) maintain height above the LSALT;

(h) divert from flight planned route to track to an alternate aerodrome, navigation aid or aerodrome;

(i) review and apply operational information for alternate aerodrome(s);

(j) review and amend fuel plan;

(k) identify and avoid hazardous weather conditions;

(l) demonstrate awareness of and take appropriate action in relation to penetration of hazardous weather;

(m) use aircraft systems effectively to mitigate the effects of hazardous weather;

(n) configure aircraft to comply with turbulence penetration procedures;

(o) identify and manage non-normal and emergency events.

2.4 **PIF.4 – Navigating and holding using navigation system**

(a) operate navigation system;

(b) perform system confidence and integrity checks;

(c) use ground-based and satellite-based navigation systems to navigate aircraft under the IFR, including the following:

(i) fix position;

(ii) intercept and maintain tracks to and from stations and way points;

(d) track aircraft to the holding fix and enter holding pattern;

(e) perform holding procedure (entry, full holding pattern and exit).

2.5 **PIF.5 – Conduct instrument departure (if applicable)**

(a) conduct an instrument departure procedure to comply with obstacle clearance requirements;

(b) if applicable, perform SID or other published departure;

(c) maintain assigned SID, including tracks, headings, altitudes and speeds;

(d) comply with a departure clearance by maintaining tracks, headings, altitudes and speeds within specified tolerances;

(e) for single-engine aircraft instrument endorsements:

(i) following a simulated engine failure, establish optimum flight path and manoeuvre aircraft towards most suitable terrain considering conditions;

(ii) time permitting, conduct checklists and radio calls;

(f) for multi-engine aircraft instrument endorsements:

(i) during departure manage aircraft following a simulated 1 engine inoperative event;

(ii) maintain aircraft flight path;

(iii) conduct checklists and radio calls;

(iv) maintain terrain clearance;

(v) assess conditions and decide and then execute plan to continue or return to aerodrome.

2.6 **PIF.6 – Perform an instrument approach operation (if applicable)**

(a) perform an instrument approach in accordance with procedures unique to the instrument approach type;

(b) maintain a stabilised flight path within specified tolerances during the approach operation;

(c) conduct a visual circling approach requiring at least a 90$^{o}$ change of heading to establish the aircraft onto the final approach leg to the specified runway whilst maintaining a stabilised flight path;

(d) for the night endorsement, comply with requirements for conducting a circling approach at night.

2.7 **PIF.7 – Perform an instrument approach 1 engine inoperative (multi-engine aircraft only), if applicable**

(a) at or before the FAF identify, control and establish aircraft flight path within specified tolerances following an engine failure;

(b) complete checklists and radio calls;

(c) from the missed approach point conduct a missed approach whilst maintaining flight path within specified tolerances.

2.8 **PIF.8 – Perform a descent, visual approach and landing**

(a) plan descent to establish VMC above or at the LSALT or MSA;

(b) maintain VMC during decent and arrival to the destination aerodrome;

(c) conduct visual approach and landing;

(d) for the night endorsement, comply with requirements for descending below LSALT at night.

**3 Range of variables**

(a) for the single-engine aeroplane private instrument endorsement, the aircraft must be a single-engine aeroplane;

(b) for the multi-engine aeroplane private instrument endorsement and the departure — multi-engine aeroplane private instrument endorsement, the aircraft must be a multi-engine aeroplane;

(c) for the single-engine helicopter private instrument endorsement, the aircraft must be a single-engine helicopter;

(d) for the multi-engine helicopter private instrument endorsement and the departure — multi-engine helicopter private instrument endorsement, the aircraft must be a multi-engine helicopter;

(e) for the powered-lift aircraft private instrument endorsement and the departure — powered-lift aircraft private instrument endorsement, the aircraft must be a powered-lift aircraft;

(f) for the gyroplane private instrument endorsement, the aircraft must be a gyroplane;

(g) for the airship private instrument endorsement and the departure — airship private instrument endorsement, the aircraft must be an airship;

(h) for the departure — single-engine aircraft private instrument endorsement, the aircraft must be a single-engine aircraft;

(i) for the standard instrument departure private instrument endorsement, the candidate must complete a published standard instrument departure procedure;

(j) for the navigation — NDB private instrument endorsement, competency must be demonstrated using an NDB where applicable;

(k) for the navigation — VOR/LLZ private instrument endorsement, competency must be demonstrated using a VOR or LLZ where applicable;

(l) for the navigation — GNSS private instrument endorsement, competency must be demonstrated using a GNSS, where applicable;

(m) for the STAR private instrument endorsement, competency must be demonstrated using an NDB where applicable;

(n) for the approach and landing — multi-engine aeroplane private instrument endorsement, the aircraft must be a multi-engine aeroplane;

(o) for the approach and landing — multi-engine helicopter private instrument endorsement, the aircraft must be a multi-engine helicopter;

(p) for the night private instrument endorsement, competency must be demonstrated at night;

(q) activities are performed in accordance with published procedures;

(r) IMC or simulated IMC conditions;

(s) aircraft or approved synthetic training device;

(t) single-pilot or multi-crew aircraft;

(u) single-engine or multi-engine aircraft;

(v) turbine or piston power plants;

(w) day or night;

(x) analogue or digital flight decks;

(y) autopilots and flight management systems;

(z) CTA and OCTA airspace;

(za) RVSM or non-RVSM airspace;

(zb) AIP, Jeppensen or other approved IAL plates;

(zc) NDB, VOR, DME, RNAV/GNSS navigation aids.

**4 Underpinning knowledge of the following:**

(a) environmental conditions of VMC;

(b) AIP and published regulations;

(c) approved aircraft flight manual;

(d) determining the currency of operational documents;

(e) relevant sections of Civil Aviation Safety Regulations and Civil Aviation Orders;

(f) airspace requirements and procedures under IFR conditions;

(g) IFR route planning requirements and procedures;

(h) IFR approach procedures;

(i) use of the navigational computer;

(j) aircraft fuel planning, including holding, alternate, fixed reserve and usage rates;

(k) visual and instrument flight rules and procedures;

(l) factors affecting en route performance, range and endurance;

(m) critical point and point of no return;

(n) meteorological considerations for an IFR flight;

(o) icing conditions, hazards and avoidance;

(p) turbulence conditions, hazards and avoidance;

(q) requirements for an alternate aerodrome;

(r) take-off minima;

(s) IFR and visual;

(t) ability to read and interpret an instrument approach procedure chart;

(u) instrument approach procedures and limitations;

(v) tracking tolerance and altitude limitations for DME/GNSS arc approach procedure;

(w) when an aircraft may descend below the MDA (day and night);

(x) interpret a STAR chart;

(y) interpret a SID chart;

(z) conditions permitting descent below minima;

(za) radio procedures;

(zb) procedures for abnormal operations and emergencies during an approach procedure, including navigation aid failure, loss of signal integrity and disparity between aids.

# NIGHT VFR RATING

## NVR1 Conduct a traffic pattern at night

### 1 Unit description

This unit describes the skills and knowledge required to take off, land and operate an aircraft safely in the traffic pattern at night.

### 2 Elements and performance criteria

2.1 **NVR1.1 – Control aircraft on the ground at night**

(a) instrument and cockpit lighting are adjusted to an appropriate level for taxiing;

(b) ATC instructions and manoeuvres of the aircraft on the ground at night within the approved movement area as defined by aerodrome ground lighting are complied with;

(c) aircraft lighting to identify obstructions, other aircraft and taxiway and runway limits is used as required;

(d) aircraft is taxied at a speed which allows for an adequate lookout to be maintained to avoid obstructions.

2.2 **NVR1.2 – Activate pilot activated lighting (PAL)**

(a) appropriate radiotelephone frequency is utilised to activate PAL system when within radio range;

(b) transmit sequence is utilised to activate PAL system;

(c) wind indicator lighting is monitored to determine end of activation period.

2.3 **NVR1.3 – Take-off aircraft at night**

2.3.1 For aircraft in the aeroplane category, as follows:

(a) aircraft is lined up correctly in centre of runway in take-off direction;

(b) line-up checks appropriate to night take-off are completed;

(c) take-off by reference to flare path and runway lighting and aircraft instruments is executed;

(d) aircraft is rotated at manufacturer's recommended speed;

(e) climb attitude and control aircraft in climb, after take-off solely by reference to instruments is completed;

(f) alignment with runway by visual reference and lookout is established and maintained;

(g) after take-off, checks are performed at a safe height.

2.3.2 For aircraft in the helicopter category, as follows:

(a) accelerates helicopter in take-off direction on a prescribed track;

(b) recognises and controls translational lift;

(c) executes take-off by reference to flare path and runway lighting or HLS lighting and aircraft instruments;

(d) applies climb power and adjusts attitude to maintain climb speed appropriate to obstacle clearance requirements;

(e) aligns helicopter landing gear with the planned take-off direction until the point at which balanced flight is required;

(f) maintains helicopter outside the height-velocity chart avoid area;

(g) retracts undercarriage at a safe height and airspeed, if applicable;

(h) trims helicopter, if applicable;

(i) balances helicopter;

(j) performs after-take-off checks in accordance with approved checklist.

2.4 **NVR1.4 – Fly a circuit pattern at night**

Performs a circuit pattern safely and in accordance with the specified procedures and approved techniques.

2.5 **NVR1.5 – Manage emergency situations at night**

(a) (in simulated conditions) aircraft control is maintained;

(b) emergency situation is managed in accordance published procedures;

(c) electrical lighting and power sources are monitored;

(d) electrical lighting and power source emergency procedures are conducted as appropriate.

2.6 **NVR1.6 – Perform a go-around**

(a) the need to conduct a go-around is recognised;

(b) go-around is performed from any point on base and final approach legs.

2.7 **NVR1.7 – Land at night, with and without the use of aircraft landing lights**

(a) circuit entry and pattern are performed with reference to runway environment;

(b) safe altitude is maintained by reference to aircraft instruments and runway lighting;

(c) aircraft is safely landed at night with and without landing lights;

(d) after landing checks are performed.

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) for the single-engine aeroplane night VFR endorsement, the aircraft must be a single-engine aeroplane;

(c) for the multi-engine aeroplane night VFR endorsement, the aircraft must be a multi-engine aeroplane;

(d) for the helicopter night VFR endorsement, the aircraft must be a helicopter;

(e) for the powered-lift aircraft night VFR endorsement, the aircraft must be a powered-lift aircraft;

(f) for the gyroplane night VFR endorsement, the aircraft must be a gyroplane;

(g) for the airship night VFR endorsement, the aircraft must be a airship;

(h) night or simulated night conditions;

(i) aircraft or approved synthetic training device;

(j) analogue or digital flight decks;

(k) autopilots and flight management systems.

**4 Underpinning knowledge of the following:**

(a) the topics mentioned in Section 2.7 of this MOS, night VFR rating;

(b) colour and pattern of the following:

(i) permanent threshold light;

(ii) runway threshold identifications lights;

(iii) displaced threshold lighting;

(iv) runway edge lighting;

(v) runway end lighting;

(vi) runway centreline lighting;

(vii) obstacle lighting;

(c) method of activating PAL;

(d) method of activating Aerodrome Frequency Response Unit (AFRU) with PAL options;

(e) time that PAL remains illuminated;

(f) PAL warning for users that the lights are about to extinguish;

(g) operation and use of a VASI system;

(h) operation and use of a PAP) system;

(i) vestibular systems, namely the semicircular canals and otoliths, in helping the pilot maintain orientation;

(j) circumstances aggravate vestibular disorientation, and how to overcome this problem;

(k) causes that may aggravate, vestibular disorientation such as somatogravic illusions, somatogyral illusions and ‘graveyard spiral’, coriolis effect, and ‘leans’;

(l) conditions and causes under which visual illusions, such as ‘false horizons’, visual-cue illusions, relative motion illusions, ‘flicker effect’, ‘black hole’ illusion, and autokinesis may occur.

## NVR2 Night VFR – single-engine aircraft

### 1 Unit description

This unit describes the skills and knowledge required to conduct a NVFR operation in a single-engine aircraft.

### 2 Elements and performance criteria

2.1 **NVR2.1 – Determine aircraft meets requirements for NVFR flight**

(a) aircraft requirements for NVFR flight are determined;

(b) flight and navigation instruments, minimum electrical lighting and navigation equipment and any other requirements which are fitted to the aircraft are checked to ensure they are suitable and serviceable for NVFR flight.

2.2 **NVR2.2 – Obtain and use current operational documents**

(a) operational documents applicable to the flight are obtained and checked for currency;

(b) applicable information contained in documents for flight planning and management is interpreted and applied;

(c) documents required for the flight are stowed and accessibility for the pilot during flight is ensured.

2.3 **NVR2.3 – Prepare flight plan for NVFR flight**

(a) charts suitable for intended NVFR flight are selected and prepared;

(b) applicable information to prepare a flight plan which details tracks, distances, times, altitudes to be flown and fuel requirements to reach destination are obtained, analysed and applied;

(c) meteorological, airways facilities, aerodrome and NOTAM information applicable to planning and conducting a flight is obtained, interpreted and applied;

(d) routes to optimise options in the event of an engine failure are planned.

2.4 **NVR2.4 – Determine operational requirements**

(a) suitability of the aerodrome lighting for night operations is determined;

(b) curfew requirements are complied with;

(c) duration of flight is determined;

(d) holding, alternate and reserve fuel requirements due to weather, navigation aid availability and aerodrome lighting are determined in accordance with operational requirements;

(e) total fuel requirements are calculated.

2.5 **NVR2.5 – Make flight notification**

(a) flight notification is prepared for planned NVFR flight;

(b) completed flight notification is submitted;

(c) flight notification acceptance is confirmed.

2.6 **NVR2.6 – Program navigation system**

(a) prepare data for transfer to approved airborne navigation system;

(b) navigation data is loaded and checked.

2.7 **NVR2.7 – Select, operate and monitor navigation aids and systems**

(a) appropriate navigation aids and systems for the planned NVFR flight are selected and operated in accordance navigation aid and system requirements;

(b) integrity of navigation aid and systems information is monitored and maintained.

2.8 **NVR2.8 – Make visual departure at night**

(a) obstacle clearance is ensured until reaching LSALT;

(b) departure track is intercepted within 5 nm of aerodrome

(c) conduct take-off and departure from an aerodrome which is remote from ground lighting as follows:

(i) climb out after take-off, using instruments as the primary reference;

(ii) after take-off checks are performed at a safe height.

2.9 **NVR2.9 – Navigate the aircraft under NVFR**

(a) cockpit and instrument lighting are adjusted to allow reference to documentation, instruments and lookout;

(b) manages and interprets outputs of on-board navigation systems;

(c) aircraft position fix is determined visually or with reference to navigation aid and system;

(d) updates navigation log;

(e) maintains fuel log;

(f) uses a recognised navigation work cycle;

(g) tracks are intercepted to and from visually or with reference to navigation aids and systems;

(h) track is maintained within tolerances specified in published procedures;

(i) timings are recorded, assessed and revised as required;

(j) station passage is recognised;

(k) planned route above LSALT is maintained;

(l) route and destination weather conditions are monitored and appropriate actions are executed;

(m) descent point is calculated and amended.

2.10 **NVR2.10 – Comply with air traffic control rules and procedures for NVFR flights**

(a) separation from other air traffic maintained;

(b) airspace requirements are complied with;

(c) two-way communication is maintained with ATS and other aircraft;

(d) ATC clearances and radar vectoring instructions are complied with.

2.11 **NVR2.11 – Manage hazardous weather conditions**

(a) hazardous weather conditions are identified and avoided;

(b) procedures for avoidance of hazardous weather are demonstrated and explained;

(c) aircraft systems are employed to mitigate the effects of hazardous weather.

2.12 **NVR2.12 – Manage emergency situations at night**

(a) (in simulated conditions) aircraft control is maintained;

(b) emergency situation is managed in accordance published procedures;

(c) electrical lighting and power sources are monitored;

(d) electrical lighting and power source emergency procedures are conducted as appropriate.

2.13 **NVR2.13 – Conduct a diversion to revised route or alternate aerodrome at night**

(a) requirement for an unplanned diversion is recognised and confirmed;

(b) route to alternate aerodrome, navigation aid and revised track is determined;

(c) planned route maintains height above LSALT in accordance with regulations while flying under NVFR;

(d) flight planned route is diverted to track to an alternate aerodrome, navigation aid or aerodrome;

(e) operational information for alternate aerodrome(s) is reviewed and applied according to published procedures;

(f) fuel plan is reviewed and amended according to published procedures.

2.14 **NVR2.14 – Make visual approach at night**

(a) descent below LSALT is conducted in accordance with published procedures;

(b) track is maintained to destination aerodrome;

(c) conduct an approach and landing at an aerodrome that is remote from extensive ground lighting.

2.15 **NVR2.15 – Perform a go-around**

(a) the need to conduct a go-around is recognised;

(b) go-around is performed from any point on base and final approach legs.

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) tasks may be undertaken in NVFR conditions;

(c) performance may be demonstrated in the following as applicable:

(i) single-engine aircraft;

(ii) synthetic training device approved by the appropriate authority;

(d) aircraft may include:

(i) fixed wing;

(ii) helicopter;

(e) instruments may be:

(i) fitted flight instruments suitable for NVFR flight;

(ii) head up display suitable for NVFR flight;

(f) limitations may be imposed by:

(i) local noise abatement requirements and curfews;

(ii) airspace endorsements;

(g) Aircraft requirements may include:

(i) instruments;

(ii) communication;

(iii) navigation system;

(iv) lighting;

(h) for the single-engine aeroplane night VFR endorsement, the aircraft must be a single-engine aeroplane;

(i) for the helicopter night VFR endorsement, the aircraft must be a helicopter;

(j) for the powered-lift aircraft night VFR endorsement, the aircraft must be a powered-lift aircraft;

(k) for the gyroplane night VFR endorsement, the aircraft must be a gyroplane;

(l) for the airship night VFR endorsement, the aircraft must be a airship.

**4 Underpinning knowledge of the following:**

(a) the topics mentioned in Section 2.7 of this MOS, night VFR rating;

(b) navigation requirements for the following:

(i) a night visual flight using radio navigation systems;

(ii) a night visual flight using self-contained or long-range navigation systems;

(iii) a night visual flight using visual reference to ground and water;

(c) navigation tolerance for a night visual flight avoiding CTA;

(d) requirements for the following:

(i) positive radio fixing;

(ii) the most precise track guidance;

(e) navigation requirements for night visual flight with respect to time interval between fixes, accuracy of time reference, and accuracy and procedures in track-keeping;

(f) procedures for night visual flight in all classes of airspace when diverting from track due to navigation or weather;

(g) route for night visual flight with respect to forecast weather, controlled airspace, prohibited, restricted and danger areas, engine out performance for multi-engine aircraft, specified route limitations, airways operational requirements, and availability of published routes, en route alternate aerodromes, navigation aids, rated coverage and radio communication;

(h) compulsory reporting points;

(i) route, aircraft equipment and navigation requirements for NVFR;

(j) LSALT for a night visual flight for a route published on a chart;

(k) dimensions of the significant safety sector when calculating LSALT for a route not published on a chart;

(l) methods of calculating LSALT for a route not published on a chart;

(m) calculation of LSALT when uncertain of position;

(n) conditions for descent below LSALT;

(o) pre-flight altimeter accuracy check for a night visual flight;

(p) altimetry procedures to all stages of a night visual flight

(q) operating at aerodromes where surrounding light is limited.

# NVR3 Night VFR – multi-engine aircraft

## 1 Unit description

This unit describes the skills and knowledge required to conduct a flight at night under the NVFR in a multi-engine aircraft.

## 2 Elements and performance criteria

### 2.1 NVR3.1 – Determine aircraft meets requirements for NVFR flight

(a) aircraft requirements for NVFR flight are determined;

(b) flight and navigation instruments, minimum electrical lighting and navigation equipment and any other requirements which are fitted to the aircraft are checked to ensure they are suitable and serviceable for NVFR flight.

### 2.2 NVR3.2 – Obtain and use current operational documents

(a) operational documents applicable to the flight are obtained and checked for currency;

(b) applicable information contained in documents for flight planning and management is interpreted and applied;

(c) documents required for the flight are stowed and accessibility for the pilot during flight is ensured.

### 2.3 NVR3.3 – Prepare flight plan for NVFR flight

(a) charts suitable for intended NVFR flight are selected and prepared;

(b) calculates LSALT for planned flight using WAC;

(c) applicable information to prepare a flight plan which details tracks, distances, times, altitudes to be flown and fuel requirements to reach destination are obtained, analysed and applied;

(d) meteorological, airways facilities, aerodrome and NOTAM information applicable to planning and conducting a flight is obtained, interpreted and applied;

(e) routes to optimise options in the event of an engine failure are planned.

### 2.4 NVR3.4 – Determine operational requirements

(a) suitability of the aerodrome lighting for night operations is determined;

(b) curfew requirements are complied with;

(c) duration of flight is determined;

(d) holding, alternate and reserve fuel requirements due to weather, navigation aid availability and aerodrome lighting are determined in accordance with operational requirements;

(e) total fuel requirements are calculated;

(f) calculates performance available and plans actions in the event of engine failure after take-off;

(g) calculates performance available in the event of engine failure during cruise and determines if aircraft can maintain at least the LSALT for planned route until established within 3 nm of destination aerodrome with the runway in sight;

(h) replans if OEI performance indicates inability to maintain LSALT on planned route.

### 2.5 NVR3.5 – Make flight notifications

(a) flight notification is prepared for planned NVFR flight;

(b) completed flight notification is submitted;

(c) flight notification acceptance is confirmed.

### 2.6 NVR3.6 – Program navigation system

(a) prepare data for transfer to approved airborne navigation system;

(b) navigation data is loaded and checked.

2.7 **NVR3.7 – Select, operate and monitor navigation aids and systems**

(a) appropriate navigation aids/systems for the planned NVFR flight are selected and operated in accordance navigation aid/system requirements;

(b) integrity of navigation aid/systems information is monitored and maintained.

2.8 **NVR3.8 – Take-off at night at other than departure aerodrome which is remote from ground lighting**

(a) aircraft is lined up correctly in centre of runway in take-off direction;

(b) line-up checks appropriate to night take-off are completed;

(c) take-off by reference to flare path/runway lighting and aircraft instruments is executed;

(d) aircraft is rotated at manufacturer's recommended speed;

(e) climb attitude and control aircraft in climb, after take-off solely by reference to instruments is completed;

(f) alignment with runway by visual reference and lookout is established and maintained;

(g) after take-off, checks are performed at a safe height.

2.9 **NVR3.9 – Engine failure after take-off (performed in day VFR conditions)**

Under simulated IMC at a height not below 400 ft AGL controls aircraft following a simulated engine failure after take-off from the point of failure, carries out published engine failure procedures and establishes the aircraft at circuit height within prescribed tolerances for altitude and heading.

2.10 **NVR3.10 – Make a visual departure at night**

(a) obstacle clearance is ensured until reaching LSALT;

(b) departure track is intercepted within 5 nm of aerodrome.

2.11 **NVR3.11 – Navigate the aircraft in NVFR**

(a) cockpit and instrument lighting are adjusted to allow reference to documentation, instruments and lookout;

(b) manages and interprets outputs of on-board navigation systems;

(c) aircraft position fix is determined visually or with reference to navigation aid and system;

(d) updates navigation log;

(e) maintains fuel log;

(f) uses a recognised navigation work cycle;

(g) tracks are intercepted to and from visually or with reference to navigation aids and systems;

(h) track is maintained within tolerances specified in published procedures;

(i) timings are recorded, assessed and revised as required;

(j) station passage is recognised;

(k) planned route above LSALT is maintained;

(l) route and destination weather conditions are monitored and appropriate actions are executed;

(m) descent point is calculated and amended.

2.12 **NVR3.12 – Engine failure during cruise (not below LSALT at night)**

(a) following a simulated engine failure during cruise, carries out published engine failure-procedures and establishes aircraft at a nominated altitude above LSALT for route within prescribed tolerances for altitude, track and heading;

(b) using a structured method develops and decides on a course of action to minimise threats for continuation of flight with 1 engine inoperative.

2.13 **NVR3.13 – Comply with air traffic control rules and procedures for NVFR flights**

(a) separation from other air traffic maintained;

(b) airspace requirements are complied with;

(c) two-way communication is maintained with ATS and other aircraft;

(d) ATC clearances and radar vectoring instructions are complied with.

2.14 **NVR3.14 – Manage hazardous weather conditions**

(a) hazardous weather conditions are identified and avoided;

(b) procedures for avoidance of hazardous weather are demonstrated and explained;

(c) aircraft systems are employed to mitigate the effects of hazardous weather.

2.15 **NVR3.15 – Manage emergency situations at night**

(a) (in simulated conditions) aircraft control is maintained;

(b) emergency situation is managed in accordance published procedures;

(c) electrical lighting and power sources are monitored;

(d) electrical lighting and power source emergency procedures are conducted as appropriate.

2.16 **NVR3.16 – Conduct a diversion to revised route or alternate aerodrome at night**

(a) requirement for an unplanned diversion is recognised and confirmed;

(b) route to alternate aerodrome, navigation aid and revised track is determined;

(c) planned route maintains height above LSALT in accordance with regulations while flying under NVFR;

(d) flight planned route is diverted to track to an alternate aerodrome, navigation aid or aerodrome;

(e) operational information for alternate aerodrome(s) is reviewed and applied according to published procedures;

(f) fuel plan is reviewed and amended according to published procedures.

2.17 **NVR3.17 – Make visual approach at night**

(a) descent below LSALT is conducted in accordance published procedures;

(b) track is maintained to destination aerodrome;

(c) with 1 engine inoperative, under day VFR conditions conducts a descent, circuit join, approach and landing from 3 nm at or above a simulated LSALT with 1 engine inoperative whilst maintaining prescribed flight tolerances.

2.18 **NVR3.18 – Land at night, with and without the use of aircraft landing lights at other than departure aerodrome which is remote from ground lighting**

(a) circuit entry and pattern are performed with reference to runway environment;

(b) safe altitude is maintain by reference to aircraft instruments and runway lighting;

(c) aircraft is safely landed at night with and without landing lights;

(d) after landing checks are performed.

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) tasks may be undertaken in NVFR conditions;

(c) performance may be demonstrated in a:

(i) multi-engine aircraft;

(ii) synthetic training device approved by the appropriate authority;

(d) aircraft may include:

(i) fixed wing;

(ii) helicopter;

(e) crew may include:

(i) single pilot;

(ii) multi-crew;

(f) instruments may be:

(i) fitted flight instruments suitable for NVFR flight;

(ii) head up display suitable for NVFR flight;

(g) limitations may be imposed by:

(i) local noise abatement requirements and curfews;

(ii) airspace endorsements;

(h) aircraft requirements may include:

(i) instruments;

(ii) communication;

(iii) navigation system;

(iv) lighting;

(i) for the multi-engine aeroplane night VFR endorsement, the aircraft must be a multi-engine aeroplane.

**4 Underpinning knowledge of the following:**

(a) the topics mentioned in Section 2.7, Night VFR rating in Schedule 3 of this MOS;

(b) navigation requirements for the following:

(i) a night visual flight using radio navigation systems;

(ii) a night visual flight using self-contained or long-range navigation systems;

(iii) a night visual flight using visual reference to ground and water;

(c) navigation tolerance for a night visual flight avoiding CTA;

(d) requirements for the following:

(i) positive radio fixing;

(ii) the most precise track guidance;

(e) navigation requirements for night visual flight with respect to time interval between fixes, accuracy of time reference, and accuracy and procedures in track-keeping;

(f) procedures of night visual flight in all classes of airspace when diverting from track due to navigation or weather;

(g) route for night visual flight with respect to forecast weather, controlled airspace, prohibited, restricted and danger areas, engine out performance for multi-engine aircraft, specified route limitations, airways operational requirements, and availability of published routes, en route alternate aerodromes, navigation aids, rated coverage and radio communication;

(h) compulsory reporting points;

(i) route, aircraft equipment and navigation requirements for NVFR;

(j) LSALT for a night visual flight for a route published on a chart;

(k) dimensions of the significant safety sector when calculating LSALT for a route not published on a chart;

(l) methods of calculating LSALT for a route not published on a chart;

(m) calculation of LSALT when uncertain of position;

(n) conditions for descent below LSALT;

(o) pre-flight altimeter accuracy check for a night visual flight;

(p) altimetry procedures to all stages of a night visual flight;

# NIGHT VISION IMAGING SYSTEM RATING

## NVI Night vision imaging system operation

### 1 Unit description

This unit describes the skills and knowledge required to plan and conduct helicopter operations using night vision imaging systems (NVIS) at night.

### 2 Elements and performance criteria

#### 2.1 NV1.1 – Plan NVIS operations

(a) identifies task requirements and any hazards or risks;

(b) plans navigation and operational requirements;

(c) manual, including:

(i) NVFR or IFR operations;

(ii) operational requirements and procedures;

(iii) risk and hazard mitigation;

(iv) contingency procedures;

(d) determine serviceability of NVG equipment and aircraft:

(i) determines helicopter certification MEL requirements for conducting an NVIS operation;

(ii) inspects and ensures serviceability of NVG equipment;

(iii) inspects and ensures serviceability and suitability of aircraft and aircraft lighting system for NVG operations;

(e) brief and de-brief NVG operations:

(i) pre-flight brief;

(f) briefs all stakeholders, including:

(i) a plan for recovery from inadvertent IMC entry and loss of visual cues, when appropriate;

(ii) the transit flight, let-down and approach procedures;

(iii) landing and take-off procedures;

(iv) role functions and procedures;

(v) contingency management;

(vi) post-flight brief;

(vii) analyses objectives and outcomes of the flight and reviews operating procedures;

(viii) analyses effectiveness and efficiency in the use and performance of role equipment;

(ix) identifies achievements and any faults or errors that occurred during the NVG flight and provides guidance and feedback to crew members;

(x) ensures inspection, servicing and stowage arrangements for NVG equipment.

#### 2.2 NV1.2 – Perform circuit procedures using NVG

(a) performs hover, taxi, take-off, circuits and landing using NVG to the standards for night visual flight specified in this MOS;

(b) performs baulked landing procedures using NVG;

(c) performs cockpit procedures and checks during goggled and de-goggled flight;

(d) take off and transit to and from area of operation using NVG;

(e) performs hover, taxi, take-off and transit to and from area of operations using NVG in accordance with NVFR standards specified in this MOS;

(f) descends aircraft to unlit HLS while avoiding terrain and obstructions using NVG;

(g) maintains control of aircraft during transition to and from goggled and de-goggled flight;

(h) identifies the unlit HLS and any obstructions or terrain using NVG;

(i) approach, land on, take-off from and climb out from an unlit HLS using NVG;

(j) approach and landing

(i) manoeuvres aircraft using instrument scan and visual cues;

(ii) intercepts and maintains glide slope;

(iii) identifies and confirms touchdown point and reference markers;

(iv) approaches at a constant angle;

(v) terminates approach and establishes stable hover over HLS;

(vi) lands helicopter on HLS using NVG, including:

(A) sloping ground landing;

(B) pinnacle and ridgeline landing;

(k) take-off and climb-out

(i) identifies obstructions and hazards using NVG;

(ii) establishes stable hover;

(iii) takes off helicopter, including:

(A) sloping ground take-off;

(B) pinnacle and ridgeline take-off;

(iv) climbs helicopter steeply after take-off;

(v) avoids obstacles and terrain;

(vi) establishes climb to LSALT.

2.3 **NV1.3 – Manage abnormal and emergency situations using NVG**

(a) controls helicopter;

(b) identifies and confirms abnormal or emergency situations during aided flight;

(c) manages abnormal or emergency situation;

(d) manages inadvertent entry into IMC and re-establishment of VMC:

(i) manages loss of visual cues on take-off and landing during operations devoid of surrounding cultural lighting.

2.4 **NV1.4 – Conduct NVIS operation**

(a) perform role functions;

(b) manage flight during multi-crew NVG operations:

(i) ensures that all crew members have role clarity and relevant information to achieve goals;

(ii) ensures clear communications using standard operating procedures in accordance with Company Operations Manual;

(iii) manages changing priorities and, if necessary, re-focuses crew members to accommodate the changed priorities;

(iv) corrects individual or crew member deviations from standards;

(c) threat and error management:

(i) identifies environmental or operational threats that could affect the safety of the flight;

(ii) develops options to mitigate or control threats;

(iii) applies checklists and standard operating procedures to prevent aircraft handling, procedural or communication errors, and identifies committed errors before safety is affected or aircraft enters an undesired aircraft state;

(iv) recognises undesired aircraft state;

(v) manipulates aircraft controls or systems, or modifies actions or procedures, to correct undesired aircraft state in the time available.

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) for the class 1 endorsement, IFR where applicable;

(c) for the class 2 endorsement, NVFR conditions;

(d) goggled and de-goggled flight;

(e) approved aircraft fitted with flight instruments, including attitude and stabilised heading indicators with lighting adapted to NVG standards;

(f) operations without visible horizon;

(g) simulated hazardous weather;

(h) simulated abnormal and emergency situations;

(i) lit and unlit HLS.

**4 Underpinning knowledge of the following:**

(a) the topics mentioned in Section 2.6, Night vision imaging system (NVIS) rating of Schedule 3 of this MOS;

(b) NVG equipment;

(c) human and aeromedical factors;

(d) NVG environment;

(e) terrain interpretation and navigation;

(f) NVG regulations;

(g) NVG flight planning;

(h) crew coordination;

(i) dangers of non-NVG-trained personnel and non-compatible lighting at landing sites.

# LOW LEVEL RATING

## LL-A Aeroplane low-level operations

### 1 Unit description

This unit describes the skills and knowledge required to safely conduct low-level operations in aeroplanes.

### 2 Elements and performance criteria

2.1 **LL-A.1 – Plan low-level operations**

(a) identify hazards, evaluate and manage risks at low level;

(b) complete consultation with all stake holders involved in the low-level operation to confirm task requirements;

(c) ensure aeroplane type and performance capability is appropriate for the task;

(d) assess and allow for the effects of fatigue and physical health on pilot performance;

(e) analyse and apply actual and forecast weather conditions to low-level operations;

(f) identify area of operations using chart and geographical features;

(g) assess geographical characteristics of the area of flying operations to ensure safe completion of the task;

(h) confirm location of ground support personnel when available;

(i) conduct appropriate reconnaissance and pre-manoeuvre or other relevant checks prior to descending below 500 ft AGL.

2.2 **LL-A.2 – Flight component**

(a) correctly performs pre-flight inspection and determine aircraft serviceability for intended flight;

(b) initialises and checks data validity of area navigation system (if fitted);

(c) correctly operates aircraft;

(d) correctly performs take-off.

2.3 **LL-A.3 – Aircraft handling**

2.3.1 For this element, manoeuvres are performed at an altitude above 3,000 ft AGL for training purposes:

(a) perform level flight, climbing and descending turns up to 60° angle of bank (45° for multi-engine aircraft):

(i) visual references utilised;

(ii) speed monitored;

(iii) bank attitude maintained;

(iv) pitch attitude adjusted for bank angle;

(v) desired altitude maintained;

(vi) rollout and level off anticipated;

(b) perform approach and recovery to the stall in level flight:

(i) recognise approach to stall conditions;

(ii) maintain references by visual cues;

(iii) identify the approach to stall;

(iv) recover by AOA reduction and power application to minimise height loss;

(v) reconfigure aeroplane;

(c) perform approach to the stall in turning flight and recovers:

(i) recognise approach to stall conditions;

(ii) maintain references by visual cues;

(iii) identify the approach to stall;

(iv) recover by AOA reduction and power application to minimise height loss;

(v) reconfigures aeroplane;

(d) recover from wing drop at the stall to straight and level in various configurations (limited to single-engine aeroplanes):

(i) identify the approach to stall;

(ii) recognise wing drop at the stall;

(iii) reduce angle of attack to unstall the wing;

(iv) prevent yaw;

(v) use available power and height to increase the aircraft energy state;

(vi) avoid secondary stall;

(vii) re-establish desired flight path and aircraft control with balanced control application;

(viii) reconfigure aeroplane as required;

(e) perform maximum rate turning:

(i) apply maximum performance turning criteria;

(ii) maximum power applied;

(iii) maximum bank applied for turning performance commensurate with speed;

(iv) maximum permitted ‘g’ applied commensurate with speed;

(v) achieve turning at maximum AOA;

(vi) ensure aeroplane does not stall or exceed permitted G limits;

(vii) release ‘g’ force during roll out of turn;

(f) perform minimum radius turning:

(i) apply minimum radius turning criteria;

(ii) maximum power applied;

(iii) height as low as safely practical;

(iv) recognise stall warning indications (at the approach to the stall);

(v) ensure aeroplane does not stall;

(vi) release ‘g’ force immediately prior to rolling out of the turn;

(g) manage the energy state of the aircraft:

(i) identify high kinetic energy situations;

(ii) identify low kinetic energy situations;

(iii) identify high potential energy situations;

(iv) identify low potential energy situations;

(h) perform a forced landing following a simulated engine failure (single-engine aircraft only).

### 2.4 LL-A.4 – Low-level handling

2.4.1 For this element, manoeuvres are performed, manoeuvres are performed at an altitude of below 500 ft AGL but not below 100 ft AGL:

(a) manage the aircraft energy state;

(b) identify wind velocity;

(c) perform straight flight:

(i) adjust height according to terrain to maintain assigned height above ground level;

(ii) recognise and manage the effect of rising and descending terrain on aircraft performance;

(iii) compensate for drift;

(d) perform turning at various bank angles up to 60° angle of bank at normal cruise speed:
  (i) perform lookout;
  (ii) adjust power as required;
  (iii) manage the effects of flying over featureless terrain or water;
  (iv) recognise and manages the effect of rising and descending terrain on aircraft performance;
  (v) compensate for the effect of gradient wind;
  (vi) anticipate rollout;

(e) conduct procedure turns from a fixed ground reference point and compensate for the effect of gradient wind;

(f) demonstrate knowledge of the effect of false horizons;

(g) recognise and manage impact of sun glare on increased risk of collision with obstacles;

(h) demonstrate use of escape routes and rising ground;

(i) demonstrate flight at various speed and configurations not below the calculated stall speed +15 KIAS or safe single-engine speed +15 KIAS (for multi-engine aeroplanes);

(j) identify and maintain safe distance from pole stay wires;

(k) operate adjacent to powerlines and wires;

(l) identify the requirement to operate in the vicinity of powerlines and wires and assess risk;

(m) demonstrate awareness of wind effect in the vicinity of obstructions, mountainous terrain and illusions;

(n) identify poles, cross trees, wires and insulators to assist powerline and wire location;

(o) recognise and control the illusion of slipping and skidding during turns close to the ground;

(p) recognise the effect of rising and descending terrain on aircraft performance;

(q) comply with airspace requirements and procedures;

(r) demonstrate correct navigation techniques and procedures at low level;

(s) navigate to a predetermined destination at a height below 500 ft AGL;

(t) correctly performs low level circuit and landing.

2.5 **LL-A.6 – Execute forced landing (simulated) from below 500 ft AGL (single-engine aeroplane only)**

(a) identify potential forced-landing areas prior to and during low-level operations;

(b) recognise engine failure or any other emergency requiring a forced landing and conduct recall actions;

(c) maintain control of the aircraft – select the most appropriate landing area within gliding distance while avoiding any powerlines or obstructions;

(d) manoeuvre the aircraft to a landing area that achieves the safest outcome;

(e) explain plan of action and the landing techniques that would ensure the safest outcome when committed to a forced landing on unfavourable terrain or water.

2.6 **LL-A.7 – Execute engine failure (simulated) from below 500 ft AGL (multi-engine aeroplane only)**

(a) identify potential escape routes prior to and during low-level operations;

(b) recognise engine failure or any other emergency and conduct recall actions;

(c) maintain control of the aeroplane;

(d) initiate climb to safe altitude;

(e) manoeuvre the aeroplane via escape route to a safe altitude;

(f) complete check system items;

(g) explain plan of action.

2.7 **LL-A.8 – Operate at low level in hilly terrain**

(a) safely manipulate the aeroplane at low level in hilly terrain;

(b) establish and maintain safe height relevant to application type;

(c) demonstrate safe contour flying;

(d) identify and select appropriate natural markers to aid situational awareness;

(e) demonstrate safe approaches to higher ground, including identification of escape routes;

(f) demonstrate safe turns in hilly terrain;

(g) demonstrate awareness and management of the effects of wind and turbulence in hilly terrain, including lee effects;

(h) demonstrate awareness of illusions in hilly terrain, including false horizon effect and shadows.

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) day VFR in variable weather conditions;

(c) alternate landing areas;

(d) obstructions and vertical terrain;

(e) up to and including light turbulence;

(f) simulated emergency and abnormal situations;

(g) simulated hazardous weather;

(h) multi-engine and single-engine aeroplanes;

(i) winds in excess of 10 kts.

**4 Underpinning knowledge of the following:**

(a) the topics mentioned in Section 2.5, Low-level rating in Schedule 3 of this MOS;

(b) minimum height for flight by an aircraft over a city, town or populous area;

(c) legislative restrictions applicable to low flying;

(d) minimum lateral and vertical distances that an aircraft must avoid persons, vessels, vehicles, structures or livestock over a sparsely populated area;

(e) dangers associated with ‘out of balance’ flight manoeuvres when flying at low level;

(f) maximum rate turns and minimum radius turn criteria;

(g) aeroplane limitations;

(h) how unintended spinning may be induced.

# LL-H Helicopter low-level operations

## 1 Unit description

This unit describes the skills and knowledge required to safely conduct low-level operations in helicopters.

## 2 Elements and performance criteria

### 2.1 LL-H.1 – Plan low-level operations

(a) identify, evaluate and manage risks at low level;

(b) complete consultation with all stake holders involved in the low-level operation to confirm task requirements;

(c) ensure aircraft type and performance is appropriate for the task;

(d) assess and allow for the effects of fatigue and physical health on pilot performance;

(e) analyse and apply actual and forecast weather conditions to low-level operations;

(f) identify area of operations using chart and geographical features;

(g) assess geographical characteristics of the area of flying operations to ensure safe completion of the task;

(h) identify and avoid all obstructions;

(i) identify and avoid buildings, personnel, vehicles, animals, vegetation and nuisance areas.

### 2.2 LL-H.2 – Flight component

(a) correctly perform pre-flight inspection and determine aircraft serviceability for intended flight;

(b) initialise and check data validity of area navigation system (if fitted);

(c) correctly operate aircraft;

(d) correctly perform take-off.

### 2.3 LL-H.3 – Aircraft handling (at an altitude above 1,500 ft AGL)

(a) conduct pre-manoeuvre checks for each manoeuvre;

(b) demonstrate level flight, climbing and descending turns up to 60° angle of bank as follows:

(i) visual references utilised;

(ii) speed monitored;

(iii) bank attitude maintained;

(iv) pitch attitude adjusted for bank angle;

(v) desired altitude maintained;

(vi) rollout and level off anticipated;

(c) recognise the approach and demonstrate the recovery to retreating blade stall in level flight as follows:

(i) configure aircraft appropriately;

(ii) recognise approach to retreating blade stall conditions;

(iii) maintain references by visual cues;

(iv) recover by reduction of collective (AOA) (consistent with available height and power application);

(d) recognise the approach and demonstrate the recovery to retreating blade stall in turning flight as follows:

(i) configure aircraft appropriately;

(ii) recognise approach to retreating blade stall conditions;

(iii) maintain references by visual cues;

(iv) recover by AOA reduction (consistent with available height and power application);

(e) apply correct techniques for upset recovery in various configurations as follows:
  (i) configure aircraft appropriately;
  (ii) recognise upset condition;
  (iii) maintain references by visual cues;
  (iv) recover to level flight condition;

(f) Reserved

(g) Reserved

(h) manage the energy state of the aircraft for the following:
  (i) identify high kinetic energy situations;
  (ii) identify low kinetic energy situations;
  (iii) identify high potential energy situations;
  (iv) identify low potential energy situations.

2.4 **LL-H.4 – Low-level handling (at an altitude of 200 ft AGL but not below 5 ft AGL)**

(a) manage the aircraft energy state;

(b) perform straight flight as follows:
  (i) adjust height according to terrain to maintain assigned height above ground level;
  (ii) recognise and manage the effect of rising and descending terrain on aircraft performance;
  (iii) compensate for drift;

(c) perform turning at various bank angles up to 60° angle of bank at normal cruise speed as follows:
  (i) adjust power as required;
  (ii) recognise and manage the effect of rising and descending terrain on aircraft performance;
  (iii) compensate for the effect of gradient wind;
  (iv) anticipate rollout;

(d) demonstrate use of escape routes and rising ground;

(e) demonstrate flight at various speed and configurations not below (safe single-engine speed +15 KIAS for multi-engine aircraft);

(f) operate adjacent to powerlines and wires;

(g) demonstrate awareness of wind effect in the vicinity of obstructions, mountainous terrain and illusions;

(h) recognise and control the illusion of slipping and skidding during turns close to the ground;

(i) recognise the effect of rising and descending terrain on aircraft performance;

(j) maintain a constant altitude over featureless terrain or water;

(k) conduct procedure turns from a fixed ground reference point;

(l) demonstrate knowledge of the effect of false horizons;

(m) recognise and manage impact of sun glare on increased risk of collision with obstacles;

(n) identify escape routes and rising ground;

(o) identify the requirement to operate in the vicinity of powerlines and wires and assesses risk;

(p) identify and avoid powerlines (wires) by a minimum of 15 ft when crossing overhead;

(q) identify and avoid all powerlines and wires;

(r) identify poles, cross trees, wires and insulators to assist powerline and wire location;

(s) identify and avoid pole stay wires;

(t) perform quick stop manoeuvres; into wind and downwind entry as follows:

(i) identify termination point;
(ii) decelerate helicopter;
(iii) balance helicopter and maintain direction and altitude;
(iv) maintain helicopter outside height velocity diagram requirements;
(v) hover over the termination point;
(vi) perform quick stop manoeuvres, downwind entry;
(vii) identify termination point;
(viii) turn 180° by controlled corrective action (downwind entry);
(ix) turn helicopter into wind and initiate deceleration;
(x) balance helicopter and maintain direction and altitude;

(u) perform flight at various speed and configurations;
(i) identify and maintain safe distance from pole stay wires;
(ii) navigate to a predetermined destination at altitude below 500 ft AGL;
(iii) comply with airspace requirements and procedures;
(iv) demonstrate correct navigation techniques and procedures at low level;
(v) correctly perform low level circuit and landing;
(vi) correctly perform after landing and shutdown checks.

2.5 **LL-H.5 – Execute autorotative forced landing (simulated) from below 500 ft AGL (single-engine helicopter only)**

(a) identify potential forced-landing areas prior to and during low-level operations;

(b) recognise engine failure or any other emergency requiring a forced landing and conduct recall actions;

(c) maintain control of the aircraft – select the most appropriate landing area within gliding distance while avoiding any powerlines or obstructions;

(d) manoeuvre the aircraft to a landing area that achieves the safest outcome;

(e) explain plan of action and the landing techniques that would ensure the safest outcome when committed to a forced landing on unfavourable terrain or water.

2.6 **LL-H.6 – Execute engine failure (simulated) from below 500 ft AGL (multi-engine helicopter only)**

(a) identify potential escape routes prior to and during low-level operations;

(b) recognise engine failure or any other emergency and conduct recall actions;

(c) maintain control of the aircraft – initiate climb to safe altitude;

(d) manoeuvre the aircraft via escape route to a safe altitude;

(e) complete check system items;

(f) explain plan of action.

2.7 **LL-H.7 – Operate at low level in hilly terrain**

(a) safely manipulate the aeroplane at low level in hilly terrain;

(b) establish and maintain safe height relevant to application type;

(c) demonstrate safe contour flying;

(d) identify and select appropriate natural markers to aid situational awareness;

(e) demonstrate safe approaches to higher ground, including identification of escape routes;

(f) demonstrate safe turns in hilly terrain;

(g) demonstrate awareness and management of the effects of wind and turbulence in hilly terrain, including lee effects;

(h) demonstrate awareness of illusions in hilly terrain, including false horizon effect and shadows.

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) day VFR;

(c) approved helicopter with dual controls, electronic intercom and dual control brakes if fitted;

(d) aerodromes or HLS;

(e) hazards may include variable terrain and weather, surface conditions, other aircraft, lose objects, personnel, animals, birds propeller wash, rotor wash, jet blast and negative ‘g’ in teetering rotor systems;

(f) limitations may be imposed by local noise abatement procedures and curfews.

**4 Underpinning knowledge of the following:**

(a) the topics mentioned in Section 2.5, Low-level rating in Schedule 3 of this MOS;

(b) maximum rate and minimum rate turn criteria;

(c) the effect of wind velocity in low-level operations;

(d) the effect of aircraft inertia at low level;

(e) effects of illusions;

(f) obstruction avoidance techniques;

(g) critical operational conditions, including retreating blade stall, vortex ring, over pitching loss of anti-torque effectiveness and negative ‘g’ effects;

(h) meteorological factors affecting helicopter performance at low level;

(i) terrain following techniques;

(j) safety hazards and risks of low-level operations and methods of control.

## LL-PL Powered-light low-level operations – *Reserved*

## LL-G Gyroplane low-level operations

### 1 Unit description

This unit describes the skills and knowledge required to manoeuvre a helicopter safely and effectively at low level, in accordance with the following provisions.

### 2 Elements and performance criteria

#### 2.1 LL-G.1 – Plan low-level operations

(a) identifies, evaluates and manages risks at low level;

(b) complete consultation with all stake holders involved in the low-level operation to confirm task requirements;

(c) ensures aircraft type and performance is appropriate for the task;

(d) assesses and allows for the effects of fatigue and physical health on pilot performance;

(e) analyses and applies actual and forecast weather conditions to low-level operations;

(f) identifies area of operations using chart and geographical features;

(g) assesses geographical characteristics of the area of flying operations to ensure safe completion of the task;

(h) identifies and avoid all significant obstructions;

(i) identifies and avoids buildings, personnel, vehicles, animals, vegetation and nuisance areas

#### 2.2 LL-G.2 – Flight component

(a) correctly performs pre-flight inspection and determine aircraft serviceability for intended flight;

(b) initialises and checks data validity of area navigation system (if fitted);

(c) correctly operates aircraft;

(d) correctly performs take-off.

#### 2.3 LL-G.3 – Aircraft handling

(a) at an altitude above 1,500 ft AGL:

(i) conducts pre-manoeuvre checks;

(ii) performs an effective lookout;

(iii) demonstrates level flight, climbing and descending turns up to 60° angle of bank;

(A) visual references utilised;

(B) speed monitored;

(C) bank attitude maintained;

(D) pitch attitude adjusted for bank angle;

(E) desired altitude maintained;

(F) lookout performed;

(G) rollout and level off anticipated;

(iv) demonstrates approach and recovery to stall in level flight;

(A) clearing turns;

(B) configures aircraft;

(C) recognises approach to stall conditions;

(D) maintains references by visual cues;

(E) recovers by AOA reduction (consistent with available height) and power application;

(v) demonstrates approach and recovery to stall in turning flight;
  (A) clearing turns;
  (B) configures aircraft;
  (C) recognises approach to stall conditions;
  (D) maintains references by visual cues;
  (E) recovers by AOA reduction (consistent with available height) and power application;

(vi) applies correct techniques for upset recovery in various configurations;
  (A) clearing turns;
  (B) configures aircraft;
  (C) recognises approach to stall conditions;
  (D) maintains references by visual cues;
  (E) identifies the approach to stall;
  (F) recovers by AOA reduction (consistent with available height);

(vii) demonstrates maximum rate turning;
  (A) knows maximum performance turning criteria;
  (B) area cleared;
  (C) maximum power applied;
  (D) maximum bank applied for turning performance commensurate with speed;
  (E) maximum permitted ‘g’ applied commensurate with speed;
  (F) achieves turning at maximum AOA;
  (G) aircraft does not stall or exceed permitted ‘g’ limits;
  (H) performs lookout;
  (I) anticipates rollout;
  (J) releases ‘g’ force during roll out of turn;

(viii) demonstrates minimum radius turning;
  (A) knows minimum radius turning criteria;
  (B) area cleared;
  (C) maximum power applied;
  (D) height as low as practical (1,500 ft AGL);
  (E) maximum AOA maintained;
  (F) aircraft does not stall;
  (G) performs lookout;
  (H) anticipates rollout;
  (I) releases ‘g’ forces while rolling out of the turn;

(ix) demonstrates methods of losing height in a turn and straight flight;

(x) manages the energy state of the aircraft;
  (A) identifies high kinetic energy situations;
  (B) identifies low kinetic energy situations;
  (C) identifies high potential energy situations;
  (D) identifies low potential energy situations.

2.4 **LL-G.4 – Low level handling**

(a) at an altitude of 200 ft AGL but not below 50 ft AGL:
  (i) manage the aircraft energy state;
  (ii) perform straight flight:
    (A) adjust height according to terrain to maintain assigned height above ground level;

(B) recognise and manage the effect of rising and descending terrain on aircraft performance;

(C) compensate for drift;

(iii) perform turning at various bank angles up to 60° angle of bank at normal cruise speed;

(A) adjust power as required;

(B) recognise and manage the effect of rising and descending terrain on aircraft performance;

(C) compensate for the effect of gradient wind;

(D) anticipate rollout;

(iv) demonstrate use of escape routes and rising ground;

(v) demonstrate flight at various speed and configurations not below minimum safe speed + 15 KIAS;

(vi) operate adjacent to powerlines and wires;

(vii) demonstrate awareness of wind effect in the vicinity of obstructions, mountainous terrain and illusions;

(viii) recognise and control the illusion of slipping and skidding during turns in windy conditions;

(ix) recognise the effect of rising and descending terrain on aircraft performance;

(x) maintain a constant altitude over featureless terrain or water;

(xi) conduct procedure turns from a fixed ground reference point;

(xii) demonstrate knowledge of the effect of false horizons;

(xiii) recognise and manage impact of sun glare on increased risk of collision with obstacles;

(xiv) identify the requirement to operate in the vicinity of powerlines and wires and assesses risk;

(xv) identify and avoid powerlines (wires) by a minimum of 15 ft (-0 ft) when crossed overhead by an aircraft;

(xvi) identify and avoid all powerlines and wires;

(xvii) identify poles, cross trees, wires and insulators to assist powerline and wire location;

(xviii) identify and avoid pole stay wires;

(xix) navigate to a predetermined destination at altitude below 500 ft AGL;

(xx) maintain a constant altitude over featureless terrain or water;

(xxi) conduct procedure turns from a fixed ground reference point;

(xxii) comply with airspace requirements and procedures;

(xxiii) demonstrate correct navigation techniques and procedures at low level;

(xxiv) correctly perform low-level circuit and landing;

(xxv) correctly perform after landing and shutdown checks.

2.5 **LL-G.5 – Execute autorotative forced landing (simulated) from below 500 ft AGL (single-engine gyrocopter only)**

(a) identify potential forced-landing areas prior to and during low-level operations;

(b) recognise engine failure or any other emergency requiring a forced landing and conduct recall actions;

(c) maintain control of the aircraft – select the most appropriate landing area within gliding distance while avoiding any powerlines or obstructions;

(d) manoeuvre the aircraft to a landing area that achieves the safest outcome;

(e) explain plan of action and the landing techniques that would ensure the safest outcome when committed to a forced landing on unfavourable terrain or water.

2.6 **LL-G.6 – Operate at low level in hilly terrain**

(a) safely manipulate the aeroplane at low level in hilly terrain;

(b) establish and maintain safe height relevant to application type;

(c) demonstrate safe contour flying;

(d) identify and select appropriate natural markers to aid situational awareness;

(e) demonstrate safe approaches to higher ground, including identification of escape routes;

(f) demonstrate safe turns in hilly terrain;

(g) demonstrate awareness and management of the effects of wind and turbulence in hilly terrain, including lee effects;

(h) demonstrate awareness of illusions in hilly terrain, including false horizon effect and shadows.

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) day VFR;

(c) approved gyroplane dual controls, electronic intercom and dual control brakes if fitted;

(d) aerodromes or landing areas;

(e) hazards may include variable terrain and weather, surface conditions, other aircraft, lose objects, personnel, animals, birds propeller wash, rotor wash, jet blast and negative ‘g’ in teetering rotor systems;

(f) limitations may be imposed by local noise abatement procedures and curfews.

**4 Underpinning knowledge of the following:**

(a) the topics mentioned in Section 2.5, Low-level rating in Schedule 3 of this MOS;

(b) maximum rate and minimum rate turn criteria;

(c) the effect of wind velocity in low-level operations;

(d) the effect of aircraft inertia at low level;

(e) effects of illusions;

(f) obstruction avoidance techniques;

(g) critical operational conditions, including retreating blade stall, blade flap, and negative ‘g’ effects;

(h) meteorological factors affecting performance at low level;

(i) terrain following techniques;

(j) safety hazards and risks of low-level operations and methods of control.

# LL-M Aerial mustering operations

## 1 Unit description

This unit describes the skills and knowledge required to conduct aerial mustering operations.

## 2 Elements and performance criteria

### 2.1 LL-M.1 – Plan a stock mustering operation

Formulate a stock mustering operation plan, including:

(a) determination of location and boundaries of the area of operation, terrain features;

(b) suitability and serviceability of aircraft, starting point, positioning of support personnel, final destination of stock, location and suitability of landing areas;

(c) present and forecast weather;

(d) methods of communication and signals;

(e) hazards and obstructions;

(f) emergency procedures to ensure the safe and effective operation.

### 2.2 LL-M.2 – Manoeuvre aircraft to the limits of the flight-manoeuvring envelope

(a) manoeuvre aircraft in all planes below 500 ft AGL, up to and not beyond the limits of the flight-manoeuvring envelope, without exceeding the operating limitations of the aircraft;

(b) in addition to the performance criterion in paragraph (a), for helicopters, perform reversal turns, decelerations, steep turns, climb and descent manoeuvres, low and high speed manoeuvres within the following standards:

(i) ensure power available exceeds power required;

(ii) conduct hovering only when OGE power is available for the gross weight, density altitude and relative wind conditions;

(iii) avoid conditions conducive to loss of tail rotor effectiveness;

(iv) avoid negative ‘g’ and reduced disc loading flight manoeuvres in teetering main rotor head systems;

(v) avoid vortex ring conditions during quick stop/deceleration manoeuvres and recovery from low airspeed descending manoeuvres;

(vi) remain below $V_{MAX}$ and $V_{NE}$ limits;

(vii) comply with weight/velocity avoid combinations;

(c) in addition to the performance criterion in paragraph (a), for gyroplanes, perform reversal turns, decelerations, steep turns, climb and descent manoeuvres, low and high speed manoeuvres within the following standards:

(i) manoeuvre the gyroplane at speeds above the speed that ensures the gyroplane is not ‘behind the power curve’ (power available is greater than power required);

(ii) avoid negative ‘g’ manoeuvres;

(iii) $V_{MAX}$ and $V_{NE}$ limits are not exceeded;

(iv) balances gyroplane.

### 2.3 LL-M.3 – General manoeuvring

(a) achieves desired ground tracks;

(b) maintains visual contact with the ground;

(c) manages the effect of wind and turbulence.

### 2.4 LL-M.4 – Conduct a stock mustering operation using an aircraft

(a) coordinates and conducts the assembly and movement of stock to predetermined destination in the time available, safely and effectively, using an aircraft;

(b) establishes and maintains an effective communication system with stock mustering people on the ground.

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) day VFR;

(c) for the aerial mustering – aeroplane endorsement, the aircraft must be an aeroplane;

(d) for the aerial mustering – helicopter endorsement, the aircraft must be an helicopter;

(e) for the aerial mustering – gyroplane endorsement, the aircraft must be an gyroplane;

(f) obstructions and vertical terrain;

(g) up to and including light turbulence;

(h) simulated emergency or abnormal situations;

(i) simulated hazardous weather;

(j) stock.

**4 Underpinning knowledge of the following:**

(a) the topics mentioned in Section 2.5, Low-level rating in Schedule 3 of this MOS;

(b) maximum rate and minimum rate turn criteria;

(c) the effect of wind velocity in low-level operations;

(d) the effect of aircraft inertia at low level;

(e) effects of illusions;

(f) obstruction avoidance techniques;

(g) critical operational conditions, including, aerodynamic stall, retreating blade stall, blade flap, and negative ‘g’ effects;

(h) meteorological factors affecting performance at low level;

(i) terrain following techniques;

(j) safety hazards and risks of low-level operations and methods of control.

# LL-SO Sling operations

## 1 Unit description

This unit describes the skills and knowledge required to conduct sling operations.

## 2 Elements and performance criteria

### 2.1 LL-SO.1 – Prepare and rig a sling load

(a) tasking requirements are identified;

(b) external load is secured, stabilised and rigged in accordance with workplace procedures and AFM or POH.

### 2.2 LL-SO.2 – Plan external load operations

(a) external load procedure, equipment and personnel required for task are determined;

(b) helicopter performance data is interpreted and calculated to ensure suitability of aircraft for external load operations;

(c) outbound and return flight routes are planned;

(d) secure and stable load preparations are arranged;

(e) load lifting equipment strength and suitability are assessed.

### 2.3 LL-SO.3 – Conduct pre-flight briefings for external load operations

(a) requirements of the load task are explained and confirmed;

(b) personnel responsible for inspecting the load lifting equipment for serviceability and security are identified;

(c) communication and hook-up procedure is explained;

(d) hook-up person and hook-up procedure is specified;

(e) departure, transit, approach, termination and load release procedures are explained;

(f) emergency procedures are explained and confirmed;

(g) pilot vertical reference (long line) procedure is explained if applicable;

(h) crew and ground loadmaster are briefed on all aspects of the load lifting task;

(i) seating is adjusted to ensure full exercise of the flight controls and the ability to scan the instrument panel;

(j) helicopter performance data is interpreted and calculated to ensure suitability of aircraft for operations;

(k) the removal of doors and the security of internal equipment is arranged as required.

### 2.4 LL-SO.4 – Operate the aircraft during external load operations

(a) functional and safety checks on role equipment are performed, and defects are reported;

(b) fuel and cargo load combinations to achieve task are calculated;

(c) adequacy of power margin and directional control are determined;

(d) stable hover over the load during hook-up/delivery procedures is maintained;

(e) external load is lifted and transported to a separate location and placed at a specified position;

(f) load is monitored and appropriate actions are taken to ensure load security and stability during flight;

(g) excessive load swing during transit is avoided.

### 2.5 LL-SO.5 – Manage abnormal and emergency situations during external load operations

(a) helicopter control is maintained;

(b) abnormal or emergency situations are identified and managed in accordance with workplace procedures and AFM or POH;

(c) load is jettisoned when appropriate.

2.6 **LL-SO.6 – Conduct post-flight activities for external load operations**

(a) operating procedures and outcomes of the flight are reviewed and analysed;

(b) effectiveness, efficiency and performance of equipment is analysed and reported.

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) tasks that may be undertaken in variable weather in day VFR and NVFR conditions;

(c) performance must be demonstrated in:

(i) an aircraft capable of hovering;

(ii) variable air traffic conditions;

(iii) variable flight situations;

(iv) abnormal situations;

(d) performance must be demonstrated on aircraft with:

(i) fully functioning dual controls;

(ii) an electronic intercom system;

(iii) dual control brakes;

(iv) wheeled or skidded undercarriages;

(v) NVFR environment may include:

(A) unaided;

(B) aided utilising night vision devices;

(e) crew may include:

(i) single pilot;

(ii) multi-crew;

(f) load lifting may be carried out:

(i) with crewman;

(ii) without crewman.

**4 Underpinning knowledge of the following:**

(a) the topics mentioned in Section 2.5, Low-level rating in Schedule 3 of this MOS;

(b) relevant sections of Civil Aviation Safety Regulations and Civil Aviation Orders;

(c) engine performance checks for the helicopter type to be flown;

(d) aircraft performance calculations (for all phases of flight);

(e) internal and external load limitations for the aircraft type to be flown;

(f) aerial delivery equipment operation, safe working loads and limitations;

(g) cargo hook limitations, problems and hazards;

(h) load rigging and preparation for flight;

(i) principles of aerodynamics;

(j) control effectiveness in all phases of flight;

(k) hazards that exist and problems that can occur when operating an aircraft during external load operations;

(l) procedures to address problems associated with a helicopter during external load operations;

(m) aircraft dimensions;

(n) vertical reference (long line) operation procedures if applicable;

(o) external load lifting equipment inspection procedures;

(p) communication procedure and terminology applicable to external load operations.

## LL-WR Winch and rappelling operations

### 1 Unit description

This unit describes the skills and knowledge required to conduct winch and rappelling operations.

### 2 Elements and performance criteria

#### 2.1 LL-WR.1 – Plan roping operations

(a) tasking requirements are identified;

(b) crew roping personnel and equipment required to ensure safe achievement of task are determined;

(c) aircraft performance is interpreted and calculated to ensure suitability of aircraft for roping operations;

(d) transit, roping operation communications and recovery is planned in accordance with workplace procedures;

(e) roping personnel qualifications are confirmed;

(f) roping operations abnormal and emergency situation actions are planned.

#### 2.2 LL-WR.2 – Conduct pre-flight briefings for roping operations

(a) requirements of the roping operation are explained and confirmed;

(b) location, terrain features (sea state as applicable) and forecast weather conditions are obtained and confirmed;

(c) timings, route(s), airspeeds and altitudes are confirmed;

(d) pilot, crew and roping personnel responsibilities and communication procedures are explained;

(e) roping operation emergency procedures are explained.

#### 2.3 LL-WR.3 – Operate the helicopter during roping operations

(a) site inspection, approach and hover heading are determined in accordance with operational requirements;

(b) descent and approach is controlled to terminate over the roping site;

(c) adequacy of hover power margin and control limits to perform roping operations is checked and maintained;

(d) control is applied to the aircraft to maintain position over roping site;

(e) obstacle clearances are maintained during roping operations;

(f) crew member is directed/cleared to deploy ropes;

(g) roping team is directed when clear to perform roping operation in accordance with workplace procedures;

(h) ropes are recovered/detached and site vacated in accordance with workplace procedures.

#### 2.4 LL-WR.4 – Manage abnormal and emergency situations during roping operations

(a) aircraft control is maintained;

(b) abnormal or emergency situations are identified and managed in accordance with workplace procedure and AFMAFM or POH.

#### 2.5 LL-WR.5 – Conduct post-flight briefings for roping operations

(a) operating procedures and outcomes of the flight are reviewed and analysed;

(b) effectiveness, efficiency and performance of equipment is analysed and reported.

### 3 Range of variables

(a) activities are performed in accordance with published procedures;

(b) tasks may be undertaken in variable weather conditions in accordance with day VFR and NVFR;

(c) performance may be demonstrated in:
  (i) an aircraft capable of hovering;
  (ii) variable air traffic conditions;
  (iii) variable flight situations;
  (iv) abnormal situations;

(d) performance must be demonstrated on a helicopter or tilt rotor aircraft with:
  (i) fully functioning dual controls;
  (ii) an electronic intercom system;
  (iii) dual control brakes;
  (iv) wheeled or skidded undercarriages;
  (v) night aided vision devices;

(e) NVFR environment may include:
  (i) unaided;
  (ii) aided utilising night vision devices;

(f) operational environments may include:
  (i) unprepared landing sites;
  (ii) confined areas;
  (iii) unknown landing sites;
  (iv) pinnacles;
  (v) embarked/sea platforms;
  (vi) marine environments;

(g) crew may include:
  (i) single pilot;
  (ii) multi-crew;

(h) limitations may be imposed by local noise abatement requirements and curfews;

(i) roping may include:
  (i) rappelling;
  (ii) fast rope;

(j) checklists may include:
  (i) AFM or POH approach and landing;
  (ii) hover;
  (iii) pre-roping;

(k) class of airspace are:
  (i) those designated by CASA;
  (ii) restricted and danger areas;
  (iii) military control zones;
  (iv) Air Defence identification zones;

(l) operational hazards during low-level operations may include:
  (i) structures;
  (ii) other aircraft;
  (iii) loose objects;
  (iv) birds;
  (v) engine salt ingestion;
  (vi) trees;

(vii) dust;

(viii) low visibility;

(ix) turbulence;

(x) wind strength;

(xi) sea state;

(m) guidance during low-level operations may be provided by:

(i) air traffic control instructions;

(ii) light signals;

(iii) aerodrome markings;

(n) procedures for maintaining compliance with airspace requirements are:

(i) geographical limits of the flight area are demonstrated on a chart;

(ii) prominent geographical features are identified using a chart;

(iii) the limits of the flight area are identified on the ground;

(iv) the position of controlled airspace is determined using a chart and geographical features;

(v) restricted areas are identified using a chart and geographical features;

(vi) departure from the circuit (roping) area and transition to the flight area is completed without incident;

(vii) departure from the flight area and transition to the circuit (roping) area is completed without incident;

(o) dependent on the type of organisation concerned and the local terminology used, workplace procedures may include:

(i) company procedures;

(ii) enterprise procedures;

(iii) organisational procedures;

(iv) established procedures;

(v) standard operating procedures;

(p) information/documents may include:

(i) relevant sections of CASR 1998 and CAOs, including day VFR;

(ii) in Defence context, relevant Defence Orders and Instructions;

(iii) AFM or POH;

(iv) this MOS;

(v) AIP;

(vi) ERSA;

(vii) charts;

(viii) operations manuals;

(ix) approved checklists;

(x) workplace procedures and instructions and job specification;

(xi) induction and training materials;

(xii) conditions of service, legislation and industrial agreements, including workplace agreements and awards;

(q) applicable regulations and legislation may include:

(i) relevant CASR 1998 and CAOs;

(ii) in Defence context, relevant Defence Orders and Instructions;

(iii) relevant state/territory OH&S legislation;

(iv) relevant state/territory environmental protection legislation;

(v) relevant Australian Standards;

(r) performance includes tolerances specified in either of:

(i) relevant licence and aircraft rating requirements of as this MOS:

(ii) relevant Defence documentation such as:

(A) Defence Orders and Instructions;

(B) approved curricula and training documentation.

**4 Underpinning knowledge of the following:**

(a) the topics mentioned in Section 2.5, Low-level rating in Schedule 3 of this MOS;

(b) relevant sections of CASR 1998 and CAOs;

(c) relevant OH&S and environmental procedures and regulations;

(d) in Defence context, relevant Defence Orders and Instructions;

(e) communication procedure and terminology applicable to roping operations;

(f) engine performance checks for the helicopter type to be flown;

(g) aircraft performance calculations (for all phases of flight);

(h) internal and external load limitations for the helicopter type to be flown, including weight and balance consideration;

(i) functions and effects of all aircraft controls and instruments;

(j) principles of aerodynamics:

(i) control effectiveness in all phases of flight;

(ii) hazards, limitations and problems that can occur when operating an aircraft during roping operations;

(iii) rope and attaching point limitations;

(iv) helicopter dimensions.

# AERIAL APPLICATION RATING

## AA1 Aeroplane aerial application operation

### 1 Unit description

This unit describes the skills and knowledge required to conduct aerial application operations other than firefighting operations in aeroplanes.

### 2 Elements and performance criteria

#### 2.1 AA1.1 – Pre-flight actions

(a) conduct self-assessment fit for flight and planned operation;

(b) determine suitability of aircraft for type of operation;

(c) conduct a thorough pre-flight of aircraft and role equipment to determine serviceability for planned operations;

(d) check and correctly complete required maintenance documentation as applicable;

(e) confirm minimum equipment and minimum crew and instrumentation requirements for planned operations are met;

(f) check safe operation of role equipment, including the serviceability of the jettison (dump) door;

(g) check and adjust role equipment calibration;

(h) planning and risk management;

(i) determine the requirement to operate at low level;

(j) identifies hazards, analyses the risks and implement a decision to safely conduct low-level operations – ensures aeroplane type and performance is appropriate for the task;

(k) assesses and allows for the effects of fatigue and physical health on pilot performance;

(l) analyses and applies actual and forecast weather conditions to low-level operations;

(m) develop an Application Management Plan;

(n) correctly interpret treatment area map;

(o) understands that all aircraft limitations, except those exempted by CASA (maximum take-off weight), are applicable to the operation;

(p) adequately identify potential hazards and operational requirements, assess risks and apply appropriate risk controls, including powerlines, houses, susceptible crops and environmentally sensitive areas;

(q) demonstrate an ability to make a command decision on the safety or otherwise of the proposed application, including refusing to undertake an application where the risks are considered to be too high;

(r) make appropriate selection of application pattern and direction of treatment taking into consideration safety, efficiency, hazards and terrain;

(s) carefully plans fuel requirements;

(t) confirms acceptable aircraft performance for conditions;

(u) confirms location of ground support personnel when available;

(v) confirms normal and abnormal ops communications and signals;

(w) confirms appropriate logistical considerations, including local airstrip condition, fuel, products, ground support and access to strip, SARWATCH, water, and personal supplies, including adequate water and food.

#### 2.2 AA1.2 – Fly to, assess, land and take-off from an operational airstrip

(a) performs low-level navigation to an operational airstrip at an appropriate height;

(b) performs appropriate assessment of an operational airstrip, including strip length, conditions, direction, identification of hazards, meteorological conditions;

(c) selects the most suitable loading area;

(d) correctly performs pre-landing and pre-take-off checks;

(e) selects a 'no go, go around, commitment' point for landings;

(f) selects a touchdown point for landings;

(g) identifies and manages issues relating to aircraft weight, performance, strip length, slope, surface, direction, load, surrounds, hazards and meteorological conditions;

(h) demonstrates appropriate short-field landing and take-off techniques, including having her or his hand on the dump door handle for take-offs and being prepared to dump if required;

(i) identifies an appropriate dumping point for each take-off, including adequate safety buffers;

(j) demonstrates safe operations from a 1-way airstrip.

2.3 **AA1.3 – Fly between operational airstrip and application area**

(a) performs low-level navigation from an operational airstrip to an application area;

(b) selects the most appropriate route and height between the operational strip and application area with considerations to terrain, stock, populated areas, housing and hazards.

2.4 **AA1.4 – Conduct operations at a certified or registered aerodrome**

Performs operations in accordance with the requirements published regulations.

2.5 **AA1.5 – Conduct an aerial survey of a treatment area**

(a) develops an appropriate and safe plan for conduct of an aerial survey;

(b) accurately identifies the treatment area boundaries;

(c) confirms the map;

(d) identifies susceptible crops and environmentally sensitive areas;

(e) identifies hazards on the map;

(f) identifies potential emergency landing area(s);

(g) checks and identifies any hazards not on the map, including sun glare and shadows from hills;

(h) accurately assesses wind speed and direction;

(i) identifies clean-up runs required;

(j) confirms or appropriately amends the Application Management Plan, including pattern type and direction of treatment and possible suspension of application if conditions are not appropriate.

2.6 **AA1.6 – Fly aircraft at low level**

Identifies and avoids buildings, personnel, vehicles, animals, vegetation and nuisance areas.

2.7 **AA1.7 – Perform steep turns and procedure turns at or below 500 ft AGL**

(a) performs airspace cleared procedure;

(b) conducts a balanced steep turn level (± 100 ft) climbing and descending turn at a nominated speed;

(c) conducts procedure turns with varying flap and power settings.

2.8 **AA1.8 – Manoeuvre and navigate at low level**

(a) manoeuvres aeroplane at a height below 500 ft AGL;

(b) navigates an aeroplane to a predetermined destination at altitudes at or below 500 ft AGL;

(c) awareness of wind effect in the vicinity obstructions, mountainous terrain and illusions;

(d) identifies wind velocity;

(e) recognises and controls the illusions of slipping and skidding during turns in windy conditions;

(f) recognises and manages impact of sun glare on increased risk of collision with obstacles;

(g) operate adjacent to powerlines and wires;

(h) identifies the requirement to operate in the vicinity of powerlines and wires and assesses risk;

(i) identifies poles, cross trees, wires and insulators to assist powerline and wire location;

(j) recognises and manages the effect of rising and descending terrain on aircraft performance;

(k) demonstrate safe operation from non-certified or registered landing areas;

(l) accurately re-enters treatment area with aircraft aligned for treatment run;

(m) accurately identifies and monitors wind speed and direction;

(n) recognises and manages the adverse effects of wind caused by terrain and obstructions;

(o) recognises and manages false horizon illusions;

(p) maintains a constant altitude over featureless terrain or water;

(q) establishes and maintains an appropriate height and speed over treatment area.

2.9 **AA1.9 – Recognise and avoid the stall and recover from a simulated low altitude stall**

(a) recognises the approach to the stall during any phase of flight and resumes normal balanced flight before stall entry;

(b) recovers from a developed stall at a simulated altitude of 500 ft AGL by a simulated altitude of 300 ft AGL. Minimum actual attitude is to be not below 3,000 ft.

2.10 **AA1.10 – Execute forced landing from below 500 ft AGL**

(a) identifies potential forced-landing areas prior to and during low-level operations;

(b) recognises engine failure or any other emergency requiring a forced landing and conducts recall actions;

(c) maintains control of the aircraft – selects the most appropriate landing area within gliding distance while avoiding any powerlines or obstructions;

(d) manoeuvres the aircraft to a landing area that achieves the safest outcome;

(e) explains plan of action and the landing techniques that would ensure the safest outcome when committed to a forced landing on unfavourable terrain or water.

2.11 **AA1.11 – Conduct operations over and under powerlines**

(a) identifies powerlines both in and outside the treatment area during an aerial survey;

(b) demonstrates an ability to interpret powerline infrastructure cues so as to aid wire run identification;

(c) demonstrates safe technique for accurately assessing wire height, including safe flying parallel to wires;

(d) identifies and manages other hazards relevant to operations near powerlines, such as pole stays, crop height, fences or machinery that may pose a risk;

(e) demonstrates safe command decisions whether to fly over or under a wire;

(f) conducts safe treatment over wires, including adequate safety buffers for pull-up and let-down and accurate cut-off and on of application equipment;

(g) conducts safe treatment under wires, including safe clearance;

(h) terminates approaches towards powerlines when passage beneath is unachievable;

(i) can explain the relevant human factors that may affect operations near powerlines, particularly distraction, short-term memory limitations and in attentional blindness.

2.12 **AA1.12 – Apply substances**

(a) safely applies substances in accordance with application management plan;

(b) establishes and maintains correct application height relevant to terrain, application type and meteorological conditions;

(c) controls airspeed and flight profile appropriately on entry/re-entry to treatment area;

(d) engages and shuts off application equipment at appropriate points;

(e) manoeuvers around and over hazards in the treatment area with adequate safety buffers;

(f) regularly uses aircraft smoker to identify and monitor wind direction;

(g) monitors application flow rate, pressure and product remaining;

(h) conducts clean-up runs, including extra safety check for hazards;

(i) demonstrates safe command decisions to continue with, amend or suspend operations due to changing conditions.

2.13 **AA1.13 – Operate aircraft safely and effectively using GNSS swath guidance equipment**

(a) demonstrates basic familiarity with at least 1 GNSS system;

(b) demonstrates sound judgement in selecting the correct pattern relevant to the treatment area and terrain;

(c) selects correct swath relevant to the aircraft, aircraft configuration and the substance to be applied;

(d) accurately places an AB line and C point if required;

(e) manoeuvres the aircraft accurately on the correct swath line with reference to the light bar and natural features;

(f) operate aircraft at maximum permissible weights for aerial application operations;

(g) determines take-off weight within legal requirements and relevant to strip length and conditions;

(h) operates safely and effectively at maximum weights during:

(i) taxi;

(ii) take off and climb;

(iii) approach and landing (including safe command decisions on dumping and strip selection);

(iv) application;

(v) turns;

(vi) obstacle avoidance.

2.14 **AA1.14 – Operate at low level in hilly terrain**

(a) safely manipulate the aircraft at low level in hilly terrain;

(b) establish and maintain safe height relevant to application type;

(c) demonstrate safe contour flying;

(d) identify and select appropriate natural markers to aid situational awareness;

(e) demonstrate safe approaches to higher ground, including identification of escape routes;

(f) demonstrate safe turns in hilly terrain;

(g) demonstrate awareness and management of the effects of wind and turbulence in hilly terrain, including lee effects;

(h) demonstrate awareness of illusions in hilly terrain, including false horizon effect and shadows.

2.15 **AA1.15 – Manage abnormal and emergency situations during low-level operations**

(a) identifies potential forced-landing areas prior to and during aerial application operations;

(b) identifies abnormal or emergency situation;

(c) conducts appropriate abnormal or emergency procedures during application operations;

(d) maintains control of the aircraft, jettisons load if required, and avoids any powerlines or hazards;

(e) successfully conducts a practice forced landing from 500 ft.

2.16 **AA1.16 – Jettison load**

(a) jettisons a full liquid load during take-off prior to lift off, and maintains control of the aircraft;

(b) jettison a full liquid load immediately after take-off and maintains control of the aircraft;

(c) jettisons a full liquid load during flight and controls pitch changes to ensure maintenance of altitude (+100/-0 ft) by adjustments of elevator and power.

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) day VFR in variable weather conditions;

(c) approved aircraft;

(d) approved low-flying areas;

(e) operational airstrips;

(f) man-made or natural obstacles;

(g) undulating, hilly or mountainous terrain;

(h) emergency and abnormal situations;

(i) hazardous weather conditions;

(j) mental and physical fatigue;

(k) heat stress and dehydration;

(l) maintaining situational awareness;

(m) in-flight distractions.

**4 Underpinning knowledge of the following:**

(a) CASA exemptions with regards to maximum take-off weight and applicability of other aircraft limitations;

(b) applicable regulations that relate to the conduct of a safe operation;

(c) low level meteorology;

(d) relevant aerodynamics and aircraft performance;

(e) aircraft flight manual, performance, engine and systems;

(f) human factors;

(g) safety hazards and risks of flight at low level;

(h) role equipment;

(i) factors to be considered when determining the payload weight for each application;

(j) aircraft configuration for the aircraft being flown, when jettisoning a full load;

(k) characteristics of the aircraft being flown when jettisoning a full load;

(l) flight control and throttle actions required to maintain control of the aircraft being flown when jettisoning a full load.

# AA2 Helicopter aerial application operation

## 1 Unit description

This unit describes the skills and knowledge required to conduct aerial application operations other than firefighting operations in helicopters.

## 2 Elements and performance criteria

### 2.1 AA2.1 – Pre-flight actions

(a) conduct self-assessment fit for flight and planned operation;

(b) determine suitability of helicopter for type of operation;

(c) conduct a thorough pre-flight of helicopter and role equipment to determine serviceability for planned operations;

(d) check and correctly complete required maintenance documentation as applicable;

(e) confirm minimum equipment and minimum crew and instrumentation requirements for planned operations are met;

(f) check safe operation of role equipment, including the serviceability of the jettison (dump) door if applicable or the sling jettison;

(g) check and adjust role equipment calibration.

### 2.2 AA2.2 – Planning and risk management

(a) determine the requirement to operate at low level, analyses the risk and implement a decision to safely conduct low-level operations;

(b) develop an Application Management Plan;

(c) correctly interpret treatment area map;

(d) adequately identify potential hazards and operational requirements, assess risks and apply appropriate risk controls, including powerlines, houses, susceptible crops and environmentally sensitive areas;

(e) demonstrate an ability to make a command decision on the safety or otherwise of the proposed application, including refusing to undertake an application where the risks are considered to be too high;

(f) determine the suitability of the current and forecast weather;

(g) make appropriate selection of application pattern and direction of treatment taking into consideration safety, efficiency, hazards and terrain;

(h) carefully plans fuel requirements;

(i) confirms acceptable helicopter performance for conditions;

(j) confirms location of ground support personnel when available;

(k) confirms normal and abnormal ops communications and signals;

(l) confirms appropriate logistical considerations, including local HLS condition, fuel, products, ground support and access to HLS, SARWACH, water, and personal supplies, including adequate water and food.

### 2.3 AA2.3 – Fly to, assess, land and take-off from an operational HLS

(a) performs low-level navigation to an operational HLS at an appropriate height;

(b) performs appropriate assessment of an operational HLS, including dimensions, conditions, direction, identification of hazards, meteorological conditions;

(c) identifies and manages issues relating to helicopter weight, performance, dimensions, load and meteorological conditions;

(d) consistently performs pre-landing and pre-take-off checks;

(e) demonstrates appropriate landing and take-off techniques;

(f) identifies an appropriate dumping point for each take-off, including adequate safety buffers;

(g) demonstrates safe operations from a marginal HLS.

2.4 **AA2.4 – Fly between operational HLS and application area**

(a) performs low-level navigation from an operational HLS to an application area;

(b) selects the most appropriate route and height between the operational HLS and application area with considerations to terrain, stock, populated areas, housing and hazards;

(c) conduct operations at a certified or registered aerodrome;

(d) performs operations in accordance with the requirements of published regulations.

2.5 **AA2.5 – Conduct an aerial survey of a treatment area**

(a) develops an appropriate and safe plan for conduct of an aerial survey;

(b) accurately identifies the treatment area boundaries;

(c) confirms the map;

(d) identifies susceptible crops and environmentally sensitive areas;

(e) identifies hazards on the map;

(f) identifies potential emergency landing area(s);

(g) checks and identifies any hazards not on the map, including sun glare and shadows from hills;

(h) accurately assesses wind speed and direction;

(i) identifies clean-up runs required;

(j) confirms or appropriately amends the Application Management Plan, including pattern type and direction of treatment and possible suspension of application if conditions are not appropriate.

2.6 **AA2.6 – Manipulate helicopter at low level**

(a) manoeuvres helicopter at all speeds below 500 ft AGL, up to and not beyond the limits of the flight-manoeuvring envelope, without exceeding the operating limitations of the helicopter;

(b) conducts coordinated, smooth procedure (P) turns with varying power settings;

(c) accurately re-enters treatment area with helicopter aligned for treatment run;

(d) accurately identifies and monitors wind speed and direction;

(e) recognises and manages the adverse effects of wind caused by terrain and obstructions;

(f) recognises and controls the illusions caused by turning in windy conditions;

(g) manages the effects of gradient wind;

(h) recognises and manages the effect of rising and descending terrain on helicopter performance;

(i) recognises and manages false horizon illusions;

(j) maintains a constant altitude over featureless terrain or water;

(k) establishes and maintains an appropriate height and speed over treatment area.

2.7 **AA2.7 – Conduct operations over and under powerlines**

(a) identifies powerlines both in and outside the treatment area during an aerial survey;

(b) demonstrates an ability to interpret powerline infrastructure cues so as to aid wire run identification;

(c) demonstrates safe technique for accurately assessing wire height, including safe flying parallel to wires;

(d) identifies and manages other hazards relevant to operations near powerlines, such as pole stays, crop height, fences or machinery that may pose a risk;

(e) demonstrates safe command decisions whether to fly over or under a wire;

(f) conducts safe treatment over wires, including adequate safety buffers for pull-up and let-down and accurate cut-off and on of application equipment;

(g) conducts safe treatment under wires, including safe clearance;

(h) terminates approaches towards powerlines when passage beneath is unachievable;

(i) can explain the relevant human factors that may affect operations near powerlines, particularly distraction, short-term memory limitations and inattentional (perceptual) blindness.

2.8 **AA2.8 – Apply substances**

(a) safely applies substances in accordance with application management plan;

(b) establishes and maintains correct application height relevant to terrain, application type and meteorological conditions;

(c) controls airspeed and flight profile appropriately on entry and re-entry to treatment area;

(d) engages and shuts off application equipment at appropriate points;

(e) manoeuvers around and over hazards in the treatment area with adequate safety buffers;

(f) regularly uses aircraft smoker to identify and monitor wind direction;

(g) monitors application flow rate, pressure and product remaining;

(h) conducts clean-up runs, including extra safety check for hazards;

(i) demonstrates safe command decisions to continue with, amend or suspend operations due to changing conditions.

2.9 **AA2.9 – Operate helicopter safely and effectively using GNSS swath guidance equipment**

(a) demonstrates basic familiarity with at least 1 GNSS system;

(b) demonstrates sound judgement in selecting the correct pattern relevant to the treatment area and terrain;

(c) selects correct swath relevant to the helicopter, helicopter configuration and the substance to be applied;

(d) accurately places an AB line and C point if required;

(e) manoeuvres the helicopter accurately on the correct swath line with reference to the light bar and natural features;

(f) operate helicopter at maximum permissible weights for aerial application operations;

(g) determines take-off weight within legal requirements and relevant to HLS dimensions and conditions;

(h) operates safely and effectively at maximum weights during:

(i) hover and taxi;

(ii) take off and climb;

(iii) approach and landing (including command decision on dumping and HLS selection);

(iv) application;

(v) turns;

(vi) obstacle avoidance.

2.10 **AA2.10 – Manage known helicopter risks during application operations**

(a) demonstrate sound decision making in assessing likely hover performance considering load, density altitude, ground surface and relative wind;

(b) demonstrates awareness of, and sound behaviours in, managing rotor disc behaviour under reduced or negative ‘g’;

(c) demonstrates awareness of, and sound behaviour in, avoiding dynamic rollover;

(d) demonstrates awareness of, and sound behaviour in, avoiding loss of tail rotor effectiveness (LTE).

2.11 **AA2.11 – Operate at low level in hilly terrain**

(a) safely manipulate the helicopter at low level in hilly terrain;

(b) establish and maintain safe height relevant to application type;

(c) demonstrate safe contour flying;

(d) identify and select appropriate natural markers to aid situational awareness;

(e) demonstrate safe approaches to higher ground, including identification of escape routes;

(f) demonstrate safe turns in hilly terrain;

(g) demonstrate awareness and management of the effects of wind and turbulence in hilly terrain, including lee effects;

(h) demonstrate awareness of illusions in hilly terrain, including false horizon effect and shadows;

(i) manage abnormal and emergency situations during low-level operations;

(j) identifies potential forced-landing areas prior to and during aerial application operations;

(k) identifies abnormal or emergency situation;

(l) conducts appropriate abnormal or emergency procedures during application operations;

(m) maintains control of helicopter, including adequate coordination of collective, jettisons load if required, and avoids any powerlines or hazards;

(n) successfully conducts a practice forced landing from 500 ft.

2.12 **AA2.12 – Jettison load**

(a) jettisons a full liquid load during take-off and maintains control of the helicopter;

(b) jettisons a full liquid load during flight and controls pitch changes.

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) day VFR in variable weather conditions;

(c) approved helicopter;

(d) approved low-flying areas;

(e) operational HLSs;

(f) man-made or natural obstacles;

(g) undulating, hilly or mountainous terrain;

(h) emergency and abnormal situations;

(i) hazardous weather conditions;

(j) mental and physical fatigue;

(k) heat stress and dehydration;

(l) maintaining situational awareness;

(m) in-flight distractions.

**4 Underpinning knowledge of the following:**

(a) applicable regulations that relate to the conduct of a safe operation;

(b) low level meteorology;

(c) relevant aerodynamics and helicopter performance;

(d) helicopter flight manual, performance, engine and systems;

(e) relevant human factors;

(f) safety hazards and risks of flight at low level;

(g) role equipment;

(h) factors to be considered when determining the payload weight for each application;

(i) helicopter configuration for the helicopter being flown, when jettisoning a full load;

(j) flight characteristics of the helicopter being flown when jettisoning a full load;

(k) flight control and throttle actions required to maintain control of the helicopter being flown when jettisoning a full load.

## AA3 Gyroplane aerial application operation – *Reserved*

# AA4 Aeroplane firefighting operation

## 1 Unit description

This unit describes the skills and knowledge required to conduct firefighting operations in aeroplanes.

## 2 Elements and performance criteria

### 2.1 AA4.1 – Applies human factors

(a) demonstrates knowledge of and employs appropriate management strategies in response to human factors particularly relevant to fire operations, including:

(i) high workload;

(ii) distraction and radios;

(iii) dehydration;

(iv) fatigue;

(v) CRM;

(vi) time critical operational requirements;

(vii) external factors.

### 2.2 AA4.2 – Pre-flight actions

(a) conduct self-assessment fit for flight and planned operation;

(b) determine suitability of aircraft for type of operation;

(c) conduct a thorough pre-flight of aircraft and role equipment to determine serviceability for planned operations;

(d) check and correctly complete required maintenance documentation as applicable;

(e) confirm minimum equipment and minimum crew and instrumentation requirements for planned operations are met;

(f) apply TEM and risk management considerations, including human error;

(g) check safe operation of role equipment;

(h) confirm communication plan with fire agency and serviceability of communication equipment.

### 2.3 AA4.3 – Demonstrate understanding of generic fire agency procedures

(a) demonstrate awareness of fire agency briefing processes;

(b) demonstrate awareness of fire agency incident control systems;

(c) able to explain the role and responsibilities of Air Attack Supervisor.

### 2.4 AA4.4 – Fire traffic management and other aircraft separation

(a) demonstrate strong situational awareness of other aircraft and remotely piloted vehicles;

(b) demonstrate awareness of correct radio procedures and fire agency traffic management procedures;

(c) manage correct frequencies dependant on operational requirements.

(d) uses appropriate techniques and communication procedures when arriving at and departing from fire ground, refuelling site or replenishment points.

### 2.5 AA4.5 – Planning and risk management

(a) determine the requirement to operate at low level, analyse the risk and implement a decision to safely conduct low-level operations;

(b) adequately identify potential hazards and operational requirements, assess risks and apply appropriate risk controls;

(c) demonstrate an ability to make a command decision on the safety or otherwise of the proposed application, including refusing to undertake an application where the risks are considered to be too high;

(d) demonstrates consideration of avoidance and escape techniques;

(e) determine the suitability of the current and forecast weather;

(f) make appropriate selection of application pattern and direction of treatment taking into consideration safety, efficiency, hazards and terrain;

(g) carefully plans fuel requirements;

(h) confirms acceptable aircraft performance for conditions;

(i) confirms location of ground support and firefighting personnel;

(j) confirms normal and abnormal ops communications and signals;

(k) confirms appropriate logistical considerations, including local airstrip condition, fuel, products, ground support and access to strip, SARWATCH, water, and personal supplies, including adequate water and food.

2.6 **AA4.6 – Fly to, assess, land and take off from an operational airstrip**

(a) performs low-level navigation to an operational airstrip at an appropriate height;

(b) performs appropriate assessment of an operational airstrip, including strip length, conditions, direction, identification of hazards, meteorological conditions;

(c) selects the most suitable loading area, taking into account factors such as the safety of ground personnel and directions from the fire agency;

(d) consistently performs pre-landing and pre-take-off checks;

(e) selects a ‘no go, go around, commitment’ point for landings;

(f) selects a touchdown point for landings;

(g) identifies and manages issues relating to aircraft weight, performance, strip length, slope, surface, direction, load and meteorological conditions;

(h) demonstrates appropriate short-field landing and take-off techniques, including having her or his hand on the dump door handle for take-offs and being prepared to dump if required;

(i) identifies an appropriate dumping point for each take-off, including adequate safety buffers;

(j) demonstrates safe operations from a 1-way airstrip.

2.7 **AA4.7 – Fly between operational airstrip and drop zone**

(a) performs low-level navigation from an operational airstrip to a drop zone;

(b) selects the most appropriate route and height between the operational strip and drop zone with considerations to terrain, stock, populated areas, housing and hazards.

2.8 **AA4.8 – Conduct operations at a certified or registered aerodrome**

(a) performs operations in accordance with the requirements of published regulations.

2.9 **AA4.9 – Conduct an aerial survey of a fire area**

(a) develops an appropriate and safe plan for conduct of an aerial survey;

(b) accurately identifies the fire area boundaries;

(c) confirms the map;

(d) identifies environmentally sensitive areas;

(e) identifies hazards on the map;

(f) checks and identifies any hazards not on the map, including fire specific hazards, sun glare and shadows from hills;

(g) accurately assesses wind speed and direction;

(h) confirms or appropriately amends the Application Management Plan, including pattern type and direction of treatment and possible suspension of application if conditions are not appropriate.

2.10 **AA4.10 – Apply substances**

(a) safely and accurately apply substances in accordance with application management plan by doing the following:

(i) select the correct tank or door configuration and airspeed;

(ii) make appropriate allowance for wind conditions;

(iii) link application drops to create a continuous line of treatment;

(b) establish and maintain correct application height relevant to terrain, application type and meteorological conditions;

(c) control airspeed and flight profile appropriately on entry and re-entry to treatment area;

(d) engage and shut off application equipment at appropriate points;

(e) manoeuver around and over hazards in the treatment area with adequate safety buffers;

(f) demonstrate safe command decisions to continue with, amend or suspend operations due to changing conditions.

2.11 **AA4.11 – Operate aircraft at maximum permissible weights for fire operations**

(a) determine take-off weight within legal requirements and relevant to strip length and conditions;

(b) operate safely and effectively at maximum weights during:

(i) taxi;

(ii) take off and climb;

(iii) approach and landing (including safe command decisions on dumping and strip selection);

(iv) application;

(v) turns;

(vi) obstacle avoidance.

2.12 **AA4.12 – Operate at low level in hilly terrain**

(a) safely manipulate the aircraft at low level in hilly terrain;

(b) establish and maintain safe height relevant to application type;

(c) demonstrate safe contour flying;

(d) identify and select appropriate natural markers to aid situational awareness;

(e) demonstrate safe approaches to higher ground, including identification of escape routes;

(f) demonstrate safe turns in hilly terrain;

(g) demonstrate awareness and management of the effects of wind and turbulence in hilly terrain, including lee effects;

(h) demonstrate awareness of illusions in hilly terrain, including false horizon effect and shadows.

2.13 **AA4.13 – Operate in high winds, high density altitude and high turbulence**

(a) demonstrate awareness of the principles of operating at low level in high winds, high density altitude and high turbulence;

(b) demonstrate sound judgement in assessing take-off conditions as being within the limitations of the aircraft.

2.14 **AA4.14 – Low-visibility operations**

Able to explain low-visibility risks, including illusions such as false horizons and operating in smoke conditions.

2.15 **AA4.15 – Manage abnormal and emergency situations during low-level operations on a fire ground**

(a) identify potential forced-landing areas prior to and during firebombing operations;

(b) identify abnormal or emergency situation;

(c) conduct appropriate abnormal or emergency procedures;

(d) maintain control of aircraft, jettison load if required, and avoid any powerlines or hazards;

(e) successfully conduct a practice forced landing from 500 ft.

2.16 **AA4.16 – Jettison load from fire gate**

(a) jettison a full liquid load during take-off prior to lift off, and maintain control of the aircraft;

(b) jettison a full liquid load during flight and controls pitch changes to ensure maintenance of altitude by adjustments of elevator and power.

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) day VFR in variable weather conditions;

(c) approved aircraft;

(d) approved low-flying areas;

(e) airstrips;

(f) man-made or natural obstacles;

(g) undulating, hilly or mountainous terrain;

(h) emergency and abnormal situations;

(i) hazardous weather conditions and simulated fire conditions;

(j) mental and physical fatigue;

(k) heat stress and dehydration;

(l) maintaining situational awareness;

(m) in-flight distractions.

**4 Underpinning knowledge of the following:**

(a) applicable regulations that relate to the conduct of a safe operation;

(b) low level and localised meteorology including the following:

(i) local meteorological conditions relevant to fire conditions;

(ii) wind conditions likely to be found in fire conditions;

(iii) wind conditions in hilly terrain, include lee winds;

(c) relevant aerodynamics and aircraft performance;

(d) aircraft flight manual, performance, engine and systems;

(e) relevant human factors;

(f) safety hazards and risks of flight at low level;

(g) pre-flight serviceability checks that are conducted on firefighting equipment that is fitted to the aircraft type being flown;

(h) conditions would indicate unserviceable firefighting equipment;

(i) role and authority of the Air Attack Supervisor and common fire agency procedures;

(j) radio frequencies being used by ground crews are obtained;

(k) factors that will determine the design and conduct of drop patterns;

(l) function and use of various fire suppressants and retardants;

(m) Reserved;

(n) the drop characteristics of suppressants and retardants with respect to drift;

(o) aircraft configuration for the aircraft being flown, when jettisoning a full load;

(p) flight characteristics of the aircraft being flown when jettisoning a full load;

(q) flight control and throttle actions required to maintain control of the aircraft being flown when jettisoning a full load;

(r) terminology used during fire-bombing operations including the following:

(i) head end of load;

(ii) lead-in;

(iii) roll up;

(iv) tag-on;

(v) tail end of load;

(s) operational conditions under which fire-bombing could be suspended by an Air Attack Supervisor;

(t) environmental conditions under which an Air Attack Supervisor could suspend fire-firefighting operations;

(u) symptoms that could indicate aircrew fatigue;

(v) symptoms of dehydration and explain effects of dehydration on a pilot’s performance;

(w) container markings of fire retardant and suppression chemicals;

(x) toxicity conditions that apply to firefighting chemicals and the methods of avoiding any adverse effects;

(y) dispensing system, drop patters and emergency procedures;

(z) basic wildfires.

# AA5 Helicopter firefighting operation

## 1 Unit description

This unit describes the skills and knowledge required to conduct firefighting operations in helicopters.

## 2 Elements and performance criteria

### 2.1 AA5.1 – Applies human factors

(a) demonstrate knowledge of and employ appropriate management strategies in response to human factors particularly relevant to fire operations, including:

(i) high workload;

(ii) distraction and radios;

(iii) dehydration;

(iv) fatigue;

(v) CRM

(vi) time critical operational requirements;

(vii) external factors..

### 2.2 AA5.2 – Pre-flight actions

(a) conduct self-assessment fit for flight and planned operation;

(b) determine suitability of helicopter for type of operation;

(c) conduct a thorough pre-flight of helicopter and role equipment to determine serviceability for planned operations;

(d) check and correctly complete required maintenance documentation as applicable;

(e) confirm minimum equipment and minimum crew and instrumentation requirements for planned operations are met;

(f) apply TEM and risk management considerations, including human error;

(g) check safe operation of role equipment, including the serviceability of the jettison (dump) door if applicable or the sling jettison;

(h) confirm communication plan with fire agency and serviceability of communication equipment.

### 2.3 AA5.3 – Demonstrates understanding of generic fire agency procedures

(a) demonstrates awareness of fire agency briefing processes;

(b) demonstrates awareness of fire agency incident control systems;

(c) able to explain the role and responsibilities of Air Attack Supervisor.

### 2.4 AA5.4 – Fire traffic management and other aircraft separation

(a) demonstrates strong situational awareness of other aircraft and remotely piloted vehicles;

(b) demonstrates awareness of correct radio procedures and fire agency traffic management procedures;

(c) able to manage correct frequencies dependant on operational requirements;

(d) can explain appropriate techniques and communication procedures when arriving at and departing from fire ground, refuelling site or replenishment points.

### 2.5 AA5.5 – Planning and risk management

(a) determine the requirement to operate at low level, analyse the risk and implement a decision to safely conduct low-level operations;

(b) adequately identify potential hazards and operational requirements, assess risks and apply appropriate risk controls;

(c) demonstrates consideration of avoidance and escape techniques;

(d) demonstrate an ability to make a command decision on the safety or otherwise of the proposed application, including refusing to undertake an application where the risks are considered to be too high;

(e) determine the suitability of the current and forecast weather;

(f) make appropriate selection of application pattern and direction of treatment taking into consideration safety, efficiency, hazards and terrain;

(g) carefully plans fuel requirements;

(h) confirms acceptable helicopter performance for conditions;

(i) confirms location of ground support and firefighting personnel;

(j) confirms normal and abnormal ops communications and signals;

(k) confirms appropriate logistical considerations, including local airstrip condition, fuel, products, ground support and access to strip, SARwatch, water, and personal supplies, including adequate water and food.

2.6 **AA5.6 – Fly to, assess, land and take-off from an operational HLS or pick-up point**

(a) perform low-level navigation to an operational HLS or pick-up point at an appropriate safe height;

(b) perform appropriate assessment of an operational HLS or pick-up point, including dimensions, conditions, direction, identification of hazards, meteorological conditions;

(c) identify and manage issues relating to helicopter weight, performance, dimensions, load and meteorological conditions;

(d) consistently perform pre-landing and pre-take-off checks;

(e) demonstrate appropriate landing and take-off techniques;

(f) identify an appropriate dumping point for each take-off, including adequate safety buffers;

(g) demonstrate safe operations from a marginal HLS or pick-up point.

2.7 **AA5.7 – Fly between operational HLS and drop zone**

(a) perform low-level navigation from an operational airstrip to a drop zone;

(b) selects the most appropriate route and height between the HLS or pick-up point and the drop zone with consideration to terrain, stock, populated areas, housing and hazards.

2.8 **AA5.8 – Conduct operations at a certified or registered aerodrome**

Perform operations in accordance with the requirements of published regulations.

2.9 **AA5.9 – Conduct an aerial survey of a fire area**

(a) develops an appropriate and safe plan for conduct of an aerial survey;

(b) accurately identifies the fire area boundaries;

(c) confirms the map;

(d) identifies environmentally sensitive areas;

(e) identifies hazards on the map;

(f) identifies potential emergency landing area(s);

(g) checks and identifies any hazards not on the map, including fire specific hazards, sun glare and shadows from hills;

(h) accurately assesses wind speed and direction;

(i) confirms or appropriately amends the Application Management Plan, including pattern type and direction of treatment and possible suspension of application if conditions are not appropriate.

2.10 **AA5.10 – Apply substances**

(a) safely and accurately applies substances in accordance with application management plan by doing the following;

(i) select the correct tank or door configuration and airspeed;

(ii) make appropriate allowance for wind conditions;

(iii) link application drops to create a continuous line of treatment;

(b) perform a spot drops to achieve an accuracy of 80% of the substance falling vertically within a predetermined area;

(c) establishes and maintains correct application height relevant to terrain, application type and meteorological conditions;

(d) controls airspeed and flight profile appropriately on entry and re-entry to treatment area;

(e) engages and shuts off application equipment at appropriate points;

(f) manoeuvers around and over hazards in the treatment area with adequate safety buffers;

(g) demonstrates safe command decisions to continue with, amend or suspend operations due to changing conditions.

2.11 **AA5.11 – Reserved**

2.12 **AA5.12 – Replenish helicopter load with snorkel or bucket**

(a) demonstrates safe identification and assessment of replenishment site, including consideration of entry and exit direction, hazards, surrounding terrain, emergency actions, wind conditions and impact of heavier load on exit performance;

(b) demonstrates safe speed control and height loss on approach to target replenishment spot (e.g. dam);

(c) accurately places bucket or snorkel into water;

(d) maintains safe hover while taking on load, smoothly adjusting for increasing weight;

(e) demonstrates safe technique in lifting bucket or snorkel smoothly and maintaining safe hover and exit under new load;

(f) maintains safe control of the helicopter and demonstrates safe command decisions to jettison or replace bucket into water if helicopter is unable to safely lift load.

2.13 **AA5.13 – Operate helicopter at maximum permissible weights for fire operations**

(a) determines take-off weight within legal requirements and relevant to HLS dimensions and conditions;

(b) operates safely and effectively at maximum weights during:

(i) taxi;

(ii) take off and climb;

(iii) approach and landing, including safe command decisions on dumping and HLS selection;

(iv) application;

(v) turns;

(vi) obstacle avoidance.

2.14 **AA5.14 – Manage known helicopter risks during firefighting operations**

(a) demonstrate sound decision making in assessing likely hover performance considering load, density altitude, ground surface and relative wind;

(b) demonstrates awareness of and correct techniques in managing rotor disc behaviour under reduced or negative ‘g ‘;

(c) demonstrate awareness of and correct techniques in avoiding dynamic rollover;

(d) demonstrate awareness of and correct techniques in avoiding loss of tail rotor effectiveness (LTE) and vortex ring state.

2.15 **AA5.15 – Low-visibility operations**

Able to explain low-visibility risks, including illusions such as false horizons and operating in smoke conditions.

2.16 **AA5.16 – Operate at low level in hilly terrain**

(a) safely manipulate the helicopter at low level in hilly terrain;

(b) establish and maintain safe height relevant to application type;

(c) demonstrate safe contour flying;

(d) identify and select appropriate natural markers to aid situational awareness;

(e) demonstrate safe approaches to higher ground, including identification of escape routes;

(f) demonstrate safe turns in hilly terrain;

(g) demonstrate awareness and management of the effects of wind and turbulence in hilly terrain, including lee effects;

(h) demonstrate awareness of illusions in hilly terrain, including false horizon effect and shadows.

2.17 **AA5.17 – Operate in high winds, high density altitude and high turbulence**

(a) demonstrate awareness of the principles of operating at low level in high winds, high density altitude and high turbulence;

(b) demonstrate sound judgement in assessing take-off conditions as being within the limitations of the helicopter.;

2.18 **AA5.18 – Manage abnormal and emergency situations during low-level operations on a fire ground**

(a) identify potential forced-landing areas prior to and during firebombing operations;

(b) identify abnormal or emergency situation;

(c) conduct appropriate abnormal or emergency procedures;

(d) maintain control of helicopter including adequate coordination of collective, jettison load if required, and avoid any powerlines or hazards;

(e) successfully conduct a practice forced landing from 500 ft.

2.19 **AA5.19 – Jettison load from fire gate**

(a) jettison a full liquid load at take-off, and maintains control of the helicopter;

(b) jettison a full liquid load during flight and ensures maintenance of altitude (+100 -0 ft).

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) day VFR in variable weather conditions;

(c) approved helicopter;

(d) approved low-flying areas;

(e) operational HLSs and pick-up points;

(f) man-made or natural obstacles;

(g) undulating, hilly or mountainous terrain;

(h) emergency and abnormal situations;

(i) hazardous weather conditions and simulated fire conditions;

(j) mental and physical fatigue;

(k) heat stress and dehydration;

(l) maintaining situational awareness;

(m) in-flight distractions.

**4 Underpinning knowledge of the following:**

(a) applicable regulations that relate to the conduct of a safe operation;

(b) low level and localised meteorology:

(i) local meteorological conditions relevant to fire conditions;

(ii) wind conditions likely to be found in fire conditions;

(iii) wind conditions in hilly terrain, including lee winds;

(c) relevant aerodynamics and helicopter performance;

(d) helicopter flight manual, performance, engine and systems;

(e) human factors;

(f) safety hazards and risks of flight at low level;

(g) pre-flight serviceability checks that are conducted on fire-firefighting equipment that is fitted to the helicopter type being flown;

(h) conditions would indicate unserviceable fire-firefighting equipment;

(i) role and authority of the Air Attack Supervisor and common fire agency procedures;

(j) radio frequencies being used by ground crews are obtained;

(k) factors that will determine the design and conduct of drop patterns;

(l) function and use of various fire suppressants and retardants;

(m) Reserved;

(n) drop characteristics of suppressants and retardants with respect to drift;

(o) helicopter configuration for the helicopter being flown, when jettisoning a full load;

(p) flight characteristics of the helicopter being flown when jettisoning a full load;

(q) flight control and throttle actions required to maintain control of the helicopter being flown when jettisoning a full load;

(r) terminology used during fire-bombing operations:

(i) head end of load;

(ii) lead-in;

(iii) roll up;

(iv) tag-on;

(v) tail end of load;

(s) operational conditions under which fire-bombing could be suspended by an Air Attack Supervisor;

(t) environmental conditions under which an Air Attack Supervisor could suspend fire-bombing operations;

(u) symptoms that could indicate aircrew fatigue;

(v) symptoms of dehydration and explain effects of dehydration on a pilot’s performance;

(w) markings of fire retardant and suppression chemicals;

(x) toxicity conditions that apply to firefighting chemicals and the methods of avoiding any adverse effects;

(y) dispensing system, drop patters and emergency procedures;

(z) basic wildfires.

# AA6 Night aerial application operation

## 1 Unit description

This unit describes the skills and knowledge required to conduct an aerial application operation other than a firefighting operation at night.

## 2 Elements and performance criteria

### 2.1 AA6.1 – Aircraft and equipment serviceability

(a) confirm all required aircraft lighting is installed and serviceable;

(b) confirm additional instrumentation required for night flying is installed and serviceable.

### 2.2 AA6.2 – Conduct risk assessment of operation

Demonstrate an ability to assess forecast meteorological conditions for night operations, including moon state and to make a command decision (i.e. go-no go) based on her or his safety assessment.

### 2.3 AA6.3 – Pre-flight actions

(a) thorough risk assessment of planned treatment are conducted during daylight;

(b) conduct self-assessment fit for night flying.

### 2.4 AA6.4 – Determine whether an airstrip or HLS is suitable for night operations

(a) determine whether airstrip or /HLS dimensions and lighting is suitable and available for night operations;

(b) identify potential obstacles surrounding the airstrip or HLS and in the runway end splays.

### 2.5 AA6.5 – Take-off and land at night at an airstrip or HLS remote from ground lighting

(a) conducts take-off, circuit procedures and lands aircraft at night at an aerodrome remote from significant ground lighting that could assist the pilot in maintaining control of the aircraft;

(b) uses runway lights for positioning aircraft in circuit;

(c) confirms aircraft performance and attitude by reference to flight instruments;

(d) conducts a circuit and approach, controlling the aircraft and maintaining a safe altitude by reference to altimeter and positioning aircraft by reference to runway lighting;

(e) conducts a final approach and landing maintaining correct final approach angle and touchdown within specified touchdown zone.

### 2.6 AA6.6 – Conducts safe transit from airstrip to treatment area

(a) maintains a visible horizon;

(b) maintains a safe altitude over unsurveyed terrain during transit to and from treatment area;

(c) maintains vigilance and awareness of obstacles during descent into and departure from treatment area;

(d) conducts check of instruments and lighting prior to descent.

### 2.7 AA6.7 – Operates work lights to illuminate treatment area

(a) actions to be followed when 1 or more work lights become inoperative;

(b) extinguish work lights at the end of each spray run;

(c) illuminate work lights at the correct height when on a straight or turning descent to spray level.

## 3 Range of variables

(a) activities are performed in accordance with published procedures;

(b) for the night aeroplane aerial application endorsement, the aircraft must be an aeroplane;

(c) for the night helicopter aerial application endorsement, the aircraft must be an helicopter;

(d) for the night gyroplane aerial application endorsement, the aircraft must be an gyroplane;

(e) NVFR approved aeroplane;

(f) agricultural airstrips suitable for night operations;

(g) man-made or natural obstacles;

(h) noise sensitive areas and curfews;

(i) emergency and abnormal situations;

(j) mental and physical fatigue;

(k) maintaining situational awareness;

(l) in-flight distractions;

(m) human factors in the context of night operations.

**4 Underpinning knowledge of the following:**

(a) LSALT;

(b) NVFR requirements;

(c) aerodrome lighting requirements;

(d) limitations of human ocular system at night;

(e) visual illusions;

(f) aircraft instrument and lighting requirements.

# FLIGHT INSTRUCTOR RATING

## FIR1 Conduct aeronautical knowledge training

### 1 Unit description

This unit describes the skills and knowledge required to competently plan, conduct and review aeronautical knowledge training for Part 61 authorisations.

### 2 Elements and performance criteria

2.1 **FIR1.1 – Plan aeronautical knowledge training**

(a) assess and confirm the trainee's readiness for training;

(b) ensure the training plan includes training objectives, including threat and error management training;

(c) identify appropriate training resources;

(d) plan the lesson and delivery method appropriate to the training objectives;

(e) specify the assessment procedures;

(f) schedule and integrate the theory training with flight training lessons where appropriate;

(g) confirm the availability of the required facilities, equipment, training aids and reference materials.

2.2 **FIR1.2 – Conduct aeronautical knowledge training**

(a) establish a learning environment and motivation that suits the trainee’s needs;

(b) present the training materials;

(c) state the training objectives;

(d) lesson plan is followed and modified where applicable to achieve training objectives and transfer of knowledge;

(e) new knowledge to previous knowledge is linked and presented within a meaningful and logical framework;

(f) training aids are used to illustrate and enhance explanations;

(g) accurate technical knowledge is presented clearly and to the required standard;

(h) opportunities for trainee participation and practice are provided;

(i) applicable threat and error management issues are discussed;

(j) trainees ability to apply threat and error management principles to the material presented is confirmed;

(k) achievement of training objectives is confirmed by questioning, review and other suitable methods;

(l) feedback on trainee performance is provided;

(m) trainee self-assessment skills are developed;

(n) training objectives are completed in the time available;

(o) training is conducted effectively and safely.

2.3 **FIR1.3 – Review aeronautical knowledge training**

(a) training objectives and transfer of knowledge are achieved;

(b) training delivery and effectiveness using self-assessment, peers and supervisors is reviewed;

(c) records of assessment and progress of trainee are maintained and reviewed in accordance with established workplace procedures.

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) delivering aeronautical knowledge training to trainees that is for a flight crew licence, rating or endorsement;

(c) the training covers the units and elements of competency that applies to the licence rating or endorsement;

(d) the training environment includes suitable classroom or briefing facilities and training aids;

(e) the training is delivered in accordance with appropriate and documented lesson plans;

(f) suitable learning resources may be used to assist the presentation, including audio visual aids, aircraft models, synthetic training devices, regulatory publications and aircraft and operations manuals;

(g) training outcomes are reviewed as applicable to the needs of the trainee and against the standards specified for the issue of the licence, rating or endorsement.

**4 Underpinning knowledge of the following:**

(a) principles of learning:
  (i) learning as a behavioural change;
  (ii) sensory perception;
  (iii) factors affecting perception;
  (iv) motivation, positive and negative;
  (v) attitudes, discipline and responsibility;
  (vi) the following levels of learning:
    (A) rote;
    (B) understanding;
    (C) application;
    (D) correlation;
  (vii) factors which aid the learning process;
  (viii) transfer, habit formation;
  (ix) reinforcement;
  (x) memory and retention;

(b) role of psychology in flying instruction:
  (i) satisfaction of human needs;
  (ii) defence mechanisms;
  (iii) dealing with stress, abnormal reactions to airborne stress situations;
  (iv) psychological problems of both student and experienced pilots;

(c) teaching methods:
  (i) lecture, theory and skill lessons, guided discussion, briefing;
  (ii) behavioural objectives, their importance and formulation;

(d) lesson planning and development;

(e) effective communication;

(f) questioning techniques;

(g) use and abuse of teaching aids;

(h) application of instructional principles to airborne instruction.

# FIR2 Assess competence

## 1 Unit description

This unit describes the skills and knowledge required to effectively assess a trainee's competence.

## 2 Elements and performance criteria

### 2.1 FIR2.1 – Prepare for assessment

(a) interpret an assessment plan and confirm organisational, legal and ethical requirements for conducting an effective competency assessment;

(b) access and interpret relevant benchmarks for assessment and nominated assessment tools to confirm the requirements for evidence to be collected;

(c) arrange identified material and physical resource requirements according to assessment system policies and procedures;

(d) organise specialist support required for assessment;

(e) explain, discuss and agree details of the assessment plan with candidate.

### 2.2 FIR2.2 – Gather quality evidence

(a) use agreed assessment methods and instruments to gather, organise and document evidence in a format suitable for determining competence;

(b) apply the principles of assessment and rules of evidence in gathering quality evidence;

(c) determine opportunities for evidence gathering in actual or simulated activities through consultation with the candidate and relevant personnel;

(d) determine opportunities for integrated assessment activities and document any changes to assessment instruments where required.

### 2.3 FIR2.3 – Support the candidate

(a) guide candidates in gathering their own evidence to support recognition of prior learning (RPL);

(b) use appropriate communication and interpersonal skills to develop a professional relationship with the candidate that reflects sensitivity to individual differences and enables two-way feedback;

(c) make decisions on reasonable adjustments with the candidate, based on candidate's needs and characteristics;

(d) access required specialist support in accordance with the assessment plan;

(e) address any OHS risk to person or equipment immediately.

### 2.4 FIR2.4 – Make the assessment decision

(a) examine collected evidence and evaluate it to ensure that it reflects the evidence required to demonstrate competence;

(b) use judgement to infer whether competence has been demonstrated, based on the available evidence;

(c) make assessment decision in line with agreed assessment procedures and according to agreed assessment plan;

(d) provide clear and constructive feedback to candidate regarding the assessment decision and develop any follow-up action plan required.

### 2.5 FIR2.5 – Record and report the assessment decisions as follow:

(a) record assessment outcomes promptly and accurately;

(b) complete and process an assessment report according to agreed assessment procedures;

(c) inform other relevant parties of the assessment decision according to confidentiality conventions.

2.6 **FIR2.6 – Review the assessment process**

(a) review the assessment process in consultation with relevant people to improve own future practice;

(b) document and record the review according to relevant assessment system policies and procedures.

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) assessment plan may include:

(i) overall planning, describing:

(A) what is to be assessed;

(B) when assessment is to take place;

(C) where assessment is to take place;

(D) how assessment is to take place;

(c) benchmarks for assessment:

(i) refer to a criterion against which the candidate is assessed;

(ii) may be a competency standard, unit of competency, assessment criteria of course curricula, performance specifications, or product specifications;

(d) assessment tools include:

(i) the learning or competency unit(s) to be assessed;

(ii) the target group, context and conditions for the assessment;

(iii) the tasks to be administered to the candidate;

(iv) an outline of the evidence to be gathered from the candidate;

(v) the evidence criteria used to judge the quality of performance (i.e. the assessment decision-making rules);

(vi) the administration, recording and reporting requirements;

(vii) the evidence of how validity and reliability have been tested and built into the design and use of the tool;

(e) specialist support may include:

(i) assistance by third party, such as carer or interpreter;

(ii) support from specialist educator;

(iii) provision of developed online assessment activities;

(iv) support for remote or isolated candidates and assessors;

(v) support from subject matter or safety experts;

(vi) advice from regulatory authorities;

(vii) assessment teams and panels;

(viii) support from lead assessors;

(ix) advice from policy development experts;

(f) assessment methods include:

(i) particular techniques used to gather different types of evidence, such as:

(A) direct observation;

(B) structured activities;

(C) oral or written questioning;

(D) portfolios of evidence;

(E) review of products;

(F) third-party feedback;

(g) feedback may include:

(i) ensuring assessment for RPL process is understood;

(ii) ensuring candidate concerns are addressed;

(iii) enabling questions and answers;

(iv) confirming outcomes;

(v) identifying further evidence to be provided;

(vi) discussing action plans;

(vii) confirming gap training needed;

(viii) providing information regarding available appeal processes;

(ix) suggesting improvements in evidence gathering and presentation;

(h) consultation may involve:

(i) moderation with other assessors, or training and assessment coordinators;

(ii) discussions with client, team leaders, managers, RPL coordinators, supervisors, coaches and mentors;

(iii) technical and subject experts;

(iv) English language, literacy and numeracy experts.

**4 Underpinning knowledge of the following:**

(a) competency-based assessment, including:

(i) vocational education and training as a competency-based system;

(ii) criterion-referenced assessment as distinct from norm-referenced assessment;

(iii) competency standards as the basis of qualifications;

(iv) structure and application of competency standards;

(v) principles of assessment and how they are applied;

(vi) rules of evidence and how they are applied;

(vii) range of assessment purposes and assessment contexts, including RPL;

(viii) different assessment methods, including suitability for gathering various types of evidence, suitability for content of units, and resource requirements and associated costs;

(ix) reasonable adjustments and when they are applicable;

(x) types and forms of evidence, including assessment instruments that are relevant to gathering different types of evidence used in competency-based assessment, including RPL;

(xi) potential barriers and processes relating to assessment tools and methods;

(xii) assessment system, including policies and procedures established by the industry, organisation or training authority;

(b) recognition of prior learning policies and procedures established by the organisation.

# FIR3 Conduct flight training

## 1 Unit description

This unit describes the skills and knowledge required to effectively conduct and review flight training in an aircraft.

## 2 Elements and performance criteria

### 2.1 FIR3.1 – Plan flight training

(a) review a trainee's performance records, identify the appropriate units and elements of training to be delivered and develop an appropriate lesson plan, including remedial training if required;

(b) identify training outcomes based on prescribed performance criteria, the operator's training plans and consultation with supervisors;

(c) identify underpinning knowledge for the units and elements and confirm that the trainee has received the appropriate training;

(d) plan flight training exercise to ensure an effective, efficient and safe outcome;

(e) identify potential threats and errors, including those associated with simulation of abnormal or emergency procedures or aircraft mishandling by trainee, and apply suitable mitigators;

(f) consider availability and program suitable training aircraft and briefing facilities;

(g) establish airworthiness and fuel state of the training aircraft;

(h) determine that environmental conditions are suitable for the training exercise.

### 2.2 FIR3.2 – Conduct pre-flight briefing

(a) confirm the trainee is mentally and physically prepared for flight training and she or he can recall the underpinning knowledge required for the flight exercise;

(b) brief the trainee on the training outcomes, the associated performance criteria and the actions required of the trainee during the flight;

(c) link previous training to the current exercise;

(d) brief the trainee on how the flight will be conducted to meet the training outcomes;

(e) confirm the trainee's ability to recall the training outcomes, underpinning knowledge, handling technique and planned flight scenario;

(f) discuss threat and error management issues applicable to the proposed flight and confirm the trainee understands her or his responsibility for managing those issues (airmanship).

### 2.3 FIR3.3 – Conduct airborne training

(a) demonstrate elements:

(i) introduce tasks in manageable portions without trainee overload;

(ii) make clear, concise and systematic explanations;

(iii) coordinate demonstration with explanation of manoeuvre;

(iv) make coordinated control inputs without abrupt manoeuvring, using accepted techniques;

(v) demonstrate the manoeuvre to the competency standards specified in this manual for a commercial pilot.

(b) directs task performance:

(i) implements handover and takeover procedures for control of aircraft;

(ii) provides direction appropriate to trainee's progress;

(iii) provides instructions in a clear, concise and timely manner;

(iv) provides sufficient practice for the trainee to achieve the task;

(v) intervenes only to the extent necessary to assist the trainee's progress or to maintain safety.

(c) monitors trainee performance (unassisted practice):

(i) identify the trainee's deficiencies and provide feedback to assist the trainee in achieving the standard;

(ii) provide additional instruction and demonstration as necessary to assist trainee;

(iii) encourage the trainee to develop self-assessment skills;

(iv) note training events for debriefing and assessment.

2.4 **FIR3.4 – Manage threats and errors**

(a) manage responsibilities as pilot in command for the safe operation of the aircraft and maintain situation awareness while providing instruction;

(b) identify and manage threats and errors;

(c) intervene to recover the aircraft if trainee does not manage an undesired aircraft state;

(d) develop the trainee's responsibility through the application of human factors principles for threat and error management.

2.5 **FIR3.5 – Conduct post-flight briefing**

(a) ask the trainee to self-assess performance against the performance criteria;

(b) describe, clearly and accurately, significant details of the trainee's performance and assess the trainee's achievement against the training outcomes for the lesson and associated performance criteria;

(c) identify any deficiencies in performance and suggest remedial actions and training;

(d) discuss threat and error management issues encountered during the flight;

(e) brief the trainee on the details of the next training exercise;

(f) record achievement, or otherwise, of competency, any remedial training required and identify content of the next training exercise.

2.6 **FIR3.6 – Complete post-training administration**

(a) relevant staff are informed of trainee's performance and results;

(b) administration procedures required for issue of an endorsement or military equivalent are completed.

2.7 **FIR3.7 – Review training**

(a) evaluate training effectiveness with trainees and other appropriate stakeholders;

(b) evaluate final session outcomes against desired session outcomes;

(c) identify and incorporate adjustments to delivery, presentation and content of training when appropriate.

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) flight training includes training for the issue of a flight crew licence, rating or endorsement using a suitable training aircraft or approved synthetic flight trainer;

(c) flight training includes the units and elements authorised by the flight training endorsement(s) held by the instructor;

(d) aeronautical knowledge training, including pre- and post-flight briefings, is provided to support the flight training units and elements;

(e) flight training and aircraft operation is conducted in accordance with regulatory requirements and safe operational practices and includes administrative procedures associated with authorising and recording flight training and maintaining training records;

(f) flight training for licences and ratings is conducted under a Part 141 or Part 142 operator certificate with the relevant training specification in accordance with holder's operations manual.

**4 Underpinning knowledge of the following:**

(a) relevant sections of Civil Aviation Safety Regulations and Civil Aviation Orders;

(b) performing and learning complex skills, including cognitive and developmental issues and observational learning;

(c) cognitive basis of airmanship, situational awareness, captaincy, prioritisation, load shedding and decision making;

(d) rate of learning, enforced automaticity and the foundations of expertise;

(e) instructor professionalism, including interpersonal skills, implications of being a role-model, self-reflection and self-managed professional development;

(f) effective use of a course of training, curricula and syllabus and lesson plans;

(g) training and assessment standards;

(h) debriefing and feedback techniques;

(i) transfer of control (handover and takeover or follow-through) drills and procedures;

(j) principles of flight;

(k) crew resource management (CRM) principles;

(l) techniques for introducing tasks in manageable segments to avoid overloading a trainee and principles for integrating task segments;

(m) appropriate use of scenario-based training in flight instruction;

(n) application of risk management principles to emergency procedure simulations in flight;

(o) checklists for single-pilot or multi-crew operations as applicable;

(p) common student errors and suggested suitable remedial instruction;

(q) operational concept of threat and error management in relation to flight training in terms of:

  (i) managing threats;

  (ii) managing errors;

  (iii) managing undesired aircraft state;

(r) procedures and strategies for developing trainee threat and error management skills;

(s) task prioritisation system to assist the development of trainee task management skills in terms of:

  (i) aircraft control;

  (ii) navigation;

  (iii) communication;

(t) suitable procedures for making decisions in-flight and for developing trainee decision-making skills;

(u) goal fixation effects on good decision making;

(v) 3 types of stress likely to affect trainee performance and methods of assisting trainees to cope with stress:

  (i) physical;

  (ii) physiological;

  (iii) psychological;

(w) requirements for completing relevant documentation;

(x) principles, purpose and location of controls, monitoring devices, and systems;

(y) procedures to be followed in the event of an emergency.

## FIR4 *Reserved*

## FIR5 *Reserved*

## FIR6 *Reserved*

## FIR7 Conduct flight review

### 1 Unit description

This unit describes the skills and knowledge required to conduct a flight review and assess competency of a pilot to continue to use a flight crew licence or rating.

### 2 Elements and performance criteria

#### 2.1 FIR7.1 – Conduct pre-flight discussion

(a) pre-flight discussion plan is prepared that covers the topics required for the rating being reviewed;

(b) pre-flight discussion plan is delivered;

(c) opportunities to actively participate in the discussion are provided to the applicant;

(d) discussion is reviewed to determine whether the aims of the discussion were achieved.

#### 2.2 FIR7.2 – Conduct review

(a) flight review is conducted in accordance with flight review standards as specified in applicable regulations;

(b) assess the pilot’s performance against the standards specified in applicable regulations;

(c) remedial training for those elements performed below the specified standard is determined;

(d) remedial training is conducted where applicable.

#### 2.3 FIR7.3 – Complete post-review briefing and administration

(a) post-review briefing is conducted that includes assessment of the pilot's competence against the standards specified in published procedures;

(b) post-review administration is completed.

### 3 Range of variables

(a) activities are performed in accordance with published procedures;

(b) suitable flight review resources may include:

  (i) aircraft;

  (ii) facilities;

(c) environmental conditions may include:

  (i) weather;

  (ii) hazards and threats such as powerlines and masts;

  (iii) terrain;

(d) assessment of applicant's competence may include:

  (i) strengths;

  (ii) deficiencies;

  (iii) remedial actions;

  (iv) self-awareness and insight;

  (v) self-management.

**4 Underpinning knowledge of the following:**

(a) principles of instructions (see FIR 1, 2 and 3);

(b) relevant sections of Civil Aviation legislation;

(c) common risks that exist when conducting flight reviews;

(d) common problems that may occur when conducting flight reviews and appropriate action that should be taken in each case;

(e) assessment and workplace training competency standards;

(f) principles of adult teaching and learning;

(g) human performance and limitations factors relevant to the training tasks;

(h) psychological factors affecting satisfaction of human needs, defence mechanisms and stress management;

(i) relevant workplace policies and procedures;

(j) appropriate methods of analysis and training planning;

(k) lesson planning and development;

(l) preparation of training resources;

(m) principles of assessment;

(n) assessment of behaviour;

(o) self-assessment and evaluation;

(p) questioning techniques;

(q) requirements for completing relevant documentation.

## FIR8 *Reserved*

# FIR9 Multi-crew training endorsement

## 1 Unit description

This unit describes the skills and knowledge required to plan and conduct Multi-Crew Cooperation training courses.

## 2 Elements and performance criteria

### 2.1 FIR9.1 – Demonstrate knowledge of competency-based training as applied to multi-crew operations

(a) understands core philosophy of competency-based training;

(b) conducts training and assessment that is characterised by an emphasis on performance measured against identified competencies;

(c) assesses trainee on the basis meeting prescribed competency standards;

(d) states key competencies required by crew to operate effectively in a multi-crew operation.

### 2.2 FIR9.2 – Prepares to deliver training

(a) completes administrative tasks as per the training organisation's requirements and ensures;

(i) a training plan is prepared or provided, which identifies each performance criteria required to achieve the standard specified for the issue of an endorsement;

(ii) a trainee performance record is prepared or provided for recording trainee performance against all performance criteria;

(iii) an assessment guide is prepared or provided to assist the instructor in assessing trainee performance;

(iv) an achievement record is prepared or provided to record the date a trainee is signed off as competent in an particular competency element;

(b) completes personal preparation to deliver training session as scheduled;

(c) checks all training material supplied is complete and up-to-date and all equipment/classroom/simulator used to deliver training session is available and serviceable;

(d) reviews trainees records prior to training session to understand their experience level and competency level.

### 2.3 FIR9.3 – Prepares trainees for training session

(a) ensures trainees are not fatigued prior to commencing the training session;

(b) sets trainees tasks to prepare for training session;

(c) clearly communicates session objectives and required elements and performance criteria to meet the required level of competency for the session.

### 2.4 FIR9.4 – Conducts a multi-crew training session

(a) understands and applies the learning process;

(b) assesses trainee's performance against the performance criteria;

(c) uses role plays by trainees to gain insight to the roles of PF, and PM;

(d) structures training sessions that have outcomes that emphasises the importance of working as a highly coordinated team and applying problem solving to real world scenarios;

(e) ensures trainees are using all information available from a range of sources to assist with problem solving;

(f) emphasises non-technical skills rather than manipulative skills during exercises;

(g) uses scenarios to discuss how a breakdown in crew coordination may lead to an undesired aircraft state;

(h) strictly applies correct use of checklists and following SOP`s at all times and a high level of cockpit discipline;

(i) emphasises situational awareness and the importance of application of the TEM model;

(j) highlights effects of automation induced complacency;

(k) ensures trainees are continually aware of automation mode and its correct use and limitations;

(l) identifies to trainees the development of a compromised cockpit authority gradient;

(m) emphasises during periods of high workload and distraction that 1 trainee must be flying the plane at all times and not have attention diverted from this task;

(n) monitors trainees during session for signs of overload and breakdown in learning environment;

(o) ensures session is structured and paced to match differing trainees skill levels.

2.5 **FIR9.5 – Conducts post-session assessment**

(a) analyses trainee performance against the performance criteria performed in the session;

(b) debriefs trainees as a crew and then individually as required;

(c) debriefs trainee from a macro to micro perspective i.e. gives a general overview of performance then drills down to specific areas requiring attention to improve competency;

(d) provides a post-session plan of action for trainee to address areas requiring attention;

(e) completes debrief on a positive note highlighting areas of good performance.

2.6 **FIR9.6 – Post-session administration**

(a) completes trainee performance record in a comprehensive and legible manner;

(b) completes training performance record as soon as practicable after session and definitely before conducting another training session;

(c) determines if the trainee is competent in a particular competency element;

(d) achievement record is completed (when competency in a particular competency element has been achieved).

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) single trainee or small groups of trainees;

(c) cassroom or approved flight simulator;

(d) various SOPs and aircraft types;

(e) trainees from different cultures;

(f) sessions covering normal, abnormal and emergency operations.

**4 Underpinning knowledge of the following:**

(a) principles and methods of instruction;

(b) principles of competency based training in aviation;

(c) principles of effective interpersonal communication;

(d) cultural factors related to multi-crew operations.

# SIMULATOR INSTRUCTOR RATING

## SIR Conduct training in an approved flight simulation training device

### 1 Unit description

This unit describes the skills and knowledge required to plan and conduct practical flight training in an approved flight simulation training device (FSTD).

### 2 Elements and performance criteria

2.1 **SIR.1 – Plan a learning activity**

(a) the learning strategy and learning program are accessed, read and interpreted to determine learning outcomes or objectives to be met and relevant delivery requirements;

(b) limitations of the flight simulation training device are identified;

(c) completes administrative tasks according to the training organisation's requirements and ensures:

(i) a training plan is prepared or provided that identifies each performance criteria required to achieve the standard specified for an endorsement, rating or proficiency check;

(ii) a trainee performance record is prepared or provided for recording trainee performance against all performance criteria;

(iii) an assessment guide is prepared or provided to assist the instructor in assessing trainee performance;

(d) an achievement record is prepared or provided to record the date a trainee is signed off as competent in a particular competency element;

(e) technical and human factors requirements for the training environment, including safety and emergency procedures are confirmed.

2.2 **SIR.2 – Prepare trainee for training activities**

(a) availability of suitable resources is confirmed;

(b) ensures trainees are not fatigued prior to commencing the training session;

(c) an introduction to the training environment is provided, including training objectives and relevant workplace procedures;

(d) instructional relationships are established between trainer/facilitator and trainees using appropriate communication tools and skills;

(e) trainee is briefed on how the synthetic training activity will be conducted to meet the training objectives;

(f) risk management issues applicable to the training activity are discussed and the trainee's responsibility for managing relevant risks is confirmed;

(g) trainee's ability to comprehend and recall the training objectives, underpinning knowledge, handling techniques and planned training activity or scenario are confirmed.

2.3 **SIR3 – Guide and facilitate learning in a synthetic environment**

(a) liaison with relevant personnel is conducted to determine simulation activity requirements;

(b) learning is facilitated in accordance with the delivery plan using relevant flight simulation training device and facilitation skills;

(c) good practice in facilitating learning in a simulation training environment is demonstrated to ensure an effective and safe transfer of learning to the real world;

(d) technical issues are addressed where required using relevant technical support mechanisms and personnel;

(e) opportunities for authentic learning, practice and formative assessment are built into the learning experience;

(f) pre-loaded automatic demonstrations are employed where appropriate;

(g) abnormal and unusual conditions are monitored and addressed;

(h) variations to activity conditions are implemented where applicable;

(i) handover and takeover procedures for control of the synthetic device are implemented in accordance with workplace procedures;

(j) trainee performance is assessed against the performance criteria.

2.4 **SIR.4 – Monitor learning in a flight simulation training device environment**

(a) trainee progress is monitored and documented in accordance with workplace procedures;

(b) trainee's cognitive load is assessed, monitored and managed;

(c) support and guidance are provided as appropriate;

(d) trainee is encouraged to develop self-assessment skills;

(e) trainee interaction with others, and participation in training activities, are continuously monitored and interventions are made where appropriate;

(f) opportunities are provided for trainees to reflect on their learning progress;

(g) demonstrates the ability to:

(i) operate the functional controls of the instructor station;

(ii) operate the functional controls of the pilot station;

(iii) freeze the simulator;

(iv) reposition the simulator to a designated position in space.

2.5 **SIR.5 – Demonstrate a flight sequence**

(i) narrative coordinated with demonstration;

(ii) demonstrates smooth and accurate flying;

(iii) correct handover and takeover techniques are used;

(iv) demonstrate accurate fault analysis;

(v) correct instructional and testing techniques are used throughout exercise.

2.6 **SIR.6 – Conduct post-training activities**

(a) significant details of trainee's performance are clearly and accurately debriefed;

(b) completes trainee performance record in a comprehensive and legible manner;

(c) completes training performance record as soon as practicable after session and definitely before conducting another training session;

(d) determines if the trainee is competent in a particular competency element;

(e) achievement record is completed (when competency in a particular competency element has been achieved);

(f) playback devices are employed during debriefing to illustrate key learning points when appropriate;

(g) trainee is briefed on the details of the next training event as appropriate;

(h) trainee records are maintained in accordance with workplace procedures;

(i) relevant stakeholders are kept informed about trainee learning progress;

(j) synthetic device faults are recorded and rectified in accordance with workplace procedures;

(k) support and guidance are provided post-synthetic environment activities as appropriate.

2.7 **SIR.7 – Review synthetic environment facilitation processes**

(a) training session outcomes are evaluated against desired session outcomes;

(b) a review is undertaken post-completion of the learning program, course or qualification;

(c) time is taken to reflect on own performance as a trainer or facilitator, and ways to improve performance are explored;

(d) recommendations for improvements in facilitating training and appropriateness of synthetic systems, tools and resources are identified and documented, and discussed with relevant personnel for future action.

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) number of trainees;

(c) limitations of the approved flight simulation training device can include:
  (i) fidelity;
  (ii) movement;
  (iii) instrumentation;
  (iv) resolution;

(d) flight simulation training devices can include:
  (i) full motion simulator;
  (ii) flight training device;
  (iii) synthetic training device;
  (iv) virtual reality training system;
  (v) single, multiple or team operator simulator;
  (vi) simulator;
  (vii) part-task simulator;
  (viii) desktop simulator;
  (ix) operating system;
  (x) associated simulator computer hardware and software;

(e) risk management issues can include:
  (i) threat and error management;
  (ii) simulation motion sickness;
  (iii) equipment malfunction and failure;
  (iv) smoke or overheat warnings;
  (v) simulator access and egress;
  (vi) emergency communication;
  (vii) loading stops;
  (viii) motion stops;
  (ix) negative learning;
  (x) fidelity and resolution constraints/limitations;

(f) abnormal/unusual conditions can include:
  (i) hardware malfunction/failure;
  (ii) software malfunction/failure;
  (iii) simulation sickness;
  (iv) poor/unusual participant performance;
  (v) personnel equipment malfunction and failure;

(g) simulation sickness can include:
  (i) visuomotor dysfunctions;
  (ii) mental disorientation;
  (iii) nausea, including vomiting;
  (iv) other symptoms such as drowsiness, fatigue and headache.

**4 Underpinning knowledge of the following:**

(a) fundamentals of instructing, questioning, engaging and motivating trainees;

(b) IFR and VFR operations and procedures;

(c) effective use of a course of training, curricula/syllabus and lesson plans;

(d) training and assessment standards;

(e) debriefing and feedback techniques;

(f) techniques for introducing tasks in manageable segments to avoid overloading a trainee;

(g) common trainee errors and suggested suitable remedial instruction;

(h) intervention strategies, principles and implications for the synthetic environment;

(i) sequencing and developing synthetic training activities and their relationship with real-world training activities;

(j) the application of simulation and synthetic activities, including live, virtual and constructive (LVC) simulations;

(k) advantages and limitations of synthetic training environments in facilitating learning;

(l) information communication technology within the simulation and synthetic environment;

(m) established procedures applicable to simulation operations;

(n) abnormal conditions, including hardware, software and equipment malfunction and failure and poor or unusual trainee performance;

(o) human factors implication and risks in the synthetic training environment;

(p) the effects of simulation sickness;

(q) functions of single-user, multi-user and distributed user operating systems;

(r) documentation production and safe storage;

(s) technical knowledge sufficient to distinguish between a technical problem and a content problem and to respond accordingly;

(t) relevant learning management systems;

(u) structure and content of relevant training resources;

(v) handover and takeover procedures for the control of synthetic device(s).

# FLIGHT EXAMINER RATING

## FER Conduct a flight test

### 1 Unit description

This unit describes the skills and knowledge required to plan, conduct and administer a flight test in accordance with CASA requirements in an aircraft or flight simulator.

The content of this unit also applies to the skills and knowledge required to conduct and administer a proficiency check.

### 2 Elements and performance criteria

#### 2.1 FER.1 – Plan a flight test

(a) identify the flight test to be conducted and extract the flight test standards from the applicable section of Schedule 5 of the Part 61 Manual of Standards;

(b) confirm the applicant is eligible to sit the flight test;

(c) identify competency standards that must be assessed and plan methods of gathering evidence;

(d) plan evidence gathering activities to provide sufficient, reliable, valid and fair evidence of competency;

(e) ensure the flight test applicant's knowledge deficiency report has been completed and certified by the flight training operator;

(f) plan the KDR assessment when applicable.

#### 2.2 FER.2 – Prepare applicant for flight test

(a) confirm the identity of the applicant and ensure a recommendation for the flight test has been issued by the flight training operator;

(b) confirm that the applicant meets all the requirements for the issue of the licence and ratings being assessed;

(c) confirm underpinning knowledge specified for the unit of competency being assessed;

(d) conduct KDR assessment when applicable;

(e) explain and confirm the context, purpose and content of the flight test;

(f) explain and confirm the assessment procedure and expected performance requirements;

(g) explain and confirm the function of the flight examiner, including role-playing, simulation and procedures in the event of an actual emergency;

(h) identify and provide any special needs of the applicant, and any allowable adjustments are made to the assessment procedure;

(i) explain and confirm action to be taken by the flight examiner in the event of failure to achieve competency;

(j) convey information using language and interactive strategies and techniques to communicate effectively with the person being assessed.

#### 2.3 FER.3 – Conduct flight test

(a) correctly apply the flight test process in accordance with the relevant sections of the flight examiner manual;

(b) use clear, logical, systematic and unambiguous explanations to convey information to the applicant to ensure the effective conduct of the flight test;

(c) limit flight examiner intervention to ensuring effective conduct of the flight test and management of contingencies and abnormal or emergency situations;

(d) monitor and assess the applicant's performance and maintain a comprehensive record of events;

(e) ensure the safe completion of the flight test and maintain situational awareness.

2.4 **FER.4 – Make assessment decision**

(a) evaluate the evidence of the applicant's performance in terms of validity, authenticity, sufficiency, currency and consistent achievement of the specified standards;

(b) evaluate the evidence of the applicant's performance using a holistic procedure that ensures competency when conducting tasks, managing tasks and contingencies, operating in a flight environment and transferring skills and knowledge to new situations and contexts;

(c) make the assessment decision based on objective evaluation of the evidence against the specified standards.

2.5 **FER.5 – Conduct post-flight test briefing**

(a) advise the applicant of the achievement of competency, or failure to achieve competency;

(b) provide clear and constructive feedback about performance to the applicant using appropriate language and strategies, including guidance on further training if appropriate;

(c) explore opportunities for overcoming any gaps in competency as revealed by the assessment with the applicant;

(d) advise the applicant of the reassessment procedures and the appeals mechanism if the assessment decision is challenged.

2.6 **FER.6 – Conduct post-flight test briefing with training organisation**

Advise the trainer and training operator of the flight test result and the reasons for the outcome, including both positive and negative aspects of the applicant's performance and any information that could assist in improved training outcomes.

2.7 **FER.7 – Complete administrative requirements**

(a) complete the flight test application and appropriate flight test forms;

(b) complete the applicant's records;

(c) forward the flight test report, licence application form and notification of any ratings and endorsements that have been issued to CASA.

**3 Range of variables**

(a) activities are performed in accordance with published procedures;

(b) in an aircraft or an FSTD approved for the purpose;

(c) the aircraft or flight simulation training device must be appropriate for the purposes of the flight test endorsement;

(d) the conditions must be appropriate for the purposes of the licence rating or endorsement to which the flight test endorsement applies.

**4 Underpinning knowledge of the following:**

(a) Flight Examiners Handbook;

(b) assessment and workplace training competency standards;

(c) principles of adult teaching and learning;

(d) human performance and limitations factors relevant to the training tasks;

(e) psychological factors affecting satisfaction of human needs, defence mechanisms and stress management;

(f) relevant workplace policies and procedures;

(g) appropriate methods of analysis and training planning;

(h) principles of equity and occupational health and safety;

(i) lesson planning and development;

(j) preparation of training resources;

(k) principles of assessment;

(l) assessment of behaviour;

(m) questioning techniques;

(n) applicable subject matter;

(o) self-assessment and evaluation.

## FER-AEL Conduct a language proficiency assessment – *Reserved*