

**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-manoevrue 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 360° 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 360° 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 180°, descending vertically in balanced flight and recover the aircraft from the dive to straight and level flight, aligned with a nominated line feature 180° 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-manoevrue 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;

- (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  $V_A$  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.

## **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;

- (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.

## **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;

- (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.

## **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;

- (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.



## **F AE-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.

**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.

## **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;

- (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;

- (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.

## **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;

- (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.

## **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-manoevrue 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.



## **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;

- (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'.