Schedule 2 Competency standards

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SECTION 1: ENGLISH LANGUAGE PROFICIENCY

GEL General English language proficiency

1 Unit description

This unit describes the general English language proficiency standard that applies to student pilots and recreational pilot licence (RPL) holders.

2 Elements and performance criteria

2.1 **GEL.1 – General communication**

2.1.1 The person is able to demonstrate her or his ability to do the following:

(a) pronounce words clearly, using an accent that does not cause difficulties in understanding;

(b) convey information in clearly structured sentences without confusion or ambiguity;

(c) use an extensive vocabulary to accurately communicate on general and technical topics, without excessive use of jargon, slang or colloquial language;

(d) speak fluently without long pauses, repetition or excessive false starts;

(e) respond to communications with actions that demonstrate that the information has been received and understood;

(f) exchange information clearly in a variety of situations with both expert and non-expert English speakers while giving and receiving timely and appropriate responses;

(g) use appropriate techniques such as questioning, non-verbal communication and paraphrasing to validate communications.

3 Range of variables

(a) oral and written communications;

(b) aviation technical learning environment and context;

(c) face-to-face situations.

4 Underpinning knowledge

No applicable areas.

5 Evidence required

5.1 **A person meets the standard for this unit if they provide the following evidence**

5.1.1 An assessment report, completed by a person authorised under Part 61 of CASR 1998 to perform general English language assessments, that states the candidate satisfies the general English language proficiency elements prescribed above.

5.1.2 One of the following:

(a) completed a course of secondary education conducted in an Australian or New Zealand educational institution;

(b) completed a course that is at least the equivalent of an Australian secondary education in an educational institution in a country where 1 of the principal mediums of instruction was English;

(c) is currently receiving secondary education in an Australian or New Zealand educational institution in which the principle language of instruction is English;

(d) has worked in Australia or New Zealand for at least 3 of the 5 years immediately before conducting a solo flight as a student pilot;

(e) has worked in 1 or more of the following countries for at least 3 of the 5 years immediately before conducting a flight as a student pilot:

(i) United Kingdom;

(ii) Republic of Ireland;

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(iii) United States of America;

(iv) New Zealand;

(v) Canada – providing that evidence of use of English language in the workplace is available;

(f) completed at least 1 of the following general English proficiency tests with the minimum grade specified for the test:

(i) the International English Language Testing System (IELTS) General or academic training module overall grade of 5.5, with no individual grade in a paper lower than 5;

(ii) the Test of English for International Communication (TOEIC-Secure Program Public Testing Centre) with grades not less than the following:

(A) 350 for listening;

(B) 300 for reading;

(C) 160 for speaking;

(D) 140 for writing;

(iii) the Test of English as a Foreign Language internet-based test (TOEFL IBT) with a grade of not less than 71;

(iv) the Test of English as a Foreign Language computer-based test (TOEFL CBT) with a Grade of not less than 197;

(v) the Test of English as a Foreign Language paper based test (TOEFL PB) with a grade of not less than 530.

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AEL Aviation English language proficiency

1 Unit description

This unit describes the minimum aviation English language proficiency required for the following:

(a) obtaining a flight crew licence, other than a recreational pilot licence;

(b) authorising a person to operate an aeronautical radio under CASR Part 64;

(c) obtaining recreational pilot licence endorsements.

A person may be assessed within a range of operational levels according to the standards in Section 2 of Schedule 8.

2 Elements and performance criteria

2.1 AEL.1 – Communicate effectively using English language

2.1.1 The person is able to communicate effectively in the following areas:

(a) pronunciation, stress, rhythm and intonation;

(b) grammatical structures and sentence patterns;

(c) vocabulary range and accuracy;

(d) paraphrasing;

(e) fluency;

(f) comprehension;

(g) interactions.

3 Range of variables

(a) oral and written communication in English;

(b) in flight or on the ground;

(c) in situations which include disruptions to communication normally encountered in the flight environment, including background noise levels equipment malfunctions and distractions;

(d) pre-recorded or actual aeronautical radio transmissions in more than 1 accent used to assess comprehension of basic aviation phraseology.

4 Underpinning knowledge of the following:

(a) standard phraseology used in aviation communications;

(b) the structure of the English language sufficient to comprehend written text and be able to maintain general conversation.

5 Evidence required

A report issued by a person authorised to conduct an assessment of aviation English language proficiency that states a minimum ICAO English language proficiency Level 4.

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SECTION 2: COMMON STANDARDS

C1 Communicating in the aviation environment

1 Unit description

This unit describes the standards for communicating effectively that apply to flight crew using aeronautical radios for the purposes of safely conducting flight operations.

2 Elements and performance criteria

2.1 C1.1 – Communicating face-to-face

2.1.1 The person is able to communicate effectively in general English as follows:

(a) pronounces words clearly, using an accent that does not cause difficulties in understanding;

(b) conveys information in clearly structured sentences without confusion or ambiguity;

(c) uses an extensive vocabulary to accurately communicate on general and technical topics, without excessive use of jargon, slang or colloquial language;

(d) speaks fluently without long pauses, repetition or excessive false starts;

(e) responds to communications with actions that demonstrate that the information has been received and understood;

(f) exchanges information clearly in a variety of situations with both expert and non-expert English speakers while giving and receiving timely and appropriate responses;

(g) uses appropriate techniques to validate communications.

2.2 C1.2 – Operational communication using an aeronautical radio

2.2.1 The person must be able to demonstrate her or his ability to communicate adequately for the purpose of conducting flying operations safely as follows:

(a) maintain effective communication with others on operational matters;

(b) communicate effectively in unfamiliar, stressful or non-standard situations;

(c) apply the phonetic alphabet;

(d) transmit numbers;

(e) make appropriate transmissions using standard aviation phraseology;

(f) use plain English effectively when standard phraseology is inadequate;

(g) receive appropriate responses to transmissions;

(h) respond to transmissions and take appropriate action;

(i) recognise and manage communication errors and misunderstandings effectively;

(j) seek clarification in the time available if a message is unclear or uncertainty exists;

(k) react appropriately to a variety of regional accents;

(l) communicate effectively in unexpected, stressful or non-standard situations using standard phraseology or plan English.

3 Range of variables

(a) limited background noise associated with a typical work environment;

(b) aircraft environment in a routine operational setting;

(c) simulated conditions can be used;

(d) disruptions to normal communication patterns that might be encountered in an operational situation, including background noise, equipment malfunctions and other distractions.

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4 Underpinning knowledge of the following:

(a) basic radiotelephony phraseology specified in the aeronautical information package (AIP) for visual flight rules (VFR) operations;

(b) common aviation terminology.

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C2 Perform pre- and post-flight actions and procedures

1 Unit description

This unit describes the skills and knowledge required for a person to conduct pre- and post-flight actions and procedures for an aircraft of the applicable category, class or type.

2 Elements and performance criteria

2.1 C2.1 – Pre-flight actions and procedures

(a) complete all required pre-flight administration documentation;

(b) obtain, interpret and apply information contained in the required pre-flight operational documentation, including to the following:

(i) minimum equipment list (MEL);

(ii) maintenance release;

(iii) weather forecasts;

(iv) local observations;

(v) Notice to Airmen (NOTAM);

(vi) global navigation satellite system (GNSS) receiver autonomous integrity monitoring (RAIM) information;

(vii) En Route Supplement Australia (ERSA);

(viii) Aeronautical Information Package (AIP);

(c) identify special aerodrome procedures;

(d) identify all relevant radio and navigation aid facilities to be used during the flight (if applicable);

(e) determine the suitability of the current and forecast weather conditions for the proposed flight;

(f) using the aircraft documents, calculate the following for a given set of environmental and operational conditions:

(i) weight and balance;

(ii) in-ground and out-of-ground effect hover performance (rotorcraft only);

(iii) take-off and landing performance;

(iv) fuel requirements;

(g) determine whether the aircraft is serviceable for the proposed flight.

2.2 C2.2 – Perform pre-fight inspection

This element is not applicable when the training or assessment activity is being conducted in an FSTD that is approved for the training or assessment purpose.

(a) identify and secure equipment and documentation that is required for the flight;

(b) complete an internal and external check of the aircraft;

(c) identify all defects or damage to the aircraft;

(d) report to, and seek advice from, qualified personnel to determine the action required in relation to any identified defects or damage;

(e) ensure all aircraft locking and securing devices, covers and bungs are removed and stowed securely;

(f) certify the aircraft flight technical log entering any defects or endorsements to permissible unserviceabilities as appropriate;

(g) complete and certify the daily inspection (if authorised to do so).

2.3 C2.3 – Post-flight actions and procedures

(a) shut down aircraft;

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(b) conduct post-flight inspection and secure the aircraft (if applicable);

(c) complete all required post-flight administration documentation.

3 Range of variables

(a) an aircraft of the specified aircraft category;

(b) any class or type of aircraft within that aircraft category;

(c) activities are performed in accordance with published procedures

(d) alternatively, competency is demonstrated in an FSTD that is approved for the purpose.

4 Underpinning knowledge of the following:

(a) standard operating procedures for the category, and class or type of aircraft and the operator;

(b) fuel requirements for day VFR flight operation;

(c) MEL;

(d) airworthiness requirements applicable to the aircraft category, and class or type;

(e) local weather patterns;

(f) local aerodrome requirements.

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C3 Operate aeronautical radio

1 Unit description

This unit describes the skills and knowledge required for a person to operate radiotelephone and intercom equipment under normal and emergency conditions.

2 Elements and performance criteria

2.1 C3.1 – Operate radio equipment

(a) confirm serviceability of radio equipment;

(b) conduct transmission and receipt of radio communications using appropriate procedures and phraseology;

(c) maintain a listening watch and respond appropriately to applicable transmissions;

(d) conduct appropriate emergency and urgency transmissions.

2.2 C3.2 – Manage R/T equipment malfunctions

(a) perform radio failure procedures;

(b) use fault finding procedures and perform corrective actions.

2.3 C3.3 – Operate transponder

(a) operate a transponder during normal, abnormal and emergency operations;

(b) recall transponder emergency codes.

3 Range of variables

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

(b) aircraft fitted with a common radio system and transponder;

(c) VFR procedures.

4 Underpinning knowledge of the following:

(a) the phonetic alphabet;

(b) documented radio procedures relevant to the VFR;

(c) the components of an aeronautical radio system:

(i) power source or battery switch, radio master, microphone;

(ii) transmitter;

(iii) receiver;

(iv) antenna;

(v) location of aerial antennas in buildings (except aircrew);

(vi) headphones and speaker;

(vii) the procedures for using an aeronautical radio system;

(viii) setting up an aeronautical radio (except aircrew);

(ix) use of radio transmit and receive selector switches (VHF, HF, I/C, PA);

(x) turning a radio on and off;

(xi) selecting correct frequencies;

(xii) use of squelch control;

(xiii) correct use of a microphone;

(d) characteristics of radio waves, wave propagation, transmission and reception (except aircrew):

(i) radio frequency band ranges (MF, HF, VHF, UHF);

(ii) properties of radio waves;

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(iii) propagation of paths of radio waves:
(A) ground waves;
(B) sky waves;
(iv) factors affecting the propagation of radio waves:
(A) terrain;
(B) Ionosphere;
(C) sun spot activity;
(D) interference from electrical equipment;
(E) thunderstorms;
(F) power attenuation;
(v) radio antennas:
(A) characteristics of antennas;
(B) use of antennas;

(e) the responsibilities of an aeronautical radio operator (except aircrew) for the following:
(i) secrecy of communications;
(ii) unauthorised transmissions;

(f) light signals, including interpretation and actions required.

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C4 Manage fuel

1 Unit description

This unit describes the skills and knowledge required to effectively manage fuel for an aircraft operation.

2 Elements and performance criteria

2.1 **C4.1 – Plan fuel requirements**

(a) determine the required fuel reserves;

(b) determine the quantity of fuel required taking into account operational requirements and relevant abnormal or emergency conditions and contingencies;

(c) determine the total fuel required for the flight.

2.2 **C4.2 – Manage fuel system**

(a) verify fuel quantity on-board aircraft prior to flight using 2 independent methods;

(b) ensure the fuel caps are secured;

(c) perform fuel quality check prior to flight;

(d) ensure fuel drain cocks are closed;

(e) monitor fuel usage during the flight;

(f) accurately maintain fuel log;

(g) calculate and state endurance at any point during flight;

(h) perform fuel tank changes correctly;

(i) maintain fuel load within aircraft limits;

(j) operate the fuel cross-feed system correctly (if fitted);

(k) operate fuel pumps and engine controls correctly;

(l) except for RPL and PPL, configure the aircraft correctly to achieve best range performance and correctly calculate the revised range of operation;

(m) configure the aircraft correctly to achieve best endurance performance and correctly calculate the revised operational endurance.

2.3 **C4.3 – Refuel aircraft**

(a) identify the correct type of fuel to be used;

(b) ensure aircraft is earthed prior to refuelling and defueling operations;

(c) correctly load and unload fuel;

(d) ensure required fuel quantity is loaded;

(e) ensure fuel caps are closed and secured after fuelling operations;

(f) perform fuel quality checks.

3 Range of variables

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

(b) aircraft of the applicable category;

(c) VFR.

4 Underpinning knowledge of the following:

(a) minimum fuel requirements for day VFR operations;

(b) fuel sources and fuel grades, including methods for identifying difference grades;

(c) methods of verifying the quantity of fuel on board an aircraft;

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(d) fire extinguishers that can be used for fuel-related fires, including requirements and how to use them in the event of a fire;

(e) location of refuelling places;

(f) limitations on using drum stock fuel;

(g) health and safety requirements applicable to fuelling operations;

(h) variations to planned fuel consumption.

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C5 Manage passengers and cargo

1 Unit description

This unit describes the skills and knowledge required to ensure the following:

(a) passengers are safe, informed and controlled;

(b) provision is made for passenger comfort and wellbeing;

(c) cargo is managed.

2 Elements and performance criteria

2.1 C5.1 – Manage passengers

(a) supervise passenger safety;

(b) encourage passengers to participate in and contribute to the safe outcome of the flight;

(c) conduct pre-flight passenger safety briefing;

(d) ensure passengers are aware of, and avoid interference with, flight and systems controls;

(e) ensure passengers are aware of, and comply with, the use of seat harnesses;

(f) ensure passengers are aware of the use of escape hatches, exits and emergency equipment on board the aircraft;

(g) manage passenger safety in the event of abnormal or in-flight emergency situations.

2.2 C5.2 – Aid and assist passengers

(a) establish and maintain clear communications with passengers;

(b) assist with passenger comfort both when airside and in flight.

2.3 C5.3 – Manage cargo

(a) manage loading, unloading and security of cargo during flight operations;

(b) identify dangerous goods and apply procedures to ensure safety and security.

3 Range of variables

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

(b) single or multi-engine aircraft;

(c) propeller wash, rotor wash and jet blast (may be simulated);

(d) simulated abnormal or emergency situations;

(e) real or simulated passengers and cargo.

4 Underpinning knowledge of the following:

(a) managing passengers during abnormal or emergency situations;

(b) local procedures for movement of passengers;

(c) security requirements;

(d) dangerous goods awareness;

(e) health and safety regulations and best practice.

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NTS1 Non-technical skills 1

1 Unit description

This unit describes the knowledge and skills required to manage a safe flight.

2 Elements and performance criteria

2.1 NTS1.1 – Maintain effective lookout

(a) maintain traffic separation using a systematic visual scan technique at a rate determined by traffic density, visibility and terrain;

(b) maintain radio listening watch and interpret transmissions to determine traffic location and intentions;

(c) perform airspace-cleared procedure before commencing any manoeuvre.

2.2 NTS1.2 – Maintain situational awareness

(a) monitor all aircraft systems using a systematic scan technique;

(b) collect information to facilitate ongoing system management;

(c) monitor flight environment for deviations from planned operations;

(d) collect flight environment information to update planned operations.

2.3 NTS1.3 – Assess situations and make decisions

(a) identify problems;

(b) analyse problems;

(c) identify solutions;

(d) assess solutions and risks;

(e) decide on a course of action;

(f) communicate plans of action (if appropriate);

(g) allocate tasks for action (if appropriate);

(h) take actions to achieve optimum outcomes for the operation;

(i) monitor progress against plan;

(j) re-evaluate plan to achieve optimum outcomes.

2.4 NTS1.4 – Set priorities and manage tasks

(a) organise workload and priorities to ensure optimum outcome of the flight;

(b) plan events and tasks to occur sequentially;

(c) anticipate events and tasks to ensure sufficient opportunity for completion;

(d) use technology to reduce workload and improve cognitive and manipulative activities.

2.5 NTS1.5 – Maintain effective communications and interpersonal relationships

(a) establish and maintain effective and efficient communications and interpersonal relationships with all stakeholders to ensure the optimum outcome of the flight;

(b) define and explain objectives to stakeholders;

(c) demonstrate a level of assertiveness that ensures the optimum completion of the flight.

3 Range of variables

(a) simulated conditions may be used where appropriate.

4 Underpinning knowledge of the following:

(a) effective communication under normal and non-normal circumstances;

(b) task management.

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NTS2 Non-technical skills 2

1 Unit description

This unit describes the knowledge and skills required to recognise, direct and manage threats and errors during flight operations.

2 Elements and performance criteria

2.1 NTS2.1 – Recognise and manage threats

(a) identify relevant environmental or operational threats that are likely to affect the safety of the flight;

(b) identify when competing priorities and demands may represent a threat to the safety of the flight;

(c) develop and implement countermeasures to manage threats;

(d) monitor and assess flight progress to ensure a safe outcome, or modify actions when a safe outcome is not assured.

2.2 NTS2.2 – Recognise and manage errors

(a) apply checklists and standard operating procedures to prevent aircraft handling, procedural or communication errors;

(b) identify committed errors before safety is affected or the aircraft enters an undesired state;

(c) monitor the following to collect and analyse information to identify potential or actual errors:

(i) aircraft systems using a systematic scan technique;

(ii) the flight environment;

(iii) other crew;

(d) implement countermeasures to prevent errors or take action in the time available to correct errors before the aircraft enters an undesired state.

2.3 NTS2.3 – Recognise and manage undesired aircraft state

(a) recognise an undesired aircraft state;

(b) prioritise tasks to ensure an undesired aircraft state is managed effectively;

(c) apply corrective actions to recover an undesired aircraft state in a safe and timely manner.

3 Range of variables

(a) Reserved;

(b) simulated conditions may be used where appropriate.

4 Underpinning knowledge of the following:

(a) effective communication under normal and non-normal circumstances;

(b) threat and error management detailing processes that can be used to identify and mitigate or control threats and errors;

(c) the application of situational awareness to identifying real or potential environmental or operational threats to flight safety;

(d) developing and implementing plans of action for the following:

(i) removing and mitigating threats;

(ii) removing and mitigating errors;

(e) undesired aircraft states, including prevention, identifying and controlling;

(f) how an undesired aircraft state can develop from an unmanaged threat or error;

(g) what aspects of multi-crew operations (if applicable) can prevent an undesired aircraft state;

(h) use of checklists and standard operating procedures to prevent errors.

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(i) task management, including:
  (i) workload organisation and priority setting to ensure optimum safe outcome of the flight;
  (ii) event planning to occur in a logical and sequential manner;
  (iii) anticipating events to ensure sufficient opportunity is available for completion;
  (iv) using technology to reduce workload and improve cognitive and manipulative activities;
  (v) task prioritisation and protection whilst filtering and managing real time information.

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MCO Manage flight during multi-crew operations

1 Unit description

This unit describes the skills, knowledge and behaviours required to plan, direct and control all aspects of a flight in a multi-crew environment as pilot in command or crew member.

2 Elements and performance criteria

2.1 MCO.1 – Operate effectively as a crew member

(a) utilise standard operating procedures (SOP) and phraseology to conduct and manage flight;

(b) ensure crew members are aware of changes when operating aircraft systems;

(c) ensure changes to responsibility for flying aircraft are clearly stated;

(d) listen critically and request clarification when necessary;

(e) apply assertive strategies when working with others;

(f) present ideas in a way that shows respect for others;

(g) verbalise observations in a calm and concise manner;

(h) consider the condition (ability) of other crew members to perform crew duties;

(i) monitor and appraise crew members' performance;

(j) interact with crew members in a supportive and constructive way;

(k) assist other crew members to manage workload;

(l) motivate and support other crew members;

(m) identify the signs, stages and possible causes of stress and conflict;

(n) apply strategies to manage stress and conflict;

(o) ensure pilot flying manages and monitors flight path;

(p) manage distractions and interruptions to cockpit activities.

2.2 MCO.2 – Demonstrate effective leadership and authority

(a) conduct briefings to share common plan and set priorities;

(b) ensure crew members are aware of their role and responsibilities throughout a flight;

(c) establish an atmosphere to encourage open communications;

(d) manage flight deck gradient relative to task;

(e) identify and manage threats and errors;

(f) maintain crew member motivation and commitment to task;

(g) monitor the effectiveness of crew performance;

(h) correct crew member deviations from standards;

(i) set realistic performance standards;

(j) monitor outcomes, and evaluate performance;

(k) collect information and identify key issues and relationships relative to achieving determined roles;

(l) break down tasks and establish courses of action to accomplish specified goals;

(m) encourage monitoring of performance by other crew members;

(n) allocate sufficient resources and time to complete workload;

(o) maintain patience and focus when processing large amounts of data or multiple tasks;

(p) identify when crew members become ineffective or incapacitated;

(q) manage time and resources to ensure that work is completed safely and effectively;

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(r) ensure responsibility for flight path management is always assigned;

(s) take action to resolve crew member confusion.

2.3 **MCO.3 – Maintain situational awareness**

(a) actively monitor flight path, aircraft configuration and systems to achieve desired performance using a systematic scan technique;

(b) advise pilot flying of deviations from planned operations;

(c) utilise available resources to collect flight environment information and modify planned operations when required;

(d) analyse aircraft systems and flight environment information to identify actual and potential threats or errors;

(e) cross-check the actions of other crew members.

2.4 **MCO.4 – Make effective decisions**

(a) identify problems and their associated causal factors and review them with other crew members;

(b) break down systematically and logically problems or processes into component parts;

(c) employ analytical techniques to identify solutions and consider the value and implications of each;

(d) generate, in the time available, solutions with crew members;

(e) assess alternative solutions and risks with other crew members;

(f) decide on a course of action and address crew member concerns;

(g) communicate plans of action and direct crew members to complete specified tasks;

(h) take actions to achieve optimum outcomes for the operation;

(i) monitor progress against agreed plan;

(j) evaluate decisions in line with changing circumstances;

(k) decision making is improvement-focused and directed towards achieving optimum outcomes.

3 Range of variables

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

(b) operations may be VFR or IFR;

(c) approved flight simulation training device or aircraft;

(d) normal and simulated non-normal flight and ground operations;

(e) simulated hazardous weather conditions;

(f) simulated interaction involving ground and ATC personnel relevant to aviation activities.

4 Underpinning knowledge of the following:

(a) the topics mentioned in Unit 1.6.3, ATPL human factors in Schedule 3 of this MOS;

(b) threat and error management (TEM) principles, with particular emphasis on multi-crew operations.

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SECTION 3 NAVIGATION AND INSTRUMENT FLYING STANDARDS

NAV Navigate aircraft

1 Unit description

This unit describes the knowledge and skills required to plan and conduct a flight from a departure aerodrome to a destination aerodrome, or an alternate aerodrome, and navigating the aircraft under the applicable flight rules. This includes pre-flight planning, compliance with airspace, departure and arrival procedures, and navigation under normal and abnormal conditions.

2 Elements and performance criteria

2.1 NAV.1 – Prepare documents and flight plan

(a) select and prepare appropriate navigation charts for the intended flight;

(b) select a suitable route and altitude considering weather, terrain, airspace, NOTAMs and alternate landing areas;

(c) obtain and interpret meteorological forecasts, NOTAMs and operational information applicable to the planned flight;

(d) determine whether the planned flight can be conducted under the applicable flight rules and taking account of the beginning and end of daylight times;

(e) except for the RPL navigation endorsement and the PPL, calculate and document critical point (CP) and point of no return (PNR) locations;

(f) complete a flight plan to the planned destination and alternates;

(g) lodge suitable flight notification for search and rescue (SAR) purposes.

2.2 NAV.2 – Comply with airspace procedures while navigating

(a) identify airspace restrictions and dimensions applicable to the flight;

(b) obtain and comply with air traffic clearances, if applicable;

(c) comply with airspace procedures applicable to the airspace classification throughout the flight.

2.3 NAV.3 – Conduct departure procedures

(a) organise cockpit to ensure charts, documentation and navigational calculator are accessible from the control seat;

(b) comply with all departure procedures, clearances and noise abatement requirements;

(c) establish planned track on departure within 5 nm of airfield or apply alternative procedure if required;

(d) calculate estimated time of arrival (ETA) for first waypoint.

2.4 NAV.4 – Navigate aircraft en route

(a) maintain a navigation cycle that ensures accurate tracking, and apply track correctional techniques to re-establish track prior to waypoint or destination;

(b) maintain heading to achieve a nominated track;

(c) maintain and revise ETAs (±2 minutes) for waypoint or destination;

(d) maintain track in accordance with published flight path tolerances in controlled airspace;

(e) navigate using accepted map-reading techniques;

(f) maintain navigation and fuel log to monitor tracking, ETAs and fuel status;

(g) use appropriate techniques to obtain a positive fix at suitable intervals;

(h) maintain awareness of route, en route terrain, en route and destination weather, and react appropriately to changing weather conditions;

(i) perform pre-descent and turning point checks;

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(j) maintain appropriate radio communication and listening watch with ATS and other aircraft if radio is fitted and used;

(k) configure the aircraft as required for the following environmental and operational conditions:

(i) turbulence;

(ii) holding;

(iii) maximum range;

(l) maintain awareness of search and rescue times (SARTIME) and revise as required;

(m) monitor aircraft systems, manage fuel and engine to ensure aircraft is operated to achieve flight plan objectives.

2.5 **NAV.5 – Navigate at low level and in reduced visibility**

(a) configure the aircraft as required for the following environmental and operational conditions:

(i) reduced visibility;

(ii) low cloud base;

(b) navigate aeroplane at minimum heights (not below 500 ft AGL, clear of built-up areas) and remain in VMC;

(c) maintain separation from terrain, obstacles, allowing for wind and turbulence at low level;

(d) avoid noise sensitive areas;

(e) operate appropriately in the vicinity of aerodromes and landing areas.

2.6 **NAV.6 – Perform lost procedure**

(a) acknowledge positional uncertainty in a timely manner;

(b) configure aircraft for range and endurance as required;

(c) apply recognised method to re-establish aircraft position;

(d) fix position;

(e) use radio to request assistance, if applicable;

(f) plan a timely precautionary search and landing if unable to complete flight safely to suitable aerodrome.

2.7 **NAV.7 – Perform diversion procedure**

(a) make timely decision to divert;

(b) identify an acceptable alternate aerodrome;

(c) select a suitable route and cruising level;

(d) revise flight plan considering weather, terrain, airspace and fuel available;

(e) advise ATS of an intention to divert.

2.8 **NAV.8 – Use instrument navigation systems**

(a) initialise navigation system (as applicable);

(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) navigate on departure, en route and on arrival using GNSS;

(f) operate instrument navigation systems correctly;

(g) use instrument navigation systems to assist with navigation;

(h) confirm waypoints and fixes using instrument navigation systems.

2.9 **NAV.9 – Execute arrival procedures**

(a) obtain updated relevant aerodrome information;

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(b) determine landing direction and aerodrome suitability;

(c) conduct arrival;

(d) identify and avoid all traffic;

(e) observe local and published noise abatement requirements and curfews;

(f) cancel SARWATCH.

3 Range of variables

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

(b) different terrain;

(c) applicable airspace procedures;

(d) simulated weather conditions.

4 Underpinning knowledge of the following:

(a) basic GNSS principles;

(b) en route GNSS navigation principles;

(c) dead-reckoning navigation;

(d) navigate in featureless terrain and extended over-water flights;

(e) diversion considerations and procedures;

(f) maximum payload and minimum fuel operations.

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RNE Radio navigation – en route

1 Unit description

This unit describes the skills and knowledge required to navigate an aircraft using radio navigation aids and systems.

2 Elements and performance criteria

2.1 RNE.1 – Operate and monitor radio navigation aids and systems

(a) select and operate navigation aids and systems;

(b) monitor and take appropriate action in relation to the integrity of navigation aid systems information.

2.2 RNE.2 – Navigate the aircraft using navigation aids and systems

(a) determine aircraft position fix solely with reference to navigation aids and systems;

(b) intercept tracks to and from navigation aids and systems;

(c) maintain tracks within specified tolerances;

(d) record, assess and revise timings as required;

(e) recognise station passage.

3 Range of variables

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

(b) in an aircraft or an approved flight simulation training device;

(c) azimuth and course deviation indicator display systems.

4 Underpinning knowledge of the following:

(a) tracking tolerances for radio navigation and GNSS aids;

(b) for non-directional beacon (NDB):

(i) effects of coastal refraction, night error, thunderstorms, mountainous areas, types of terrain and altitude of aircraft on NDB indications or range;

(ii) methods of selecting and using the most appropriate NDB for tracking during navigation;

(iii) NDB tracking techniques, procedures and limitations;

(iv) procedures for sector entry and holding using the NDB;

(c) for VOR:

(i) VOR instrument settings required to provide command indications when flying on given tracks both to and from the VOR;

(ii) VOR tracking techniques, procedures and limitations;

(iii) procedures for sector entry and holding using the VOR;

(d) for global navigation satellite system (GNSS):

(i) principles of operation, performance limitations and errors of a GNSS system;

(ii) methods of position fixing using a GNSS system;

(iii) GNSS operating procedures which provide safeguards against navigational error and loss of situational awareness;

(iv) GNSS operating procedures for typical navigational tasks using a specific type of aircraft equipment;

(v) indications of waypoint passage;

(vi) GNSS operational and serviceability checks;

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

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

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(e) PBN specifications and requirements:

(i) applicable navigation specifications for various airspace operations;

(ii) RNP tracking tolerances;

(iii) APV Baro – NAV;

(iv) radius to fix path terminators on RF legs;

(v) equipment requirements;

(vi) system performance, monitoring and alert requirements;

(vii) circumstances in which a GNSS sensor is a primary RNP requirement.

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IFF Full instrument panel manoeuvres

1 Unit description

This unit describes the skills and knowledge required to perform normal flight manoeuvres using the full instrument panel.

2 Elements and performance criteria

2.1 IFF.1 – Determine and monitor the serviceability of flight instruments and instrument power sources

(a) determine serviceability of flight and navigational instruments;

(b) perform functional checks of flight and navigational instruments where applicable prior to take-off;

(c) monitor flight instrument and instrument power sources and react to any warnings, unserviceability or erroneous indications.

2.2 IFF.2 – Perform manoeuvres using full instrument panel

(a) interpret flight instrument indications and apply procedures and techniques to achieve and maintain a specified flight path using the aircraft's full instrument panel;

(b) except for RPL, set and maintain power and attitude by reference to the full instrument panel to achieve the following:

(i) straight and level performance during normal cruise within the flight tolerances;

(ii) nominated climb performance within the flight tolerances;

(iii) descent performance within the flight tolerances;

(c) set and maintain power and attitude by reference to the full instrument panel to establish a rate 1 turn onto a nominated heading within the flight tolerances.

2.3 IFF.3 – Recover from upset situations and unusual attitudes

(a) correctly identify upset situations and unusual attitudes under simulated IMC;

(b) recover to controlled flight from upset situations and unusual attitudes under simulated IMC from any combination of the following aircraft states:

(i) high and low-nose attitudes;

(ii) varying angles of bank;

(iii) various power settings;

(iv) various aircraft configurations;

(v) unbalanced flight.

3 Range of variables

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

(b) day VFR in variable weather conditions;

(c) for RPL, PPL, CPL licence and multi-engine aeroplane class rating training and assessment, day VFR simulated inadvertent entry into IMC with a level 180^{o} turn to re-establish visual flight;

(d) VMC with simulated IMC;

(e) IMC if conducted in a synthetic flight simulator device;

(f) fitted flight instruments that are suitable for full panel instrument flight.

4 Underpinning knowledge of the following:

(a) scan technique appropriate to fitted flight instruments and phase of flight;

(b) attitude and power requirements to achieve specified flight profiles;

(c) instrument failure and warning systems fitted to the aeroplane.

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IFL Limited instrument panel manoeuvres

1 Unit description

This unit describes the skills and knowledge required to perform normal flight manoeuvres and recover from unusual attitudes in each of the following non-normal situations:

(a) without reference to the primary attitude indicator or display;

(b) without reference to the primary heading indicator or display;

(c) without reference to reliable airspeed indications.

2 Elements and performance criteria

2.1 IFL.1 – Recognise failure of attitude indicator and stabilised heading indicator

(a) monitor flight instruments and instrument power sources and recognise warning indicators or erroneous instrument indications;

(b) transition from a full instrument panel to a limited instrument panel.

2.2 IFL.2 – Perform manoeuvres – limited panel

(a) interpret and respond appropriately to instrument indications;

(b) apply power and attitude settings to achieve straight and level performance during:

(i) normal cruise;

(ii) in an aeroplane-approach configuration with flaps (when fitted) and undercarriage down;

(iii) in a helicopter at minimum power for level flight speed;

(c) apply power and attitude settings to achieve:

(i) nominated climb performance;

(ii) nominated descent performance;

(iii) during climb, descent and straight and level flight, rate 1 turns onto a nominated heading;

(d) trim (as applicable) and balance aircraft;

(e) establish level flight at a nominated altitude, from a climb or descent during straight or turning flight.

2.3 IFL.3 – Recover from upset situations and unusual attitudes – limited panel

(a) correctly identify upset situations and unusual attitudes under simulated IMC;

(b) recover to stabilised straight and level flight using approved techniques from upset situations and unusual attitudes under simulated IMC from any combination of the following aircraft states:

(i) high and low-nose attitudes;

(ii) varying angles of bank;

(iii) various power settings;

(iv) various aircraft configurations;

(v) unbalanced flight.

2.4 IFL.4 – Re-establish visual flight

(a) transition from visual flight conditions to instrument flight conditions while maintaining control of the aircraft;

(b) perform a manoeuvre to re-establish visual flight;

(c) implement a plan that ensures the flight continues in VMC.

3 Range of variables

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

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(b) single-engine or multi-engine aircraft or approved flight simulation training device;

(c) manually flown in single-pilot or multi-crew operations;

(d) simulated IMC conditions;

(e) up to and including light turbulence.

4 Underpinning knowledge of the following:

(a) scan technique appropriate to fitted flight instruments and phase of flight (without attitude or stabilised heading indicators);

(b) performance instrument indications and power requirements to achieve specified flight profiles;

(c) anti-icing and de-icing controls and switches fitted to the aircraft type, and when these systems should be operated;

(d) instrument failure and warning systems fitted to the aircraft;

(e) the safety risks associated with application of large or rapid control inputs in more than 1 axis simultaneously.

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CAS Operate airborne collision avoidance systems (ACAS)

1 Unit description

This unit prescribes the standards required to operate an ACAS while conducting a flight operation.

2 Elements and performance criteria

2.1 CAS.1 – ACAS pre-flight check

(a) complete a pre-flight check of ACAS equipment;

(b) determine the serviceability status of the equipment.

2.2 CAS.2 – ACAS operating mode

(a) select the correct operating mode of an ACAS;

(b) determine when the ACAS is operating normally.

2.3 CAS.3 – Respond to Traffic Advisory (TA)

(a) recognise a TA;

(b) interpret TA information correctly to determine bearing and range and vertical displacement of displayed traffic;

(c) make no change to flight path based solely on information displayed by ACAS;

(d) apply right of way rules with visual acquisition of traffic or maintain safe separation.

2.4 CAS.4 – Respond to Resolution Advisory (RA)

(a) recognise an RA, at typical cruise altitudes and below 10,000 ft;

(b) apply positive control inputs as required within 5 seconds of RA notification;

(c) notify ATC when vertical speed established;

(d) apply correct control inputs within 2.5 seconds to modify vertical speed with changes in RA guidance;

(e) recognise altitude crossing encounters where applicable;

(f) manage aircraft performance to avoid aircraft upset condition;

(g) notify ATC when clear of conflict once aircraft safety is assured and flight path resumed.

3 Range of variables

(a) in an FSTD or interactive computer-based training (CBT) with ACAS display and controls similar to those used to operate an aircraft;

(b) activities are performed in accordance with published procedures.

4 Underpinning knowledge of the following:

(a) principles of the TCAS system and operation;

(b) the ATPL general knowledge standards in Schedule 3 of the Part 61 Manual of Standards relevant to this unit.

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CTR Operate at a controlled aerodrome

1 Unit description

This unit describes the skills and knowledge required to operate an aircraft to and from a controlled aerodrome.

2 Elements and performance criteria

2.1 CTR.1 – Controlled aerodrome pre-flight preparation

(a) using a current ERSA and NOTAM, for the controlled aerodrome, extract all the relevant operational information;

(b) interpret the extracted information;

(c) identify all special aerodrome procedures;

(d) check current weather forecast and local observations;

(e) identify all relevant radio and navigation aid frequencies.

2.2 CTR.2 – Taxi aircraft at a controlled aerodrome

(a) obtain and comply with ATC clearances;

(b) manoeuvre aircraft to holding point as instructed and take appropriate action to avoid other aircraft and obstructions;

(c) recognise ground markings during taxi and take appropriate action;

(d) recognise lighting signals and take appropriate action;

(e) identify airport runway incursion hotspots;

(f) manoeuvre aircraft to avoid jet blast hazard;

(g) request taxi guidance if unsure of position;

(h) use strobes when crossing any runway.

2.3 CTR.3 – Perform departure from controlled aerodrome

(a) receive and correctly read back an airways clearance;

(b) check and ensure runway approach is clear prior to entering a runway;

(c) correctly set transponder code and mode prior to entering runway for take-off;

(d) comply with ATC departure instructions;

(e) advise ATC as soon as possible if unable to comply with clearance;

(f) contact approach with airborne report or give departure call to tower;

(g) maintain lookout;

(h) avoid wake turbulence;

(i) comply with airways clearances within tracking and altitude tolerances and maintain traffic lookout until clear of the aerodrome control zone.

2.4 CTR.4 – Perform arrival and landing at controlled aerodrome

(a) check ERSA and NOTAM prior to entering control area and extract required operational information;

(b) receive ATIS and correctly set the appropriate QNH;

(c) request and receive ATC clearance and set correct transponder code prior to entering control area;

(d) advise ATC as soon as possible if unable to comply with clearance;

(e) maintain lookout at all times;

(f) update QNH as required;

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(g) maintain tracking tolerances;

(h) establish aircraft on the correct leg of the circuit in preparation for landing and maintain separation from traffic;

(i) confirm clearance to land;

(j) vacate runway and obtain taxi clearance.

3 Range of variables

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

(b) Class C or D aerodromes;

(c) day VFR conditions.

4 Underpinning knowledge of the following:

(a) NOTAM decoding;

(b) aerodrome ground markings and lighting;

(c) standard RT phraseology;

(d) radio failure procedures in ERSA;

(e) transponder codes for radio failure and emergency.

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ONTA Operate at non-towered aerodromes

1 Unit description

This unit describes the skills and knowledge required to operate an aircraft to and from a non-towered aerodrome or landing area.

2 Elements and performance criteria

2.1 ONTA.1 – Non-towered aerodrome – pre-flight preparation

(a) using a current ERSA and NOTAM, for the non-towered aerodrome or landing area, extract all of the relevant operational information;

(b) interpret the extracted information;

(c) identify all special aerodrome procedures;

(d) check current weather forecast and local observations;

(e) identify all relevant radio and navigation aid frequencies.

2.2 ONTA.2 – Taxi aircraft at a non-towered aerodrome or landing area

(a) refer to aerodrome or landing area chart (if available);

(b) set local QNH or area QNH;

(c) broadcast intentions on appropriate frequency;

(d) obtain and interpret traffic information;

(e) maintain lookout for, and separation from, other aircraft, wildlife and other obstructions;

(f) recognise ground markings during taxi and take appropriate action;

(g) Reserved;

(h) taxi aircraft to holding point;

(i) use strobes when crossing any runway.

2.3 ONTA.3 – Perform departure at a non-towered aerodrome or landing area

(a) check and ensure runway approach is clear prior to entering a runway;

(b) correctly set transponder code and mode prior to entering runway for take-off;

(c) confirm runway approaches clear in all directions prior to entering runway;

(d) broadcast line up details;

(e) Reserved;

(f) transmit appropriate radio calls and maintain separation with other aircraft;

(g) advise air service provider of departure details, if required;

(h) conduct departure.

2.4 ONTA.4 – Perform arrival and landing at a non-towered aerodrome or landing area

(a) check ERSA and NOTAM prior to entering circuit area;

(b) set correct area or local QNH;

(c) use correct radio frequency to transmit inbound calls as required;

(d) maintain effective lookout;

(e) maintain aircraft separation and avoid other traffic;

(f) maintain tracking tolerances;

(g) determine wind velocity;

(h) determine landing direction;

(i) confirm runway is serviceable for the operation;

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(j) determine circuit direction;

(k) conduct landing area inspection (if applicable);

(l) position aircraft in the circuit in preparation for landing and maintain separation from traffic;

(m) make all necessary circuit radio calls;

(n) verify runway is clear of other traffic, wildlife and other obstructions;

(o) land the aircraft;

(p) vacate runway;

(q) cancel SARWATCH, if applicable.

3 Range of variables

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

(b) non-towered aerodromes;

(c) landing areas;

(d) Class G airspace;

(e) CTAF;

(f) day VFR conditions.

4 Underpinning knowledge of the following:

(a) decode NOTAM;

(b) aerodrome ground markings and lighting;

(c) standard RT phraseology for operations at non-towered aerodromes and landing areas;

(d) radio failure procedures in ERSA;

(e) transponder codes for G airspace.

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CTA Operate in controlled airspace

1 Unit description

This unit describes the skills and knowledge required to operate an aircraft in controlled airspace.

2 Elements and performance criteria

2.1 CTA.1 – Operate aircraft in controlled airspace

2.1.1 The person must be able to demonstrate her or his ability to do the following:

(a) comply with airways clearance requirements for operating in all classes of airspace, including lead time required for flight plan submission, contents, 'clearance void time', and 'readback' requirement;

(b) apply airways clearance requirements for entering, operating in and departing from CTA and CTR, including details that need to be provided to ATC, and what details to expect from ATC;

(c) maintain control area protection tolerances;

(d) maintain tracking and altitude tolerances when operating on an airways clearance;

(e) reconfirm any clearance items when doubt exists;

(f) advise ATC as soon as possible if unable to maintain clearance due to adverse weather conditions;

(g) follow ATC requirements for a change of level in CTA, including in an emergency situation;

(h) comply with departure, climb, transition to cruise (levelling out), cruise, change of levels, descent and visual approach procedures in CTA and CTR instructions;

(i) apply separation standards between IFR flights, and IFR and VFR flights in the various classes of CTA;

(j) perform appropriate actions in the event of the loss of radio communication in CTA and CTR;

(k) perform appropriate actions in the event of abnormal operations and emergency procedures in CTA and CTR;

(l) operate under radar vectoring procedures, including radio procedures and phraseologies;

(m) maximum permissible time interval between ATC transmissions during radar vectoring are not exceeded;

(n) perform appropriate actions in the event of abnormal operations and emergencies;

(o) recall transponder emergency code and communication failure code.

3 Range of variables

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

(b) day VFR conditions;

(c) any category of aircraft;

(d) Class C, D, or G airspace.

4 Underpinning knowledge of the following:

(a) decode NOTAMS;

(b) aerodrome ground markings and lighting;

(c) standard RT phraseology for operations at controlled aerodromes;

(d) radio failure procedures that are published in the ERSA;

(e) transponder codes.

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OGA Operate in Class G airspace

1 Unit description

This unit describes the skills and knowledge required to operate an aircraft in Class G (uncontrolled) airspace.

2 Elements and performance criteria

2.1 OGA – Operate aircraft in Class G airspace

(a) maintain tracking and altitude tolerances to remain outside controlled airspace;

(b) apply separation tolerances between IFR flights, and IFR and VFR flights;

(c) when using an aircraft radio:

(i) monitor appropriate radio frequency;

(ii) make appropriate radio calls;

(iii) obtain operational information from air services provider and other aircraft;

(iv) use information to ensure aircraft separation is maintained;

(v) apply loss of radio communication procedures;

(d) using a suitable chart:

(i) operate clear of active aerodromes and landing areas in the vicinity of the aircraft;

(ii) identify and remain clear of controlled and restricted airspace;

(iii) take appropriate action when operating in the vicinity of a danger area;

(e) perform actions in the event of abnormal operations and emergencies;

(f) recall transponder emergency code and communication failure code.

3 Range of variables

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

(b) day VFR conditions;

(c) Class G airspace;

(d) simulated or actual abnormal, emergency situations and radio failure.

4 Underpinning knowledge of the following:

Class G airspace.

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SECTION 4: AIRCRAFT RATING STANDARDS

AEROPLANE CATEGORY

A1 Control aeroplane on the ground

1 Unit description

This unit describes the skills and knowledge required to operate an aeroplane on the ground.

2 Elements and performance criteria

2.1 **A1.1 – Start and stop engine**

(a) perform engine start and after start actions;

(b) perform engine shutdown and after shutdown actions;

(c) manage engine start and shutdown malfunctions and emergencies;

(d) considers ground surface in relation to contamination and propeller care during engine start and stop activities.

2.2 **A1.2 – Taxi aeroplane**

(a) use aerodrome or landing area charts to taxi aircraft;

(b) comply with taxiway and other aerodrome markings, right-of-way rules and ATC or marshalling instructions when applicable;

(c) perform applicable taxi checks, including the following:

(i) brakes and steering function normally and take appropriate action in the event of a malfunction;

(ii) instruments for correct readings;

(iii) altimeter setting;

(d) maintain safe taxi speed and control of the aircraft;

(e) maintain safe spacing from other aircraft, obstructions, and persons;

(f) maintain the aircraft on the taxiway centreline;

(g) avoid causing a hazard to other aircraft, objects or persons;

(h) correct handling techniques are applied to take into account wind from all 4 quadrants;

(i) correctly manage the engine during taxi manoeuvres.

3 Range of variables

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

(b) single-engine aeroplane with propeller;

(c) aircraft with undercarriage and flaps;

(d) windsock located on the aerodrome;

(e) sufficient wind that requires control adjustment (may be simulated);

(f) hazardous weather (may be simulated);

(g) day VFR conditions;

(h) local area operational limitations such as noise abatement and aerodrome curfews (may be simulated).

4 Underpinning knowledge of the following:

(a) typical single-engine aeroplane aircraft systems;

(b) differences between normally aspirated and fuel-injected systems;

(c) carburettor icing;

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(d) the cause and effect of fuel vaporisation;

(e) typical aircraft performance characteristics of single-engine aeroplanes and the effects of local weather conditions on performance;

(f) aircraft weight and balance and the how to calculate aircraft centre of gravity;

(g) the contents of the flight manual and POH for the aircraft being flown;

(h) the environmental conditions that represent VMC;

(i) propeller wash, rotor wash and jet blast and how they affect other aircraft;

(j) the day VFR flight rules;

(k) the meaning of:

(i) light and marshalling signals;

(ii) aerodrome markings, signals and local procedures;

(l) care of propellers;

(m) the actions to be taken in the event of a brake or tyre or steering failure;

(n) the relevant sections of the AIP.

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A2 Take-off aeroplane

1 Unit description

This unit describes the skills and knowledge required to complete pre-take-off checks, take-off aeroplane into wind and in cross-wind conditions and perform after take-off checks in an aeroplane.

2 Elements and performance criteria

2.1 A2.1 – Carry out pre-take-off procedures

(a) correctly identify critical airspeeds, configurations, and emergency and abnormal procedures for normal and cross-wind take-offs;

(b) work out a plan of action, in advance, to ensure the safest outcome in the event of abnormal operations;

(c) verify and correctly apply correction for the existing wind component to the take-off performance;

(d) perform all pre-take-off and line-up checks required by the aircraft checklist;

(e) ensure approach path is clear of conflicting traffic and other hazards before lining up for take-off;

(f) align the aeroplane on the runway centreline.

2.2 A2.2 – Take off aeroplane

(a) apply the controls correctly to maintain longitudinal alignment on the centreline of the runway, if appropriate, prior to initiating and during the take-off;

(b) adjust the power controls taking into account the existing conditions;

(c) monitor power controls, settings, and instruments during take-off to ensure all predetermined parameters are achieved and maintained;

(d) adjust the controls to attain the desired pitch attitude at the predetermined airspeed to attain the desired performance;

(e) perform the take-off applying the required pitch, roll and yaw inputs as appropriate in a smooth, coordinated manner;

(f) trim the aeroplane accurately;

(g) perform gear and flap retractions, power adjustments (as applicable) and other required pilot-related activities;

(h) maintain flight path along the runway extended centreline;

(i) apply the applicable noise abatement and wake turbulence avoidance procedures;

(j) recognise take-off abnormalities and take appropriate action to reject take-off (can be simulated).

2.3 A2.3 – Take off aeroplane in a cross-wind

(a) perform a take-off in an aeroplane making appropriate adjustments for cross-wind conditions;

(b) maintain the runway centreline and extended centreline.

2.4 A2.4 – Carryout after take-off procedures

(a) perform after take-off checklist;

(b) maintain the appropriate climb segment at the nominated heading and airspeed;

(c) manoeuvre according to local and standard procedures;

(d) maintain traffic separation.

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2.5 **A2.5 – Take-off aeroplane from 'short field'**

(a) calculate take-off and landing performance in accordance with the aeroplane's performance charts;

(b) perform take-off aeroplane to achieve the minimum length take-off performance;

(c) perform take-off aeroplane to achieve the obstacle clearance parameters.

3 Range of variables

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

(b) aeroplane with piston or turbine powerplant and propeller;

(c) aircraft with nose wheel or tail wheel;

(d) aircraft with fixed or retractable undercarriage;

(e) aircraft with or without flaps;

(f) sealed, gravel or grass runways and taxiways;

(g) windsock located on aerodrome;

(h) engine start and shutdown malfunctions and emergencies covered by the aircraft flight manual;

(i) simulated hazardous weather;

(j) day VFR conditions;

(k) for take-off in cross-wind, the cross-wind component must be:

(i) for RPL, not more than 10 kts;

(ii) otherwise, 70% of the maximum permitted for the type of aeroplane being flown;

(l) local area operational limitations such as noise abatement and aerodrome curfews.

4 Underpinning knowledge of the following:

(a) obtaining or calculating the cross-wind and down or up wind components;

(b) the factors affecting take-off and initial climb performance;

(c) interpreting windsock indications and determining wind direction and speed;

(d) take-off distance required calculation;

(e) aerodrome charts and an ability to interpret them;

(f) local topographical charts to identify safe areas for engine-failure purposes and noise-abatement considerations.

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A3 Control aeroplane in normal flight

1 Unit description

This unit describes the skills and knowledge required to control an aeroplane while performing normal flight manoeuvres.

2 Elements and performance criteria

2.1 A3.1 – Climb aeroplane

(a) operate and monitor all aircraft systems when commencing, during, and completing a climbing flight manoeuvre;

(b) adjust altimeter subscale according to applicable settings;

(c) identify and avoid terrain and traffic;

(d) for the following climbing manoeuvres select power, attitude and configuration as required for the flight path, balance and trim the aeroplane accurately, and apply smooth, coordinated control inputs to achieve the required flight tolerances that apply to the manoeuvre:

(i) cruise climb;

(ii) best angle climb;

(iii) best rate climb;

(e) anticipate level-off altitude and achieve straight and level flight.

2.2 A3.2 – Maintain straight and level flight

(a) operate and monitor all aircraft systems during straight and level flight manoeuvres;

(b) adjust altimeter subscale according to applicable settings;

(c) identify and avoid terrain and traffic;

(d) for the following straight and level manoeuvres select power, attitude and configuration as required for the flight path, balance and trim the aeroplane accurately, and apply smooth, coordinated control inputs to achieve the required flight tolerances that apply to the manoeuvre:

(i) at slow speed;

(ii) at normal cruise;

(iii) at high-speed cruise;

(iv) during acceleration and deceleration;

(v) except for the RPL, at maximum range;

(vi) except for the RPL, at maximum endurance;

(vii) with flaps selected.

2.3 A3.3 – Descend aeroplane

(a) operate and monitor all aircraft systems during descending flight manoeuvres;

(b) for the following descending manoeuvres select power, attitude and configuration as required for the flight path, balance and trim the aeroplane accurately, and apply smooth, coordinated control inputs to achieve the required flight tolerances that apply to the manoeuvre:

(i) glide;

(ii) powered;

(iii) approach configuration descent (flap and undercarriage);

(c) anticipate level-off altitude and achieve straight and level flight.

2.4 A3.4 – Turn aeroplane

(a) operate and monitor all aircraft systems during turning flight manoeuvres;

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(b) for the following turning manoeuvres select power, attitude and configuration as required for the flight path, balance and trim the aeroplane accurately, and apply smooth, coordinated control inputs to achieve the required flight tolerances that apply to the manoeuvre:

(i) level turns;

(ii) climbing turn;

(iii) powered descending;

(iv) gliding descending turn;

(c) complete turn manoeuvre on a nominated heading or geographical feature;

(d) turn aeroplane at varying rates to achieve specified tracks;

(e) manoeuvre aeroplane over specified tracks or geographical features.

2.5 **A3.5 – Control aeroplane at slow speeds**

(a) complete pre-manoeuvre checks;

(b) operate and monitor all aircraft systems when operating the aeroplane at slow speed in straight and level, climbing, descending and turning flight;

(c) except for multi-engine aeroplane operations, select power, attitude and configuration as required for the flight path, balance and trim the aeroplane accurately, and apply smooth, coordinated control inputs to achieve stable flight at the required flight tolerances that apply to the following:

(i) minimum approach speed with flaps retracted;

(ii) minimum approach speed in approach configuration;

(iii) flight at speeds just above stall warning activation or at the initial symptoms of stall;

(d) except for multi-engine aeroplane operations, observe audible and visible stall warnings and recover aeroplane to controlled flight;

(e) recognise and respond positively to reduced effectiveness of controls during slow flight manoeuvres;

(f) recognise the need to increase power while manoeuvring in slow flight to maintain nominated altitude and a margin of speed above the stall;

(g) transition from slow speed configuration, using take-off power to achieve nominated speed in excess of 1.5 Vs without loss of height.

2.6 **A3.6 – Perform circuits and approaches**

(a) operate and monitor all aircraft systems when operating the aeroplane in the circuit;

(b) in accordance with specific local procedures, safely perform a full circuit pattern (5 legs) by balancing and trimming the aeroplane accurately while applying smooth, coordinated control inputs to achieve the required flight tolerances specified for the flight path flown during traffic pattern manoeuvres as follows:

(i) track upwind along extended centreline to 500 ft;

(ii) establish and maintain cross-wind leg tracking 90° to the runway;

(iii) establish and maintain downwind leg tracking parallel to, and at a specified distance from, the runway at circuit height;

(iv) establish base leg tracking 90° to the runway at a specified distance from the runway threshold;

(c) perform checks as required throughout circuit;

(d) establish the approach and landing configuration appropriate for the runway and meteorological conditions, and adjust the power plant controls as required for the following:

(i) commence and control approach descent path;

(ii) adjust descent commencement point to take account of extended downwind leg or traffic adjustments;

(iii) align and maintain aircraft on final approach flight path with specified or appropriate runway;

(iv) set and maintain approach configuration not below 500 ft AGL;

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(v) identify and maintain the nominated aiming point;

(vi) maintain a stabilised approach angle at the nominated airspeed not less than $1.3V_S$ to the round-out height;

(vii) verify existing wind conditions, make proper correction for drift, and maintain a precise ground track;

(viii) apply speed allowances for wind gusts;

(ix) configure aeroplane for landing;

(e) maintain aircraft separation and position in the circuit with reference to other aircraft traffic in the circuit area.

2.7 **A3.7 – Local area airspace**

(a) using an appropriate chart, for the local area and circuit area:

(i) identify geographical features;

(ii) identify geographical limits;

(iii) identify restricted, controlled and uncontrolled airspace areas;

(iv) state local airspace limits;

(v) identify the transit route between the departure aerodrome and training area;

(vi) identify the geographical limits of the training area;

(vii) identify aerodromes and landing areas within the local area;

(b) maintain orientation and pinpoint location by using geographical features and a local area chart;

(c) transit from the circuit area and transit to the designated training area;

(d) operate safely within a transit lane (if applicable);

(e) remain clear of restricted, controlled and other appropriately designated airspace;

(f) operate safely in the vicinity of local aerodromes and landing areas;

(g) transit from the designated training area to the circuit area;

(h) set QNH appropriately;

(i) correctly determine which runway is to be used for landing;

(j) ensure runway is serviceable and available;

(k) position aircraft for arrival into the circuit.

3 Range of variables

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

(b) aeroplane with piston or turbine powerplant and propeller;

(c) aircraft with fixed or retractable undercarriage;

(d) aircraft with or without flaps;

(e) simulated hazardous weather;

(f) approach and landing configurations:

(i) normal;

(ii) flapless;

(iii) glide;

(g) circuit patterns:

(i) normal 1,000 ft AGL circuit;

(ii) low-level 500 ft AGL circuit;

(iii) full circuit pattern, including 5 legs;

(iv) shortened circuit pattern;

(h) day VFR conditions;

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(i) local area airspace limitations.

4 Underpinning knowledge of the following:

(a) the primary effects of controls;

(b) the secondary effects of controls;

(c) the stall warning devices;

(d) aircraft systems;

(e) aircraft performance;

(f) aircraft weight and balance;

(g) hazards when performing performance manoeuvres;

(h) turning using a magnetic compass;

(i) relationship between angle of bank, load factor and stall speed;

(j) relationship between induced drag and operating at slow speed;

(k) dangers associated with mechanical and wake turbulence;

(l) engine considerations during prolonged climbing and descending;

(m) contents of the aircraft flight manual and pilot's operating handbook;

(n) environmental conditions that represent VMC;

(o) day VFR flight rules;

(p) local area operating procedures;

(q) relevant sections of the AIP.

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A4 Land aeroplane

1 Unit description

This unit describes the skills and knowledge required to conduct a landing in an aeroplane.

2 Elements and performance criteria

2.1 A4.1 – Land aeroplane

(a) maintain a constant landing position aim point;

(b) achieve a smooth, positively-controlled transition from final approach to touchdown, including the following;

(i) control ballooning during flare;

(ii) touchdown at a controlled rate of descent, in the specified touchdown zone within tolerances

(iii) control bouncing after touchdown;

(iv) touchdown aligned with the centreline within tolerances;

(c) ensure separation is maintained;

(d) maintain positive directional control and cross-wind correction during the after-landing roll;

(e) use drag and braking devices, as applicable, in such a manner to bring the airplane to a safe stop;

(f) complete the applicable after-landing checklist items in a timely manner.

2.2 A4.2 – Land aeroplane in a cross-wind

(a) verify existing wind conditions, make proper correction for drift, and maintain a precise ground track;

(b) configure the aeroplane for the cross-wind conditions;

(c) control the aeroplane during the transition from final approach to touchdown and during after-landing roll to compensate for the cross-wind conditions.

2.3 A4.3 – Conduct a missed approach

(a) recognise the conditions when a missed approach should be executed;

(b) make the decision to execute a missed approach when it is safe to do so;

(c) make a smooth, positively-controlled transition from approach to missed approach, including the following:

(i) select power, attitude and configuration to safely control aeroplane;

(ii) manoeuvre aeroplane clear of the ground and conduct after take-off procedures;

(iii) make allowance for wind velocity during go-around;

(iv) avoid wake turbulence.

2.4 A4.4 – Perform recovery from missed landing

(a) recognise when a missed landing is occurring and when it is appropriate to take recovery action;

(b) make the decision to execute recovery from a missed landing only when it is safe to do so;

(c) make a smooth, positively-controlled transition from missed landing to missed approach, including the following:

(i) select power, attitude and configuration to safely control aeroplane;

(ii) manoeuvre aeroplane clear of the ground and conduct after take-off procedures;

(iii) make allowance for wind velocity during go-around;

(iv) avoid wake turbulence.

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2.5 **A4.5 – Short landing**

(a) land aeroplane at nominated touchdown point at minimum speed;

(b) control ballooning during flare;

(c) control bouncing after touchdown;

(d) maintain direction after touchdown;

(e) apply maximum braking without locking up wheels;

(f) stops aircraft within landing distance available.

3 Range of variables

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

(b) aeroplane with piston or turbine powerplant and propeller;

(c) aircraft with nose wheel or tail wheel;

(d) aircraft with fixed or retractable undercarriage;

(e) aircraft with or without flaps;

(f) sealed, gravel or grass runways and taxiways;

(g) windsock located on aerodrome;

(h) simulated hazardous weather;

(i) day VFR conditions;

(j) for landing an aeroplane in cross-wind, the cross-wind component must be:

(i) for RPL, not more than 10 kts;

(ii) otherwise, 70% of the maximum permitted for the type of aeroplane being flown;

(k) local area operational limitations such as noise abatement and aerodrome curfews.

4 Underpinning knowledge of the following:

(a) typical single-engine aeroplane aircraft systems;

(b) aeroplane performance;

(c) aeroplane limitations;

(d) aeroplane weight and balance;

(e) options when local conditions are not suitable for landing;

(f) causes of loss of control of aeroplane on landing;

(g) contents of the aircraft flight manual and pilot's operating handbook;

(h) environmental conditions that represent VMC;

(i) day VFR flight rules;

(j) propeller wash, rotor wash and jet blast;

(k) relevant sections of the AIP.

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A5 Aeroplane advanced manoeuvres

1 Unit description

This unit describes the skills and knowledge required to perform advanced manoeuvres in an aeroplane.

2 Elements and performance criteria

2.1 A5.1 – Enter and recover from stall

(a) perform stalling pre-manoeuvre checks;

(b) recognise symptoms of a stall;

(c) control the aeroplane by trimming and balancing accurately for slow flight and then applying the required pitch, roll and yaw inputs to enter and recover from the following:

(i) slow flight where initial symptoms of a stall become evident;

(ii) stall, recovering without application of power;

(iii) stall, recovering with full power applied (not required for multi-engine aeroplanes);

(iv) stall under the following conditions:

(A) straight and level flight;

(B) climbing flight (not required for multi-engine aeroplanes);

(C) descending flight (not required for multi-engine aeroplanes);

(D) approach to land configuration;

(E) turning flight (not required for multi-engine aeroplanes);

(d) perform stall recovery including the following:

(i) reduce angle of attack;

(ii) prevent yaw;

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

(iv) avoid secondary stall;

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

(e) perform stall recovery in simulated partial and complete engine failure conditions;

(f) perform stall recovery at simulated low altitude.

2.2 A5.2 – Avoid spin

This element only applies to a single-engine aeroplane:

(a) perform stalling pre-manoeuvre checks;

(b) recognise wing drop at the stall;

(c) from balanced flight, recover from stall in the attitudes and configurations most likely to cause a wing drop;

(d) perform recovery where the aeroplane exhibits a tendency to drop a wing at the stall, in accordance with paragraph (d) of subclause 2.1 (5.1 – Enter and recover from stall);

(e) perform stall recovery at simulated low altitude.

2.3 A5.3 – Turn aeroplane steeply

(a) pre-manoeuvre checks for steep turning;

(b) steep level turn using a nominated bank angle, ending on a nominated heading or geographical feature, without altitude change;

(c) steep descending turn using a nominated bank angle, ending on a nominated heading or geographical feature ending on a nominated altitude;

(d) aeroplane operating limits are not exceeded.

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2.4 **A5.4 – Sideslip aeroplane (where flight manual permits)**

(a) straight sideslip:

(i) induce slip to achieve increased rate of descent while maintaining track and airspeed; and

(ii) adjust rate of descent by coordinating angle of bank and applied rudder;

(b) sideslipping turn by adjusting the bank angle to turn through minimum heading change of 90° at constant airspeed using sideslip, and exiting the turn on a specified heading or geographical feature, within tolerance;

(c) recover from a sideslip and return the aeroplane to balanced flight.

3 Range of variables

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

(b) manoeuvres are performed within operating limits of aeroplane;

(c) aeroplane with piston or turbine powerplant and propeller;

(d) aircraft with nose wheel or tail wheel;

(e) aircraft with fixed or retractable undercarriage;

(f) aircraft with or without flaps;

(g) sealed, gravel or grass runways and taxiways;

(h) windsock located on aerodrome;

(i) simulated hazardous weather;

(j) day VFR conditions;

(k) local area operational limitations such as noise abatement and aerodrome curfews.

4 Underpinning knowledge of the following:

(a) operational circumstances where steep turns are required;

(b) aerodynamic and aeroplane operational considerations related to slow flight, sideslipping, stalling, spinning, steep turns, upset aeroplane states, including but not limited to the following:

(i) symptoms of approach to stall and throughout the stall manoeuvre until recovery;

(ii) relationship between angle of attack and stall;

(iii) effects of weight, centre of gravity position, ‘g’ force and angle of attack;

(iv) dangers of unbalanced flight;

(v) principle of stick and control and the point of stall;

(vi) priority given to reduce angle of attack during stall manoeuvres;

(vii) loss of height is considered in relation to available height and energy state;

(viii) the technique of converting excess speed to height;

(ix) the technique of converting excess height to speed;

(x) symmetrical and rolling ‘g’ force limitations;

(xi) higher stall speeds when aeroplane is turning;

(xii) effects on fuel, pitot and flap systems;

(c) contents of the flight manual and POH;

(d) environmental conditions that represent VMC;

(e) day VFR flight rules;

(f) relevant sections of the AIP.

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A6 Manage abnormal situations – single-engine aeroplanes

1 Unit description

This unit describes the skills and knowledge required to accurately assess an abnormal situation, reconfigure the aeroplane, control the aeroplane and execute appropriate manoeuvres to achieve a safe outcome with no injury to personnel or damage to the aeroplane or property.

2 Elements and performance criteria

2.1 A6.1 – Manage engine failure – take-off (simulated)

(a) correctly identify an engine failure after take-off;

(b) apply the highest priority to taking action to control the aeroplane;

(c) maintain control of aeroplane;

(d) perform recall actions;

(e) perform emergency actions as far as time permits;

(f) manoeuvre the aeroplane to achieve the safest possible outcome;

(g) ensure passengers adopt brace position;

(h) advise others such as ATS and other aircraft of intentions if time permits.

2.2 A6.2 – Manage engine failure in the circuit area (simulated)

(a) correctly identify an engine failure during flight;

(b) apply the highest priority to taking action to control the aeroplane;

(c) perform recall actions;

(d) select a suitable landing area within gliding distance, on the aerodrome or elsewhere;

(e) perform emergency procedures and land the aeroplane if the engine cannot be restarted as time permits;

(f) advise ATS or other agencies capable of providing assistance of situation and intentions;

(g) re-brief passengers about flight situation, brace position and harness security;

(h) land the aeroplane ensuring safest outcome if an engine restart is not achieved.

2.3 A6.3 – Perform forced landing (simulated)

(a) after a simulated complete engine failure has occurred, without prior indications, carryout the following:

(i) identify complete power failure condition and control aeroplane;

(ii) perform immediate actions;

(iii) formulate and describe a recovery plan, including selecting the most suitable landing area;

(iv) establish optimal gliding flight path to position the aeroplane for a landing on the selected landing area;

(v) perform emergency procedures and land the aeroplane if the engine cannot be restarted as time permits;

(vi) advise ATS or other agencies capable of providing assistance of situation and intentions;

(vii) re-brief passengers about flight situation, brace position and harness security;

(viii) land the aeroplane ensuring safest outcome if an engine restart is not achieved;

(b) after a simulated partial engine failure has occurred, without prior indications, carryout the following:

(i) identify partial power failure condition;

(ii) perform recall actions;

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(iii) adjust flight controls to re-establish flight path that maximises performance for partial power condition and maintain a safe airspeed margin above stall speed;

(iv) establish radio communications where possible;

(v) perform partial engine failure actions;

(vi) formulate a plan to recover aeroplane to a safe landing area or aerodrome, taking into account that partial failure might lead to a full power failure at any time;

(vii) manoeuvre the aeroplane to a selected landing area or aerodrome using the remaining power to establish an optimal aircraft position for a safe landing;

(viii) advise ATS, or other agencies capable of providing assistance of situation and intentions;

(ix) re-brief passengers about flight situation, brace position and harness security;

(x) maintain a contingency plan for coping with a full power failure throughout the manoeuvre;

(xi) when a safe landing position is established, shut down and secure engine and aeroplane.

2.4 **A6.4 – Conduct precautionary search and landing (simulated condition)**

(a) assess flight circumstances and make an appropriate decision when to perform precautionary landing;

(b) configure aeroplane for conditions;

(c) perform precautionary search procedure;

(d) select landing area, carryout an inspection and assess its suitability for landing, taking into account:

(i) unobstructed approach and overshoot paths;

(ii) landing area length adequate for landing;

(iii) landing area surface is suitable for aeroplane type and clear of hazards;

(e) maintain orientation and visual contact with the landing area;

(f) advise ATS or other agencies capable of providing assistance of situation and intentions;

(g) re-brief passengers about flight situation, brace position and harness security;

(h) land and secure aircraft and manage passengers.

2.5 **A6.5 – Manage other abnormal situations (simulated)**

(a) correctly identify the situation and maintain safe control of the aeroplane at all times;

(b) manage abnormal and emergency situations in accordance with relevant emergency procedures and regulatory requirements;

(c) follow appropriate emergency procedures while maintaining control of the aeroplane;

(d) identify and conduct flight with an unreliable airspeed indication;

(e) correctly identify when an emergency evacuation of an aeroplane is required;

(f) execute a simulated emergency evacuation of an aeroplane;

(g) advise ATS or other agencies capable of providing assistance of situation and intentions.

2.6 **A6.6 – Recover from unusual flight attitudes**

(a) identify nose-high or nose-low unusual attitude flight condition;

(b) recover from nose-low or nose-high unusual attitudes by adjusting pitch, bank and power to resume controlled and balanced flight;

(c) apply controlled corrective action while maintaining aircraft performance within limits.

3 Range of variables

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

(b) single-engine aeroplane with piston or turbine powerplant and propeller;

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(c) discontinue simulated manoeuvres that would be terminated by a forced landing when the assessor is satisfied that the landing standard would be achieved;

(d) day VFR conditions.

4 Underpinning knowledge of the following:

(a) engine failure scenarios and procedures for partial and complete power loss;

(b) forced landing scenarios and procedures;

(c) causes leading to precautionary landings;

(d) judging descent profiles in various configurations;

(e) prioritising activities during emergencies and non-normal situations;

(f) ditching;

(g) suitable fields for forced landings and precautionary landings;

(h) considerations when practicing emergencies and non-normal operations;

(i) aircraft performance in a glide (straight and turning);

(j) hazard of sideslip at low altitude;

(k) effects of partial engine power on performance, flight profile, range and landing options;

(l) contents of the flight manual and pilot's operating handbook;

(m) passenger control and briefing;

(n) VMC;

(o) low-flying hazards.

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AME Operate multi-engine aeroplane

1 Unit description

This unit describes the skills and knowledge required to operate a multi-engine class-rated aeroplane in non-normal and emergency operations.

2 Elements and performance criteria

2.1 AME.1 – Operate multi-engine aeroplane

(a) start multi-engine aeroplane;

(b) use asymmetric thrust to assist with taxi manoeuvring;

(c) check multi-engine specific systems and instrumentation.

2.2 AME.2 – Manage failures and malfunctions – general

(a) operate and manage aircraft systems;

(b) asymmetric operations for all phases of flight are anticipated and contingencies are planned;

(c) a plan of action is self-briefed or briefed that will ensure the safest outcome in the event of asymmetric operations.

2.3 AME.3 – Manage engine failure and malfunction after take-off (simulated)

(a) manage simulated engine failures and malfunctions effectively whilst maintaining control of the aircraft flight path within specified tolerances;

(b) configure and fly aeroplane to achieve best performance;

(c) replan flight and take action to return to land or divert to alternate.

2.4 AME.4 – Manage engine failure and malfunction en route (simulated)

(a) maintain or regain control of the aeroplane flight path within specified tolerances;

(b) manage failed or malfunctioning engine effectively;

(c) replan flight and take action to continue or divert to alternate.

2.5 AME.5 – Perform rejected take-off – multi-engine aeroplane

(a) abort take-off at or before decision point during the take-off where the abort procedure can be initiated and the aeroplane stopped on the remaining runway or stopway;

(b) reduce power smoothly and promptly;

(c) activate spoilers, prop fine, reverse, thrust reverse, wheel brakes and other drag and braking devices (as applicable);

(d) maintain positive control to bring the aeroplane to a safe stop;

(e) initiate and complete engine failure procedures and checklists.

2.6 AME.6 – Manage engine failure and malfunction during approach and landing (simulated)

(a) maintain control of aeroplane flight path;

(b) nominate decision height for landing;

(c) make decision to continue or abort approach and landing in a safe and timely way;

(d) advise ATS or other agencies capable of providing assistance of situation and intentions;

(e) establish the approach and landing configuration appropriate for the runway or landing area, and meteorological conditions, and adjust the power plant controls as required;

(f) maintain a stabilised approach and nominated airspeed within tolerances;

(g) achieve a smooth, positively-controlled transition from final approach to touchdown in the touchdown zone within tolerances;

(h) maintain positive directional control and cross-wind corrections during the after-landing roll maintaining the centreline within tolerances;

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(i) use spoilers, prop reverse, thrust reversers, wheel brakes, and other drag or braking devices, as appropriate, in such a manner to bring the airplane to a safe stop after landing (as applicable).

2.7 **AME.7 – Conduct go-around or missed approach with engine failure (simulated)**

(a) identify and confirm engine failure in a multi-engine aeroplane during a go-around or missed approach;

(b) maintain control of aeroplane;

(c) perform engine inoperative go-around safely not below the decision height.

3 Range of variables

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

(b) day VFR or IFR;

(c) class-rated multi-engine aeroplane with dual controls, electronic intercom and dual control brakes;

(d) aerodromes;

(e) appropriate surfaces;

(f) simulated emergencies;

(g) simulated hazardous weather.

4 Underpinning knowledge of the following:

(a) airspeed limitations, including: V_{NO}, V_A, V_X and V_Y, V_{NE}, V_{FE}, V_{LO}, V_{LE}, V_{LO2} (landing gear operations down), maximum cross-wind, turbulence penetration speed and maximum load factor;

(b) emergency airspeeds, including: V_{MCA}, V_{SSE}, engine(s) inoperative climb, approach and final speed, emergency descent and best glide range speeds;

(c) emergency procedures for: engine failure after take-off, engine fire on the ground and airborne, engine failure in the cruise, waste gate failure (if applicable) and propeller or turbine over-speed;

(d) safety implications of asymmetric flight below V_{MCA};

(e) power, flight and configuration requirements that apply to V_{MCA};

(f) methods of regaining control of an aeroplane with a failed engine that is flying at a speed less than V_{MCA};

(g) conditions that would increase V_1 (if stated in AFM and POH);

(h) performance the aeroplane can achieve after reaching V_Y or V_2 during asymmetric flight;

(i) markings on the airspeed indicator that apply to failed engine operations;

(j) normal and cross-wind take-off and landing procedures: climb, cruise, descent procedures, including airspeeds, configurations, method of drift allowance, setting of flight instruments and non-normal and emergency procedures;

(k) technique and procedures used during engine failure on take-off, the appropriate reference airspeeds, and the specific pilot actions required;

(l) technique and procedure for carrying out a rejected take-off after an engine or system(s) failure or warnings, including related safety factors;

(m) technique and procedures used to conduct an asymmetric go-around or missed approach, the appropriate reference airspeeds, and the specific pilot actions required;

(n) other abnormal or emergency items as contained in the flight manual or pilot operating handbook.

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TR-CR Type rating – cruise relief aeroplane

1 Unit description

This unit describes the skills and knowledge required for the issue of a cruise-relief type rating.

2 Elements and performance criteria

2.1 TR-CR.1 – Conduct pre-flight inspection

(a) complete pre-flight inspections;

(b) communicate with ground support crew;

(c) ensure all aircraft locking devices and bungs are removed;

(d) prepare and operate aircraft systems correctly.

2.2 TR-CR.2 – Extract pre-flight performance data

(a) extract correct aircraft loading and performance data;

(b) set instrumentation and systems;

(c) obtain and interpret the take-off and departure clearance issued by ATC.

2.3 TR-CR.3 – Request ATC clearance

Obtain, interpret and brief ATC clearance.

2.4 TR-CR.4 – Start engines

(a) start engine correctly;

(b) manage occurrences where specific instructions or checklist items are not published.

2.5 TR-CR.5 – Taxi aircraft

(a) request ATC clearances or make mandatory air traffic broadcast;

(b) push back or power back aircraft safely;

(c) maintain control of aircraft during taxi;

(d) divide attention appropriately between inside and outside the flight deck, to ensure maintenance of control while taxiing and completion of cockpit procedures and checklists;

(e) check instruments in a suitable area clear of traffic and other hazards;

(f) interpret and comply with taxiway, lighting, other aerodrome markings and marshalling instructions;

(g) adjust taxi speed to suit aircraft type, surface conditions, congestion, and maintenance of control, and avoid collision with personnel, obstacles or other aircraft;

(h) apply flying controls, power and brakes to maintain the aircraft on the taxiway centreline while compensating for wind and surface conditions.

2.6 TR-CR.6 – Conduct pre-take-off checks

(a) perform pre-take-off checklist and confirm all systems are within normal operating range;

(b) perform pre-take-off briefing;

(c) confirm, prior to entering runway, that aircraft is positioned on specified or appropriate taxiway;

(d) ensure final approach path is clear of conflicting traffic on specified or appropriate runway.

2.7 TR-CR.7 – Conduct take-off

(a) demonstrate knowledge of airspeeds, configurations, and emergency and abnormal procedures for normal and cross-wind take-offs;

(b) brief a plan of action to ensure the safest outcome in the event of abnormal operations;

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(c) verify and correctly apply correction for the existing wind component to the take-off performance;

(d) ensure all pre-take-off checks required by the appropriate checklist items are completed in a timely manner;

(e) align the aircraft on the runway centreline;

(f) apply the controls correctly to maintain longitudinal alignment on the centreline of the runway, if appropriate, prior to initiating and during the take-off;

(g) adjust the power plant controls;

(h) monitor power plant controls, settings, and instruments during take-off to ensure all predetermined parameters are maintained;

(i) adjust the controls to attain the desired pitch attitude at the predetermined airspeed to attain the desired performance;

(j) perform the required pitch changes and, as appropriate, perform and verify the completion of, gear and flap retractions, power adjustments (as applicable) and other required pilot-related activities at the required airspeed within the published tolerances;

(k) use the applicable noise abatement and wake turbulence avoidance procedures;

(l) verify the completion of the appropriate after take-off checklist items in a timely manner;

(m) manage any incident, malfunction or failure during take-off to achieve the safest possible outcome.

2.8 **TR-CR.8 – Operate aircraft in flight**

(a) operate aircraft in normal flight profiles;

(b) operate aircraft systems for normal, non-normal and emergency conditions;

(c) demonstrate the following manoeuvres:

(i) approach to stall and full stall recovery;

(ii) maximum performance turning;

(iii) unusual attitude and upset recovery;

(iv) flight with unreliable airspeed;

(v) emergency descent.

2.9 **TR-CR.9 – Manage engine failure in flight**

(a) maintain control of aircraft flight path;

(b) correctly identify and verify malfunction;

(c) manage failure effectively.

2.10 **TR-CR.10 – Conduct a descent, arrival and landing**

(a) plan and conduct a descent, arrival and landing;

(b) obtain, interpret and brief ATC clearance for descent and arrival;

(c) manage non-normal or emergency conditions;

(d) demonstrate missed approach manoeuvre.

2.11 **TR-CR.11 – Conduct taxi to stand, park and shutdown**

Follow published procedures, taxi, park and shutdown aircraft at the designated parking bay.

3 Range of variables

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

(b) day and night VMC or IMC;

(c) approved aircraft or approved flight simulation training device;

(d) simulated abnormal or emergency situations;

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(e) flight crew incapacitation (multi-crew operations);

(f) simulated hazardous weather;

(g) sealed, gravel or grass surfaces.

4 Underpinning knowledge of the following:

(a) normal and cross-wind take-off;

(b) instrument take-off;

(c) engine failure during take-off;

(d) the procedures used during engine failure on take-off, the appropriate reference airspeeds, and the specific pilot actions required;

(e) rejected take-off;

(f) departure procedures;

(g) steep turns;

(h) approaches to stalls;

(i) engine failure;

(j) any specific flight characteristics;

(k) recovery from unusual attitudes;

(l) normal and cross-wind approaches and landings;

(m) approach and landing with a (simulated) engine failure;

(n) baulked approach and missed-landing;

(o) no flap or a non-standard flap approach and landing;

(p) critical airspeeds, V-speeds (including tyre rotation limits);

(q) how to calculate landing distance required;

(r) the normal system operating procedures of the aircraft systems;

(s) emergency procedures;

(t) how potential, kinetic and chemical energy relate to an aircraft in flight;

(u) how energy states are manipulated to generate aerodynamic forces that allow an aircraft to be manoeuvred;

(v) the unintended flight conditions of pitch, bank and airspeed that describe upset aircraft state;

(w) the physical symptoms that may or may not be evident in a stall;

(x) stall recovery technique during any nominated phase of flight applicable to the aircraft type being flown;

(y) the upset recovery techniques applicable to the aircraft type being flown at low altitude, and high altitude where the aircraft is pressurised;

(z) Structural integrity of an aeroplane is not ensured when operating at or below maximum manoeuvring speed, if multiple control inputs in one axis, or full control inputs in more than one axis, are initiated at the same time.

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TR-SEA Type rating – single-engine aeroplane

1 Unit description

This unit describes the skills and knowledge required for a person to operate a type-rated single-engine aeroplane.

2 Elements and performance criteria

2.1 TR-SEA.1 – Conduct pre-flight inspection

(a) complete pre-flight inspection correctly;

(b) communicate effectively with ground support crew;

(c) ensure all aircraft locking devices, covers and bungs are removed;

(d) prepare and operate aircraft systems.

2.2 TR-SEA.2 – Extract pre-flight performance data

(a) extract correct aircraft loading and performance data;

(b) set instrumentation and systems;

(c) obtain and interpret the take-off and departure clearance issued by ATC.

2.3 TR-SEA.3 – Request ATC clearance

Obtain, interpret and brief ATC clearance.

2.4 TR-SEA.4 – Start engine

(a) start engine;

(b) manage occurrences where specific instructions or checklist items are not published.

2.5 TR-SEA.5 – Taxi aircraft

(a) request ATC clearances or make mandatory air traffic broadcast appropriate to the local airspace and aerodrome;

(b) maintain control of aircraft during taxi;

(c) divide attention appropriately between inside and outside the flight deck, to ensure aircraft control is maintained while taxiing and complete cockpit procedures and checklists;

(d) check instruments in a suitable area clear of traffic and other hazards;

(e) interpret and comply with taxiway, lighting, other aerodrome markings and marshalling instructions;

(f) adjust taxi speed to suit aircraft type, surface conditions, congestion, and maintenance of control; and avoid collision with personnel, obstacles or other aircraft;

(g) apply flying controls, power and brakes to maintain the aircraft on the taxiway centreline while compensating for wind and surface conditions.

2.6 TR-SEA.6 – Conduct pre-take-off checks

(a) perform pre-take-off checklist and confirm all systems are within normal operating range;

(b) perform pre-take-off briefing effectively;

(c) confirm prior to entering runway, that aircraft is positioned on specified or appropriate taxiway;

(d) ensure final approach path is clear of conflicting traffic on specified or appropriate runway.

2.7 TR-SEA.7 – Conduct take-off

(a) apply correct airspeeds, configurations, and emergency and abnormal procedures for normal and cross-wind take-offs;

(b) conduct a briefing covering the plan of action that will ensure the safest outcome in the event of abnormal operations;

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(c) verify and correctly apply correction for the existing wind component to the take-off performance;

(d) perform and ensure all pre-take-off checks required by the appropriate checklist items are completed in a timely manner;

(e) align the aircraft on the runway centreline;

(f) apply the controls correctly to maintain longitudinal alignment on the centreline of the runway, if appropriate, prior to initiating and during the take-off;

(g) adjust the powerplant controls correctly;

(h) monitor powerplant controls, settings, and instruments during take-off to ensure all predetermined parameters are maintained;

(i) adjust the controls to attain the desired pitch attitude to attain the desired performance;

(j) perform the required pitch changes and, as appropriate, perform and verify the completion of, gear and flap retractions, power adjustments (as applicable) and other required pilot-related activities at the required airspeed within the published tolerances;

(k) use the applicable noise abatement and wake turbulence avoidance procedures, as applicable;

(l) verify the completion of the appropriate after take-off checklist items in a timely manner.

2.8 **TR-SEA.8 – Incident, malfunction or failure during take-off**

Appropriately manage incident, malfunction or failure during take-off.

2.9 **TR-SEA.9 – Operate aircraft in flight**

(a) operate aircraft in normal flight profiles;

(b) operate aircraft systems for normal, non-normal and emergency conditions;

(c) identify aeroplane upset conditions and take appropriate action to return aeroplane to normal flight;

(d) demonstrate approach to the stall and stall recovery as follows:

(i) recognises approaching stall symptoms;

(ii) reduce AOA at the stall;

(iii) prevents yaw with rudder;

(iv) apply recommended power;

(v) when the wings are unstalled, level them using balanced aileron control;

(vi) recover height loss;

(e) demonstrate maximum performance turning under the following conditions:

(i) maximum rate;

(ii) minimum radius;

(f) demonstrate flight with unreliable airspeed;

(g) demonstrate ability to recover from unusual attitude and upset situations;

(h) demonstrate an emergency descent.

2.10 **TR-SEA.10 – Manage partial and complete engine failure situations in flight**

(a) maintain control of aircraft;

(b) correctly identify and verify failure;

(c) manage failure to achieve safest possible outcome;

(d) perform forced landing;

(e) perform precautionary landing (simulated).

2.11 **TR-SEA.11 – Conduct engine relight and restart in flight**

Maintain control while performing relight and restart.

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2.12 **TR-SEA.12 – Conduct a descent, arrival and landing**

(a) plan and conduct a descent, arrival and landing;

(b) obtain, interpret and brief ATC clearance for descent and arrival;

(c) manage non-normal or emergency conditions;

(d) demonstrate missed approach manoeuvre.

2.13 **TR-SEA.13 – Conduct taxi to stand, park and shutdown**

(a) taxi, park and shut down aircraft at the designated parking bay as cleared;

(b) secure aircraft.

3 Range of variables

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

(b) day and night VMC or IMC;

(c) upset conditions include the following:

(i) pitch attitude more than 25° nose up;

(ii) pitch attitude more than 10° nose down;

(iii) bank angle more than 45°;

(iv) flying at airspeeds inappropriate to the conditions;

(d) aircraft of the type to which the rating applies;

(e) approved flight simulator.

4 Underpinning knowledge of the following:

(a) normal and cross-wind take-off;

(b) instrument take-off (IFR pilots only);

(c) engine failure during take-off;

(d) rejected take-off;

(e) departure procedures;

(f) steep turns;

(g) approaches to stalls;

(h) engine failure;

(i) any specific flight characteristics (e.g. Dutch roll);

(j) recovery from unusual attitudes;

(k) normal and cross-wind approaches and landings;

(l) approach and landing with a (simulated) engine failure – multi-engine aeroplane;

(m) baulked approach and missed landing;

(n) no flap and non-standard flap approach and landing:

(o) factors that affect an aircraft when full or partial flaps, leading edge flaps, and any other similar devices become inoperative, including aircraft handling;

(p) extract critical airspeeds, V-speeds (including tyre rotation limits);

(q) calculate landing distance required;

(r) normal systems operating procedures;

(s) emergency procedures;

(t) how potential and kinetic energy relate to an aircraft in flight;

(u) how energy states are manipulated to generate aerodynamic forces that allow an aircraft to be manoeuvred;

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(v) the unintended flight conditions of pitch, bank and airspeed that describe upset aircraft state;

(w) the physical symptoms that may or may not be evident in a stall;

(x) stall recovery technique during any nominated phase of flight applicable to the aircraft type being flown;

(y) upset recovery techniques applicable to the aircraft type being flown at low altitude, and high altitude where the aircraft is pressurised;

(z) Structural integrity of an aeroplane is not ensured when operating at or below maximum manoeuvring speed, if multiple control inputs in one axis, or full control inputs in more than one axis, are initiated at the same time.

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TR-MEA Type rating – multi-engine aeroplane

1 Unit description

This unit describes the skills and knowledge required for a person to operate a type-rated multi-engine aeroplane.

2 Elements and performance criteria

2.1 TR-MEA.1 – Conduct pre-flight inspection

(a) complete pre-flight inspection correctly;

(b) communicate effectively with ground support crew;

(c) ensure all aircraft locking devices, covers and bungs are removed;

(d) prepare and operate aircraft systems.

2.2 TR-MEA.2 – Extract pre-flight performance data

(a) extract correct aircraft loading and performance data;

(b) set instrumentation and systems;

(c) obtain and interpret the take-off and departure clearance issued by ATC.

2.3 TR-MEA.3 – Request ATC clearance

Obtain, interpret and brief ATC clearance.

2.4 TR-MEA.4 – Start engines

(a) start engines;

(b) manage occurrences where specific instructions or checklist items are not published.

2.5 TR-MEA.5 – Taxi aircraft

(a) request ATC clearances or make mandatory air traffic broadcast appropriate to the local airspace and aerodrome;

(b) push back or power back aircraft safely;

(c) maintain control of aircraft during taxi;

(d) divide attention appropriately between inside and outside the flight deck, to ensure aircraft control is maintained while taxiing and cockpit procedures and checklists are completed;

(e) check instruments in a suitable area clear of traffic and other hazards;

(f) interpret and comply with taxiway, lighting, other aerodrome markings and marshalling instructions;

(g) adjust taxi speed to suit aircraft type, surface conditions, congestion, and maintenance of control, and avoid collision with personnel, obstacles or other aircraft;

(h) apply flying controls, power and brakes to maintain the aircraft on the taxiway centreline while compensating for wind and surface conditions.

2.6 TR-MEA.6 – Conduct pre-take-off checks

(a) perform pre-take-off checklist and confirm all systems are within normal operating range;

(b) perform pre-take-off briefing;

(c) confirm, prior to entering runway, that aircraft is positioned on specified or appropriate taxiway;

(d) ensure final approach path is clear of conflicting traffic on specified or appropriate runway.

2.7 TR-MEA.7 – Conduct take-off

(a) demonstrate knowledge of airspeeds, configurations, and emergency and abnormal procedures for normal and cross-wind take-offs;

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(b) conduct a briefing covering the plan of action that will ensure the safest outcome in the event of abnormal operations;

(c) verify and correctly apply correction for the existing wind component to the take-off performance;

(d) perform and ensure all pre-take-off checks required by the appropriate checklist items are completed in a timely manner;

(e) align the airplane on the runway centreline;

(f) apply the controls correctly to maintain longitudinal alignment on the centreline of the runway, if appropriate, prior to initiating and during the take-off;

(g) adjust the power plant controls correctly;

(h) monitor power plant controls, settings, and instruments during take-off to ensure all predetermined parameters are maintained;

(i) adjust the controls to attain the desired pitch attitude to attain the desired performance;

(j) perform the required pitch changes and, as appropriate, perform and verify the completion of, gear and flap retractions, power adjustments (as applicable) and other required pilot-related activities at the required airspeed within the published tolerances;

(k) use the applicable noise abatement and wake turbulence avoidance procedures;

(l) verify the completion of the appropriate after take-off checklist items in a timely manner.

2.8 **TR-MEA.8 – Incident, malfunction or failure during take-off**

Manage incidents, malfunctions and failures during take-off as described in the AFM.

2.9 **TR-MEA.9 – Operate aircraft in flight**

(a) operate aircraft in normal flight profiles;

(b) operate aircraft systems for normal, non-normal and emergency conditions;

(c) identify aeroplane upset conditions and take appropriate action to return aeroplane to normal flight;

(d) demonstrate approach to the stall and stall recovery as follows:

(i) recognise approaching stall symptoms;

(ii) at the stall, reduce AOA;

(iii) prevent further yaw with rudder;

(iv) apply recommended power;

(v) when the wings are unstalled, level the wings using aileron control;

(vi) recover height loss;

(e) demonstrate maximum performance turning under the following conditions:

(i) maximum rate;

(ii) minimum radius;

(f) demonstrate flight with unreliable airspeed;

(g) demonstrate her or his ability to recover from unusual attitude and upset situations;

(h) demonstrate an emergency descent.

2.10 **TR-MEA.10 – Manage engine failure in flight**

(a) maintain control of aircraft flight path;

(b) correctly identify and verify failed engine;

(c) manage failure to achieve the safest outcome.

2.11 **TR-MEA.11 – Conducts engine relight and restart in flight**

Relight and restart an engine in flight.

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2.12 **TR-MEA.12 – Conduct a descent, arrival and landing**

(a) plan and conduct a descent, arrival and landing;

(b) obtain, interpret and brief ATC clearance for descent and arrival;

(c) manage non-normal or emergency conditions;

(d) demonstrate missed approach manoeuvre.

2.13 **TR-MEA.13 – Conduct taxi to stand, park and shut down**

Follow published procedures taxi, park and shut down aircraft at the designated parking bay.

3 Range of variables

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

(b) day and night VMC or IMC;

(c) aircraft of the type which the rating applies to;

(d) approved flight simulation training device if available;

(e) upset conditions include the following:

(i) pitch attitude more than 25° nose up;

(ii) pitch attitude more than 10° nose down;

(iii) bank angle more than 45°;

(iv) flying at airspeeds inappropriate to the conditions;

(f) in the absence of markings, the aircraft is maintained in the centre of the taxiway and at a safe distance from obstacles;

(g) simulated abnormal or emergency situations;

(h) flight crew incapacitation (multi-crew operations);

(i) simulated hazardous weather;

(j) sealed, gravel or grass surfaces.

4 Underpinning knowledge of the following:

(a) normal and cross-wind take-off;

(b) instrument take-off (IFR pilots only);

(c) engine failure during take-off;

(d) rejected take-off;

(e) departure procedures;

(f) steep turns;

(g) approaches to stalls;

(h) engine failure;

(i) any specific flight characteristics (e.g. Dutch roll);

(j) recovery from unusual attitudes;

(k) normal and cross-wind approaches and landings;

(l) approach and landing with a (simulated) engine failure – multi-engine aeroplane;

(m) baulked approach and missed landing;

(n) no flap or a non-standard flap approach and landing;

(o) the factors that affect the characteristics of an aircraft when full or partial flaps, leading edge flaps, and any other similar devices become inoperative, including on aircraft handling;

(p) extract critical airspeeds, V-speeds (including tyre rotation limits);

(q) calculate landing distance required;

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(r) normal systems operating procedures;

(s) emergency procedures;

(t) how potential and kinetic energy relate to an aircraft in flight;

(u) how energy states are manipulated to generate aerodynamic forces that allow an aircraft to be manoeuvred;

(v) knows the unintended flight conditions of pitch, bank and airspeed that describe upset aircraft state;

(w) knows the physical symptoms that may or may not be evident in a stall;

(x) stall recovery technique during any nominated phase of flight applicable to the aircraft type being flown;

(y) upset recovery techniques applicable to the aircraft type being flown at low altitude, and high altitude where the aircraft is pressurised.

(z) Structural integrity of an aeroplane is not ensured when operating at or below maximum manoeuvring speed, if multiple control inputs in one axis, or full control inputs in more than one axis, are initiated at the same time.

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FR-SEAC SINGLE-ENGINE AEROPLANE CLASS RATING FLIGHT REVIEW

1 Unit description

This unit describes the standards required for a single-engine aeroplane class rating flight review.

2 Elements and performance criteria

2.1 FR-SEAC.1 – Conduct flight

(a) start and taxi aircraft ready for take-off;

(b) perform a normal take-off simulating minimum take-off distance available;

(c) perform departure from circuit area;

(d) perform general handling manoeuvres, including the following:

(i) initiate stall and recover where initial symptoms of a stall become evident;

(ii) perform a full stall and recovery;

(iii) perform steep level and descending turns through at least 360°;

(iv) conduct low flying at 500 ft AGL and perform a reversal turn;

(e) perform circuit rejoin and at least 1 full circuit pattern;

(f) perform a missed approach;

(g) perform a flapless approach and landing;

(h) perform cross-wind take-off and landing if conditions permit;

(i) perform a normal landing simulating minimum landing distance available.

2.2 FR-SEAC.2 – Manage aircraft systems

(a) ensure sufficient fuel is loaded and fuel consumption is monitored and managed throughout the flight;

(b) manage the aircraft fuel system;

(c) manage all other aircraft systems.

2.3 FR-SEAC.3 – Navigation (optional)

(a) plan flight of at least 3 legs and submit flight plan in accordance with AIP;

(b) conduct a departure;

(c) navigate en route using visual and instrument navigation systems;

(d) perform diversion procedure;

(e) conduct arrival.

2.4 FR-SEAC.4 – Airspace

(a) comply with airspace procedures and requirements;

(b) operate aircraft radio and conform to standard radio procedures.

2.5 FR-SEAC.5 – Instrument flying

(a) perform basic flight manoeuvres using full instrument panel;

(b) recover from upset situations and unusual aircraft attitudes to straight and level flight;

(c) perform checks and monitor system for serviceability.

2.6 FR-SEAC.6 – Manage non-normal and emergency conditions

(a) manage a simulated engine failure in the take-off segment (optional);

(b) manage a simulated partial engine failure (optional);

(c) manage a simulated complete engine failure and execute a forced landing;

(d) manage aircraft system malfunctions other than engine failure.

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2.7 **FR-SEAC.7 – Non-technical skills**

(a) recognise and manage threats and errors during pre-flight planning and in-flight;

(b) maintain effective lookout and situational awareness;

(c) assess situations and make appropriate decisions;

(d) set priorities and manage tasks;

(e) maintain effective communication with stakeholders;

(f) communicate effectively using aeronautical radio.

2.8 **FR-SEAC.8 – Manage passengers and cargo**

(a) conduct pre-flight and in-flight safety briefings to ensure passengers are familiar with safety procedures, emergency equipment, exits and operational requirements;

(b) manage cargo.

3 Range of variables

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

(b) simulated conditions can be used;

(c) for FR-SEAC.5 – instrument flying, simulated or actual instrument conditions.

4 Underpinning knowledge of the following:

(a) privileges, limitations and responsibilities of the licences, ratings and endorsements the applicant holds;

(b) flight review requirements;

(c) obtaining, interpreting and applying meteorological and aeronautical information;

(d) navigation and flight planning for day VFR operations;

(e) weight and balance and aircraft performance;

(f) operation of systems fitted to the aircraft that is used in the flight review;

(g) extracting and applying aircraft performance data, including take-off and landing performance data for the aircraft that is used in the flight review;

(h) airspace requirements and procedures;

(i) manage cargo and passengers;

(j) hazard identification and risk management;

(k) non-normal and emergency procedures, including full and partial failures;

(l) local operating procedures;

(m) hazardous weather;

(n) airworthiness requirements;

(o) reporting requirements;

(p) ERSA normal and emergency procedures;

(q) current and recently changed legislation and procedures that are relevant to the applicant's licences, ratings and endorsements.

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FR-MEAC Multi-engine aeroplane class rating flight review

1 Unit description

This unit describes the standards required for a multi-engine aeroplane class rating flight review.

2 Elements and performance criteria

2.1 FR-MEAC.1 – Conduct flight

(a) start and taxi aircraft ready for take-off;

(b) perform a normal take-off simulating minimal take-off distance available;

(c) perform departure from circuit area;

(d) perform general handling manoeuvres, including the following:

(i) initiate stall and recover where initial symptoms of a stall become evident;

(ii) perform a full stall and recovery;

(iii) perform steep level and descending turns through at least 360°;

(iv) conduct low flying at 500 ft AGL and perform a reversal turn;

(e) perform circuit rejoin and at least 1 full circuit pattern;

(f) perform a missed approach;

(g) perform a normal landing simulating minimum landing distance available.

2.2 FR-MEAC.2 – Manage aircraft systems

(a) ensure sufficient fuel is loaded and fuel consumption is monitored and managed throughout the flight;

(b) manage the aircraft fuel system;

(c) manage all other aircraft systems.

2.3 FR-MEAC.3 – Navigation (optional)

(a) plan flight of at least 3 legs and submit flight plan in accordance with AIP;

(b) conduct a departure;

(c) navigate en route using visual and instrument navigation systems;

(d) perform diversion procedure;

(e) conduct arrival.

2.4 FR-MEAC.4 – Airspace

(a) comply with airspace procedures and requirements;

(b) operate aircraft radio and conform to standard radio procedures.

2.5 FR-MEAC.5 – Instrument flying

(a) perform basic flight manoeuvres using full instrument panel;

(b) recover from upset situations and unusual aircraft attitudes to straight and level flight;

(c) perform checks and monitor system for serviceability.

2.6 FR-MEAC.6 – Manage non-normal and emergency conditions

(a) manage a simulated engine failure in the take-off segment;

(b) manage a simulated partial engine failure;

(c) manage a simulated complete engine failure and execute a simulated asymmetric approach and landing;

(d) manage aircraft system malfunctions.

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2.7 **FR-MEAC.7 – Non-technical skills**

(a) recognise and manage threats and errors during pre-flight planning and in-flight;

(b) maintain effective lookout and situational awareness;

(c) assess situations and make appropriate decisions;

(d) set priorities and manage tasks;

(e) maintain effective communication with stakeholders;

(f) communicate effectively using aeronautical radio.

2.8 **FR-MEAC.8 – Manage passengers and cargo.**

(a) conduct pre-flight and in-flight safety briefings to ensure passengers are familiar with safety procedures, emergency equipment, exits and operational requirements;

(b) manage cargo.

3 Range of variables

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

(b) simulated conditions can be used;

(c) for FR-MEAC.5 – instrument flying, simulated or actual instrument conditions.

4 Underpinning knowledge of the following:

(a) privileges, limitations and responsibilities of the licences, ratings and endorsements the applicant holds;

(b) flight review requirements;

(c) obtaining, interpreting and applying meteorological and aeronautical information;

(d) navigation and flight planning for day VFR operations;

(e) weight and balance and aircraft performance;

(f) operation of systems fitted to the aircraft that is used in the flight review;

(g) extracting and applying aircraft performance data, including take-off and landing performance date for the aircraft that is used in the flight review;

(h) airspace requirements and procedures;

(i) manage cargo and passengers;

(j) hazard identification and risk management;

(k) non-normal and emergency procedures, including full and partial failures;

(l) local operating procedures;

(m) hazardous weather;

(n) airworthiness requirements;

(o) reporting requirements;

(p) ERSA normal and emergency procedures;

(q) current and recently changed legislation and procedures that are relevant to the applicant's licences, ratings and endorsements.

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FR-MEAT Multi-engine aeroplane type rating flight review

1 Unit description

This unit describes the standards required for a multi-engine aeroplane type rating flight review.

2 Elements and performance criteria

2.1 FR-MEAT.1 – Conduct flight

(a) start and taxi aircraft ready for take-off;

(b) perform a normal take-off simulating minimal take-off distance available;

(c) perform departure from circuit area;

(d) perform general handling manoeuvres, including the following:

(i) initiate stall and recover where initial symptoms of a stall become evident;

(ii) perform a full stall and recovery;

(iii) perform steep level and descending turns through at least 360°;

(iv) conduct low flying at 500 ft AGL and perform a reversal turn;

(e) perform circuit rejoin and at least 1 full circuit pattern;

(f) perform a missed approach;

(g) perform a normal landing simulating minimum landing distance available.

2.2 FR- MEAT.2 – Manage aircraft systems

(a) ensure sufficient fuel is loaded and fuel consumption is monitored and managed throughout the flight;

(b) manage the aircraft fuel system;

(c) manage all other aircraft systems.

2.3 FR- MEAT.3 – Navigation (optional)

(a) plan flight of at least 3 legs and submit flight plan in accordance with AIP;

(b) conduct a departure;

(c) navigate en route using visual and instrument navigation systems;

(d) perform diversion procedure;

(e) conduct arrival.

2.4 FR- MEAT.4 – Airspace

(a) comply with airspace procedures and requirements;

(b) operate aircraft radio and conform to standard radio procedures.

2.5 FR- MEAT.5 – Instrument flying

(a) perform basic flight manoeuvres using full instrument panel;

(b) recover from upset situations and unusual aircraft attitudes to straight and level flight;

(c) perform checks and monitor system for serviceability.

2.6 FR- MEAT.6 – Manage non-normal and emergency conditions

(a) manage a simulated engine failure in the take-off segment;

(b) manage a simulated partial engine failure;

(c) manage a simulated complete engine failure and execute a simulated asymmetric approach and landing;

(d) manage aircraft system malfunctions.

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2.7 **FR- MEAT.7 – Non-technical skills**

(a) recognise and manage threats and errors during pre-flight planning and in-flight;

(b) maintain effective lookout and situational awareness;

(c) assess situations and make appropriate decisions;

(d) set priorities and manage tasks;

(e) maintain effective communication with stakeholders;

(f) communicate effectively using aeronautical radio.

2.8 **FR- MEAT.8 – Manage passengers and cargo.**

(a) conduct pre-flight and in-flight safety briefings to ensure passengers are familiar with safety procedures, emergency equipment, exits and operational requirements;

(b) manage cargo.

3 Range of variables

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

(b) simulated conditions can be used;

(c) for FR-MEAT.5 – instrument flying, simulated or actual instrument conditions.

4 Underpinning knowledge of the following:

(a) privileges, limitations and responsibilities of the licences, ratings and endorsements the applicant holds;

(b) flight review requirements;

(c) obtaining, interpreting and applying meteorological and aeronautical information;

(d) navigation and flight planning for day VFR operations;

(e) weight and balance and aircraft performance;

(f) operation of systems fitted to the aircraft that is used in the flight review;

(g) extracting and applying aircraft performance data, including take-off and landing performance date for the aircraft that is used in the flight review;

(h) airspace requirements and procedures;

(i) manage cargo and passengers;

(j) hazard identification and risk management;

(k) non-normal and emergency procedures, including full and partial failures;

(l) local operating procedures;

(m) hazardous weather;

(n) airworthiness requirements;

(o) reporting requirements;

(p) ERSA normal and emergency procedures;

(q) current and recently changed legislation and procedures that are relevant to the applicant's licences, ratings and endorsements.

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TR-FE Type rating – flight engineer

1 Unit description

This unit describes the skills and knowledge required by a flight engineer to operate a type-rated aircraft.

2 Elements and performance criteria

2.1 FTM.1 – Conduct pre-flight inspection

(a) complete pre-flight inspection correctly;

(b) communicate effectively with ground support crew;

(c) ensure removal of appropriate aircraft engine protective devices;

(d) prepare and operate aircraft systems.

2.2 FTM.2 – Manage engines

(a) manage engine systems correctly;

(b) manage and monitor aircraft systems as appropriate;

(c) manage occurrences where specific instructions or checklist items are not published.

2.3 FTM.3 – Conduct pre-take-off checks

(a) complete the pre-take-off checklist and confirm all applicable systems are within normal operating range.

2.4 FTM.4 – Conduct take-off

(a) operate flight engineer controls correctly;

(b) adjust the power plant controls correctly;

(c) monitor power plant controls, settings, and instruments during take-off to ensure all predetermined parameters are maintained;

(d) inform the pilot in command of abnormal or emergency situations in a timely manner.

2.5 FTM.5 – Operate aircraft in flight

(a) operate flight engineer systems for normal, non-normal and emergency conditions;

(b) identify an aeroplane upset condition and immediately informs the pilot in command.

2.6 FTM.6 – Manage engine failure in flight

(a) inform pilot in command;

(b) correctly identify and verify failed engine;

(c) manage failure appropriately.

2.7 FTM.7 – Conducts engine relight and restart in flight

2.8 FTM.8 – Conducts shutdown

2.8.1 The person must be able to demonstrate her or his ability to correctly shutdown the aircraft.

3 Range of variables

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

(b) day and night VMC or IMC;

(c) upset conditions include the following:

(i) pitch attitude more than 25° nose up;

(ii) pitch attitude more than 10° nose down;

(iii) bank angle more than 45°;

(iv) flying at airspeeds inappropriate to the conditions.

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(d) approved multi-engine multi-crew aircraft;

(e) approved flight simulator;

(f) simulated abnormal or emergency situations;

(g) flight crew incapacitation (multi-crew operations);

(h) simulated hazardous weather.

4 Underpinning knowledge of the following:

(a) engine failure during take-off;

(b) rejected take-off;

(c) departure procedures;

(d) aircraft systems failures;

(e) any specific flight characteristics (e.g. Dutch roll);

(f) recognition of unusual attitudes;

(g) recognition of aeroplane upset conditions (aeroplane only);

(h) normal systems operating procedures;

(i) emergency procedures;

(j) approach and landing with a (simulated) engine failure – multi-engine aircraft.

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HELICOPTER CATEGORY

H1 Control helicopter on the ground – stationary

1 Unit description

This unit describes the skills and knowledge required to operate a stationary helicopter on the ground.

2 Elements and performance criteria

2.1 **H1.1 – Start and stop engine**

(a) ensure the helicopter is in a suitable location for starting the engine and rotors;

(b) perform pre-start and start actions;

(c) perform shutdown and after-shutdown actions;

(d) control blade sailing during start and shut down by appropriate positioning of helicopter and use of cyclic pitch;

(e) comply with manufacturer's limitations and report deviations when appropriate;

(f) manage emergencies appropriately (simulated).

2.2 **H1.2 – Engage rotor**

(a) set engine RPM within limits before rotor engagement (if applicable – this is only relevant to the few rotorcraft, including the R22 and R44 which are the most common basic trainers);

(b) engage rotor correctly (if applicable);

(c) maintain engine RPM within limits during rotor engagement;

(d) maintain disc position within operating limits as Rotor RPM (RRPM) increases;

(e) operate rotor brake correctly (if applicable – this is only relevant to the very few rotocraft that can run 1 engine at idle before rotor engagement);

(f) monitor and react appropriately to transmission, hydraulic system and engine indications (if applicable).

2.3 **H1.3 – Control main rotor disc and anti-torque system**

(a) maintain the correct main rotor disc attitude during all RRPM operations;

(b) set correct engine idle RPM;

(c) set correct anti-torque pedal position to compensate for main rotor torque;

(d) maintain correct rotor disc attitude and RRPM while performing other tasks or actions.

3 Range of variables

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

(b) helicopter with dual controls and electronic intercom, if fitted;

(c) engine start and shutdown emergencies covered by the aircraft flight manual;

(d) malfunctions and emergency procedures described in the flight manual;

(e) day VFR;

(f) aerodromes and helicopter landing sites;

(g) obstructions and personnel (simulated);

(h) various wind conditions (may be simulated).

4 Underpinning knowledge of the following:

(a) regulations and procedures relating to the ground operation of rotorcraft;

(b) operational and start limitations of typical helicopters;

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(c) applicable helicopter systems;

(d) operating on different surfaces, including sealed and unsealed surfaces;

(e) effect of wind on rotor blade control (blade sailing);

(f) use of the fire extinguisher system fitted to the helicopter;

(g) ground resonance;

(h) dynamic rollover;

(i) local noise abatement procedures and curfews.

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H2 Control helicopter in lift-off, hover and landing

1 Unit description

This unit describes the skills and knowledge required to complete pre-take-off checks, lift-off helicopter to the hover, complete hover checks, perform hover, perform aborted lift-off, perform hovering turns and land from the hover.

2 Elements and performance criteria

2.1 H2.1 – Lift-off and hover helicopter, perform hover checks and abort take-off

(a) calculate aircraft performance for the flight;

(b) complete pre-take-off checks;

(c) lift-off helicopter:

(i) set flight controls correctly to prepare for lift-off to the hover at the location;

(ii) use correct flight and power controls to lift helicopter off the surface to a stable hover at the appropriate hover height for the helicopter while controlling heading;

(iii) anticipate and take account of wind effect with appropriate control inputs to maintain position over hover point;

(iv) demonstrate awareness of rotor downwash on surrounding aircraft, people, objects and environment;

(v) confirm the proper functioning of the flight controls and the centre of gravity and power required to hover are within limits;

(d) at a constant and safe hover height, commence, maintain and stop a hover taxi manoeuvre while maintaining power and RRPM within the limits;

(e) remain clear of the manufacturer's 'height-velocity diagram avoid area' when applicable;

(f) perform aborted take-off from the hover.

2.2 H2.2 – Hover helicopter in cross-wind and tailwind

(a) maintain helicopter in flight over a nominated hover point at a nominated height and heading in cross-wind and tailwind;

(b) apply controlled corrective action to maintain a constant rate of turn and counter the effects of wind.

2.3 H2.3 – Perform turn around a mast

(a) turn helicopter around a mast while maintaining a constant height at a constant rate of turn using anti-torque pedals;

(b) stop the turn on a nominated heading;

(c) maintain RPM within limits during the turn.

2.4 H2.4 – Perform turns around nose and tail

(a) turn helicopter around a nominated point on or forward of the nose while maintaining a constant height and specified rate of movement around the point;

(b) turn helicopter around a nominated point on or aft of the tail while maintaining a constant height and specified rate of movement around the point;

(c) commence turns in a specified direction and stop them at a specified heading;

(d) maintain RPM within limits during the turn;

(e) maintain ground track at a constant distance from the nominated point;

(f) use the anti-torque pedals to ensure helicopter is pointed at the nominated turning point.

2.5 H2.5 – Perform sideways and backwards flight

(a) transition from static hover to forward, sideways and backwards flight and terminate this movement over a nominated hover point at a nominated height;

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(b) ensure direction of travel is clear of obstructions;

(c) conduct backward movement only after visually checking behind helicopter and adjusting height as required;

(d) maintain sideways and backwards directional control;

(e) maintain RPM within limits during the turn;

(f) maintain rate of movement of helicopter at a safe speed;

(g) maintain lookout in direction of travel;

(h) terminate sideways or backwards movement at desired hover point.

2.6 **H2.6 – Land from the hover**

(a) complete pre-landing checks (if applicable);

(b) nominate touchdown point;

(c) from a stable hover, establish a controlled rate of descent, maintain heading and remain over the nominated hover point;

(d) land helicopter at a suitable rate and maintain a constant heading without lateral or longitudinal drift while maintaining the requisite RRPM during the landing sequence;

(e) ensure helicopter is stable on its undercarriage prior to fully lowering collective;

(f) perform after-landing checks;

(g) for mishandled landing:

(i) recognise when a safe landing cannot be achieved;

(ii) discontinue the landing and return to the hover safely;

(iii) re-establish a stabilised hover;

(iv) land from the stabilised hover.

3 Range of variables

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

(b) helicopter with dual controls and electronic intercom day VFR;

(c) aerodromes and helicopter landing sites;

(d) obstructions and personnel (simulated);

(e) various wind conditions (may be simulated).

4 Underpinning knowledge of the following:

(a) calculates aircraft performance for the flight;

(b) operational and start limitations of typical helicopters;

(c) operating on different surfaces, including sealed and unsealed surfaces;

(d) effect of wind on rotor blade control (blade sailing);

(e) use of the fire extinguisher system fitted to the helicopter being used;

(f) ground resonance;

(g) recirculation;

(h) dynamic rollover;

(i) local noise abatement procedures and curfews.

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H3 Taxi helicopter

1 Unit description

This unit describes the skills and knowledge required to taxi a helicopter.

2 Elements and performance criteria

2.1 H.3.1 – Ground taxi helicopter

(a) use correct flight and power control techniques to initiate forward movement of the helicopter on the surface;

(b) check and confirm the proper functioning of the wheel brake system;

(c) use correct flight and power control techniques to ground taxi and manoeuvre the helicopter on appropriate surfaces (wet and dry) at a safe speed in headwind, cross-wind and tailwind conditions;

(d) perform flight instrument checks while taxiing (if applicable);

(e) avoids adverse effects of rotor wash on personnel, aircraft, structures and loose objects;

(f) apply smooth control while ground taxiing and manoeuvring the helicopter with turns at a constant and safe rate of turn while maintaining power and RRPM within the limits;

(g) adjusts taxi speed to suit helicopter type, surface conditions, congestion while maintaining control and desired track and avoiding collision with obstacles and other aircraft;

(h) maintain landing gear in contact with the ground;

(i) apply smooth and controlled actions to terminate at a nominated holding or parking point under different wind and surface conditions;

(j) maintain RRPM within normal operating limits;

(k) observe mast operating limits, if applicable;

(l) ensure final approach path is clear of conflicting traffic.

2.2 H3.2 – Air taxi helicopter

(a) manoeuvre the helicopter while allowing for prevailing conditions, over a prescribed track at a constant height;

(b) maintain alignment of the landing gear with the direction of travel;

(c) remain clear of manufacturer's 'height-velocity diagram avoid area';

(d) maintain RPM within operating limits;

(e) adjust air taxi speed to suit helicopter type, traffic conditions, congestion, and maintenance of control and to avoid collision with obstacles or other aircraft;

(f) ensure final approach path is clear of conflicting traffic.

2.3 H3.3 – Air transit helicopter

(a) obtain transit clearance and complies with ATC instructions (if applicable);

(b) manoeuvre the helicopter, while allowing for prevailing conditions, over a prescribed track at a height not above 100 ft AGL at airspeeds greater than speeds used for air taxiing;

(c) limits movement within the aerodrome boundaries, without incident;

(d) remain clear of manufacturer's 'height-velocity diagram avoid area';

(e) maintain height;

(f) manipulate instruments, switches or devices, when safe to do so, including when the release of the collective pitch level is required, while maintaining height, heading, speed, and attitude and not exceeding RPM or power limits;

(g) avoid conditions that could lead to loss of tail rotor or anti-torque effectiveness;

(h) aligns helicopter with track, or balances, as applicable;

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(i) adjust air transit ground speed to suit helicopter type, traffic conditions, congestion, and maintenance of control and to avoid collision with obstacles or other aircraft;

(j) maintain RRPM within normal operating limits;

(k) avoid adverse effect of rotor wash on other aircraft, facilities, loose objects and personnel;

(l) ensure final approach path is clear of conflicting traffic.

3 Range of variables

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

(b) helicopter with dual controls and electronic intercom;

(c) day VFR;

(d) aerodromes and helicopter landing sites;

(e) obstructions and personnel (simulated);

(f) various wind conditions (may be simulated).

4 Underpinning knowledge of the following:

(a) height-velocity diagram;

(b) adverse effects of rotor wash;

(c) ground resonance and action to be taken when it occurs;

(d) taxiway and runway markings;

(e) loss of tail rotor effectiveness and action to be taken when it occurs;

(f) hazards and risks associated with conducting air taxi and air transit manoeuvres.

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H4 Take-off helicopter and approach to hover

1 Unit description

This unit describes the skills and knowledge required to prepare a helicopter for take-off, perform take-off and perform an approach to termination at hover.

2 Elements and performance criteria

2.1 **H4.1 – Carryout pre-take-off checks**

(a) complete pre-take-off checks correctly and clearing turn (if applicable);

(b) assess situation and select safe take-off path;

(c) conduct a take-off safety briefing (this may be carried out prior to take off lift-off to the hover if necessitated by location);

(d) clear the area, taxi into the take-off position, perform line-up checks.

2.2 **H4.2 – Take-off helicopter**

(a) transition to forward flight and maintain take-off path;

(b) recognise and control translational lift effect;

(c) accelerate to and maintain the recommended or nominated climb speed;

(d) control the helicopter to remain outside of the Height-Velocity (H-V) avoid curve, balanced and trimmed (if applicable);

(e) ensure obstacle clearance;

(f) correct power and attitude are maintained for the profile and IAS to be flown;

(g) landing gear is retracted after a positive rate of climb is established (if applicable);

(h) comply with noise abatement procedures, where applicable;

(i) complete after take-off checks.

2.3 **H4.3 – Approach to hover**

(a) select a suitable termination point;

(b) complete checklists as applicable for manoeuvre;

(c) intercept and maintain appropriate approach angle and track;

(d) adjust power and attitude to achieve a controlled decreasing closure rate to the termination point;

(e) align the landing gear to the planned approach direction;

(f) recognise and control loss of translational lift;

(g) controls RPM within limits;

(h) terminates approach to the hover over the termination point.

2.4 **H4.4 – Perform go-round procedure**

(a) recognise adverse conditions that require the execution of a go-round;

(b) initiate go-round safely in the time available;

(c) set power and attitude to achieve safe climb at appropriate IAS;

(d) maintain control throughout go-round procedure;

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

(f) perform after-take-off checks.

3 Range of variables

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

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(b) helicopter with dual controls and electronic intercom;

(c) day VFR;

(d) aerodromes and helicopter landing sites;

(e) obstructions and personnel (simulated);

(f) various wind conditions (may be simulated).

4 Underpinning knowledge of the following:

(a) vortex ring state;

(b) loss of tail rotor effectiveness (LTE);

(c) low ‘g’ and mast bumping;

(d) overpitching or low RRPM – rotor stall;

(e) recirculation;

(f) contributing operational situations and environmental conditions;

(g) avoidance and recognition of and recovery techniques appropriate to helicopter type;

(h) aircraft systems;

(i) aircraft performance;

(j) aircraft weight and balance;

(k) AFM and POH;

(l) day VFR flight rules.

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H5 Control helicopter in normal flight

1 Unit description

This unit describes the skills and knowledge required to control a helicopter in normal flight, whilst flying straight and level, climbing, descending and turning.

2 Elements and performance criteria

2.1 H5.1 – Climb helicopter

(a) set and maintain power and attitude to establish and maintain climb flight on a constant heading for the following profiles:

(i) maintain IAS for cruise climb;

(ii) maintain IAS for best angle of climb (V_X);

(iii) maintain IAS for best rate of climb (V_Y);

(b) set appropriate altimeter settings;

(c) ensure helicopter is balanced and trimmed (if applicable);

(d) maintain power as altitude increases.

2.2 H5.2 – Maintain straight and level flight

(a) set and maintain power and attitude to achieve straight and level flight at nominated airspeeds, altitudes and headings;

(b) ensure helicopter is balanced and trimmed (if applicable).

2.3 H5.3 – Descend helicopter

(a) set and maintain power and attitude to achieve cruise descending flight on a constant heading at a nominated rate of descent;

(b) set appropriate altimeter settings;

(c) identify and avoid terrain and aircraft traffic;

(d) ensure helicopter is balanced and trimmed (if applicable).

2.4 H5.4 – Turn helicopter

(a) perform airspace cleared procedure;

(b) set and maintain power, attitude and bank to achieve specified turn performance to the left and to the right, onto specific headings or geographical features for the following:

(i) level turns;

(ii) climbing turn, rate 1 or with 20° bank angle;

(iii) powered descending turn with 30° bank angle;

(c) turn helicopter onto specified headings using the magnetic compass;

(d) manoeuvre the helicopter over specified ground tracks;

(e) ensure helicopter is balanced and trimmed (if applicable).

2.5 H5.5 – Perform circuits and approaches

(a) plan and conduct descent;

(b) join traffic pattern;

(c) maintain a safe separation from other traffic joining, departing or in the traffic pattern;

(d) track upwind on extended centreline to 500 ft;

(e) adjust circuit to ensure spacing with preceding traffic;

(f) establish the helicopter on cross-wind tracking 90° to the runway;

(g) establish the helicopter on downwind at circuit height tracking parallel to the runway at a specified distance from the runway;

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(h) perform pre-landing checks;

(i) establish aircraft on base leg a specified distance from helicopter landing site;

(j) commence and control rate of descent to maintain approach path;

(k) ensure helicopter is aligned with specified or appropriate runway when applicable;

(l) establish helicopter on final approach in approach configuration not below 500 ft AGL;

(m) select termination point;

(n) maintain closure rate to the termination point;

(o) maintain helicopter on extended centreline, approach slope and approach speed;

(p) adjust speed to compensate for wind gusts;

(q) complete final approach checks;

(r) ensure helicopter is balanced and trimmed (as applicable);

(s) complete approach at the termination point.

2.6 **H5.6 – Comply with airspace requirements**

(a) use a chart and identify the geographical limits of the designated area;

(b) with reference to a suitable chart, identify prominent geographical features;

(c) describe the position of controlled airspace using a suitable chart and geographical features;

(d) identify and avoid restricted areas and controlled airspace using a chart and geographical features when applicable;

(e) complete departure from the circuit area and transits to the designated area without incident;

(f) complete departure from the designated area and transits to the circuit area without incident;

(g) maintain orientation by geographical features with the aid of a suitable map.

3 Range of variables

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

(b) helicopter with dual controls and electronic intercom;

(c) day VFR;

(d) aerodromes and helicopter landing sites;

(e) obstructions and personnel (simulated);

(f) various wind conditions (may be simulated).

4 Underpinning knowledge of the following:

(a) primary and secondary effects of helicopter controls;

(b) vortex ring state;

(c) circuit operations;

(d) managing non-normal and emergencies in the circuit area;

(e) wind shear, turbulence and wake turbulence;

(f) helicopter instruments and monitoring helicopter performance.

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H6 Control helicopter during advanced manoeuvres

1 Unit description

This unit describes the skills and knowledge required to control a helicopter during advanced manoeuvres and procedures.

2 Elements and performance criteria

2.1 H6.1 – Turn helicopter steeply

(a) complete airspace cleared procedure;

(b) perform steep turns (45º) onto a nominated heading or geographical feature as follows:

(i) maintaining altitude;

(ii) descending through a minimum descent of 500 ft;

(iii) in balance.

2.2 H6.2 – Perform autorotative flight

(a) enter and maintain autorotative flight at a nominated speed in balanced flight for the following profiles:

(i) straight descent at nominated heading and manufacturer's recommended speed;

(ii) turning descent through 180˚ and 360˚ using up to 45˚ angle of bank;

(iii) best range speed and minimum descent rate speed;

(b) maintain RRPM within limitations during autorotative flight;

(c) perform power recovery as follows:

(i) anticipate and comply with nominated minimum descent altitude;

(ii) ensure engine RPM and RRPM 'needles' are rejoined prior to the setting of climb power;

(iii) set climb power;

(iv) control yaw;

(v) set climb speed;

(d) perform power termination as follows:

(i) maintain RRPM within limitations;

(ii) ensure throttle(s) is at 100% (or the equivalent terminology) prior to the commencement of the flare;

(iii) commence flare at appropriate height for the prevailing conditions and reduce ground speed and rate of descent;

(iv) controls attitude to achieve a decreasing closure rate and reducing rate of descent;

(v) control yaw, engine and RRPM;

(vi) terminate the helicopter to a hover or hover taxi within tolerances of termination point without lateral or rearward movement;

(e) perform autorotative landing as follows:

(i) commence flare at appropriate height for the prevailing conditions and reduce ground speed and rate of descent;

(ii) control RRPM;

(iii) select and maintain helicopter at the hover attitude without lateral or rearward movement;

(iv) control touchdown rate;

(v) control yaw;

(vi) land helicopter with zero or minimum run-on speed within tolerances of nominated touchdown point without lateral or rearward movement.

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2.3 **H6.3 – Land on, and lift off from, sloping ground**

2.3.1 Land on sloping ground:

(a) plan and conduct a slope landing in accordance with the wind and slope limits specified for the helicopter (if stated);

(b) use the appropriate slope landing technique relevant to the helicopter as follows:

(i) make adjustments using the controls in response to wind, surface and applicable limitations;

(ii) maintain RRPM within limits;

(iii) apply an appropriate rate of descent whilst maintaining a constant heading and preventing all drift during all the phases of land on;

(iv) control the roll rate of the helicopter following first contact;

(v) maintain the helicopter's position on the slope while lowering collective and centralising the cyclic;

(c) ensure security of the helicopter on the sloping surface prior to reducing rotor RPM.

2.3.2 Lift off from sloping ground:

(a) plan and conduct a lift-off from sloping ground in accordance with the wind and slope limits of the helicopter;

(b) use the appropriate slope lift-off technique for the helicopter as follows:

(i) make adjustments using the controls in response to wind, surface and applicable limitations;

(ii) maintain RRPM within limits;

(iii) apply an appropriate rate of climb while maintaining a constant heading and preventing all drift during all the phases of lift-off;

(iv) control the roll rate of the rotorcraft during lift-off;

(c) establish a stable hover above the lift off position clear of all obstacles.

2.4 **H6.4 – Land, take off and manoeuvre in a confined area**

2.4.1 Land in confined area:

(a) plan and conduct a confined area landing in accordance with the limitations for the helicopter;

(b) confirm helicopter performance, which includes power checks as applicable;

(c) inspect confined area and determine a plan, including an appropriate approach and departure path;

(d) intercept and maintain approach path to the termination point;

(e) operate the helicopter within its limitations;

(f) land at a suitable landing and lift-off area.

2.4.2 Take off from confined area:

(a) plan a take-off from a confined area in accordance with the limitations for the helicopter;

(b) calculate and confirm the helicopter's take-off performance is adequate for the confined area;

(c) determine an appropriate abort point;

(d) identify all obstacles on the departure patch and a possible abort path in the confined area;

(e) conduct take-off and departure from the confined area and remain clear of obstacles with a margin that is applicable to the operation;

(f) operate the helicopter within its limitations.

2.4.3 Manoeuvre in a confined area:

(a) plan for manoeuvring in a confined area in accordance with the limitations for the helicopter;

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(b) confirm the helicopter's performance, which includes power checks as applicable;

(c) identify all obstacles in the confined area;

(d) manoeuvre the helicopter in the confined area while remaining clear of obstacles;

(e) operate the helicopter within its limitations.

2.5 **H6.5 – Execute limited power take-off, approach and landing**

2.5.1 Limited power take-off:

(a) confirm the helicopter's performance using its performance charts;

(b) apply maximum, or nominated, power, while maintaining optimum RRPM;

(c) accelerate helicopter at an appropriate rate;

(d) recognise and control translational lift effect;

(e) maintain direction of departure path then balance when appropriate;

(f) establish and maintain climb;

(g) identify and avoid obstacles.

2.5.2 Limited power approach and landing:

(a) confirm the helicopter's performance using its performance charts;

(b) confirm the landing area available is sufficient for a safe limited power approach and landing;

(c) determine an appropriate plan for approach, which includes the nomination of a suitable touchdown point;

(d) intercept the planned approach path appropriate for the performance of the helicopter in the prevailing conditions;

(e) manage the helicopter's airspeed with the optimum RRPM appropriate to the power available and landing environment;

(f) identify and avoid obstacles;

(g) maintain effective translational lift until touchdown is assured;

(h) maintain balance and direction of approach path;

(i) touchdown on the nominated touchdown point;

(j) control the helicopter on the ground.

2.6 **H6.6 – Land on, and take-off, from a pinnacle or ridgeline (CPL only)**

2.6.1 Land on pinnacle or ridgeline:

(a) plan a pinnacle or ridgeline landing in accordance with the limitations of the helicopter;

(b) confirm the helicopter's performance, which includes power checks as applicable;

(c) inspect the ridgeline or pinnacle as applicable, and determine a plan including an appropriate approach and departure path;

(d) assess the local environment conditions for effects of the terrain on wind and turbulence;

(e) intercept and maintain the approach path to the termination point;

(f) operate the helicopter within its limitations and set optimum RPM;

(g) maintain effective translational lift until touchdown is assured;

(h) terminate to a hover over the selected landing and lift-off area;

(i) touchdown on nominated touchdown point;

(j) control the helicopter on the ground.

2.6.2 Take off from pinnacle or ridgeline:

(a) plan a take-off from in a pinnacle or ridgeline in accordance with the limitations of the helicopter;

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(b) calculate and confirm the helicopter's take-off performance is adequate for the departure;

(c) determine an appropriate abort point (if applicable);

(d) identify all obstacles on the departure patch and proposed abort path for the pinnacle or ridgeline (if applicable);

(e) conduct take-off and departure from the pinnacle or ridgeline remaining clear of obstacles with a margin that is applicable to the operation;

(f) operate the helicopter within its limitations.

3 Range of variables

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

(b) day VFR;

(c) where applicable:

(i) confined helicopter landing site;

(ii) terrain with sloping ground;

(iii) terrain with a pinnacle or ridgeline;

(d) simulated abnormal and emergency situations;

(e) simulated hazardous or marginal weather;

(f) for PPL, autorotative landings may be replaced by a power termination.

4 Underpinning knowledge of the following:

(a) cross-wind and rotor control limits for the helicopter;

(b) helicopter performance limitations;

(c) local weather conditions;

(d) typical hazards and risks associated with conducting advanced manoeuvres and identify precautions and procedures to control the risks;

(e) instructions, procedures and information that is relevant to executing advanced manoeuvres and procedures.

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H7 Manage abnormal situations and emergencies – helicopter

1 Unit description

This unit describes the skills and knowledge required to manage abnormal and emergency situations in helicopters.

2 Elements and performance criteria

2.1 H7.1 – Manage forced landing from level flight

(a) identify engine failure correctly and maintain control of helicopter;

(b) establish and maintain helicopter in autorotative flight;

(c) maintain balance;

(d) control RRPM within limitations;

(e) select suitable landing area;

(f) position helicopter to land in selected area;

(g) make appropriate radio transmissions (if time permits);

(h) perform emergency checks;

(i) brief passengers as appropriate;

(j) perform autorotative landing and secure helicopter.

2.2 H7.2 – Manage engine failure during take-off and on final approach

(a) identify engine failure correctly and maintain control of helicopter;

(b) establish and maintain helicopter in autorotative flight;

(c) maintain skids parallel to direction of travel;

(d) perform autorotative landing or power termination and secure helicopter.

2.3 H7.3 – Manage engine failure during hover or hover taxi

2.3.1 During hover:

(a) correctly identify engine failure;

(b) control yaw and drift;

(c) perform controlled touchdown.

2.3.2 During hover taxi:

(a) correctly identify engine failure;

(b) control yaw and drift;

(c) maintain skids parallel to direction of travel;

(d) perform controlled touchdown;

(e) control ground-slide.

2.4 H7.4 – Manage tail rotor malfunctions

2.4.1 During flight:

(a) correctly identify tail rotor malfunction;

(b) maintain control of the helicopter;

(c) select a suitable landing area;

(d) manoeuvre helicopter to a position where the safest landing is assured;

(e) land the helicopter.

2.4.2 During hover:

(a) correctly identify tail rotor malfunction;

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(b) maintain control of the helicopter;

(c) select a suitable landing area;

(d) land the helicopter.

2.5 **H7.5 – Manage jammed flight control systems**

(a) correctly identify when controls are jammed;

(b) locate and remove any objects that are causing the jam;

(c) maintain control of the helicopter and rectify the malfunction, if appropriate;

(d) manoeuvre the helicopter to the safest landing area available.

2.6 **H7.6 – Manage helicopter systems malfunctions**

(a) maintain control of the helicopter;

(b) identify and confirm the system malfunction;

(c) manage the malfunction appropriately;

(d) where appropriate, isolate the system;

(e) perform emergency procedures.

3 Range of variables

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

(b) helicopter with dual controls and electronic intercom;

(c) day VFR;

(d) aerodromes and helicopter landing sites;

(e) obstructions and personnel (simulated);

(f) various wind conditions (can be simulated).

4 Underpinning knowledge of the following:

(a) emergency procedures;

(b) applicable system malfunctions;

(c) managing system malfunctions;

(d) prioritising tasks when managing malfunctions;

(e) the following key hazards including, for each, the typical causal factors and contributing operational situations, avoidance and recognition of symptoms and recovery techniques:

(i) vortex ring state;

(ii) ground resonance;

(iii) loss of tail rotor effectiveness (LTE);

(iv) low ‘g’ and mast bumping;

(v) overpitching or low RRPM – rotor stall;

(vi) retreating blade stall;

(vii) recirculation;

(viii) dynamic rollover;

(f) the impact of high gross weight and high density altitude on key hazards;

(g) threat and error management as follows:

(i) flight planning to avoid hazardous flight regimes;

(ii) techniques for how to avoid a potentially hazardous situation developing whilst in flight.

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TR-SEH Type rating – single-engine helicopter

1 Unit description

This unit describes the skills and knowledge required to operate a type-rated single-engine helicopter.

2 Elements and performance criteria

2.1 TR-SEH.1 – Control helicopter on the ground

2.1.1 For all helicopters:

(a) prepare for start as follows:

(i) using an orderly procedure with checklists, inspect and prepare the helicopter, including those items recommended by the manufacturer, for a flight;

(ii) identify and verify switches, circuit breakers, fuses, and spare fuses pertinent to day and night operations;

(iii) confirm that there is sufficient fuel and oil for the intended flight;

(iv) identify and verify the required equipment for the flight is on-board and serviceable;

(v) ensure security of baggage and required equipment;

(vi) organise and arrange documents and equipment that will need to be accessed in flight in a manner that makes the items readily available;

(vii) perform an effective passenger safety briefing (if type capable of carrying passengers);

(b) conduct engine start and rotor engagement as follows:

(i) ensure helicopter is located in a suitable location for starting engine and rotors;

(ii) use the appropriate checklist provided by the helicopter manufacturer or owner or operator;

(iii) calculate and confirm sufficient power margin available for the proposed flight;

(iv) demonstrate knowledge of recommended starting procedures;

(v) take appropriate action with respect to unsatisfactory start conditions;

(vi) complete the appropriate engine and helicopter systems checks;

(c) taxiing and hover manoeuvring as follows:

(i) carry out pre-take-off checks;

(ii) set flight controls correctly to prepare for the lift-off transition to the hover at the location;

(iii) use correct flight and power control techniques to lift helicopter off the surface to a stable hover at the appropriate hover height for the helicopter;

(iv) confirm the proper functioning of the flight controls and confirm centre of gravity and power required to hover are within limits;

(v) trim helicopter where applicable;

(vi) demonstrate smooth control at a constant safe hover height while hover manoeuvring and maintaining power and RRPM within the limits;

(vii) maintain helicopter in flight over a nominated hover point at a nominated height and heading in cross-wind and tailwind;

(viii) transition from static hover to forward, sideways and backwards flight and terminate this movement over a nominated hover point;

(ix) turn helicopter around a the mast while maintaining a constant height at a constant rate of turn using anti-torque pedals;

(x) turn helicopter around a nominated point on or forward of the nose or on or aft of the tail while maintaining a constant height and specified rate of movement around the point;

(xi) apply controlled corrective action to maintain a constant rate of turn and to counter the effects of wind;

(xii) adjust air transit ground speed to suit helicopter type, traffic conditions, congestion, and maintenance of control and to avoid collision with obstacles or other aircraft.

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2.1.2 For a helicopter with wheel landing gear, be able to do the following:

(a) select and maintain correct disk attitude and power required to initiate forwards movement of the helicopter on the surface;

(b) check and confirm the proper functioning of the wheel brake system;

(c) select and maintain correct disk attitude and power required to ground taxi and manoeuvre the helicopter on appropriate surfaces (wet and dry) at a safe speed in headwind, cross-wind and tailwind conditions;

(d) control the helicopter smoothly while ground taxiing and manoeuvring the helicopter with turns at a constant and safe rate of turn while maintaining an appropriate disk attitude and power setting;

(e) apply smooth and controlled actions to terminate at a nominated holding or parking point under different wind and surface conditions.

2.2 **TR-SEH.2 – Conduct take-off to departure**

2.2.1 Manage normal take-off to departure as follows:

(a) using approved technique and documented procedures perform a take-off, either from the ground or hover, and transition to forward flight and:

(i) complete appropriate checklists;

(ii) perform a take-off safety briefing (this may be carried out prior to lift off to the hover if necessitated by location);

(iii) ensure operating RPM within limits;

(iv) clear the area, taxi into the take-off position;

(v) transition to forward flight and through translational lift using correct techniques;

(b) accelerate to and maintain the recommended or nominated climb speed using the correct profile:

(i) outside of the Height-Velocity (H-V) avoid curve;

(ii) ensure obstacle avoidance;

(iii) retract the landing gear after a positive rate of climb is established (if applicable);

(iv) maintain correct power and attitude for the profile and IAS to be flown;

(v) comply with noise abatement procedures, where applicable;

(vi) complete appropriate checks.

2.2.2 Manage engine failure during take-off to departure as follows:

(a) self-brief, or brief crew members, stating a plan of action that will ensure the safest outcome in the event of an engine failure;

(b) maintain RRPM within the prescribed limits and control of the helicopter;

(c) perform autorotation to power termination or touchdown, as applicable;

(d) at the appropriate time, complete the engine failure shutdown checklist.

2.3 **TR-SEH.3 – Control helicopter in normal flight**

Set power and maintain attitude to establish and maintain the following manoeuvres with the helicopter in balanced flight and trimmed (as applicable) within prescribed tolerances as follows:

(a) straight and level:

(i) straight and level flight at normal cruise;

(ii) maintains heading;

(iii) maintains nominated altitude;

(b) straight climbs and descents:

(i) maintain IAS for best angle of climb (V_X);

(ii) maintain IAS for best rate of climb (V_Y);

(iii) maintain IAS for cruise climb;

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(iv) maintain IAS for cruise descent;

(v) maintain correct power setting as applicable to the rotorcraft;

(vi) maintain heading;

(c) turn onto specific headings (using magnetic compass) or geographical feature within the flight tolerances for the following:

(i) level turn;

(ii) climbing turn, rate 1 or 20° bank;

(iii) powered descending turn, 30° bank.

2.4 **TR-SEH.4 – Control helicopter during advanced manoeuvres**

(a) perform steep turns (45º) within the flight tolerances as follows:

(i) level turn altitude;

(ii) exit on specified heading or geographical feature;

(b) perform autorotative flight:

(i) enter and maintain autorotative flight at nominated speed in balanced flight for the following profiles:

(A) descend at nominated heading and manufacturer's recommended speed;

(B) conduct 180˚ autorotations using up to 45˚ angle of bank;

(C) autorotative flight at best range speed and minimum descent rate speed;

(D) maintain RRPM within limitations;

(c) perform landing or power termination as applicable;

(d) perform power termination:

(i) maintain RRPM within limitations;

(ii) commence flare at appropriate height for the prevailing conditions and reduce ground speed and rate of descent;

(iii) control attitude to achieve a decreasing closure rate and reducing rate of descent;

(iv) control yaw, engine and RRPM;

(v) terminate the helicopter to a hover or hover taxi within tolerances of termination point without lateral or rearward drift;

(e) perform autorotative landing:

(i) commence flare at appropriate height for the prevailing conditions and reduces ground speed and rate of descent;

(ii) control RRPM;

(iii) select and maintain helicopter at the hover attitude without lateral or backward movement;

(iv) control touchdown rate;

(v) control yaw;

(vi) land helicopter with zero or minimum run-on speed within tolerances of nominated touchdown point without lateral or backward drift.

2.5 **TR-SEH.5 – Manage abnormal and emergency conditions**

(a) manage engine failure using the correct technique and applying the applicable checklists, procedures and planning during the following:

(i) hover and hover taxi;

(ii) take-off and departure;

(iii) cruise flight;

(iv) approach and landing;

(b) manage control malfunction as follows:

(i) identify tail rotor malfunction during flight and take appropriate action following required checklists and procedures;

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(ii) select and manoeuvre helicopter to the safest landing area within area of regard;

(iii) identify jammed primary controls, carry out manoeuvres to safely remediate the problem, and land at a suitable location for the following:

(A) jammed pedals;

(B) jammed or limited cyclic or collective;

(c) manage system malfunctions by identifying critical system malfunction during flight and take appropriate action following required checklists and procedures for:

(i) hydraulic system emergencies (if applicable);

(ii) electrical system emergencies;

(iii) clutch system emergencies (if applicable);

(iv) engine governing system emergencies;

(d) perform recovery from the following (if applicable):

(i) vortex ring condition;

(ii) loss of tail rotor effectiveness;

(iii) low 'g' and mast bumping;

(e) control helicopter throughout, and manoeuvre the helicopter to the safest landing area available.

2.6 **TR-SEH.6 – Conduct a descent and arrival to an aerodrome**

(a) plan and conduct descent;

(b) join traffic pattern;

(c) maintain a safe separation from other traffic joining, departing or in the traffic pattern.

2.7 **TR-SEH.7 – Fly a full circuit pattern**

(a) perform a full circuit pattern (5 legs) within the tolerances specified for the relevant flight path;

(b) manage engine failure in the circuit:

(i) maintain control of the aircraft;

(ii) perform recall actions correctly;

(iii) select a suitable landing area within gliding distance, on the aerodrome or elsewhere;

(iv) perform emergency procedures correctly and land the aircraft if the engine cannot be restarted;

(v) advise ATS or other agencies capable of providing assistance of situation and intentions;

(vi) brief passengers about flight situation, brace position and harness security;

(vii) land aircraft ensuring safest outcome if an engine restart is not achieved.

2.8 **TR-SEH.8 – Conduct a landing**

Perform the following while operating within the limitations prescribed in the RFM:

(i) land on, and lift off from, sloping ground;

(ii) land, take off and manoeuvre in a confined area;

(iii) limited power approach and landing and take-off;

(iv) land and take-off from a pinnacle or ridgeline.

3 Range of variables

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

(b) day VFR;

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

(d) aerodromes or HLS;

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(e) sealed, gravel or grass surfaces;

(f) limitations, such as those imposed by local noise abatement procedures and curfews;

(g) operational hazards, which may include variable surfaces, loose objects, personnel, birds and propeller wash, rotor wash and jet blast;

(h) simulated abnormal and emergency situations;

(i) simulated hazardous weather.

4 Underpinning knowledge of the following:

(a) general aircraft data;

(b) make, type and model of helicopter, designation of engines, take-off and rated power;

(c) stated airspeed limitations including, but not limited to: V_{NE} (at varying AUW and density altitudes) V_H, configuration airspeed limits V_{LO}, V_{TURB}, maximum cross-wind;

(d) low speed wind limits;

(e) RRPM limits (Power ON and Power OFF);

(f) engine, transmission and any other stated limits in the RFM;

(g) slope landing limitations (if available);

(h) emergency procedures for the following:

(i) engine failure in the hover;

(ii) taxiing;

(iii) during transitions before and after take-off;

(iv) in the cruise;

(v) on final approach before and after landing;

(vi) engine fire on the ground and airborne;

(vii) electrical fire on the ground and airborne;

(viii) cabin fire in flight;

(i) N1, torque split indications;

(j) identify malfunctioning governor in flight and manage the related engine;

(k) corrective action to be taken when engine run-up or run-down has been diagnosed;

(l) the following weight and balance topics:

(i) weight, balance and performance;

(ii) permissible take-off weight;

(iii) maximum gross weight, landing weight, ramp weight and zero fuel weight;

(iv) centre of gravity position for any specified conditions;

(v) centre of gravity limitations;

(vi) appropriate charts to determine centre of gravity;

(vii) calculated centre of gravity position and confirm it is within limits;

(m) the following take-off and landing topics:

(i) continuing and rejected take-off distances;

(ii) take-off decision point;

(iii) landing decision point;

(n) climb performance, hover out of ground effect and height–velocity diagram charts;

(o) failed engine operations;

(p) the following aircraft systems:

(i) fuel system;

(ii) hydraulic system;

(iii) electrical system;

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(iv) oil system;

(v) stability augmentation, AFCS and FDS (as applicable);

(vi) anti-icing and de-icing systems (as applicable);

(vii) heating and ventilation systems;

(viii) pitot and static system;

(ix) fire extinguisher system (as applicable);

(x) engine systems;

(xi) transmission and rotor systems;

(xii) display systems (as applicable);

(xiii) undercarriage system (fixed or retractable as applicable);

(q) the following key hazards including, for each, the typical causal factors and contributing operational situations, avoidance and recognition of symptoms and recovery techniques:

(i) vortex ring state;

(ii) ground resonance;

(iii) loss of tail rotor effectiveness (LTE);

(iv) low ‘g’ and mast bumping;

(v) overpitching or low RRPM – rotor stall;

(vi) retreating blade stall;

(vii) recirculation;

(viii) dynamic rollover.

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TR-MEH Type rating – multi-engine helicopter

1 Unit description

This unit describes the skills and knowledge required to operate a multi-engine helicopter.

2 Elements and performance criteria

2.1 TR-MEH.1 – Control helicopter on the ground

2.1.1 For all helicopters:

(a) prepare for start as follows:

(i) using an orderly procedure with checklists, inspect and prepare the helicopter, including those items recommended by the manufacturer, for a flight;

(ii) identify and verify switches, circuit breakers, fuses, and spare fuses pertinent to day and night operations;

(iii) confirm that there is sufficient fuel and oil for the intended flight;

(iv) identify and verify the required equipment for the flight is on-board and serviceable;

(v) ensure security of baggage and required equipment;

(vi) organise and arrange documents and equipment that will need to be accessed in flight in a manner that makes the items readily available;

(vii) perform an effective passenger safety briefing (if type capable of carrying passengers);

(b) conduct engine start and rotor engagement as follows:

(i) ensure helicopter is located in a suitable location for starting engine and rotors;

(ii) use the appropriate checklist provided by the helicopter manufacturer or owner or operator;

(iii) calculate and confirm sufficient power margin available for the proposed flight;

(iv) demonstrate knowledge of recommended starting procedures;

(v) take appropriate action with respect to unsatisfactory start conditions;

(vi) complete the appropriate engine and helicopter systems checks;

(c) taxiing and hover manoeuvring as follows:

(i) carry out pre-take-off checks;

(ii) set flight controls correctly to prepare for the lift-off transition to the hover at the location;

(iii) use correct flight and power control techniques to lift helicopter off the surface to a stable hover at the appropriate hover height for the helicopter;

(iv) confirm the proper functioning of the flight controls and confirm centre of gravity and power required to hover are within limits;

(v) trim helicopter where applicable;

(vi) demonstrate smooth control at a constant safe hover height while hover manoeuvring and maintaining power and RRPM within the limits;

(vii) maintain helicopter in flight over a nominated hover point at a nominated height and heading in cross-wind and tailwind;

(viii) transition from static hover to forward, sideways and backwards flight and terminate this movement over a nominated hover point;

(ix) turn helicopter around a the mast while maintaining a constant height at a constant rate of turn using anti-torque pedals;

(x) turn helicopter around a nominated point on or forward of the nose or on or aft of the tail while maintaining a constant height and specified rate of movement around the point;

(xi) apply controlled corrective action to maintain a constant rate of turn and to counter the effects of wind;

(xii) adjust air transit ground speed to suit helicopter type, traffic conditions, congestion, and maintenance of control and to avoid collision with obstacles or other aircraft.

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2.1.2 For a helicopter with wheel landing gear, be able to do the following:

(a) select and maintain correct disk attitude and power required to initiate forwards movement of the helicopter on the surface;

(b) check and confirm the proper functioning of the wheel brake system;

(c) select and maintain correct disk attitude and power required to ground taxi and manoeuvre the helicopter on appropriate surfaces (wet and dry) at a safe speed in headwind, cross-wind and tailwind conditions;

(d) control the helicopter smoothly while ground taxiing and manoeuvring the helicopter with turns at a constant and safe rate of turn while maintaining an appropriate disk attitude and power setting;

(e) apply smooth and controlled actions to terminate at a nominated holding or parking point under different wind and surface conditions.

2.2 **TR-MEH.2 – Conduct take-off to departure**

2.2.1 Manage normal take-off to departure as follows:

(a) using approved technique and documented procedures perform a take-off, either from the ground or hover, and transition to forward flight and:

(i) complete appropriate checklists;

(ii) perform a take-off safety briefing (this may be carried out prior to lift off to the hover if necessitated by location);

(iii) ensure operating RPM within limits;

(iv) clear the area, taxi into the take-off position;

(v) transition to forward flight and through translational lift using correct techniques;

(b) accelerate to and maintain the recommended or nominated climb using the correct profile:

(i) outside of the Height-Velocity (H-V) avoid curve;

(ii) ensure obstacle avoidance;

(iii) retract the landing gear after a positive rate of climb is established (if applicable);

(iv) maintain correct power and attitude for the profile and IAS to be flown;

(v) comply with noise abatement procedures, where applicable;

(vi) complete appropriate checks.

2.2.2 Manage engine failure during take-off to departure as follows:

(a) self-brief, or brief crew members, stating a plan of action that will ensure the safest outcome in the event of an engine failure;

(b) maintain RRPM within the prescribed limits and control of the helicopter;

(c) correctly identify and confirm the failed engine(s) and at the appropriate time, complete the engine failure shutdown checklist for the following situations:

(i) engine failure prior to reaching take-off decision point:

(A) conduct the rejected take-off procedure in accordance with AFM and POH;

(B) apply the appropriate power within the AFM limits for the configuration being flown;

(C) perform a controlled landing in the rejected take-off distance available;

(ii) engine failure after take-off:

(A) maintain control of the helicopter;

(B) set maximum contingency power on serviceable engine;

(C) accelerate to V_{TOSS} (if applicable);

(D) identify and confirm failed engine;

(E) at the appropriate time, complete the engine failure shutdown checklist;

(F) climb multi-engine helicopter not below V_{YSE};

(G) land helicopter at nearest appropriate landing area.

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2.3 **TR-MEH.3 – Control helicopter in normal flight**

Set power and maintain attitude to establish and maintain the following manoeuvres with the helicopter in balanced flight and trimmed (as applicable) within prescribed tolerances as follows:

(a) straight and level:

(i) straight and level flight at normal cruise;

(ii) maintains heading;

(iii) maintains nominated altitude;

(b) straight climbs and descents:

(i) maintain IAS for best angle of climb (V_X);

(ii) maintain IAS for best rate of climb (V_Y);

(iii) maintain IAS for cruise climb;

(iv) maintain IAS for cruise descent;

(v) maintain correct power setting as applicable to the rotorcraft;

(vi) maintain heading;

(c) turn onto specific headings (using magnetic compass) or geographical feature within the flight tolerances for the following:

(i) level turn

(ii) climbing turn, rate 1 or 20° bank;

(iii) powered descending turn, 30° bank.

2.4 **TR-MEH.4 – Control helicopter during advanced manoeuvres**

(a) perform steep turns (45º) within the flight tolerances as follows:

(i) level turn altitude;

(ii) exits on specified heading or geographical feature;

(b) perform autorotative flight:

(i) enters and maintains autorotative flight at nominated speed in balanced flight for the following profiles:

(A) descend at nominated heading and manufacturer's recommended speed;

(B) conduct 180º autorotations using up to 45º angle of bank;

(C) autorotative flight at best range speed and minimum descent rate speed;

(D) maintains RRPM within limitations;

(c) perform power termination:

(i) maintain RRPM within limitations;

(ii) ensure throttle(s) is at 100% (or the equivalent terminology) prior to the commencement of the flare;

(iii) commence flare at appropriate height for the prevailing conditions and reduce ground speed and rate of descent;

(iv) control attitude to achieve a decreasing closure rate and reducing rate of descent;

(v) control yaw, engine and RRPM;

(vi) terminate the helicopter to a hover or hover taxi within tolerances of termination point without lateral or rearward drift.

2.5 **TR-MEH.5 – Manage abnormal and emergency conditions**

(a) manage engine failure, using the correct technique and applying the applicable checklists, procedures and planning manages engine failure during the following:

(i) hover and hover taxi;

(ii) take-off and departure;

(iii) cruise flight;

(iv) approach and landing;

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(b) manage control malfunction as follows:

(i) identify tail rotor malfunction during flight and take appropriate action following required checklists and procedures;

(ii) select and manoeuvre helicopter to the safest landing area within area of regard;

(iii) identify jammed primary controls, carry out manoeuvres to safely remediate the problem, and land at a suitable location for the following:

(A) jammed pedals;

(B) jammed or limited cyclic or collective;

(c) manage system malfunctions by identifying critical system malfunction during flight and take appropriate action following required checklists and procedures for the following:

(i) hydraulic system emergencies (if applicable);

(ii) electrical system emergencies;

(iii) clutch system emergencies (if applicable);

(iv) engine governing system emergencies;

(d) perform recovery from the following (if applicable):

(i) vortex ring condition;

(ii) loss of tail rotor effectiveness;

(iii) low 'g' and mast bumping;

(e) control helicopter throughout and manoeuvres helicopter to the safest landing area available.

2.6 **TR-MEH.6 – Conduct a descent and arrival to an aerodrome**

(a) plan and conduct descent;

(b) join traffic pattern;

(c) maintain a safe separation from other traffic joining, departing or in the traffic pattern.

2.7 **TR-MEH.7 – Fly a full circuit pattern**

(a) perform a full circuit pattern (5 legs) within the tolerances specified for the relevant flight path;

(b) manage engine failure in the circuit:

(i) maintain control of the aircraft;

(ii) perform recall actions correctly;

(iii) select a suitable landing area within gliding distance, on the aerodrome or elsewhere;

(iv) perform emergency procedures correctly and land the aircraft if the engine cannot be restarted;

(v) advise ATS or other agencies capable of providing assistance of situation and intentions;

(vi) brief passengers about flight situation, brace position and harness security;

(vii) land aircraft ensuring safest outcome if an engine restart is not achieved.

2.8 **TR-MEH.8 – Conduct a landing**

Perform the following while operating within the limitations prescribed in the RFM:

(i) land on, and lift off from, sloping ground;

(ii) land, take off and manoeuvre in a confined area;

(iii) limited power approach and landing and take-off;

(iv) land and take-off from a pinnacle or ridgeline (CPL).

3 Range of variables

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

(b) day VFR;

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

(d) aerodromes or HLS;

(e) sealed, gravel or grass surfaces;

(f) limitations, such as those imposed by local noise abatement procedures and curfews;

(g) operational hazards, which may include variable surfaces, loose objects, personnel, birds and propeller wash, rotor wash and jet blast;

(h) simulated abnormal and emergency situations;

(i) flight crew incapacitation (multi-crew operations);

(j) simulated hazardous weather.

4 Underpinning knowledge of the following:

(a) general aircraft data;

(b) make, type and model of helicopter, designation of engines, take-off and rated power;

(c) stated airspeed limitations including, but not limited to, V_{NE} (at varying AUW and density altitudes) V_H, configuration airspeed limits V_{LO}, V_{TURB}, maximum cross-wind;

(d) low speed wind limits;

(e) RRPM limits (Power ON and Power OFF);

(f) engine, transmission and any other stated limits in the RFM;

(g) slope landing limitations (if available);

(h) emergency procedures for the following:

(i) engine failure in the hover;

(ii) taxiing;

(iii) during transitions before and after take-off;

(iv) in the cruise;

(v) on final approach before and after landing;

(vi) engine fire on the ground and airborne;

(vii) electrical fire on the ground and airborne;

(viii) cabin fire in flight;

(i) N1, torque split indications;

(j) identify malfunctioning governor in flight and manage the related engine;

(k) corrective action to be taken when engine run-up or run-down has been diagnosed;

(l) the following weight and balance topics:

(i) weight, balance and performance;

(ii) permissible take-off weight;

(iii) maximum gross weight, landing weight, ramp weight and zero fuel weight;

(iv) centre of gravity position for any specified conditions;

(v) centre of gravity limitations;

(vi) appropriate charts to determine centre of gravity;

(vii) calculated centre of gravity position and confirm it is within limits;

(m) the following take-off and landing topics:

(i) continuing and rejected take-off distances;

(ii) take-off decision point;

(iii) landing decision point;

(n) climb performance, hover out of ground effect and height-velocity diagram charts;

(o) failed engine operations;

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(p) initial rate of climb and climb gradient for 1 engine inoperative for specified conditions;

(q) range of the aircraft increases or decreases following an engine failure;

(r) PNR for 1 engine inoperative (CPL and ATPL);

(s) ETP for 1 engine inoperative (CPL and ATPL);

(t) the following aircraft systems:

(i) fuel system;

(ii) hydraulic system;

(iii) electrical system;

(iv) oil system;

(v) stability augmentation, AFCS and FDS (as applicable);

(vi) anti-icing and de-icing systems (as applicable);

(vii) heating and ventilation systems;

(viii) pitot and static system;

(ix) fire extinguisher system (as applicable);

(x) engine systems;

(xi) transmission and rotor systems;

(xii) display systems (as applicable);

(xiii) undercarriage system (fixed or retractable as applicable);

(u) the following key hazards including, for each, the typical causal factors and contributing operational situations, avoidance and recognition of symptoms and recovery techniques:

(i) vortex ring state;

(ii) ground resonance;

(iii) loss of tail rotor effectiveness (LTE);

(iv) low ‘g’ and mast bumping;

(v) overpitching or low RRPM – rotor stall;

(vi) retreating blade stall;

(vii) recirculation;

(viii) dynamic rollover.

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FR-SEH Single-engine helicopter flight review

1 Unit description

This unit describes the standards required for a single-engine helicopter class rating and a single-engine helicopter type rating flight review.

2 Elements and performance criteria

2.1 FR-SEHC.1 – Conduct flight

(a) start, lift-off, hover and taxi helicopter ready for take-off;

(b) perform a normal take-off and departure;

(c) perform general handling manoeuvres, including the following:

(i) perform steep turns through at least 360°;

(ii) conduct low flying at 500 ft AGL and perform a reversal turn;

(d) perform circuit rejoin and at least 1 full circuit pattern;

(e) perform a missed approach;

(f) perform hover, taxi, take-off, approach and landing in a cross-wind if conditions permit;

(g) conduct operations on sloping ground and in confined areas (where possible).

2.2 FR-SEAHC.2 – Manage aircraft systems

(a) ensure sufficient fuel is loaded and fuel consumption is monitored and managed throughout the flight;

(b) manage the aircraft fuel system;

(c) manage all other aircraft systems.

2.3 FR-SEHC.3 – Navigation (optional)

(a) plan flight of at least 3 legs and submit flight plan in accordance with AIP;

(b) conduct a departure;

(c) navigate en route using visual and instrument navigation systems;

(d) perform diversion procedure;

(e) demonstrate lost procedure;

(f) conduct arrival.

2.4 FR-SEHC.4 – Airspace

(a) comply with airspace procedures and requirements;

(b) operate aircraft radio and conform to standard radio procedures.

2.5 FR-SEHC.5 – Instrument flying (optional)

(a) perform basic flight manoeuvres using full instrument panel;

(b) recover from upset situations and unusual aircraft attitudes to straight and level flight;

(c) perform checks and monitor system for serviceability.

2.6 FR-SEHC.6 – Manage non-normal and emergency conditions

(a) perform autorotation to touchdown or power termination;

(b) manage simulated engine failure during hover or hover taxi;

(c) manage aircraft system malfunctions other than engine failure;

(d) manage hydraulic system failure;

(e) perform recovery from the following (if applicable):

(i) vortex ring condition;

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(ii) loss of tail rotor effectiveness;

(iii) low ‘g’ and mast bumping;

(f) manage loss of tail rotor control for the following:

(i) forward flight;

(ii) hover.

2.7 **FR-SEHC.7 – Non-technical skills**

(a) recognise and manage threats and errors during pre-flight planning and in-flight;

(b) maintain effective lookout and situational awareness;

(c) assess situations and make appropriate decisions;

(d) set priorities and manage tasks;

(e) maintain effective communication with stakeholders;

(f) communicate effectively using aeronautical radio.

2.8 **FR-SEHC.8 – Manage passengers and cargo**

(a) conduct pre-flight and in-flight safety briefings to ensure passengers are familiar with safety procedures, emergency equipment, exits and operational requirements;

(b) manage cargo.

3 Range of variables

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

(b) simulated conditions can be used;

(c) for FR-SEH.5 – *instrument flying*, simulated or actual instrument conditions;

(d) for FR-SEH.6 – *manage non-normal and emergency conditions*, performance criteria are limited according to the type of aircraft being used.

4 Underpinning knowledge of the following:

(a) privileges, limitations and responsibilities of the licences, ratings and endorsements the applicant holds;

(b) flight review requirements;

(c) obtaining, interpreting and applying meteorological and aeronautical information;

(d) navigation and flight planning for day VFR operations;

(e) diversion and lost procedures;

(f) weight and balance and aircraft performance;

(g) operation of systems fitted to the aircraft that is used in the flight review;

(h) extracting and applying aircraft performance data for the aircraft that is used in the flight review;

(i) limitations applicable to the rotorcraft being flown for the flight review;

(j) airspace requirements and procedures;

(k) helicopter landing sites;

(l) manage cargo and passengers;

(m) hazard identification and risk management;

(n) low inertia characteristics;

(o) for each of the following, the typical causal factors and contributing operational situations, avoidance and recognition of symptoms and recovery techniques:

(i) vortex ring generation;

(ii) ground resonance;

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(iii) loss of tail rotor effectiveness;

(iv) low ‘g’ and mast bumping;

(v) overpitching/low RRPM – rotor stall;

(vi) retreating blade stall;

(vii) recirculation;

(viii) dynamic rollover;

(p) non-normal and emergency procedures, including full and partial failures;

(q) local operating procedures;

(r) hazardous weather;

(s) airworthiness requirements;

(t) reporting requirements;

(u) ERSA normal and emergency procedures;

(v) current and recently changed legislation and procedures that are relevant to the applicant’s licences, ratings and endorsements.

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FR-MEHT Multi-engine helicopter type rating flight review

1 Unit description

This unit describes the standards required for a multi-engine helicopter type rating flight review.

2 Elements and performance criteria

2.1 FR-MEHT.1 – Conduct flight

(a) start, lift-off, hover and taxi helicopter ready for take-off;

(b) perform a normal take-off and departure;

(c) perform general handling manoeuvres, including the following:

(i) perform steep turns through at least 360°;

(ii) conduct low flying at 500 ft AGL and perform a reversal turn;

(d) perform circuit rejoin and at least 1 full circuit pattern;

(e) perform hover, taxi, take-off, approach and landing in a cross-wind if conditions permit;

(f) conduct operations on sloping ground and in confined areas (if possible).

2.2 FR-MEHT.2 – Manage aircraft systems

(a) ensure sufficient fuel is loaded and fuel consumption is monitored and managed throughout the flight;

(b) manage the aircraft fuel system;

(c) manage all other aircraft systems.

2.3 FR-MEHT.3 – Navigation (optional)

(a) plan flight of at least 3 legs and submit flight plan in accordance with AIP;

(b) conduct a departure;

(c) navigate en route using visual and instrument navigation systems;

(d) perform diversion procedure;

(e) conduct arrival.

2.4 FR-MEHT.4 – Airspace

(a) comply with airspace procedures and requirements;

(b) operate aircraft radio and conform to standard radio procedures.

2.5 FR-MEHT.5 – Instrument flying

(a) perform basic flight manoeuvres using full instrument panel;

(b) recover from upset situations and unusual aircraft attitudes to straight and level flight;

(c) perform checks and monitor system for serviceability.

2.6 FR-MEHT.6 – Manage non-normal and emergency conditions

(a) perform autorotation to power termination;

(b) manage simulated engine failures during departure and approach manoeuvres, to the applicable rotorcraft category standard;

(c) perform a single-engine missed approach;

(d) manage aircraft system malfunctions other than engine failure;

(e) perform recovery from the following (if applicable):

(i) vortex ring condition;

(ii) loss of tail rotor effectiveness;

(iii) low ‘g’ and mast bumping;

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(f) manage loss of tail rotor control for the following:

(i) forward flight;

(ii) hover.

2.7 **FR-MEHT.7 – Non-technical skills**

(a) recognise and manage threats and errors during pre-flight planning and in-flight;

(b) maintain effective lookout and situational awareness;

(c) assess situations and make appropriate decisions;

(d) set priorities and manage tasks;

(e) maintain effective communication with stakeholders;

(f) communicate effectively using aeronautical radio.

2.8 **FR-MEHT.8 – Manage passengers and cargo**

(a) conduct pre-flight and in-flight safety briefings to ensure passengers are familiar with safety procedures, emergency equipment, exits and operational requirements;

(b) manage cargo.

3 Range of variables

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

(b) simulated conditions can be used;

(c) for FR- MEHT.5 – *instrument flying*, simulated or actual instrument conditions.

4 Underpinning knowledge of the following:

(a) privileges, limitations and responsibilities of the licences, ratings and endorsements the applicant holds;

(b) flight review requirements;

(c) obtaining, interpreting and applying meteorological and aeronautical information;

(d) navigation and flight planning for day VFR operations;

(e) weight and balance and aircraft performance;

(f) operation of systems fitted to the aircraft that is used in the flight review;

(g) extracting and applying aircraft performance data for the aircraft that is used in the flight review;

(h) limitations applicable to the rotorcraft being flown for the flight review;

(i) airspace requirements and procedures;

(j) helicopter landing sites;

(k) manage cargo and passengers;

(l) hazard identification and risk management;

(m) low inertia characteristics;

(n) for each of the following, the typical causal factors and contributing operational situations, avoidance and recognition of symptoms and recovery techniques:

(i) vortex ring generation;

(ii) ground resonance;

(iii) loss of tail rotor effectiveness;

(iv) low ‘g’ and mast bumping;

(v) overpitching/low RRPM – rotor stall;

(vi) retreating blade stall;

(vii) recirculation;

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(viii) dynamic rollover;

(o) non-normal and emergency procedures, including full and partial failures;

(p) local operating procedures;

(q) hazardous weather;

(r) airworthiness requirements;

(s) reporting requirements;

(t) ERSA normal and emergency procedures;

(u) current and recently changed legislation and procedures that are relevant to the applicant's licences, ratings and endorsements.

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GYROPLANE CATEGORY

G1 Control gyroplane on the ground

1 Unit description

This unit describes the skills and knowledge required to operate a gyroplane on the ground.

2 Elements and performance criteria

2.1 **G1.1 – Start and stop engine**

The person must be able to demonstrate their ability to do the following:

(a) perform engine start and after start actions;

(b) perform engine shutdown and after shutdown actions;

(c) manage engine start and shutdown malfunctions and emergencies;

(d) consider ground surface in relation to contamination and propeller care during engine start and stop activities;

(e) control gyroplane movement during and after engine start.

2.2 **G1.2 – Conduct prerotation**

The person must be able to demonstrate their ability to do the following:

(a) operate rotor brake (if fitted);

(b) conduct prerotation;

(c) prevent blade flap;

(d) maintain rotor disc position within limits during prerotation and ground manoeuvring.

2.3 **G1.3 – Taxi gyroplane**

The person must be able to demonstrate their ability to do the following while taxiing a gyroplane:

(a) check and confirm proper functioning of the wheel brake system;

(b) taxi gyroplane in accordance with prevailing aerodrome conditions;

(c) perform applicable taxi checks, including checking the following:

(i) steering function normal and take appropriate action in the event of a malfunction;

(ii) instruments for correct readings;

(iii) altimeter setting;

(d) maintain taxi speed and control of the gyroplane;

(e) manage engine and rotors on ground;

(f) maintain rotor clearance from other aircraft, obstructions, and persons;

(g) maintain the gyroplane on the taxiway centreline;

(h) ensure correct handling techniques are applied to take into account wind from all 4 quadrants;

(i) coordinate taxi speed and rotor disc position to control rotor RPM and prevent blade flap.

3 Range of variables

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

(b) sealed, gravel and grass runways and taxiways;

(c) sufficient wind that requires control adjustment (may be simulated);

(d) hazardous weather (may be simulated);

(e) hot and cold engine starts in accordance with appropriate checklists.

4 Underpinning knowledge of the following:

(a) typical single-engine aircraft systems;

(b) differences between normally aspirated and fuel-injected systems;

(c) carburettor icing;

(d) cause and effect of fuel vaporisation;

(e) typical aircraft performance characteristics of single-engine gyroplanes and the effects of local weather conditions on performance;

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(f) gyroplane weight and balance and how to calculate the gyroplane CG;
(g) the contents of the aircraft flight manual applicable to the gyroplane being flown;
(h) the environmental conditions that represent VMC and day VFR flight rules;
(i) propeller wash, rotor wash and jet blast and how they affect other aircraft;
(j) effects of wind on rotor blades;
(k) the meaning of the following:
    (i) light and marshalling signals;
    (ii) aerodrome markings, signals and local procedures;
(l) care of propellers and rotors;
(m) the actions to be taken in the event of a rotor brake failure or failure of the wheel brake, tyre or steering;
(n) the relevant sections of the AIP;
(o) rotor prerotation procedures;
(p) the effects of wind on rotor blades;
(q) performing weight and balance calculations;
(r) loading within specified limitations;
(s) cause and effect of ground resonance and recall actions in the event of ground resonance;
(t) correct handling techniques in the event of blade flap;
(u) aerodrome markings;
(v) light and marshalling signals.

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G2 Take-off gyroplane

1 Unit description

This unit describes the skills and knowledge required to complete pre-take-off checks, take-off gyroplane into wind and in cross-wind conditions and perform after take-off checks in a gyroplane.

2 Elements and performance criteria

2.1 G2.1 – Carry out pre-take-off procedures

(a) correctly identify critical airspeeds, configurations, and emergency and abnormal procedures for normal and cross-wind take-offs;

(b) brief on plan of action to ensure the safest outcome in the event of abnormal or emergency operations;

(c) apply correction for the existing wind;

(d) perform pre-take-off and line-up checks;

(e) ensure approach path is clear of conflicting traffic and other hazards before lining up for take-off;

(f) align the gyroplane on the runway centreline in take-off direction.

2.2 G2.2 – Take-off gyroplane

(a) apply the controls correctly to maintain longitudinal alignment on the centreline of the runway, if appropriate, before initiating and during the take-off;

(b) adjust the power controls taking into account the existing conditions;

(c) monitor power controls, settings, and instruments during take-off;

(d) apply power to accelerate gyroplane and achieve flying rotor RPM in accordance with appropriate aircraft flight manual;

(e) prevent blade flap;

(f) use throttle and controls to balance gyroplane on main gear before lift-off;

(g) achieve desired rotor RPM for flight not later than minimum power speed;

(h) perform the take-off applying the required pitch, roll and yaw inputs as appropriate in a smooth, coordinated manner;

(i) trim the gyroplane accurately (if applicable);

(j) perform gear retractions, power adjustments (as applicable) and other required pilot-related activities;

(k) maintain flight path along the runway extended centreline as required;

(l) maintain climb speed at best angle or best rate while observing height-velocity diagram considerations;

(m) recognise take-off abnormalities and take appropriate action to reject take-off (can be simulated);

(n) reduce take-off power to climb power in accordance with the aircraft flight manual.

2.3 G2.3 – Take-off gyroplane in a cross-wind

(a) perform a take-off in a gyroplane making appropriate adjustments for cross-wind conditions;

(b) maintain the runway centreline and extended centreline.

2.4 G2.4 – Carry out after take-off procedures

(a) perform after take-off check;

(b) maintain the appropriate climb segment at the nominated heading and airspeed;

(c) manoeuvre according to local and standard procedures;

(d) maintain traffic separation.

2.5 G2.5 – Take-off gyroplane from ‘short field’

(a) perform take-off in gyroplane to achieve the minimum length take-off performance;

(b) perform take-off in gyroplane to achieve the obstacle clearance parameters.

2.6 G2.6 – Take-off gyroplane from ‘rough or soft field’

(a) perform take-off in gyroplane to achieve the minimum ground roll during take-off;

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(b) accelerate gyroplane in ground effect to achieve climb speed.

3 Range of variables

(a) sealed, gravel and grass runways and taxiways;

(b) engine start and shutdown malfunctions and emergencies covered by the aircraft flight manual;

(c) simulated hazardous weather;

(d) for take-off in cross-wind, the cross-wind component must be as follows:

(i) for RPL, greater than 10 kts;

(ii) otherwise, 70% of the maximum permitted for the type of gyroplane being flown.

4 Underpinning knowledge of the following:

(a) aircraft flight manual limitations;

(b) calculating take-off and landing performance;

(c) obtaining and calculating the cross-wind and down or up wind components;

(d) factors affecting take-off and initial climb performance;

(e) interpreting windsock indications and determining wind direction and speed;

(f) take-off distance required calculation;

(g) aerodrome charts and an ability to interpret them;

(h) local topographical charts to identify safe areas for engine-failure purposes and noise abatement considerations.

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G3 Control gyroplane in normal flight

1 Unit description

This unit describes the skills and knowledge required to control a gyroplane while performing normal flight manoeuvres.

2 Elements and performance criteria

2.1 **G3.1 – Climb gyroplane**

(a) set and maintain climb power as altitude is increased;

(b) operate and monitor all aircraft systems when commencing, during, and completing a climbing flight manoeuvre;

(c) select power, attitude and configuration as required for the flight path, balance and trim the gyroplane accurately (if applicable), and apply smooth, coordinated control inputs for the following climbing manoeuvres:

(i) normal climb;

(ii) best angle of climb (Vx);

(iii) best rate of climb (Vy);

(d) anticipate level-off altitude and achieve straight and level flight.

2.2 **G3.2 – Maintain straight and level flight**

(a) operate and monitor all aircraft systems during straight and level flight manoeuvres;

(b) select power, attitude and configuration as required, balance and trim the gyroplane accurately (if applicable), apply carburettor heat as applicable and apply smooth, coordinated control inputs for the following straight and level manoeuvres:

(i) slow speed;

(ii) normal cruise;

(iii) high-speed;

(iv) during acceleration and deceleration;

(v) except for the RPL, maximum range speed;

(vi) except for the RPL, maximum endurance speed;

(c) maintain altitude;

(d) maintain desired speed.

2.3 **G3.3 – Descend gyroplane**

(a) operate and monitor all aircraft systems during descending flight manoeuvres;

(b) select power, attitude and configuration as required, balance and trim the gyroplane accurately (if applicable), apply carburettor heat as applicable and apply smooth, coordinated control inputs for the following straight descending manoeuvres:

(i) glide;

(ii) powered;

(iii) approach configuration;

(c) monitor and control engine temperature;

(d) anticipate level-off altitude and achieve straight and level flight.

2.4 **G3.4 – Turn gyroplane**

(a) operate and monitor all aircraft systems during turning flight manoeuvres;

(b) select power, attitude and configuration as required for the flight path, balance and trim the gyroplane accurately (if applicable), apply carburettor heat as applicable and apply smooth, coordinated control inputs for the following turning manoeuvres:

(i) level turn;

(ii) climbing turn;

(iii) climbing turn at best angle of climb;

(iv) climbing turn at best rate of climb;

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(v) powered descending turn;

(vi) gliding descending turn;

(vii) descending turn in approach and landing configuration.

2.5 **G3.5 – Perform circuits and approaches**

(a) operate and monitor all aircraft systems when operating the gyroplane in the circuit;

(b) allow for wind effect on all legs of the circuit;

(c) perform a full circuit pattern (5 legs), balance and trim the gyroplane (if applicable) while applying smooth, coordinated control inputs to achieve flight path as follows:

(i) track upwind along extended centreline to minimum 500 ft AAL;

(ii) establish and maintain cross-wind leg tracking 90° to the runway;

(iii) establish and maintain downwind leg tracking parallel to, and at a specified distance from, the runway at circuit height;

(iv) establish base leg tracking 90° to the runway at a specified distance from the runway threshold;

(v) track and maintain the gyroplane on final approach flight path with specified or appropriate runway;

(d) perform checks as required throughout circuit;

(e) establish the approach and landing configuration appropriate for the runway and meteorological conditions, and adjust the engine controls as required for the following:

(i) commence and control approach descent path;

(ii) adjust descent commencement point to take account of extended downwind leg or traffic adjustments;

(iii) set and maintain approach configuration not below 500 ft AAL;

(iv) identify and maintain the nominated aiming point;

(v) maintain a stabilised approach angle at the nominated airspeed to the round-out height;

(vi) verify existing wind conditions, make proper correction for drift, and maintain a precise ground track;

(vii) apply airspeed allowances for wind gusts;

(viii) configure gyroplane for landing;

(f) maintain lookout, aircraft separation and position in the circuit with reference to other aircraft traffic in the circuit area.

2.6 **G3.6 – Local area airspace**

(a) identify the following using an appropriate chart for the local area and circuit area:

(i) geographical features;

(ii) geographical limits;

(iii) restricted, controlled and uncontrolled airspace areas;

(iv) state local airspace limits;

(v) the transit route between the departure aerodrome and training area;

(vi) the geographical limits of the training area;

(vii) aerodromes and landing areas within the local area;

(b) maintain orientation and pinpoint location by using geographical features and a local area chart;

(c) transit from the circuit area and transit to the designated training area;

(d) operate within a transit lane (if applicable);

(e) remain clear of restricted, controlled and other appropriately designated airspace;

(f) operate in the vicinity of local aerodromes and landing areas;

(g) transit from the designated training area to the circuit area;

(h) set QNH appropriately;

(i) correctly determine which runway is to be used for landing;

(j) ensure runway is serviceable and available;

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(k) position gyroplane for arrival into the circuit.

3 Range of variables

(a) activities are performed in accordance with published procedures;
(b) gyroplane with fixed or retractable undercarriage;
(c) simulated hazardous weather;
(d) approach and landing configurations:
  (i) normal;
  (ii) glide;
(e) circuit patterns:
  (i) normal 1,000 ft AAL circuit;
  (ii) low-level 500 ft AAL circuit;
  (iii) full circuit pattern, including 5 legs;
  (iv) shortened circuit pattern;
(f) day VFR conditions;
(g) local area airspace limitations.

4 Underpinning knowledge of the following:

(a) operation of the controls;
(b) use of trim controls;
(c) forces acting on a gyroplane during descent;
(d) forces acting on a gyroplane in a turn;
(e) effect of angle of bank on load factor;
(f) effects of turn on magnetic compass performance;
(g) dangers of turbulence and wake turbulence when flying at high speed;
(h) circuit patterns and procedures;
(i) dangers of wind shear, turbulence and wake turbulence;
(j) aircraft systems;
(k) aircraft performance;
(l) aircraft weight and balance;
(m) hazards when performing performance manoeuvres;
(n) relationship between induced drag and operating at slow airspeed;
(o) engine considerations during prolonged climbing and descending;
(p) contents of the aircraft flight manual;
(q) environmental conditions that represent VMC;
(r) day VFR flight rules;
(s) local area operating procedures;
(t) relevant sections of the AIP;
(u) principles of aerodynamics;
(v) function of primary controls;
(w) theory and application of best rate and angle of climb;
(x) forces and moments acting during straight and turning level, climbing and descending flight;
(y) relationship of attitude and power to trim.

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G4 Land gyroplane

1 Unit description

This unit describes the skills and knowledge required to conduct a landing in a gyroplane.

2 Elements and criteria

2.1 G4.1 – Land gyroplane

(a) maintain a constant landing position aim point;

(b) achieve a smooth, positively-controlled transition from final approach to touchdown, including the following:

(i) control ballooning during flare;

(ii) touchdown at a controlled rate of descent, in the specified touchdown zone within tolerances;

(iii) control bouncing after touchdown;

(iv) touchdown aligned with the runway centreline;

(c) ensure aircraft separation is maintained;

(d) maintain positive directional control and cross-wind correction during the after-landing roll;

(e) use drag techniques and braking devices, as applicable, to bring the gyroplane to a stop;

(f) complete the applicable after-landing checks.

2.2 G4.2 – Land gyroplane in a cross-wind

(a) verify existing wind conditions, correct for drift and maintain ground track;

(b) configure the gyroplane for the cross-wind landing;

(c) control the gyroplane during the transition from final approach to touchdown and during after-landing roll to compensate for the cross-wind conditions.

2.3 G4.3 – Conduct a missed approach

(a) recognise the conditions when a missed approach should be executed;

(b) execute a missed approach when it is safe to do so;

(c) transition from approach to missed approach smoothly, and with positive control:

(i) select power, pitch attitude and configuration to control gyroplane; and

(ii) manoeuvre gyroplane clear of the ground and conduct after take-off procedures; and

(iii) make allowance for wind during go-around; and

(iv) complete after take-off checks.

2.4 G4.4 – Perform recovery from missed landing

(a) recognise when a missed landing is occurring and when it is appropriate to take recovery action;

(b) execute recovery from a missed landing only when it is safe to do so;

(c) transition from missed landing to missed approach smoothly, and with positive control:

(i) select power, pitch attitude and configuration to control gyroplane; and

(ii) manoeuvre gyroplane clear of the ground and conduct after take-off procedures; and

(iii) make allowance for wind during go-around.

2.5 G4.5 – Short landing

(a) land gyroplane to achieve the obstacle clearance parameters;

(b) land gyroplane at nominated touchdown point at appropriate speed;

(c) control ballooning during flare;

(d) control bouncing after touchdown;

(e) maintain direction after touchdown;

(f) apply maximum braking using rotor and wheel brakes;

(g) stop gyroplane within landing distance available.

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3 Range of variables

(a) activities are performed in accordance with published procedures;
(b) sealed, gravel and grass runways and taxiways;
(c) simulated hazardous weather;
(d) for landing a gyroplane in cross-wind, the cross-wind component must be as follows:
  (i) for RPL, greater than 10 kts;
  (ii) otherwise, 70% of the maximum permitted for the type of gyroplane being flown.

4 Underpinning knowledge of the following:

(a) typical single-engine aircraft systems;
(b) calculate aircraft performance;
(c) aircraft limitations;
(d) weight and balance;
(e) effects of headwind and tailwind on approach and landing;
(f) options when local conditions are not suitable for landing;
(g) causes of loss of control of gyroplane on landing;
(h) contents of the aircraft flight manual;
(i) environmental conditions that represent VMC;
(j) day VFR flight rules;
(k) propeller wash, rotor wash and jet blast;
(l) relevant sections of the AIP.

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G5 Gyroplane advanced manoeuvres

1 Unit description

This unit describes the skills and knowledge required to perform advanced manoeuvres in a gyroplane.

2 Elements and performance criteria

2.1 **G5.1 – Recover gyroplane from slow flight and flight behind the power curve**

(a) complete pre-manoeuvre checks;

(b) operate and monitor all aircraft systems when operating the gyroplane at slow speed;

(c) recover from slow flight and vertical descent in accordance with the gyroplane height-velocity diagram;

(d) select power, attitude and configuration as required for the flight path, balance and trim the gyroplane accurately (if applicable), apply carburettor heat as applicable and apply smooth, coordinated control inputs for the following slow flight manoeuvres:

(i) minimum level flight speed;

(ii) maintain forward speed when below minimum level flight speed;

(e) recover from flight below minimum flight speed;

(f) coordinate use of power and cyclic to increase airspeed above minimum level flight speed;

(g) regain level flight by nominated altitude.

2.2 **G5.2 – Turn gyroplane steeply**

(a) complete pre-manoeuvre checks;

(b) perform steep-level turn using a nominated bank angle, ending on a nominated heading or geographical feature, without altitude change;

(c) perform steep descending turn using a nominated bank angle, ending on a nominated heading or geographical feature through a minimum of 500 ft;

(d) balance gyroplane;

(e) recognise and recover from any spiral.

2.3 **G5.3 – Minimum forward airspeed and 'S' turn descents**

(a) complete pre-manoeuvre check;

(b) conduct minimum forward airspeed descent maintaining airspeed and desired track;

(c) recover from minimum forward airspeed descent to balanced level flight;

(d) perform descending balanced 'S' turn while maintaining minimum forward airspeed;

(e) exit from descending 'S' turn at minimum forward airspeed to a specified heading or geographical feature in balanced level flight.

3 Range of variables

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

(b) manoeuvres are performed within operating limits of gyroplane;

(c) gyroplane with fixed or retractable undercarriage;

(d) sealed, gravel and grass runways and taxiways;

(e) windsock located on aerodrome;

(f) simulated hazardous weather;

(g) day VFR conditions;

(h) local area operational limitations such as noise abatement and aerodrome curfews.

4 Underpinning knowledge of the following:

(a) operational circumstances where steep turns are required;

(b) aerodynamic and gyroplane operational considerations related to slow flight, vertical, steep turns, upset gyroplane states, including but not limited to the following:

(i) effects of those factors on gyroplane fuel and pitot systems;

(ii) effects of weight and 'g' force during turns;

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(c) contents of the aircraft flight manual;
(d) environmental conditions that represent VMC;
(e) day VFR flight rules;
(f) relevant sections of the AIP.

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G6 Manage abnormal situations – single-engine gyroplanes

1 Unit description

This unit describes the skills and knowledge required to accurately assess an abnormal situation, reconfigure the gyroplane, control the gyroplane and execute appropriate manoeuvres to achieve a safe outcome with no injury to personnel or damage to the gyroplane or property.

2 Elements and performance criteria

2.1 **G6.1 – Manage engine failure – take-off (simulated)**

(a) maintain control of the gyroplane;
(b) establish and maintain best gliding speed;
(c) perform emergency actions from recall actions as time permits;
(d) manoeuvre the gyroplane to achieve the safest possible outcome;
(e) brief and ensure passengers adopt brace position and harness security;
(f) advise others such as ATS and other aircraft of intentions if time permits.

2.2 **G6.2 – Manage engine failure in the circuit area (simulated)**

(a) maintain control of the gyroplane;
(b) establish best gliding speed;
(c) perform recall actions as time permits;
(d) select a suitable landing area within easy gliding distance, on the aerodrome or elsewhere;
(e) manoeuvre the gyroplane to achieve the safest possible outcome;
(f) perform emergency procedures;
(g) advise ATS or other agencies capable of providing assistance of situation and intentions;
(h) brief passengers about flight situation, brace position and harness security;
(i) land the gyroplane ensuring safest outcome if an engine restart is not achieved.

2.3 **G6.3 – Perform forced landing (simulated)**

(a) perform forced landing procedures as follows:
    (i) identify complete engine failure condition and control gyroplane;
    (ii) perform immediate actions;
    (iii) formulate a plan, including selecting the most suitable landing area;
    (iv) establish optimal glide path to position the gyroplane for a landing on the selected landing area;
    (v) perform emergency procedures if the engine cannot be restarted;
    (vi) advise ATS or other agencies capable of providing assistance of situation and intentions;
    (vii) brief passengers about flight situation, brace position and harness security;
    (viii) land the gyroplane ensuring safest outcome if engine restart is not achieved;
(b) perform forced landing following partial engine failure as follows:
    (i) identify partial engine failure;
    (ii) perform recall actions;
    (iii) adjust flight controls to establish flight path to maximise performance for partial engine condition and maintain an appropriate airspeed;
    (iv) establish radiocommunications where possible;
    (v) perform partial engine failure actions;
    (vi) formulate a plan to recover gyroplane to a safe landing area or aerodrome, taking into account that partial failure might lead to a complete engine failure at any time;
    (vii) manoeuvre the gyroplane to a selected landing area or aerodrome and position for a safe landing;
    (viii) advise ATS, or other agencies capable of providing assistance of situation and intentions;

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(ix) brief passengers about flight situation, brace position and harness security;

(x) develop and maintain a contingency plan for coping with a complete engine failure throughout the manoeuvre;

(xi) shutdown and secure engine and gyroplane when a safe landing position is established.

2.4 **G6.4 – Conduct precautionary search and landing (simulated condition)**

(a) make a decision to perform precautionary landing in time available;

(b) declare PAN and communicate intentions;

(c) configure gyroplane for reduced visibility manoeuvring, if applicable;

(d) perform precautionary search procedure;

(e) select landing area, carry out an inspection and assess its suitability for landing, taking into account:

(i) unobstructed approach and overshoot paths;

(ii) whether landing area length is adequate for landing;

(iii) whether landing area surface is suitable for gyroplane type and clear of hazards;

(iv) meteorological conditions;

(f) maintain orientation and visual contact with the landing area;

(g) declare PAN and advise ATS or other agencies capable of providing assistance of situation and intentions;

(h) brief passengers about flight situation, brace position and harness security;

(i) land, manage passengers and secure gyroplane.

2.5 **G6.5 – Manage other abnormal situations**

(a) identify the situation and maintain control of the gyroplane;

(b) manage abnormal and emergency situations;

(c) advise ATS or other agencies capable of providing assistance of situation and intentions;

(d) identify when an emergency evacuation of a gyroplane is required;

(e) execute an emergency evacuation of the gyroplane.

2.6 **G6.6 – Recover from unusual flight attitudes**

(a) identify unusual attitude flight conditions;

(b) recover from unusual attitudes by adjusting pitch, bank and power to resume controlled and balanced flight;

(c) apply controlled corrective action while maintaining aircraft performance within limits.

3 Range of variables

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

(b) discontinue simulated manoeuvres that would be terminated by a forced landing when the assessor is satisfied that the landing standard would be achieved;

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

(d) aerodromes or landing areas;

(e) sealed, gravel and grass surfaces;

(f) wake, orographic and mechanical turbulence;

(g) classes of airspace designated by the regulator;

(h) limitations, such as those imposed by local noise abatement procedures and curfews;

(i) operational hazards, which may include variable surfaces, loose objects, personnel, birds and propeller wash, rotor wash and jet blast;

(j) simulated abnormal and emergency situations;

(k) simulated hazardous weather.

4 Underpinning knowledge of the following:

(a) engine failure scenarios and procedures for partial and complete power loss;

(b) forced landing scenarios and procedures;

(c) suitable fields for forced landings and precautionary landings;

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(d) considerations when practicing emergencies and abnormal operations;
(e) causes leading to precautionary landings and precautionary search procedures;
(f) judging descent profiles in various configurations;
(g) prioritising activities during emergencies and abnormal situations;
(h) cause and effect of, and avoidance and recovery actions of, pilot-induced oscillation (PIO);
(i) cause and effect of, and avoidance of gust-induced oscillation (GIO);
(j) ditching;
(k) passenger control and briefing;
(l) VMC and day VFR flight rules;
(m) low-flying hazards;
(n) the fuel system and causes and effects of fuel vaporisation;
(o) gyroplane operational and starter motor limitations;
(p) all gyroplane limitations;
(q) effects of excessive cooling on engine performance during descent and methods to counter these effects;
(r) use of carburettor heat (if fitted to the gyroplane);
(s) hazards during maximum-rate descents;
(t) contents of the aircraft flight manual;
(u) relevant sections of the AIP;
(v) effects of ‘g’ forces during turns;
(w) effects of induced drag;
(x) hazards and effects of a sideslip on gyroplane performance and systems (where sideslip is permitted by aircraft flight manual);
(y) hazards associated with minimum forward airspeed descents;
(z) ground hazards associated with minimum ground roll and soft-surface operations;
(za) principles of maximum rate and minimum radius turn;
(zb) causes of and corrective actions to manage adverse aerodynamic situations;
(zc) causes and effects of negative ‘g’ and power pushover.

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POWERED LIFT CATEGORY (RESERVED)

AIRSHIP CATEGORY (RESERVED)

GLIDER CATEGORY

PPF-G Perform pre- and post-flight actions and procedures gliders

1 Unit description

This unit describes the skills and knowledge required for a person to conduct pre- and post-flight actions and procedures for a glider.

2 Elements and performance criteria

2.1 PPF.1 – Pre-flight actions and procedures

(a) complete all required pre-flight administration documentation;

(b) obtain, interpret and apply information contained in the required pre-flight operational documentation, including but not limited to:

(i) maintenance release;

(ii) weather forecasts;

(iii) local observations;

(iv) NOTAMs;

(v) ERSA;

(vi) AIP;

(c) identify special aerodrome procedures;

(d) identify all relevant radio and navigation aid facilities to be used during the flight (if applicable);

(e) determine the suitability of the current and forecast weather conditions for the proposed flight;

(f) using the aircraft documents, calculate the following for a given set of environmental and operational conditions:

(i) weight and balance;

(g) determine whether the aircraft is serviceable for the proposed flight.

2.2 PPF.2 – Perform pre-fight inspection

(a) identify and secure equipment and documentation that is required for the flight;

(b) complete an internal and external check of the aircraft;

(c) identify all defects or damage to the aircraft;

(d) report to and seek advice from qualified personnel to determine the action required in relation to any identified defects or damage;

(e) ensure all aircraft locking and securing devices, covers and bungs are removed and stowed securely;

(f) certify the aircraft flight technical log entering any defects or endorsements to permissible unserviceabilities, as appropriate;

(g) complete and certify the daily inspection (if authorised to do so).

2.3 PPF.3 – Post-flight actions and procedures

(a) conduct post-flight inspection and secure the aircraft (if applicable);

(b) complete all required post-flight administration documentation.

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3 Range of variables

Activities are performed in accordance with published procedures.

4 Underpinning knowledge of the following:

(a) standard operating procedures for the glider;

(b) airworthiness requirements applicable to the glider;

(c) local weather patterns;

(d) local aerodrome requirements.

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S1 Control glider on the ground

1 Unit description

This unit describes the skills and knowledge required to operate a glider on the ground.

2 Elements and performance criteria

2.1 S1.1 – Before flight actions

(a) assess weather conditions as being suitable for flight;

(b) determine glider weight and balance is within limits;

(c) demonstrate an ability to assemble glider;

(d) determine ballast requirements;

(e) perform external pre-flight actions;

(f) perform internal pre-flight actions;

(g) determine launch mechanism is correctly connected.

3 Range of variables

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

(b) windsock located on aerodrome;

(c) sufficient wind that requires control adjustment (can be simulated);

(d) hazardous weather (can be simulated);

(e) day VFR conditions;

(f) local area operational limitations such as aerodrome curfews (can be simulated).

4 Underpinning knowledge of the following:

(a) published regulations and published procedures relating to the ground operation of aircraft;

(b) typical glider aircraft systems;

(c) typical glider launch systems;

(d) typical aircraft performance characteristics of gliders and the effects of local weather conditions on performance;

(e) aircraft weight and balance and the how to calculate aircraft centre of gravity;

(f) the contents of the flight manual and pilot operating handbook for the aircraft being flown;

(g) the environmental conditions that represent VMC;

(h) propeller wash, rotor wash and jet blast and how they affect gliders;

(i) the day VFR flight rules;

(j) the meaning of aerodrome markings, signals and local procedures;

(k) the actions to be taken in the event of a brake or tyre or steering failure;

(l) the relevant sections of the AIP.

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S2 Take-off glider

1 Unit description

This unit describes the skills and knowledge required to perform a take-off in a glider.

2 Elements and performance criteria

2.1 S2.1 – Carry out pre-take-off procedures

(a) identify and apply airspeeds, configurations, and emergency and abnormal procedures for normal and cross-wind take-offs;

(b) work out in advance a plan of action to ensure the safest outcome in the event of abnormal operations;

(c) verify and correctly apply correction for the existing wind component to the take-off performance;

(d) perform and ensure all pre-take-off and line-up checks required by the aircraft checklist items are completed in a timely manner;

(e) align the airplane on the runway centreline.

2.2 S2.2 – Take-off glider

(a) apply the controls correctly to maintain longitudinal alignment on the centreline of the runway, if appropriate, prior to initiating and during the take-off;

(b) monitor settings, and instruments during take-off to ensure all predetermined parameters are maintained;

(c) adjust the controls to attain the desired pitch attitude at the predetermined airspeed to attain the desired performance;

(d) perform the take-off using winch and towed glider equipment applying the required control inputs as appropriate in a smooth, coordinated manner;

(e) trim the glider accurately maintaining balanced flight;

(f) perform and verify the completion of, gear and flap retractions (as applicable) and other required pilot-related activities at the required airspeed within tolerances;

(g) maintain desired flight path as required.

2.3 S2.3 – Take-off glider in a cross-wind

(a) perform a take-off in a glider allowing for cross-wind;

(b) maintain runway centreline and extended centreline.

2.4 S2.4 – Carryout after take-off procedures

2.4.1 The person must be able to demonstrate the following:

(a) verify the completion of the appropriate after take-off checklist items in a timely manner;

(b) maintain the appropriate climb segment at the nominated heading and airspeed.

3 Range of variables

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

(b) towed take-off;

(c) winch launch;

(d) aircraft with or without flaps;

(e) sealed, gravel or grass runways and taxiways;

(f) windsock located on aerodrome;

(g) simulated hazardous weather;

(h) day VFR conditions;

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(i) for take-off in cross-wind, the cross-wind component must be at least 70% of the maximum permitted for the type of aeroplane being flown;

(j) local area operational limitations such as noise abatement and aerodrome curfews.

4 Underpinning knowledge of the following:

(a) hand signals;

(b) tow aircraft signals;

(c) obtaining or calculating the cross-wind and down or up wind components;

(d) the factors affecting take-off and initial climb performance;

(e) interpreting windsock indications and determining wind direction and speed;

(f) take-off distance required calculation;

(g) aerodrome charts and an ability to interpret them;

(h) local topographical chart to identify safe areas for engine-failure purposes and noise-abatement considerations.

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S3 Control glider in normal flight

1 Unit description

This unit describes the skills and knowledge required to control a glider while performing normal flight manoeuvres.

2 Elements and performance criteria

2.1 S3.1 – Climb glider

(a) operate and monitor all aircraft systems when commencing, during, and completing a climbing flight manoeuvre;

(b) for the following climbing manoeuvres select attitude and configuration as required for the flight path, balance and trim the aeroplane accurately, apply smooth, coordinated control inputs to achieve the required flight tolerances as applicable to the normal climb manoeuvre.

2.2 S3.2 – Maintain straight flight

(a) operate and monitor all aircraft systems during straight flight manoeuvres;

(b) for the following straight manoeuvres selects attitude and configuration as required for the flight path, balance and trim the glider accurately, apply smooth, coordinated control inputs to achieve the required flight tolerances as applicable to the manoeuvre:

(i) at slow speed;

(ii) at normal cruise;

(iii) at high-speed;

(iv) at maximum range;

(v) at maximum endurance;

(vi) with flap selected.

2.3 S3.3 – Descend glider

(a) operate and monitor all aircraft systems during descending flight manoeuvres;

(b) for the following descending manoeuvres select attitude and configuration as required for the flight path, balance and trim the glider accurately, apply smooth, coordinated control inputs to achieve the required flight tolerances as applicable to the manoeuvre:

(i) glide;

(ii) approach configuration descent (flap and gear).

2.4 S3.4 – Turn glider

2.4.1 The person must be able to demonstrate her or his ability to do the following:

(a) operate and monitor all aircraft systems during turning flight manoeuvres;

(b) for the following turning manoeuvres select attitude and configuration as required for the flight path, balance and trim the aeroplane accurately, apply smooth, coordinated control inputs to achieve the required flight tolerances as applicable to the manoeuvre:

(i) level turns;

(ii) climbing turn;

(iii) descending turn.

2.5 S3.5 – Control glider at slow speeds

(a) operate and monitor all aircraft systems when operating the glider at slow speed;

(b) for the following climbing manoeuvres select, attitude and configuration as required for the flight path, balance and trim the glider accurately, apply smooth, coordinated control inputs to achieve the required flight tolerances as applicable to the manoeuvre:

(i) minimum approach speed with flaps retracted;

(ii) minimum approach speed in approach configuration;

(iii) observe visual stall warnings and recover aeroplane to controlled flight;

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(iv) recognise and respond positively to reduced effectiveness of controls during slow flight manoeuvres;

(v) transition from slow speed configuration to achieve nominated speed in excess of 1.5 V_S.

2.6 **S3.6 – Perform circuits and approaches**

(a) operate and monitor all aircraft systems when operating the glider in the circuit;

(b) perform a circuit pattern (4 legs) by balancing, trimming the aeroplane accurately while applying smooth, coordinated control inputs to achieve the required flight tolerances specified for the relevant flight path flown during traffic pattern manoeuvres as follows:

(i) establish and maintain cross-wind leg tracking 90° to the runway;

(ii) establish and maintain downwind leg tracking parallel to and at a specified distance from the runway at circuit height;

(iii) establish base leg tracking 90° to the runway at a specified distance from the runway threshold;

(c) establish the approach and landing configuration appropriate for the runway and meteorological conditions as required for the following:

(i) commence and control approach descent path;

(ii) adjust descent commencement point to take account of extended downwind leg or traffic adjustments;

(iii) align and maintain aircraft on final approach flight path with specified or appropriate runway;

(iv) set and maintain approach configuration;

(v) identify and maintain aiming point;

(vi) maintain a stabilised approach angle at the nominated airspeed to the round-out height;

(vii) verify existing wind conditions, make proper correction for drift, and maintain a precise ground track;

(viii) apply speed allowances for wind gusts;

(ix) configure glider for landing;

(d) maintain separation and position in the circuit with reference to other aircraft traffic in the circuit area.

3 Range of variables

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

(b) aircraft with fixed or retractable undercarriage;

(c) aircraft with or without flaps;

(d) simulated hazardous weather;

(e) day VFR conditions;

(f) local area airspace limitations.

4 Underpinning knowledge of the following:

(a) the primary effects of controls;

(b) the secondary effects of controls;

(c) the stall warning devices;

(d) aircraft systems;

(e) aircraft performance;

(f) aircraft weight and balance;

(g) contents of the flight manual and POH;

(h) environmental conditions that represent VMC;

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(i) day VFR flight rules;

(j) relevant sections of the AIP.

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S4 Land glider

1 Unit description

This unit describes the skills and knowledge required to conduct a landing in a glider.

2 Elements and performance criteria

2.1 **S4.1 – Land glider**

(a) maintain a constant landing position aim point;

(b) achieve a smooth, positively-controlled transition from final approach to touchdown, including the following;

(i) control ballooning during flare and bouncing;

(ii) touchdown at a controlled rate of descent, in specified touchdown zone within tolerances;

(iii) touchdown aligned with the centreline within tolerances;

(c) maintain positive directional control and cross-wind correction during the after-landing roll;

(d) use drag or braking devices, as applicable, in such a manner to bring the airplane to a safe stop;

(e) complete the applicable after-landing checklist items in a timely manner.

2.2 **S4.2 – Land glider in a cross-wind**

(a) verify existing wind conditions, make proper correction for drift, and maintain a precise ground track;

(b) configure the glider for the cross-wind conditions;

(c) control the glider during the transition from final approach to touchdown and during after-landing roll to compensate for the cross-wind conditions.

2.3 **S4.3 – Conduct an 'outlanding'**

(a) recognise the conditions when an outlanding must be executed;

(b) the decision to execute an outlanding is made and executed when it is safe to do so;

(c) obstacles are identified and avoided;

(d) suitable field is identified and inspected from a safe height;

(e) wind direction is established;

(f) glider is manoeuvred for a safe landing.

3 Range of variables

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

(b) aircraft with fixed or retractable undercarriage;

(c) aircraft with or without flaps;

(d) sealed, gravel or grass runways and taxiways;

(e) windsock located on aerodrome;

(f) simulated hazardous weather;

(g) day VFR conditions;

(h) for land aeroplane in cross-wind, the cross-wind component must be at least 70% of the maximum permitted for the type of aeroplane being flown;

(i) local area operational limitations such aerodrome curfews.

4 Underpinning knowledge of the following:

(a) typical glider systems;

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(b) glider performance;

(c) glider limitations;

(d) glider weight and balance;

(e) contents of the flight manual and POH;

(f) environmental conditions that represent VMC;

(g) day VFR flight rules;

(h) propeller wash, rotor wash and jet blast;

(i) relevant sections of the AIP.

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S5 Glider advanced manoeuvres

1 Unit description

This unit describes the skills and knowledge required to perform advanced manoeuvres in a glider.

2 Elements and performance criteria

2.1 S5.1 – Enter and recover from stall

(a) perform pre-manoeuvre checks for stalling;

(b) recognise stall signs and symptoms;

(c) control the glider by applying the required pitch, roll and yaw inputs as appropriate in a smooth, coordinated manner, trims aeroplane accurately to enter and recover from the following manoeuvres:

(i) where initial symptoms of a stall become evident;

(ii) stall under the following conditions:

(A) straight and level flight;

(B) climbing;

(C) descending;

(D) approach to land configuration;

(E) turning;

(d) when executing the recovery for each of the stall manoeuvres mentioned in paragraph (c), adjust the aeroplane's attitude to resume normal balanced flight on advent of stall, applicable to glider type;

(e) during stall recovery:

(i) reduce angle of attack to unstall the wings;

(ii) achieve height loss that is appropriate for the type of glider and commensurate with available altitude (simulated ground-base height may be set).

2.2 S5.2 – Recover from spin at the incipient phase

(a) perform spin pre-manoeuvre checks;

(b) recognise symptoms of spin at the incipient phase;

(c) use the glider's attitude controls to enter a spin and recover at the incipient phase from the following flight conditions:

(i) straight and level flight;

(ii) climbing;

(iii) turning;

(d) use correct recovery technique to regain straight and level flight with height loss commensurate with the available altitude (simulated ground-base height may be set).

2.3 S5.3 – Recover from spiral dive

(a) perform spiral dive pre-manoeuvre checks;

(b) recognise a spiral dive and symptoms;

(c) use the glider's attitude controls to execute a spiral dive manoeuvre from the following flight conditions and, using correct recovery technique, regain straight and level flight with height loss commensurate available altitude (simulated ground-base height may be simulated).

2.4 S5.4 – Turn glider steeply

(a) pre-manoeuvre checks for steep turning;

(b) steep level turn using a nominated bank angle, ending on a nominated heading or geographical feature, without altitude change;

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(c) steep descending turn using a nominated bank angle, ending on a nominated heading or geographical feature ending on a nominated altitude;

(d) awareness of higher stall speed in turns is demonstrated;

(e) glider operating limits are not exceeded.

2.5 **S5.5 – Maximum performance turning**

(a) perform maximum rate turn as following:

(i) maximum bank angle attained;

(ii) maximum speed attained;

(iii) maximum allowable G limit attained;

(iv) maintain lookout during turn;

(b) perform minimum radius turn as following:

(i) maximum bank angle attained;

(ii) maximum allowable G limit attained;

(iii) maintain look-out during the turn.

2.6 **S5.6 – Sideslip glider (where flight manual permits)**

(a) straight sideslip:

(i) induce slip to achieve increased rate of descent while maintaining track and airspeed;

(ii) adjust rate of descent by coordinating angle of bank and applied rudder;

(b) sideslipping turn:

(i) adjust bank angle to turn through minimum heading change of 90° at constant airspeed using sideslip;

(ii) exit on specified heading or geographical feature within tolerance;

(c) recover from sideslip and returns glider to balanced flight.

3 Range of variables

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

(b) glider with fixed or retractable undercarriage;

(c) aircraft with or without flaps;

(d) sealed, gravel or grass runways and taxiways;

(e) windsock located on aerodrome;

(f) simulated hazardous weather;

(g) day VFR conditions;

(h) local area operational limitations such as aerodrome curfews.

4 Underpinning knowledge of the following:

(a) typical glider aircraft systems;

(b) aircraft performance;

(c) aircraft weight and balance;

(d) contents of the flight manual and POH;

(e) environmental conditions that represent VMC;

(f) day VFR flight rules;

(g) relevant sections of the AIP;

(h) hazards of unbalanced flight.

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G6 Manage abnormal situations – gliders

1 Unit description

This unit describes the skills and knowledge required to accurately assess an abnormal situation, reconfigure the glider, control the glider and execute appropriate manoeuvres to achieve a safe outcome with no injury to personnel or damage to the glider or property.

2 Elements and performance criteria

2.1 **S6.1 – Manage winch launch equipment failure – take-off (simulated)**

(a) correctly identify a winch and towed take-off emergencies during and after take-off;

(b) apply the highest priority to taking action to control the glider;

(c) perform recall actions in accordance with AFM;

(d) perform emergency actions as far as time permits;

(e) manoeuvre the glider to achieve the safest possible outcome.

2.2 **S6.2 – Perform forced landing (simulated)**

(a) after a simulated emergency has occurred, without prior indications, carry out the following:

(i) perform immediate actions;

(ii) select most suitable landing area within gliding distance;

(iii) formulate a plan;

(iv) perform all emergency procedures;

(v) establish optimal gliding flight path to a landing on the selected landing area.

2.3 **S6.5 – Manage other abnormal situations (simulated)**

(a) correctly identify the situation and maintain safe control of the aeroplane at all times;

(b) abnormal and emergency situations are managed in accordance with relevant emergency procedures and regulatory requirements;

(c) appropriate emergency procedures are followed while maintaining control of the aeroplane;

(d) identify and conduct flight with an unreliable airspeed indication.

2.4 **S6.6 – Recover from unusual flight attitudes**

(a) identify nose-high or nose-low unusual attitude flight condition;

(b) recover from nose-low or nose-high unusual attitudes by adjusting pitch and bank to resume controlled and balanced flight;

(c) apply controlled corrective action while maintaining aircraft performance within limits.

3 Range of variables

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

(b) day VFR conditions.

4 Underpinning knowledge of the following:

(a) collision avoidance precautions and procedures;

(b) forced landing procedure;

(c) aircraft performance in a glide (straight and turning);

(d) hazard of slideslip at low altitude;

(e) contents of the flight manual and POH;

(f) passenger control;

(g) VMC;

(h) low flying hazards.

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S7 Navigation – gliders

1 Unit description

This unit describes the skills and knowledge required to conduct a cross-country flight in a glider using visual references and dead reckoning.

2 Elements and performance criteria

2.1 S7.1 – Conduct cross-country flight

(a) prepare for a cross-country flight that terminates at the departure aerodrome;

(b) maintain a navigation cycle that ensures accurate tracking and apply track correctional technique to re-establish track prior to waypoint or destination;

(c) maintain heading to achieve a nominated track;

(d) maintain and revises ETAs (±2 minutes) for waypoint or destination;

(e) navigate en route using dead reckining;

(f) navigate using accepted map reading techniques;

(g) maintain navigation log to monitor tracking and ETAs;

(h) use appropriate technique obtains a positive fix at suitable intervals;

(i) maintain awareness of route and destination weather and reacts appropriately to changing weather conditions;

(j) configure glider as required for environmental and operational conditions, including the following:

(i) turbulence;

(ii) reduced visibility;

(iii) low cloud base;

(iv) maximum range.

2.2 S7.2 – Perform diversion procedure

(a) make timely decision to divert;

(b) identify an acceptable alternate landing site;

(c) revises plan considering weather, terrain, airspace and available height.

2.3 S7.3 – Execute arrival procedures

(a) determine landing site;

(b) conduct arrival;

(c) cancel SARWATCH.

3 Range of variables

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

(b) visual flight rules;

(c) different terrain;

(d) simulated weather conditions;

(e) carriage of dangerous goods.

4 Underpinning knowledge of the following:

(a) 1:60 rule;

(b) basic navigation map reading;

(c) aeronautical charts.

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DESIGN FEATURE ENDORSEMENT

DFE1 Tail wheel aeroplane

1 Unit description

This unit describes the skills and knowledge required to safely operate an aeroplane fitted with tail wheel undercarriage.

2 Elements and performance criteria

2.1 DFE1.1 – Taxi tail-wheel aeroplane

(a) taxi a tail-wheel aeroplane in the prevailing aerodrome and surface conditions and weather;

(b) operate engine on the ground and exercise propeller care;

(c) perform brake checks;

(d) perform flight instrument checks while taxiing;

(e) maintain forward visibility;

(f) maintain aeroplane within the taxiway limits;

(g) anticipate and manage ground slope;

(h) use minimum power to achieve desired performance and exercise propeller care;

(i) adjust taxi speed to suit aeroplane type, surface conditions, congestion, maintain control and avoid collision with obstacles, and other aircraft;

(j) interpret and comply with taxiway and other aerodrome markings or, in the absence of markings, the aircraft is maintained in the centre of the taxiway and at a safe distance from obstacles;

(k) compensate for effects of wind velocity and high engine power using aircraft controls.

2.2 DFE1.2 – Take-off tail wheel aeroplane

(a) perform pre-take-off checks correctly;

(b) line up aircraft in the centre of the runway in take-off direction and completes line-up checks in accordance with approved checklist;

(c) apply take-off power fully, maintain aircraft aligned with centre of runway and maintain wings level;

(d) raise tail to achieve minimum drag, ensuring the propeller is clear of the surface;

(e) control yaw;

(f) rotate at manufacturer’s recommended speed to achieve planned climb performance;

(g) adjust heading to maintain track along extended runway centreline;

(h) configure aircraft for nominated climb profile and track on runway centreline;

(i) perform after take-off checks from memory;

(j) perform take-off into wind and cross-wind take-off.

2.3 DFE1.3 – Land tail wheel aeroplane

(a) select and identify aiming point;

(b) land aeroplane at a controlled rate of descent, aligned with and above the runway centreline, within a specified area beyond a nominated touchdown point, without drift, maintaining directional control, and stop within the available runway length;

(c) minimise and control ballooning and bouncing;

(d) land aeroplane in the following profiles:

(i) main wheels and tail wheel simultaneously (3-point landing);

(ii) wheel landing (main wheels only on touchdown);

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(iii) flapless landing;

(e) perform after-landing checks correctly.

2.4 **DFE1.4 – Short take-off and landing**

(a) for short take-off, demonstrate the following:

(i) calculate take-off performance;

(ii) perform pre- and after-take-off, line-up and after-landing checks;

(iii) line up aeroplane to use maximum runway length;

(iv) apply take-off power fully before brakes (where fitted) are released and rotate aeroplane at manufacturer's recommended speed;

(v) set nominated climb speed appropriate to obstacle clearance requirements;

(b) for short landing, demonstrate the following;

(i) calculate landing performance;

(ii) land the aeroplane at the nominated touchdown point at minimum speed and apply maximum braking;

(iii) touchdown simultaneously on main wheels and tail wheel;

(iv) control the direction of the aeroplane on the ground;

(v) stop aeroplane within calculated landing distance;

(vi) perform after-landing checks correctly.

3 Range of variables

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

(b) day VFR;

(c) approved aircraft fitted with tail wheel undercarriage;

(d) aircraft with fixed or retractable undercarriage;

(e) cross-wind, headwind or tailwind to the limits of the aircraft type;

(f) sealed, gravel or grass runways;

(g) simulated abnormal and emergency situations.

4 Underpinning knowledge of the following:

(a) cross-wind limits for the aircraft type flown;

(b) ability to calculate cross-wind components;

(c) windsock indication interpretation;

(d) take-off and landing performance;

(e) take-off weight and centre of gravity calculation;

(f) centre of gravity limitations;

(g) gyroscopic effect during take-off;

(h) slipstream effect during take-off;

(i) direction of induced yaw when aircraft tail is raised;

(j) causes of loss of control of a tail wheel aeroplane on landing.

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DFE2 Retractable undercarriage

1 Unit description

This unit describes the skills and knowledge required to operate an aircraft fitted with retractable undercarriage in normal and abnormal or emergency conditions.

2 Elements and performance criteria

2.1 DF2.1 – Retractable undercarriage in normal flight

(a) retract undercarriage;

(b) establish a positive rate of climb before selecting undercarriage up;

(c) identify undercarriage selector and select undercarriage up;

(d) confirm undercarriage is in transit;

(e) confirm undercarriage is in the retracted and locked position by reference to undercarriage position indicators;

(f) comply with undercarriage speed limitations (V_{LO});

(g) lower undercarriage;

(h) comply with undercarriage lowering speed limits (V_{LE});

(i) identify undercarriage selector and select undercarriage down;

(j) confirm undercarriage is in transit;

(k) confirm undercarriage is in the lowered and locked position by reference to undercarriage position indicators.

2.2 DFE2.2 – Manage abnormal and emergency procedures applicable to retractable undercarriage

(a) identify abnormal operation of undercarriage;

(b) control aircraft;

(c) manage abnormal or emergency operation of undercarriage to achieve a safe flight outcome.

3 Range of variables

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

(b) day VFR;

(c) approved aircraft fitted with tail wheel or conventional undercarriage;

(d) aircraft with or without flaps;

(e) aircraft with retractable undercarriage;

(f) cross-wind, headwind or tailwind to the limits of the aircraft type;

(g) sealed, gravel or grass runways;

(h) simulated abnormal and emergency situations;

4 Underpinning knowledge of the following:

(a) source of power that operates the undercarriage;

(b) cockpit indications for undercarriage down and locked;

(c) cockpit indications for undercarriage retracted;

(d) cockpit indications when undercarriage is in transit;

(e) conditions that will cause the undercarriage warning horn to sound;

(f) how the landing gear doors are opened and closed;

(g) method of preventing retraction of the undercarriage on the ground;

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(h) maximum undercarriage extension speed (V_{LE});

(i) maximum undercarriage operating speed (V_{LO});

(j) how long the undercarriage takes to extend and retract;

(k) emergency procedures to extend and lock the undercarriage down.

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DFE3 Manual propeller pitch control

1 Unit description

This unit describes the skills and knowledge required to control an aircraft and operate a propeller fitted with a manual propeller pitch control on the ground and in flight during normal and abnormal and emergency situations.

2 Elements and performance criteria

2.1 DFE3.1 – Perform pre-flight and pre-take-off checks for manual propeller pitch control

(a) perform propeller pre-flight checks ensuring the serviceability of the following:
  (i) propeller;
  (ii) spinner (when fitted);
  (iii) backing plate;

(b) CSU control rods and cables are checked to confirm they are intact and secure (when visible);

(c) perform propeller pre-take-off checks, including the following:
  (i) oil temperature and pressure within limits;
  (ii) function of propeller pitch control at specified RPM;
  (iii) function of propeller feather system when applicable.

2.2 DFE3.2 – Operate manual propeller pitch control during ground and flight operations

(a) operates manual propeller pitch control on the ground within the limitations and conditions specified in AFM and POH, ensuring:
  (i) idle RPM within limits;
  (ii) propeller RPM responds appropriately to throttle;
  (iii) engine RPM is within limitations when take-off power is set;

(b) operates manual propeller pitch control in flight within the limitations and conditions specified in AFM and POH and:
  (i) sets RPM is set as required;
  (ii) monitors RPM remains within specified limits;
  (iii) synchronises engine RPM using propeller control on multi-engine aircraft;
  (iv) avoids oil congelation in cold weather operations by cycling engine RPM.

2.3 DFE3.3 – Manage abnormal and emergency procedures for a manual propeller pitch control

(a) identifies abnormal or emergency operations of manual propeller pitch control or CSU;

(b) maintains control of engine RPM;

(c) performs appropriate abnormal or emergency procedures;

(d) feathers and unfeathers propeller.

3 Range of variables

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

(b) day VFR in variable weather conditions;

(c) approved aircraft fitted with tail wheel or conventional undercarriage;

(d) single- and multi-engine aircraft;

(e) piston or diesel engine;

(f) featherable or non-featherable propeller;

(g) CSU with or without counterweights;

(h) simulated abnormal and emergency situations;

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(i) simulated hazardous weather.

4 Underpinning knowledge of the following:

(a) effects of loss of oil pressure to the CSU;

(b) effects of loss of oil pressure on the pitch of the propeller (if applicable);

(c) effects of counterweights on engine RPM (when applicable);

(d) the function of oil pressure on the CSU fitted to the aircraft;

(e) the function of the fine and coarse pitch stops;

(f) the effect that failure of the fine pitch stops may cause in the aircraft type flown;

(g) the effects of the use of carburettor heat on an aircraft fitted with a CSU;

(h) propeller over-speed in an aircraft fitted with a CSU;

(i) indications of engine ice in an engine fitted with a CSU;

(j) indications that carburettor ice has been cleared in an engine fitted with a CSU;

(k) effects on manifold pressure of reducing engine RPM in a normally aspirated engine below full throttle height.

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DFE4 Gas turbine engine

1 Unit description

This unit describes the skills and knowledge required to operate a gas turbine powered aircraft on the ground and in the air during normal and abnormal operations.

2 Elements and performance criteria

2.1 **DFE4.1 – Start and stop gas turbine engine**

Perform pre-start and after-start checks.

2.2 **DFE4.2 – Starts and stops engine**

Comply with manufacturer's limitations and report deviations when appropriate.

2.3 **DFE4.3 – Operate gas turbine engine on the ground and in the air**

(a) extract, interpret and apply engine performance and limitations information;

(b) manage gas turbine engine on the ground and in the air.

2.4 **DFE4.4 – Manage abnormal and emergency actions applicable to gas turbine engine**

(a) identify and confirm abnormal or emergency situation affecting a gas turbine engine;

(b) control aircraft;

(c) perform abnormal or emergency rectification or shutdown action.

3 Range of variables

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

(b) day VFR in variable weather conditions;

(c) approved aircraft fitted with gas turbine engine(s);

(d) variable temperatures and environmental conditions.

4 Underpinning knowledge of the following:

(a) the make and model of the engine applicable to the aircraft flown;

(b) where the make and model of the engine are found;

(c) major characteristics of the engine;

(d) purpose of the engine air intake system;

(e) purpose of inlet guide vanes in a gas turbine engine;

(f) method of measuring thrust (power) of the engine being used;

(g) main components of all gas turbine engines;

(h) principles of operation of a centrifugal compressor;

(i) principles of operation of an axial flow compressor;

(j) principles of operation of a bypass fan engine;

(k) primary method of preventing air leakage between a compressor and engine internal compartments in a gas turbine engine;

(l) purpose of the stator blades in an axial flow compressor;

(m) specific purpose of the stator blade at the last stage of a gas turbine engine;

(n) uses of bleed air on the engine being operating;

(o) the section of a gas turbine engine bleed air is normally taken;

(p) consequences of a bleed air valve being stuck open;

(q) the detrimental effects that may occur when starting a turbine engine using a battery with voltage below the minimum specified in AFM or POH;

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(r) what damage could be caused by a slow or hung start;

(s) instrument indications and physical symptoms of a hung start;

(t) hung start procedure;

(u) hot start procedure;

(v) likely cause and damage caused by a ‘hot start’;

(w) engine instrument indications and physical symptoms of a compressor stall;

(x) the automatic devices in a gas turbine engine designed to control compressor stalls;

(y) likely cause of a compressor stall;

(z) clearing a compressor stall and re-establishing normal engine operations;

(za) engine instrument indications and physical symptoms of a compressor surge;

(zb) location of the sensor for engine temperature measurement in the engine that is being operated;

(zc) the advantages and disadvantages of single shaft turbine engines;

(zd) for single shaft turbo-prop engines:

(i) the cause of shaft bowing and prevention procedure;

(ii) calculated single red line EGT indications;

(iii) compensated EGT indications;

(ze) the turbine stage that N1 RPM is measured from;

(zf) the turbine stage that N2 RPM is measured from;

(zg) causes of a low N1 reading;

(zh) actions in the event of a low N1 reading;

(zi) possible causes of a low N2 reading;

(zj) actions in the event of a low N2 reading;

(zk) how the power from the N1 turbine is transferred to thrust or SHP;

(zl) possible effects on the performance of a gas turbine engine if:

(i) the compressor is damaged;

(ii) the intake is partially blocked;

(iii) the intake is damaged;

(iv) the turbine has overheated;

(zm) the duty cycle of the start system;

(zn) the maximum transient TOT or EGT and time limit on start for the applicable engine;

(zo) the engine oil type and capacity;

(zp) indications that would be expected when engine anti-icing or de-icing system is operated;

(zq) location of fire warning sensors (as applicable);

(zr) operation of cockpit fire alert systems (as applicable);

(zs) method of arming or selecting and firing contents of the fire extinguisher(s) (as applicable).

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DFE5 Multi-engine centreline thrust aeroplane

1 Unit description

This unit describes the skills and knowledge required to operate a multi-engine centreline thrust aeroplane.

2 Elements and performance criteria

2.1 DFE5.1 – Extract, interpret, calculate and apply normal and abnormal flight performance information

(a) extract approved flight performance information from AFM or POH, interpret information and apply to:

(i) calculate aircraft take-off and landing weight, centre of gravity and take-off and landing performance; and

(ii) the phase of flight and calculate aircraft performance during normal flight operations; and

(iii) failed engine(s) operations during any phase of flight and calculate aircraft performance; and

(b) apply performance information to calculate fuel requirements; and

(c) apply performance information to calculate range and endurance at any stage of a flight following a failure of 1 or more of the following:

(i) forward engine;

(ii) rear engine.

2.2 DFE5.2 – Operate multi-engine centreline thrust aeroplane in normal flight

(a) control aeroplane in all phases of normal flight;

(b) operate all aircraft systems, equipment and engines.

2.3 DFE5.3 – Manage abnormal or emergency flight operations in multi-engine centreline thrust aeroplane

(a) identify and confirm abnormal or emergency situation;

(b) control aeroplane;

(c) perform appropriate abnormal or emergency procedures;

(d) advise ATS or other agencies capable of assistance of situation and intentions.

2.4 DFE5.4 – Manage engine failure(s) in multi-engine centreline thrust aeroplane

(a) self-brief or brief crew members stating a plan of action that will ensure the safest outcome in the event of an engine failure;

(b) maintain control of aeroplane, identify and confirm failed engine and shut down failed engine following engine failure during any phase of flight;

(c) operate aircraft during flight with failed engine for the following:

(i) engine failure in flight (sequence of actions may be varied);

(A) set power on serviceable engine(s) to ensure desired aircraft performance;

(B) configure aircraft to achieve minimum drag;

(C) climb aircraft at V_{YSE} if applicable;

(D) land aircraft at nearest appropriate landing area;

(ii) engine failure after take-off:

(A) control aircraft;

(B) ensure maximum take-off power applied to serviceable engine;

(C) identify failed engine and confirms failure;

(D) feather propeller (as applicable) and shut down failed engine;

(E) configure aircraft to achieve minimum drag;

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(F) climb aircraft at V_{YSE};

(G) land aircraft at nearest appropriate landing area;

(iii) manage engine failure after take-off below V_{TOSS} – aircraft will not accelerate or climb:

(A) set power as required to manoeuvre aircraft to most suitable area to land;

(B) perform overshoot from visual committal height;

(C) determine visual committal height;

(D) initiate go-around at or above visual committal height;

(E) control aircraft;

(F) apply take-off power;

(G) configure aircraft to achieve minimum drag;

(H) maintain V_{YSE} or greater;

(I) climb to circuit height;

(J) re-assess situation for landing;

(iv) below visual committal height:

(A) control aircraft;

(B) land aircraft.

3 Range of variables

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

(b) day VFR;

(c) approved multi-engine centreline thrust aeroplane with dual controls, electronic intercom and dual control brakes;

(d) aerodromes;

(e) sealed, gravel or grass surfaces;

(f) simulated abnormal and emergency situations;

(g) simulated hazardous weather.

4 Underpinning knowledge of the following:

(a) general aircraft data;

(b) airspeed and load limitations;

(c) normal and emergency procedures;

(d) fuel system;

(e) hydraulic system;

(f) electrical system;

(g) oil system;

(h) autopilot;

(i) anti-icing and de-icing systems;

(j) heating, ventilation and pressurisation systems;

(k) pitot and static system;

(l) suction system;

(m) oxygen system;

(n) fire extinguisher system;

(o) engines;

(p) weight, balance and performance;

(q) abnormal and emergency operations.

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DFE6 Pressurisation system

1 Unit description

This unit describes the skills and knowledge required to operate an aircraft that is fitted with a pressurisation system during normal, abnormal and emergency flight.

2 Elements and performance criteria

2.1 **DFE6.1 – Operate and monitor aircraft pressurisation system**

(a) conduct pre-flight serviceability check of flight crew supplementary oxygen system, confirming normal contents, flow and operation of oxygen system;

(b) activate and operate pressurisation system, ensuring appropriate selection of switches and circuit breakers;

(c) confirm pressurisation system is operating normally before reaching 10,000 ft;

(d) confirm the integrity of the pressurisation system when passing 10,000 ft, and identify an appropriate pressure differential between cabin and outside air pressure;

(e) confirm cabin altitude and cabin differential pressure are appropriate and constant during cruise;

(f) monitor and react appropriately to instrument indications, physiological symptoms and crew member's advice during multi-crew operations to ensure normal operation of the pressurisation system;

(g) ensure the aircraft is de-pressurised before opening doors on the ground.

2.2 **DFE6.2 – Manage pressurisation system during abnormal and emergency situations**

(a) identify abnormal or emergency situation involving aircraft pressurisation system, including rapid and slow decompression;

(b) perform abnormal or emergency procedures;

(c) monitor cabin altitude and differential pressure, identify any discrepancies and manually control the aircraft pressurisation system when appropriate;

(d) monitor physiological condition of self, crew members and passengers to identify signs of hypoxia, barotrauma or other physiological hazards associated with pressurisation failure;

(e) ensure the use of emergency oxygen by crew members and passengers when cabin altitude is greater than 10,000 ft;

(f) advise ATC of flight situation, action taken by pilot in command and any requirements.

3 Range of variables

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

(b) VFR or IFR in variable weather conditions;

(c) approved aircraft fitted with pressurisation system;

(d) variable temperatures and environmental conditions;

(e) simulated abnormal and emergency situations.

4 Underpinning knowledge of the following:

(a) pressurisation failure warning indications fitted to the aircraft type flown;

(b) the cabin pressure at which the cabin pressurisation warning light illuminates;

(c) conditions that will cause a pressurisation failure indicator to activate;

(d) functions of bleed air with respect to an aircraft pressurisation system;

(e) how bleed air pressure and temperature are controlled (modified) to meet cabin pressurisation and temperature requirements;

(f) procedure for manual control of cabin pressurisation applicable to the aircraft type flown;

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(g) what a pressure differential gauge indicates to a pilot with respect to a pressurisation system;

(h) maximum pressure differential for the aircraft type flown;

(i) symptoms that may indicate an outflow valve failure;

(j) power source that operates (controls) the outflow valve;

(k) the effect of an outflow valve that is stuck open on an aircraft climbing above 10,000 ft and explain the hazards associated with this situation;

(l) minimum and maximum rates of change of cabin air pressure;

(m) indications that would be expected in a pressurised aircraft if the outflow valve were stuck closed during descent;

(n) how the automatic depressurisation system operates after landing;

(o) times of useful consciousness without oxygen at:

(i) 10,000 ft;

(ii) 20,000 ft;

(iii) 25,000 ft;

(iv) 30,000 ft;

(p) physiological symptoms of hypoxia;

(q) physical hazards that could occur during a rapid decompression;

(r) physiological hazards that could occur following a rapid decompression;

(s) the cabin altitude above which supplementary oxygen must be used by crew and passengers.

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DFE7 Floating hull

1 Unit description

This unit describes the skills and knowledge required to operate an aircraft that has a floating hull on the water and in the air during normal and abnormal operations.

2 Elements and performance criteria

2.1 DFE7.1 – Extract, interpret, calculate and apply flight performance information

(a) extract approved flight performance information from AFM or POH, interpret the information and apply the information to:

(i) calculate aircraft take-off and landing weight and take-off and landing performance; and

(ii) calculate aircraft performance during normal flight operations; and

(iii) determine meteorological conditions, tide state, current flow and water state; and

(b) use the information to plan water operations.

2.2 DFE7.2 – Conduct pre-flight inspection of floating hull aircraft

(a) conduct pre-flight inspection in accordance with AFM or POH, and identifies and determines availability and serviceability of equipment required for marine operations ensuring:

(i) serviceability of aircraft;

(ii) suitability and serviceability of equipment carried for amphibious aircraft type and flight circumstances;

(b) ensure hull and floats do not contain excessive water;

(c) ensure removal of all aircraft locking devices;

(d) inspect mooring lines, bumpers, anchors, life jackets and rafts for condition and stowage when appropriate.

2.3 DFE7.3 – Operate floating hull aircraft on water

(a) conduct pre-flight passenger briefing, including fitment and use of personal flotation devices, evacuation procedures and water survival procedures;

(b) start and stop engines on the water and maintains control of the aircraft;

(c) disconnect and manoeuvre aircraft from a mooring without assistance, while maintaining control of the aircraft and passengers;

(d) obtain taxi clearance when required, and taxis (manoeuvres) aircraft on the water to a nominated position, anticipating and allowing for prevailing conditions and traffic while maintaining control of the aircraft;

(e) conduct displacement and step taxiing and ploughing turns to a nominated position, avoiding traffic and obstacles while maintaining control of the aircraft within the sea state and wind limitations of the aircraft;

(f) sail aircraft, using engine power, flight controls, keel surfaces and wind velocity to manoeuvre the aircraft fore and aft and laterally to a nominated position;

(g) ensure suitability of area and safely moors, dock and beach aircraft with and without assistance.

2.4 DFE7.4 – Ensure suitability of take-off area and take-off floating hull aircraft from water

(a) select a take-off path into wind, adequate to comply with take-off distance requirements, clear of traffic and obstructions, and ensure a climb-out path clear of obstacles;

(b) self-brief or brief crew about departure procedures and action in the event of engine failure after take-off;

(c) perform pre-take-off, engine run-up, line-up and after-take-off checks;

(d) retract water rudder, apply take-off power, maintain aircraft aligned with take-off direction, maintain wings level, position elevator to maintain the nose in the planing attitude until the

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step position is achieved, and adjust nose attitude to maintain the aircraft on the step until lift-off occurs;

(e) avoid porpoising;

(f) accelerate aircraft to climb speed and establishes climb;

(g) perform after take-off checks.

2.5 **DFE7.5 – Operate floating hull aircraft during all phases of flight**

(a) control aircraft in all phases of normal and abnormal flight to the appropriate standards specified for a private or commercial aeroplane pilot in this MOS;

(b) manoeuvre aircraft safely below 500 ft AGL over specified tracks after take-off and during approach for landing;

(c) operate all aircraft systems, equipment and engines correctly;

(d) operate all aircraft systems, equipment and engines correctly;

(e) assess landing area and weather conditions and formulates a plan to ensure a safe landing on water;

(f) land aircraft at a controlled rate of descent, aligned with and above the landing direction, within a specified area, without drift, maintaining directional control and wings level and stopping within the available landing area;

(g) minimise and controls ballooning and bouncing;

(h) perform after-landing checks correctly.

2.6 **DFE7.6 – Ensure suitability of landing area, plan landing and land floating hull aircraft on water**

(a) assess landing area and weather conditions and formulate a plan to ensure a safe landing on water;

(b) land aircraft at a controlled rate of descent, aligned with and above the landing direction, within a specified area, without drift, maintaining directional control and wings level and stopping within the available landing area;

(c) minimise and control ballooning and bouncing;

(d) perform after-landing checks correctly.

2.7 **DFE7.7 – Manage abnormal or emergency situations in floating hull aircraft**

(a) identify and confirm abnormal or emergency situation;

(b) control aircraft;

(c) perform abnormal or emergency procedures correctly.

3 Range of variables

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

(b) day VFR;

(c) cross-wind, headwind and tailwind to the limits of the aircraft;

(d) approved floating hull aircraft;

(e) salt and fresh waterways;

(f) variable sea states;

(g) confined waterways;

(h) variable marine traffic;

(i) maritime regulations and procedures;

(j) limitations, such as those imposed by local noise abatement procedures or curfews;

(k) simulated abnormal and emergency situations;

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(l) simulated hazardous weather.

4 Underpinning knowledge of the following:

(a) differences between a seaplane, floatplane, flying boat (floating hull) and amphibious aircraft;

(b) aircraft performance with respect to:

(i) design features for seaplanes, floatplanes and floating hulls; and

(ii) the differences between an aircraft that is fitted with the feature and the same type of aircraft that doesn't have the feature;

(c) how to interpret Beaufort scale readings and ascertain wind velocity;

(d) how movement of the centre of buoyancy affects aircraft manoeuvrability on the water;

(e) how the centre of resistance to lateral motion affects the operation of a seaplane;

(f) why water rudders are not used for take-off;

(g) how to extract information from maritime tide chart and determine the tide height and state at any specified place or time;

(h) how the centre of buoyancy can be varied when an aircraft is on the water;

(i) how movement of the centre of resistance affects aircraft manoeuvrability on the water;

(j) function of a ventral fin on a seaplane;

(k) function of float struts and bracing wires;

(l) the requirements that apply to floats with regard to minimum number of water-tight compartments and capability of supporting the aircraft weight when compartments are flooded;

(m) the method of detecting water inside a hull or float and how to remove the water;

(n) the function of the 'step' at the bottom of a float or hull;

(o) the position of the nose attitude and the 'feel' that indicates the aircraft is planning on the step;

(p) hazards associated with excessive swells.

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DFE8 Floatplane and amphibious aircraft

1 Unit description

This unit describes the skills and knowledge required to operate an amphibious aircraft on the water and land during normal and abnormal operations.

2 Elements and performance criteria

2.1 DFE8.1 – Extract, interpret, calculate and apply flight performance information

(a) extract approved flight performance information from AFM or POH, interpret the information and apply the information to:

(i) calculate amphibious aircraft take-off and landing weight, and take-off and landing performance; and

(ii) the phase of flight and calculate amphibious aircraft performance during normal flight operations;

(b) determine meteorological conditions, tide state, current flow and water state;

(c) use the information described in subparagraphs (a) and (b) to plan water operations using an amphibious aircraft;

2.2 DFE8.2 – Conduct pre-flight inspection of amphibious aircraft

(a) conduct pre-flight inspection in accordance with AFM or POH, identify and determine availability and serviceability of equipment required for marine operations ensuring:

(i) serviceability of aircraft;

(ii) suitability and serviceability of equipment carried for amphibious aircraft type and flight circumstances;

(b) ensure hull and floats do not contain excessive water;

(c) ensure removal of all aircraft locking devices;

(d) inspect mooring lines, bumpers, anchors, life jackets and rafts for condition and stowage when appropriate.

2.3 DFE8.3 – Operate amphibious aircraft during all phases of flight

(a) operate single- or multi-engine floatplane or floating hull amphibious aircraft during all phases of normal and abnormal flight, on the water and the land, to the standards specified for a private or commercial pilot in this MOS for aeroplane class ratings;

(b) land amphibious aircraft on water with undercarriage retracted;

(c) land amphibious aircraft on land with undercarriage extended;

(d) extend undercarriage in water when transiting to land (beaching);

(e) retract undercarriage in water after taxiing from land to water;

(f) operate all amphibious aircraft systems, equipment and engines.

2.4 DFE8.4 – Manage abnormal or emergency situations in amphibious aircraft

(a) identify and confirm abnormal or emergency situation;

(b) maintain control of aircraft;

(c) manage or rectify abnormal or emergency situation;

(d) perform abnormal and emergency actions when applicable;

(e) perform failed engine procedures in accordance with standards specified in class or type rating requirements.

3 Range of variables

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

(b) day VFR;

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(c) cross-wind, headwind and tailwind to the limits of the aircraft;

(d) approved floating hull aircraft;

(e) salt and fresh waterways;

(f) variable sea states;

(g) confined waterways;

(h) variable marine traffic;

(i) maritime regulations and procedures;

(j) limitations, such as those imposed by local noise abatement procedures or curfews;

(k) simulated abnormal and emergency situations;

(l) simulated hazardous weather.

4 Underpinning knowledge of the following:

(a) differences between a seaplane, floatplane, flying boat (floating hull) and amphibious aircraft;

(b) aircraft performance with respect to:

(i) design features for seaplanes, floatplanes and floating hulls; and

(ii) the differences between an aircraft that is fitted with the feature and the same type of aircraft that doesn't have the feature;

(c) how to interpret Beaufort scale readings and ascertain wind velocity;

(d) how movement of the centre of buoyancy affects amphibious aircraft manoeuvrability on the water;

(e) how the centre of resistance to lateral motion affects the operation of an amphibious aircraft;

(f) why water rudders are not used for take-off;

(g) the type of undercarriage position indicators fitted to the aircraft, and the method of indicating undercarriage retracted;

(h) the method of emergency lowering of the undercarriage;

(i) how to extract information from maritime tide chart and determine the tide height and state at any specified place or time;

(j) how the centre of buoyancy can be varied when an amphibious aircraft is on the water;

(k) how movement of the centre of resistance affects amphibious aircraft manoeuvrability on the water;

(l) functions of a ventral fin on an amphibious aircraft;

(m) the function of float struts, spreader bars and bracing wires;

(n) requirements that apply to floats with regard to minimum number of water-tight compartments and capability of supporting the amphibious aircraft weight when compartments are flooded;

(o) method of detecting water inside a float and how to remove the water;

(p) function of the 'step' at the bottom of a float or hull;

(q) hazards associated with excessive swells.

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DFE9 Helicopter float alighting gear

1 Unit description

This unit describes the skills and knowledge required to operate a helicopter fitted with float alighting gear on land and water.

2 Elements and performance criteria

2.1 **DFE9.1 – Conduct pre-flight inspection of float alighting gear**

(a) conduct pre-flight inspection of helicopter and float alighting gear;

(b) confirm fitment, inflation, condition and security of float alighting gear;

(c) ensure removal of all aircraft locking devices.

2.2 **DFE9.2 – Start and stop engine on water**

(a) perform all checklists and emergency procedures associated with starting and stopping an engine and rotors;

(b) perform free-floating start-up (as permitted by AFM or POH) and moored start-up and shutdown;

(c) start and stop engine and rotors correctly;

(d) identify abnormal or emergency situations on start or shutdown and manages correctly.

2.3 **DFE9.3 – Taxi helicopter on water**

(a) manoeuvre helicopter without incident on water over a prescribed track while allowing for prevailing conditions;

(b) comply with approved marshalling signals.

2.4 **DFE9.4 – Take-off helicopter from a solid surface and from water**

(a) perform pre-take-off checks and after-take-off checks correctly;

(b) perform take-off, transition and climb from a solid surface;

(c) perform take-off, transition and climb from water.

2.5 **DFE9.5 – Operate helicopter fitted with float alighting gear in normal flight**

(a) operate helicopter fitted with float alighting gear in normal flight in accordance with standards for helicopter specified in this MOS;

(b) manage reduced aircraft performance in float configuration.

2.6 **DFE9.6 – Land on float alighting gear on land and on water**

(a) identify aiming point, touchdown point and any alignment features;

(b) land helicopter without harshness onto a nominated touchdown point from hovering flight without longitudinal, lateral, yawing or rolling movements;

(c) ensure no aft movement when landing on water;

(d) ensure landing area on a solid surface is clear of protuberances and sharp objects;

(e) ensure helicopter is securely on the surface prior to fully lowering collective;

(f) perform after-landing checks;

(g) for a mishandled landing – implement a decision in the time available to initiate a mishandled landing to the hover when the landing standard cannot be achieved.

2.7 **DFE9.7 – Manage abnormal or emergency actions in helicopter fitted with float alighting gear**

(a) identify abnormal or emergency situation;

(b) control helicopter;

(c) perform abnormal or emergency procedures correctly.

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3 Range of variables

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

(b) day VFR in variable weather conditions;

(c) cross-wind, headwind and tailwind to the limits of the aircraft;

(d) approved helicopter fitted with float alighting gear;

(e) helicopter landing sites;

(f) salt and fresh waterways;

(g) variable sea states;

(h) confined waterways;

(i) variable marine traffic;

(j) maritime regulations and procedures;

(k) limitations, such as those imposed by local noise abatement procedures or curfews;

(l) simulated abnormal and emergency situations;

(m) simulated hazardous weather.

4 Underpinning knowledge of the following:

(a) maximum inflation pressure of the float alighting gear;

(b) maximum operating altitude permitted with float alighting gear fitted;

(c) maxim wave height permitted for float alighting gear operations in the helicopter type flown;

(d) how to calculate the maximum inflation pressure for the flotation devices;

(e) take-off distance required with the float configuration;

(f) the maximum wind speed for 360° pivot turns;

(g) hazards associated with a landing that is performed with a partially deflated float;

(h) avoidance measures for dynamic rollover;

(i) avoidance measures for ground resonance.

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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.

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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.

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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;

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(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;

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(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.

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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;

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(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;

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(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.

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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;

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(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;

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

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

(j) RVR versus SVR.

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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;

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(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.

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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.

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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.

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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.

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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;

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(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.

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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;

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(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;

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(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;

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(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.

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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.

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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.

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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:

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(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;

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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;

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(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.

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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.

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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;

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(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;

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(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;

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(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.

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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);

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(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:

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(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;

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(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.

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LL-PL Powered-lift aircraft low-level operations – *Reserved*

LL-G Gyroplane low-level operations

1 Unit description

This unit describes the skills and knowledge required to manoeuvre a gyroplane 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;

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(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;

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(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;

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(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.

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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.

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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.

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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;

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(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;

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(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.

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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;

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(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;

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(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:

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(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.

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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;

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(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;

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(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.

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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;

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(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.

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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;

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(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;

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(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;

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(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;

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(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.

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AA3 Gyroplane aerial application operation

1 Unit description

This unit describes the skills and knowledge required to conduct aerial application operations other than firefighting operations in gyroplanes.

2 Elements and performance criteria

2.1 AA3.1 – Pre-flight actions

(a) self-assess personal fitness for flight and planned operation;
(b) determine suitability of gyroplane for type of operation;
(c) conduct pre-flight of gyroplane and role equipment to determine serviceability for planned operations;
(d) check and complete required maintenance documentation as applicable;
(e) confirm minimum equipment and minimum crew and instrumentation requirements for planned operations are met;
(f) check 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) identify hazards, analyse the risks and implement a decision to safely conduct low-level operations – ensure gyroplane type and performance is appropriate for the task;
(k) assess and allow for the effects of fatigue and physical health on pilot performance;
(l) analyse and apply actual and forecast weather conditions to low-level operations;
(m) develop an aerial application management plan;
(n) interpret treatment area map;
(o) understand that aircraft limitations apply to the operation except those exempted by CASA (maximum take-off weight);
(p) identify potential hazards and operational requirements, assess risks and apply 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) plan fuel requirements;
(t) confirm acceptable aircraft performance for conditions;
(u) confirm location of ground support personnel;
(v) confirm normal and abnormal ops communications and signals;
(w) confirm logistical considerations are in place, including local airstrip condition, fuel, products, ground support and access to strip, SARWATCH, water, and personal supplies, including adequate water and food.

2.2 AA3.2 – Fly to, assess, land and take off from an operational airstrip

(a) perform low-level navigation to an operational airstrip at an appropriate height;
(b) perform assessment of an operational airstrip, including strip length, conditions, direction, identification of hazards, meteorological conditions;
(c) select the most suitable loading area;
(d) perform pre-landing and pre-take-off checks;
(e) select a ‘no go, go around, commitment’ point for landings;
(f) select a touchdown point for landings;
(g) identify and manage issues relating to aircraft weight, performance, strip length, slope, surface, direction, load, surrounds, hazards and meteorological conditions;

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(h) demonstrate appropriate short-field landing and take-off techniques and being prepared to dump if required;
(i) identify an appropriate dumping point for each take-off, including adequate safety buffers;
(j) demonstrate operations from a 1-way airstrip.

2.3 **AA3.3 – Fly between operational airstrip and application area**

(a) perform low-level navigation from an operational airstrip to an application area;
(b) select the most appropriate route and height between the operational strip and application area considering terrain, stock, populated areas, housing and hazards.

2.4 **AA3.4 – Conduct operations at a certified aerodrome**

Perform operations in accordance with the published procedures and requirements.

2.5 **AA3.5 – Conduct an aerial survey of a treatment area**

(a) develop an appropriate plan for conduct of an aerial survey;
(b) identify the treatment area boundaries;
(c) confirm map accuracy;
(d) identify susceptible crops and environmentally-sensitive areas;
(e) identify hazards on the map;
(f) identify potential emergency landing area(s);
(g) check and identify any hazards not on the map, including sun glare and shadows from hills;
(h) assess wind speed and direction;
(i) identify clean-up runs required;
(j) confirm or amend the aerial application management plan, including pattern type and direction of treatment and possible suspension of application if conditions are not acceptable.

2.6 **AA3.6 – Fly gyroplane at low level**

Identify and avoid buildings, personnel, vehicles, animals, vegetation and nuisance areas.

2.7 **AA3.7 – Perform steep turns and procedure turns at or below 500 ft AGL**

(a) conduct balanced steep-level (±100 ft) climbing and descending turns at a nominated speed;
(b) conduct procedure turns with varying power settings.

2.8 **AA3.8 – Manoeuvre and navigate at low level**

(a) manoeuvre gyroplane at a height below 500 ft AGL;
(b) navigate gyroplane to a predetermined destination at altitudes at or below 500 ft AGL;
(c) demonstrate awareness of wind effect in the vicinity of obstructions, mountainous terrain and illusions;
(d) identify wind velocity;
(e) recognise and manage illusions of slipping and skidding during turns in windy conditions;
(f) recognise and manage impact of sun glare on increased risk of collision with obstacles;
(g) operate adjacent to powerlines and wires;
(h) identify requirement to operate in the vicinity of powerlines and wires and manage risk;
(i) identify poles, cross trees, wires and insulators to assist powerline and wire location;
(j) recognise and manage effect of rising and descending terrain on gyroplane performance;
(k) demonstrate operation from non-certified or registered landing areas;
(l) re-enter treatment area with gyroplane aligned for treatment run;
(m) identify and monitor wind speed and direction;
(n) recognise and manage adverse effects of wind caused by terrain and obstructions;
(o) recognise and manage false horizon illusions;
(p) maintain a constant altitude over featureless terrain or water;
(q) establish and maintain appropriate height and speed over treatment area.

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2.9 **AA3.9 – Manage flight at low speed and flight behind the power curve**

(a) recognise approach to minimum level flight speed during any phase of flight;

(b) resume normal balanced flight before entering flight behind the power curve;

(c) recover from flight behind the power curve at simulated low level in accordance with the height-velocity diagram.

2.10 **AA3.10 – Execute forced landing from below 500 ft AGL**

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

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

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

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

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

2.11 **AA3.11 – Conduct operations over and under powerlines**

(a) identify powerlines both in and outside the treatment area during an aerial survey;

(b) interpret powerline infrastructure cues so as to aid wire run identification;

(c) demonstrate technique for accurately assessing wire height, including flying parallel to wires;

(d) identify and manage other hazards relevant to operations near powerlines, such as pole stays, crop height, fences or machinery;

(e) make command decisions whether to fly over or under a wire;

(f) conduct treatment over wires, including adequate safety buffers for pull-up and let-down and accurate cut-off and on of application equipment;

(g) conduct treatment under wires, including safe clearance;

(h) terminate approaches towards powerlines when passage beneath is unachievable;

(i) explain the relevant human factors that may affect operations near powerlines, particularly distraction, short-term memory limitations and inattentional blindness.

2.12 **AA3.12 – Apply substances**

(a) apply substances in accordance with aerial application management plan;

(b) establish and maintain correct application height relevant to terrain, application type and meteorological conditions;

(c) control airspeed and flight profile appropriately on entry/re-entry to treatment area;

(d) engage and shut off application equipment at appropriate points;

(e) manoeuvre around and over hazards in the treatment area with adequate safety buffers;

(f) use aircraft smoker (if fitted) to identify and monitor wind direction;

(g) monitor application flow rate, pressure and product remaining;

(h) conduct clean-up runs, including extra safety check for hazards;

(i) demonstrate command decisions to continue with, amend or suspend operations due to changing conditions.

2.13 **AA3.13 – Operate at low level in hilly terrain**

(a) manipulate gyroplane at low level in hilly terrain;

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

(c) demonstrate contour flying;

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

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

(f) demonstrate 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.

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2.14 **AA3.14 – Manage abnormal and emergency situations during low-level operations**

(a) identify potential forced-landing areas before and during aerial application operations;
(b) identify abnormal or emergency situation;
(c) conduct abnormal or emergency procedures during application operations;
(d) maintain control of gyroplane, jettison load if required, and avoid any powerlines or hazards;
(e) conduct a practice forced landing from 500 ft.

2.15 **AA3.15 – Jettison load (simulated where not fitted)**

(a) jettison a full liquid load during take-off before lift off, and maintain control of gyroplane;
(b) jettison a full liquid load immediately after take-off and maintain control of gyroplane;
(c) jettison a full liquid load during flight and control pitch changes to ensure maintenance of altitude (+100/-0 ft) by adjustments of cyclic 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 relating 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 payload weight for each application;
(j) aircraft configuration for the gyroplane being flown, when jettisoning a full load;
(k) characteristics of the gyroplane being flown when jettisoning a full load;
(l) flight control and throttle actions required to maintain control of the gyroplane being flown when jettisoning a full load.

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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;

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(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;

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(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.

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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;

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(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.

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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;

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(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.

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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.

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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;

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(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.

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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;

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(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.

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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.

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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.

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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.

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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;

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(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.

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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.

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(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.

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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.

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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.

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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*

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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;

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(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) classroom 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.

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FAE-10 Formation flying — gyroplane

1 Unit description

This unit describes the skills and knowledge required to fly a gyroplane in formation, plan a formation flight, brief all participants and lead a formation.

2 Elements and performance criteria

2.1 FAE-10.1 – Fly echelon formation

(a) maintain the specified echelon right and left formation stations while remaining in the lateral plane of the lead aircraft during all manoeuvres and phases of flight;

(b) balance gyroplane;

(c) apply standard clear and concise radiotelephony phraseology to ensure precise advice to formation lead and other formation aircraft;

(d) perform pairs take-off;

(e) perform pairs stream take-off and join up;

(f) apply specified procedures and hand signals (non-verbal) for take-off;

(g) maintain the specified echelon position during take-off.

2.2 FAE-10.2 – Fly line astern formation

(a) maintain the specified line astern formation station while remaining stepped down and in line astern with the lead aircraft during all manoeuvres and phases of flight;

(b) maintain in line with lead aircraft;

(c) balance gyroplane.

2.3 FAE-10.3 – Perform station changes

Manoeuvre the gyroplane to specified alternative formation stations during all phases of flight in the briefed sequence, while remaining clear of all other formation aircraft.

2.4 FAE-10.4 – Perform manoeuvres in echelon and line astern

(a) straight and level at various airspeeds;

(b) level turns at various airspeeds;

(c) climbing:

  (i) straight;

  (ii) turning;

(d) descending at various speeds:

  (i) straight;

  (ii) turning;

(e) flight in various aircraft configurations:

  (i) straight and level;

  (ii) turning and level;

  (iii) descending in straight flight;

  (iv) descending and turning;

(f) perform break and rejoin:

  (i) recognise loss of contact with formation or any other requirement to break away and implement a decision to break away from the formation;

  (ii) break away from formation lead by creating positive track and height separation with the remaining formation aircraft;

  (iii) notify formation leader of break away;

  (iv) maintain track and height separation until cleared by formation leader to rejoin the formation;

  (v) regain visual contact with leader;

  (vi) transmit rejoin intentions;

  (vii) maintain vertical separation with the remaining formation aircraft;

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(viii) establish and manage overtaking speed while maintaining vertical separation;

(g) establish a flight path that will ensure the gyroplane will pass behind and below the formation in the event of a join-up overshoot and position the gyroplane into the recognised formation position;

(h) perform circuit and stream landing:

(i) conduct formation break into the circuit;

(ii) maintain separation with other formation aircraft;

(iii) manage wake turbulence;

(iv) land in turn;

(v) perform formation landing;

(i) maintain formation position;

(j) carry out pre-landing checks;

(k) configure aircraft on leader's call;

(l) land aircraft:

(i) after landing, ensure horizontal and lateral separation is established;

(ii) after clearing runway establish formation taxiing position;

(iii) conduct after-landing checks;

(m) perform formation overshoot:

(i) maintain formation position;

(ii) configure gyroplane on instructions from leader;

(iii) complete applicable after take-off checks.

2.5 FAE-10.5 – Plan a formation flight

(a) identify the task requirements for the flight;

(b) arrange crews, briefing venue and time, and coordinate aircraft availability;

(c) analyse tasks to be achieved and determine the manoeuvres and formations that ensure safe achievement of the task;

(d) plan flight route to allow task achievement in the time available and within performance capabilities of the flight, while complying with all air traffic, area limitations and navigation requirements;

(e) plan actions in the event of abnormal or emergency situations involving the formation.

2.6 FAE-10.6 – Brief and debrief formation pilots

(a) explain and confirm the ground and flight manoeuvres to be conducted;

(b) explain and confirm timings, routes, speeds and altitudes to be flown;

(c) identify and nominate deputy leader and explain and confirm responsibilities;

(d) explain and confirm communication procedures, in-flight minimum fuel, abnormal and emergency procedures and method of return for landing;

(e) identify achievements and any faults or errors that occurred during the formation flight and provide guidance and feedback to other formation members during the post-flight debrief.

2.7 FAE-10.7 – Lead a formation flight

(a) manoeuvre lead aircraft using controlled corrective action to ensure a stable platform for pilots flying in formation stations;

(b) manoeuvre the formation anticipating and allowing for formation size, proximity to obstructions, terrain, airspace limitations, weather conditions and air traffic, while ensuring compliance with regulatory requirements;

(c) direct and control the formation using precise standard radio phraseology and hand and other signal procedures;

(d) manage lost contact procedures in accordance with standard operating procedures;

(e) monitor formation members' flight performances and react appropriately to any problems.

2.8 FAE-10.8 – Manage abnormal and emergency situations during formation flight

(a) control aircraft and formation when leading;

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(b) manage abnormal or emergency situations in accordance with standard operating procedures or the aircraft flight manual, both as flight leader and as pilot in command of a non-lead aircraft.

3 Range of variables

(a) activities are performed in accordance with published procedures;
(b) day VFR;
(c) 2 or more aircraft.

4 Underpinning knowledge of the following:

(a) left and right echelon positions for the gyroplane being flown;
(b) the reference points that are used to achieve a specified formation position;
(c) line astern position for the gyroplane being flown;
(d) how to manoeuvre from echelon to line astern;
(e) how to manoeuvre from echelon right to echelon left;
(f) how to manoeuvre from line astern to echelon;
(g) the verbal and non-verbal signals for:
    (i) commence take off roll;
    (ii) position changes;
    (iii) radio receiver failure;
    (iv) radio transmitter failure;
(h) lost contact procedure;
(i) formation rejoin procedures.

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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;

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(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;

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(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;

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(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).

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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;

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(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;

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(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*

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SECTION 6 FLIGHT ACTIVITY ENDORSEMENT STANDARDS

FAE-1 Aerobatics — 3,000 ft AGL

1 Unit description

This unit describes the skills and knowledge required to perform aerobatic manoeuvres not below 3,000 ft AGL.

2 Elements and performance criteria

2.1 **FAE-1.1 – Prepare for aerobatic flight**

(a) select suitable airspace that allows the completion of all aerobatic manoeuvres above the authorised minimum altitude;

(b) perform pre-manoeuvre checks and select appropriate aircraft configuration;

(c) maintain lookout using a systematic scan technique at a rate determined by traffic density, visibility or terrain.

2.2 **FAE-1.2 – Perform looping manoeuvre**

(a) pitch the aircraft vertically at a continuous rate through 360º in balanced flight, maintaining wings parallel to the Earth's horizon, positive 'g', without stalling and maintaining alignment with a nominated line feature from a nominated airspeed that will ensure completion of a loop;

(b) comply with engine, airframe and physiological limitations;

(c) observe entry and recovery heights.

2.3 **FAE-1.3 – Perform rolling manoeuvre**

(a) roll the aircraft from a nominated airspeed around the fore and aft axis through 360º while maintaining direction and altitude, or a height loss appropriate to the aircraft type;

(b) observe entry and recovery height.

2.4 **FAE-1.4 – Perform stall turn-hammerhead (vertical yaw reversal)**

(a) pitch aircraft from a nominated airspeed to the vertical in balanced flight with the wings parallel to the horizon and terminate the pitch at the vertical;

(b) maintain the aircraft vertical and yaw through 180º, descending vertically in balanced flight and recover the aircraft from the dive to straight and level flight, aligned with a nominated line feature 180º to the original heading;

(c) observe entry and recovery height.

2.5 **FAE-1.5 – Recover from unusual attitudes**

(a) recover aircraft to controlled flight, in the height available, from any attitude, bank angle or speed within the limitations of the aircraft;

(b) recover aircraft to controlled flight, in the height available from any inverted negative 'g' attitude, bank angle or speed within the limitations of the aircraft.

2.6 **FAE-1.6 – Recover from spin**

(a) perform pre-manoeuvre checks;

(b) enter and establish an upright spin;

(c) identify upright spin and direction of yaw;

(d) close throttle;

(e) stop yaw;

(f) unstall wing by reducing AOA (aeroplane);

(g) recover to controlled flight;

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(h) recover within the number of turns normally required for upright spin recovery in the aircraft type, within the aircraft and height limitations.

3 Range of variables

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

(b) day VFR;

(c) aeroplanes approved to conduct aerobatic flight.

4 Underpinning knowledge of the following:

(a) meaning of the terms positive and negative ‘g’;

(b) symmetrical positive and negative ‘g’ limits for the aircraft flown;

(c) meaning of the term rolling ‘g’;

(d) rolling ‘g’ limits for the aircraft flown;

(e) how to calculate the rolling ‘g’ limitation of an aircraft;

(f) relationship during rolling manoeuvres between pitch angle required on commencement of a roll and rate of roll;

(g) engine RPM limitations for the aircraft flown;

(h) physiological effects of positive and negative ‘g’;

(i) the ‘g’ figure that a normal person may experience ‘g’ induced loss of consciousness (G-LOC);

(j) differences between grey out, black out, and G-LOC;

(k) conditions under which G-LOC is likely to occur;

(l) time period that disorientation may occur for after recovery from G-LOC;

(m) factors that can reduce G-LOC tolerances;

(n) physiological effects of sustained and rapid changes of ‘g’ loading;

(o) relationship between tunnel vision and loss of consciousness;

(p) hazards and consequences of performing aerobatics with blocked eustachian tubes;

(q) physiological factors that can reduce ‘g’ tolerance;

(r) physical actions that may increase ‘g’ tolerance;

(s) minimum altitude to perform aerobatic manoeuvres;

(t) relationship between pre-stall buffet and rate of turn or rate of pitch;

(u) effect of increasing airspeed on stick force;

(v) structural irregularities that indicate an aircraft has been overstressed;

(w) effect of increased ‘g’ loading on stall speed;

(x) airspeed limitations;

(y) V_A, V_{NE} and V_{NO};

(z) effect of aircraft weight on VA and what precautions must be taken;

(za) recovery from manoeuvre-induced disorientation;

(zb) how to assess personal fitness for aerobatic flight;

(zc) maximum rate turn criteria;

(zd) minimum radius criteria.

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FAE-2 Aerobatics — 1,500 ft AGL

1 Unit description

This unit describes the skills and knowledge required to design and plan an aerobatic routine and conduct aerobatics safely not below 1,500 ft AGL.

2 Elements and performance criteria

2.1 FAE-2.1 – Design an aerobatic routine

(a) design a sequence of aerobatic manoeuvres that meet a specified requirement, involve practical transitions between manoeuvres, and identify performance parameters that will ensure safe completion of all manoeuvres not below 1,500 ft AGL;

(b) identify performance parameters based on a combination of aircraft attitude, power setting, altitude and speed that provide go-no go guidance for safe completion of all manoeuvres not below 1,500 ft AGL within the physical limitations of the pilot and structural limitations of the aircraft.

2.2 FAE-2.2 – Plan an aerobatic performance

(a) identify the stakeholder requirements for the aerobatic sequence and formulate a plan to safely present the sequence, meeting the specified requirements;

(b) ensure any required aerobatic approvals are appropriate, valid and current;

(c) analyse prevailing and forecast weather and apply wind velocity, visibility and cloud base to ensure safe and accurate aerobatic performance;

(d) identify the ‘aerobatic box’ when appropriate, and plan manoeuvres to remain within the box;

(e) modify aerobatic performance if weather conditions cause (or controlling authority imposes) limitations, when appropriate;

(f) recall and apply the identified go-no go performance criteria to plan break-off manoeuvres at any point of the aerobatic sequence where performance criteria are not achievable;

(g) recall escape manoeuvres that could be required during the aerobatic sequence stating the go-no go criteria and detail the escape manoeuvres that will result in (return to) controlled flight not below 1,500 ft AGL.

2.3 FAE-2.3 – Conduct aerobatics not below 1,500 ft AGL

(a) complete a specified sequence of aerobatic manoeuvres in accordance with display plan in the specified time;

(b) ensure performance parameters required for safe completion of the manoeuvre are achieved prior to commencement of each manoeuvre;

(c) maintain orientation with display axis;

(d) manage the energy potential of the aircraft to ensure completion of manoeuvres and sequences of manoeuvres within aircraft structure and minimum height limits;

(e) recognise the failure to achieve performance parameters (energy requirement) to complete a manoeuvre and manage the aircraft to regain the manoeuvre energy potential;

(f) maintain height at or above a specified altitude not below 1,500 ft AGL.

3 Range of variables

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

(b) day VFR;

(c) aerobatic aircraft;

(d) lateral and vertical limitations imposed on manoeuvring airspace.

4 Underpinning knowledge of the following:

(a) energy management as applied to aerobatic routines;

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(b) the minimum height required to complete a pull through manoeuvre, remaining within the structural limits of the aircraft, from inverted flight at 80 kts in the aircraft type being flown;

(c) the minimum height required to recover from a spin in the aircraft type being flown;

(d) the recovery technique to regain physiological and aircraft control when disorientation is experienced;

(e) the ‘g’ limitations for the aircraft being flown;

(f) the rolling ‘g’ limitations for the aircraft being flown;

(g) maximum rate turn criteria;

(h) minimum radius turn criteria;

(i) the precautions that should be taken with regard to radius of turn when operating at a high-density altitude;

(j) factors that lead to increased density altitude.

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FAE-3 Aerobatics — 1,000 ft AGL

1 Unit description

This unit describes the skills and knowledge required to design and plan an aerobatic routine and conduct aerobatics safely not below 1,000 ft AGL.

2 Elements and performance criteria

2.1 FAE-3.1 – Design an aerobatic routine

(a) design a sequence of aerobatic manoeuvres that meet a specified requirement, involve practical transitions between manoeuvres, and identify performance parameters that will ensure safe completion of all manoeuvres not below 1,000 ft AGL;

(b) identify performance parameters based on a combination of aircraft attitude, power setting, altitude and speed that provide go-no go guidance for safe completion of all manoeuvres not below 1,000 ft AGL within the physical limitations of the pilot and structural limitations of the aircraft.

2.2 FAE-3.2 – Plan an aerobatic performance

(a) identify the stakeholder requirements for the aerobatic sequence and formulate a plan to safely present the sequence, meeting the specified requirements;

(b) ensure any required aerobatic approvals are appropriate, valid and current;

(c) analyse prevailing and forecast weather and apply wind velocity, visibility and cloud base to ensure safe and accurate aerobatic performance;

(d) identify the ‘aerobatic box’ when appropriate, and plan manoeuvres to remain within the box;

(e) modify aerobatic performance if weather conditions cause (or controlling authority imposes) limitations, when appropriate;

(f) recall and apply the identified go-no go performance criteria to plan break-off manoeuvres at any point of the aerobatic sequence where performance criteria are not achievable;

(g) recall escape manoeuvres that could be required during the aerobatic sequence stating the go-no go criteria and detail the escape manoeuvres that will result in (return to) controlled flight not below 1,000 ft AGL.

2.3 FAE-3.3 – Conduct aerobatics above 1,000 ft AGL

(a) complete a specified sequence of aerobatic manoeuvres in accordance with display plan in the specified time;

(b) ensure performance parameters required for safe completion of the manoeuvre are achieved prior to commencement of each manoeuvre;

(c) maintain orientation with display axis;

(d) manage the energy potential of the aircraft to ensure completion of manoeuvres and sequences of manoeuvres within aircraft structure and minimum height limits;

(e) recognise the failure to achieve performance parameters (energy requirement) to complete a manoeuvre and manage the aircraft to regain the manoeuvre energy potential;

(f) maintain height at or above a specified altitude not below 1,000 ft AGL.

3 Range of variables

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

(b) day VFR;

(c) aerobatic aircraft;

(d) lateral and vertical limitations imposed on manoeuvring airspace.

4 Underpinning knowledge of the following:

(a) energy management as applied to aerobatic routines;

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(b) the minimum height required to complete a pull through manoeuvre, remaining within the structural limits of the aircraft, from inverted flight at 80 kts in the aircraft type being flown;

(c) the minimum height required to recover from a spin in the aircraft type being flown;

(d) the recovery technique to regain physiological and aircraft control when disorientation is experienced;

(e) the ‘g’ limitations for the aircraft being flown;

(f) the rolling ‘g’ limitations for the aircraft being flown;

(g) maximum rate turn criteria;

(h) minimum radius turn criteria;

(i) the precautions that should be taken with regard to radius of turn when operating at a high-density altitude;

(j) factors that lead to increased density altitude.

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FAE-4 Aerobatics — 500 ft AGL

1 Unit description

This unit describes the skills and knowledge required to design an aerobatic sequence, plan an aerobatic performance and conduct aerobatics safely not below 500 ft AGL.

2 Elements and performance criteria

2.1 FAE-4.1 – Design an aerobatic routine

(a) design a sequence of aerobatic manoeuvres that meet a specified requirement, involve practical transitions between manoeuvres and identify performance parameters that will ensure safe completion of all manoeuvres not below 500 ft AGL;

(b) identify performance parameters based on a combination of aircraft attitude, power setting, altitude and speed that provide go-no go guidance for safe completion of all manoeuvres not below 500 ft AGL within the physical limitations of the pilot and structural limitations of the aircraft.

2.2 FAE-4.2 – Plan an aerobatic performance

(a) identify the stakeholder requirements for the aerobatic sequence and formulate a plan to safely present the sequence, meeting the specified requirements;

(b) ensure any required aerobatic approvals are appropriate, valid and current;

(c) analyse prevailing and forecast weather and apply wind velocity, visibility and cloud base to ensure safe and accurate aerobatic performance;

(d) demonstrate her or his ability to safely modify aerobatic performance if weather conditions cause, or controlling authority imposes, limitations (when appropriate);

(e) plan a safe aerobatic display using manoeuvres applicable to a prescribed or actual limited cloud base (plan a ‘flat’ or ‘low’ show);

(f) recall and apply the identified go-no go performance parameters to plan break-off manoeuvres at any point of the aerobatic sequence where performance criteria are not achieved;

(g) recall escape manoeuvres that could be required during the aerobatic sequence stating the go-no go criteria and detail the escape manoeuvres that will result in (return to) controlled flight not below 500 ft AGL.

2.3 FAE-4.3 – Conduct aerobatics not below 500 ft AGL

(a) complete a specified sequence of aerobatic manoeuvres in accordance with display plan in the specified time;

(b) ensure performance parameters required for safe completion of the manoeuvre are achieved prior to commencement of each manoeuvre;

(c) maintain orientation with display axis;

(d) manage the energy potential of the aircraft to ensure completion of manoeuvres and sequences of manoeuvres within aircraft structure and minimum height limits;

(e) recognise the failure to achieve performance parameters (energy requirement) to complete a manoeuvre and manage the aircraft to regain the manoeuvre energy potential;

(f) maintain height at or above a specified altitude not below 500 ft AGL;

(g) demonstrate safe behaviour.

3 Range of variables

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

(b) day VFR.

4 Underpinning aeronautical knowledge of the following:

(a) energy management as applied to aerobatic routines;

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(b) the minimum height required to complete a pull through manoeuvre, remaining within the structural limits of the aircraft, from inverted flight at 80 kts in the aircraft type being flown;

(c) minimum height required to recover from a spin in the aircraft type being flown;

(d) recovery technique to regain physiological and aircraft control when disorientation is experienced;

(e) 'g' limitations for the aircraft being flown;

(f) rolling 'g' limitations for the aircraft being flown;

(g) Beggs-Mueller emergency spin recovery technique;

(h) maximum rate turn criteria;

(i) minimum radius turn criteria;

(j) precautions that should be taken with regard to radius of turn when operating at a high-density altitude;

(k) factors that lead to increased density altitude;

(l) potential danger associated with conducting aerobatics at 500 ft AGL over unfamiliar terrain.

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FAE-5 Aerobatics — unlimited

1 Unit description

This unit describes the skills and knowledge required to design an aerobatic sequence, plan an aerobatic performance and conduct aerobatics at any height.

2 Elements and performance criteria

2.1 FAE-5.1 – Design an aerobatic routine

(a) design a sequence of aerobatic manoeuvres that meet a specified requirement, involve practical transitions between manoeuvres and identify performance parameters that will ensure safe completion of all manoeuvres below 500 ft AGL;

(b) identify performance parameters based on a combination of aircraft attitude, power setting, altitude and speed that provide go-no go guidance for safe completion of all manoeuvres below 500 ft AGL within the physical limitations of the pilot and structural limitations of the aircraft.

2.2 FAE-5.2 – Plan an aerobatic performance

(a) identify the stakeholder requirements for the aerobatic sequence and formulates a plan to safely present the sequence, meeting the specified requirements;

(b) ensure any required aerobatic approvals are appropriate, valid and current;

(c) analyse prevailing and forecast weather and apply wind velocity, visibility and cloud base to ensure safe and accurate aerobatic performance;

(d) identify the ‘aerobatic box’ when appropriate, and plan manoeuvres to remain within the box;

(e) demonstrate the ability to safely modify aerobatic performance if weather conditions cause or controlling authority imposes limitations, when appropriate;

(f) plan a safe aerobatic display using manoeuvres applicable to a prescribed or actual limited cloud base (plan a ‘flat’ or ‘low’ show);

(g) recall and apply the identified go-no go performance parameters to plan break-off manoeuvres at any point of the aerobatic sequence where performance criteria are not achieved;

(h) recall escape manoeuvres that could be required during the aerobatic sequence stating the go-no go criteria and detail the escape manoeuvres that will result in (return to) controlled flight below 500 ft AGL.

2.3 FAE-5.3 – Conduct aerobatics below 500 ft AGL

(a) complete a specified sequence of aerobatic manoeuvres in accordance with display plan in the specified time;

(b) ensure performance parameters required for safe completion of the manoeuvre are achieved prior to commencement of each manoeuvre;

(c) maintain orientation with display axis;

(d) manage the energy potential of the aircraft to ensure completion of manoeuvres and sequences of manoeuvres within aircraft structure and minimum height limits;

(e) recognise the failure to achieve performance parameters (energy requirement) to complete a manoeuvre and manage the aircraft to regain the manoeuvre energy potential.

3 Range of variables

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

(b) day VFR;

(c) aerobatic aircraft;

(d) lateral and vertical limitations imposed on manoeuvring airspace.

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4 Underpinning knowledge of the following:

(a) energy management as applied to aerobatic routines;

(b) minimum height required to complete a pull through manoeuvre, remaining within the structural limits of the aircraft, from inverted flight at 80 kts in the aircraft type being flown;

(c) maximum rate turn criteria;

(d) minimum radius turn criteria;

(e) minimum height required to recover from a spin in the aircraft type being flown;

(f) recovery technique to regain physiological and aircraft control when disorientation is experienced;

(g) 'g' limitations for the aircraft being flown;

(h) rolling 'g' limitations for the aircraft being flown;

(i) Mueller-Beggs emergency spin recovery technique;

(j) precautions that should be taken with regard to radius of turn when operating at a high-density altitude;

(k) factors that lead to increased density altitude;

(l) the potential danger associated with conducting aerobatics below 500 ft AGL over unfamiliar terrain.

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FAE-6 Formation flying — aeroplane

1 Unit description

This unit describes the skills and knowledge required to safely fly an aeroplane in formation, plan a formation flight, brief all participants and lead a formation.

2 Elements and performance criteria

2.1 FAE-6.1 – Fly echelon formation

(a) maintain the specified echelon right and left formation stations while remaining in the lateral plane of the lead aircraft during all manoeuvres and phases of flight;

(b) balance aircraft;

(c) apply standard clear and concise radiotelephony phraseology to ensure precise advice to formation lead and other formation aircraft;

(d) perform pairs take-off;

(e) perform pairs stream take-off and join up;

(f) apply specified procedures and hand signals (non-verbal) for take-off;

(g) maintain the specified echelon position during take-off.

2.2 FAE-6.2 – Fly line astern formation

(a) maintain the specified line astern formation station while remaining stepped down parallel to the lateral plane of the lead aircraft during all manoeuvres and phases of flight;

(b) maintain wings parallel to lead aircraft;

(c) balance aircraft.

2.3 FAE-6.3 – Perform station changes

Manoeuvre the aeroplane safely to specified alternative formation stations during all phases of flight in the briefed sequence, while remaining clear of all other formation aircraft.

2.4 FAE-6.4 – Perform manoeuvres in echelon and line astern

(a) straight and level at various airspeeds

(b) level turns at various airspeeds

(c) climbing:

  (i) straight;

  (ii) turning;

(d) descending at various speeds:

  (i) straight;

  (ii) turning;

(e) flight in various aircraft configurations:

  (i) straight and level;

  (ii) turning and level;

  (iii) descending in straight flight;

  (iv) descending and turning;

(f) perform break and rejoin:

  (i) recognise loss of contact with formation or any other requirement to break away and implement a decision to break away from the formation;

  (ii) break away from formation lead by creating positive track and height separation with the remaining formation aircraft;

  (iii) notify formation leader of break away;

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(iv) maintain track and height separation until cleared by formation leader to rejoin the formation;

(v) regain visual contact with leader;

(vi) transmit rejoin intentions;

(vii) maintain vertical separation with the remaining formation aircraft;

(viii) establish and manage overtaking speed while maintaining vertical separation;

(g) establish a flight path that will ensure the aircraft will pass behind and below the formation in the event of a join-up overshoot:

(i) position the aircraft into the recognised formation position;

(h) perform circuit and stream landing:

(i) conduct formation break into the circuit;

(ii) maintain separation with other formation aircraft;

(iii) manage wake turbulence;

(iv) land in turn;

(i) perform formation landing:

(i) maintain formation position and

(A) carry out pre-landing checks;

(B) configure aircraft on leader's call;

(C) land aircraft;

(ii) after landing, ensure horizontal and lateral separation is established;

(iii) after clearing runway establish formation taxiing position;

(iv) conduct after-landing checks;

(j) perform formation overshoot:

(i) maintain formation position;

(ii) configure aircraft on instructions from leader;

(iii) complete after take-off checks.

2.5 **FAE-6.5 – Plan a formation flight**

(a) identify the task requirements for the flight;

(b) arrange crews, briefing venue and time, and coordinate aircraft availability;

(c) analyse the tasks to be achieved and determine the manoeuvres and formations that ensure safe achievement of the task;

(d) plan flight route to allow task achievement in the time available and within performance capabilities of the flight, while complying with all air traffic, area limitations and navigation requirements;

(e) plan actions in the event of abnormal or emergency situations involving the formation.

2.6 **FAE-6.6 – Brief and de-brief formation pilots**

(a) explain and confirm the ground and flight manoeuvres to be conducted;

(b) explain and confirm timings, route(s), speeds and altitudes to be flown;

(c) identify and nominate deputy leader and explain and confirm responsibilities;

(d) explain and confirm communication procedures, in-flight minimum fuel, abnormal and emergency procedures and method of return for landing;

(e) identify achievements and any faults or errors that occurred during the formation flight and provides guidance and feedback to other formation members during the post-flight de-brief.

2.7 **FAE-6.7 – Lead a formation flight**

(a) manoeuvre lead aircraft using controlled corrective action to ensure a stable platform for pilots flying in formation stations;

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(b) manoeuvre the formation safely anticipating and allowing for formation size, proximity to obstructions, terrain, airspace limitations, weather conditions and air traffic, while ensuring compliance with regulatory requirements;

(c) direct and control the formation using precise standard radio phraseology, hand and other signal procedures;

(d) manage lost contact procedures in accordance with standard operating procedures;

(e) monitor formation member's flight performances and reacts appropriately to any problems.

2.8 **FAE-6.8 – Manage abnormal and emergency situations during formation flight**

(a) control aircraft and formation when leading;

(b) manage abnormal or emergency situations in accordance with standard operating procedures or AFM and POH, both as flight leader and as pilot in command of a non-lead aircraft.

3 Range of variables

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

(b) day VFR;

(c) two or more aircraft.

4 Underpinning knowledge of the following:

(a) left and right echelon positions for the aeroplane being flown;

(b) the reference points that are used to achieve a specified formation position;

(c) line astern position for the aeroplane being flown;

(d) how to manoeuvre from echelon to line astern;

(e) how to manoeuvre from echelon right to echelon left;

(f) how to manoeuvre from line astern to echelon;

(g) the verbal and non-verbal signals for:

(i) commence take off roll;

(ii) position changes;

(iii) radio receiver failure;

(iv) radio transmitter failure;

(h) lost contact procedure;

(i) formation rejoin procedures.

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FAE-7 Aerobatics — formation

1 Unit description

This unit describes the skills and knowledge required to safely plan, direct and control a formation of aircraft during the performance of aerobatic manoeuvres.

2 Elements and performance criteria

2.1 FAE-7.1 – Identify the role, requirements and principles of operation of the formation aerobatic team

Identify and explain the role of the aerobatic team with respect to types of displays and aircraft used, requirements of the team and team members and the principles that will be applied to ensure safe and effective formation displays.

2.2 FAE-7.2 – Select a formation aerobatic team

(a) identify appropriately qualified and willing pilots to be selected for the aerobatic team;

(b) explain and confirm the requirements of each pilot with respect to personal performance, expected behaviour and commitment;

(c) develop a method of assessment to determine the suitability of pilots to conduct formation aerobatics;

(d) conduct airborne assessment of formation team pilots to ensure suitability and competence to conduct formation aerobatics.

2.3 FAE-7.3 – Develop a formation aerobatic training plan

(a) produce a training plan that will ensure the development of competency of a pilot to safely conduct formation aerobatic flight;

(b) direct and control the training and practice of the formation team until specified flying standards are consistently achieved.

2.4 FAE-7.4 – Develop and plan a formation aerobatic routine

Develop and plan a formation aerobatic routine that is safe, achievable, practical and fulfils the identified role of the formation team.

2.5 FAE-7.5 – Brief and de-brief formation pilots

(a) explain and confirm the ground and flight manoeuvres to be conducted;

(b) explain and confirm timings, route(s), speeds and altitudes to be flown;

(c) describe the venue of the formation aerobatic display, display axis, minimum distance from crowd, elevation of the venue, minimum altitude and any hazards or obstructions;

(d) identify and nominate deputy leader and explain and confirm responsibilities;

(e) explain and confirm communication procedures, in flight minimum fuel, abnormal and emergency procedures and method of return for landing;

(f) identify achievements and any faults or errors that occurred during the formation flight and provide guidance and feedback to other formation team members during the post-flight de-brief.

2.6 FAE-7.6 – Lead a formation aerobatic team during an aerobatic sequence

(a) identify the task requirements for the flight;

(b) arrange crews, briefing venue and time, and coordinate aircraft availability;

(c) analyse the tasks to be achieved and determine the manoeuvres and formations that ensure safe achievement of the task;

(d) plan flight route to allow task achievement in the time available and with performance capabilities of the flight, while complying with all air traffic, area limitations and navigation requirements;

(e) plan actions in the event of abnormal or emergency situations involving the formation;

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(f) manoeuvre lead aircraft using controlled corrective action to ensure a stable platform for pilots flying in formation stations;

(g) manoeuvre the formation safely during aerobatic flight anticipating and allowing for formation size, proximity to obstructions, terrain, airspace limitations, weather conditions and air traffic, while ensuring compliance with regulatory requirements;

(h) direct and control the formation using precise standard radio phraseology, hand and other signal procedures;

(i) manage lost contact procedures in accordance with standard operating procedures;

(j) monitor formation member's flight performances and react appropriately to any problems.

2.7 **FAE-7.7 – Manage abnormal and emergency situations during formation aerobatic flight**

(a) control aircraft and formation;

(b) manage abnormal or emergency situations in accordance with standard operating procedures or AFM and POH, both as flight leader and as pilot in command of a non-lead aircraft.

3 Range of variables

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

(b) day VFR;

(c) approved aerobatic aircraft;

(d) a team of pilots;

(e) lateral and vertical limitations imposed on manoeuvring airspace.

4 Underpinning knowledge

(a) left and right echelon positions for the aeroplane being flown;

(b) the line astern position for the aeroplane being flown;

(c) how to manoeuvre from echelon to line astern;

(d) how to manoeuvre from echelon right to echelon left, how to manoeuvre from line astern to echelon;

(e) the verbal and non-verbal signals for:

(i) commence take off roll;

(ii) change position;

(iii) radio receiver failure;

(iv) radio transmitter failure;

(f) the procedure that a pilot flying a wing position would follow when visual contact is lost with the lead aircraft;

(g) how to rejoin the flight leader.

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FAE-8 Spinning

1 Unit description

This unit describes the skills and knowledge required to execute and recover from an upright spin manoeuvre.

2 Elements and performance criteria

2.1 FAE-8.1 – Recover from spin

(a) perform pre-manoeuvre checks;

(b) enter and establish an upright spin;

(c) identify upright spin and direction of yaw;

(d) close throttle;

(e) stop yaw;

(f) unstall wing by reducing AOA;

(g) recover to controlled flight;

(h) recover within the number of turns normally required for upright spin recovery in the aircraft type, within the aircraft and height limitations.

3 Range of variables

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

(b) day VFR flight in VMC;

(c) within the lateral and vertical limitations of the planned manoeuvring airspace using an approved aerobatic aeroplane.

4 Underpinning knowledge of the following:

(a) actions required to recover from wing drop at the stall;

(b) what control inputs, with an aeroplane in any attitude, at the point of stall, are likely to cause a spin;

(c) blanketing effects the elevator can have on the rudder during spin recovery;

(d) significance of stick and control wheel position with respect to spin recovery;

(e) aerodynamic causes of a spin;

(f) what aerodynamic factor determines the direction of a spin;

(g) how to recognise a stable spin;

(h) difference between a stable spin and an unstable spin;

(i) effects of C of G position on spin performance and acceleration;

(j) difference between a spin and spiral dive;

(k) factors which may lead to a flat spin;

(l) difference between an upright and an inverted spin;

(m) visual indications used to determine the direction of a spin;

(n) instrument indications used confirm the direction of a spin;

(o) standard spin entry and recovery techniques for the aircraft being flown;

(p) number of turns normally required for spin recovery in the aeroplane type;

(q) height normally required entering and recovering from a stable spin;

(r) Mueller-Beggs spin recovery action and limitations on its application;

(s) ‘g’ and any other limitations applicable to spinning for the aeroplane type.

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FAE-9 Formation flying — helicopter

1 Unit description

This unit describes the skills and knowledge required to safely fly a helicopter in formation.

2 Elements and performance criteria

2.1 FAE-9.1 – Fly echelon formation

(a) maintain the specified echelon right and left formation stations during take-off, climb, cruise, descent and turning manoeuvres;

(b) advise formation lead and other formation aircraft using standard clear and concise radiotelephony phraseology to ensure precise information.

2.2 FAE-9.2 – Fly line astern formation

(a) maintain the specified line astern formation station during take-off, climb, cruise, descent and turning manoeuvres;

(b) advise formation lead and other formation aircraft using standard clear and concise radiotelephony phraseology to ensure precise information.

2.3 FAE-9.3 – Perform station changes

(a) manoeuvre the helicopter safely to specified alternative formation stations during climb, cruise, descending and turning manoeuvres, while remaining clear of all other formation aircraft.

2.4 FAE-9.4 – Perform breakaway and rejoin procedures

(a) recognise loss of contact situations and implement a decision to break away from the formation;

(b) break away from formation lead aircraft and rejoin at specified formation stations.

2.5 FAE-9.5 – Plan a formation flight

(a) identify the task requirements for the flight;

(b) analyse the tasks to be achieved and determine the manoeuvres and formations that ensure safe achievement of the task;

(c) plan flight route to allow task achievement in the time available and within the performance capabilities of the flight, while complying with all air traffic, area limitations and navigation requirements;

(d) arrange crews, briefing venue and time, and coordinate helicopter availability;

(e) plan actions in the event of abnormal or emergency situations involving the formation.

2.6 FAE-9.6 – Brief and de-brief formation pilots

(a) explain and confirm the ground and flight manoeuvres to be conducted;

(b) explain and confirms timings, route(s), airspeeds and altitudes to be flown;

(c) identify and nominate deputy leader and explain and confirm responsibilities;

(d) explain communication procedures, standard calls, in flight minimum fuel, abnormal and emergency procedures and method of return for landing;

(e) identify achievements and any faults or errors that occurred during the formation flight and provide guidance and feedback to other formation members.

2.7 FAE-9.7 – Lead a formation flight

(a) manoeuvre lead aircraft without using harsh or rapid control input to ensure a stable platform for pilots flying in formation stations;

(b) manoeuvre the formation safely, anticipating and allowing for formation size, proximity to obstructions, terrain, airspace limitations, weather conditions and air traffic, while ensuring compliance with regulatory requirements;

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(c) direct and control the formation using precise standard radio phraseology, hand and other signal procedures;

(d) manage lost contact in accordance with standard operating procedures;

(e) monitor formation member's flight performances and react appropriately to any problems.

2.8 **FAE-9.8 – Perform formation take-off approach and landings**

(a) maintain echelon left and right positions from a hover departure, throughout the climb to level off, acceleration and cruise speed;

(b) maintain echelon right, echelon left and line astern positions during an approach for landing;

(c) execute termination to the hover from a formation approach.

2.9 **FAE-9.9 – Manage abnormal and emergency situations during formation flight**

(a) control aircraft and formation when leading;

(b) manage abnormal or emergency situations in accordance with standard operating procedures or AFM and POH, both as flight leader and as pilot in command of a non-lead aircraft.

3 Range of variables

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

(b) day VFR;

(c) more than 1 approved helicopter.

4 Underpinning knowledge of the following:

(a) left and right echelon positions for the aeroplane being flown;

(b) reference points used to achieve a specified formation position;

(c) line astern position for the aeroplane being flown;

(d) how to manoeuvre from echelon to line astern;

(e) how to manoeuvre from echelon right to echelon left;

(f) how to manoeuvre from line astern to echelon;

(g) the verbal and non-verbal signals for:

(i) commence take off roll;

(ii) position change;

(iii) radio receiver failure;

(iv) radio transmitter failure;

(h) lost contact procedure;

(i) formation rejoin procedures;

(j) explain reasons for lag between control input and attitude change;

(k) 'Control Power'.

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