



Australian Government

Department of Agriculture, Fisheries and Forestry
Australian Plague Locust Commission

APLC AERIAL OPERATIONS: INFORMATION FOR PILOTS



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Uncontrolled document once printed: refer to APLC web site (www.daff.gov.au/aplc) for updates

Contents	Page
Section 1: General (All aircraft/pilots)	
1.1 APLC Aviation Quality and Safety Policy	3
1.2 APLC Standard Operating Procedures	3
1.3 Overview: APLC Aerial operations and aerial safety	4
1.4 Daily Operational Briefing Checklist	8
Section 2: Information for Spray Pilots	
2.1 Acceptance Checklist: Fixed Wing Spray Aircraft	10
2.2 Locust Control: Instructions to Spray Pilots	13
2.3 Tasking and Safety Direction No. 2: Spray Operations	16
2.4 Aerial spraying checklist	18
2.5 Fenitrothion: Guideline for control of Australian Plague locust	19
2.6 Fipronil: Guideline for control of Australian Plague locust nymphs	20
2.7 Green Guard: Guideline for control of Australian Plague locust nymphs	21
2.8 Malathion: Draft Guideline for control of Australian Plague locust	22
Section 3: Information for Fixed wing spotter pilots	
3.1 Acceptance Checklist: Fixed-wing Spotter Aircraft	24
3.2 Tasking and Safety Direction No. 3: Fixed Wing Survey	26
3.3 Pre-Flight checklist for aerial survey	28
Section 4: Information for Helicopter Survey Pilots	
4.1 Survey Helicopter Acceptance Checklist	30
4.2 Tasking and Safety Directions No. 1: Helicopter Survey	32
4.3 Pre-Flight checklist for aerial survey	35
Annex 1: APLC Standard Operating Procedures	

Section 1: General (All aircraft/pilots)

1.1 APLC Aviation Quality and Safety Policy

1.2 APLC Standard Operating Procedures

1.3 Overview: APLC Aerial operations and aerial safety

1.4 Daily Operational Briefing Checklist

1.1 APLC Aviation Quality and Safety Policy

The Australian Plague Locust Commission acknowledges that aviation safety is an essential and integral factor in satisfying the objectives and requirements of the Commission's mandate in control and management of Plague Locust activities.

It is the policy of the Australian Plague Locust Commission to prevent accidents and minimise injury by placing safety of aviation activities above all considerations.

To accomplish this APLC will:

- Promote a culture encouraging the development, implementation and continuous improvement of operating systems which protect personnel involved in aviation operations.
- Establish principles and standards regarding safety, health and environmental protection, and in doing so, develop and maintain measurable objectives to focus APLC on continuously improving aviation safety performance.
- Empower all staff, sub-contractors and air operators involved in APLC aviation activities to initiate immediate Stop Work procedures in the event of unsafe acts being observed.
- Identify, evaluate and control safety, health and environmental hazards through risk analysis.
- Provide necessary and adequate training and resources to APLC personnel for fulfillment of aviation activities in accordance with objectives and standards.
- Communicate safety, health and environmental responsibilities to every individual within the APLC, and hold personnel accountable.
- Monitor and audit ongoing operations to assure conformance to safety, health and environmental standards.
- Identify non-compliance with safety, health and environmental requirements, promote a 'Just Culture' where all incidents and near misses are openly reported and investigated, take corrective action and verify the effectiveness of those actions.
- Ensure only approved air operating companies, personnel and equipment, meeting APLC minimum requirements, are contracted for APLC aviation operations.
- Require contractors to manage Health, Safety and Environment (HSE) in line with this policy.

1.2 APLC Standard Operating Procedures

The APLC has developed a set of Standard Operating Procedures (SOP's) to assist Aircraft Operators and APLC personnel in the safe and efficient management and use of aircraft involved in the provision of locust management aerial operations.

The conduct of aerial operations within APLC must satisfy two main quality requirements – the APLC Quality and Safety Policy [section 1.1 above] and the requirements of the Civil Aviation Safety Authority for aerial activities.

The purpose of the Standard Operating Procedures and associated guidance material is to provide confidence that all operations are conducted in accordance with the applicable requirements, standards and operational procedures in order to ensure safe operations and efficient service.

For APLC aerial activities to function safely and efficiently, it must identify and manage numerous linked activities. Each activity has a process for completion and often the output from one process directly forms the input to the next. It is essential therefore, that each objective and process be identified, monitored and measured against requirements and policies, results reported and continual improvements planned and actioned. A poorly monitored task at the lower level of Operations may result in an unsatisfactory input into a higher Operational level, thereby resulting in a compromised flight safety issue or poor level of overall service.

All pilots working with the APLC are required to read and comply with the SOPs (refer Annex 1) as appropriate to the aerial tasking undertaken.

Disclaimer

Aircraft Operators are responsible for determining whether they should seek specialist advice and assistance in managing their air operations, based upon individual circumstances. To the extent of any inconsistency, the following take precedence over these SOP's insofar as they relate to the management and use of aircraft and the provision of related services:

- Any statutory requirements or other requirements under the laws of Australia (including without limitation, Civil Aviation and OH&S legislation);
- Any Codes of Practice or related industry standards or guidelines, or guidelines or policies issued by Government or Regulatory Authorities;
- Aircraft Operators Operations Manuals;
- Any manufacturers' recommendations.

Aircraft Operators are responsible for notifying APLC immediately of any inconsistencies they become aware of between these SOP's and the above requirements, codes, regulations, guidelines and recommendations.

1.3 Overview: APLC Aerial operations and aerial safety

Purpose of the Information Pack

The purpose of this document is to provide relevant background information on APLC operations and procedures and the APLC's approach to aviation safety to pilots working for the APLC.

The document contains essential information describing the protocols used by the APLC to mitigate the risks involved in aerial operations.

All pilots should carefully read the relevant parts of the document to familiarise themselves with APLC procedures and protocols.

APLC aerial safety

The Australian Plague Locust Commission regards aviation safety as an essential and integral factor in satisfying the objectives and requirements of the Commission's mandate in control and management of Plague Locust activities.

It is the policy of the Australian Plague Locust Commission to prevent accidents and minimise injury by placing safety of aviation activities above all considerations.

The APLC commissioned an independent review of aerial safety in 2006-2007. Following this review the APLC implemented a number of recommendations arising from the review to further mitigate risks. A copy of the review report is available from the APLC web site (www.daff.gov.au/aplc).

Documentation that is both essential and critical for the safety of aircraft operations is contained in:

- The APLC Aviation Procedures Manual;

- APLC Standing Orders; and
- Aircraft Tasking and Safety Directions.

Copies of the APLC Aviation Procedures manual can be downloaded from the APLC web site (www.daff.gov.au/aplc).

Some of the information contained in this manual has been reproduced directly from the Aviation Procedures Manual.

Fixed wing survey (Hopper bands)

Aerial search using a fixed wing aircraft is the standard method for the detection of hopper bands enabling the APLC to quickly establish the extent of an infestation and to identify specific blocks of hopper bands suitable for aerial control.

If bands are not visible from the air it is unlikely the APLC will mount a nymphal control campaign. Unfortunately, bands are not always visible from the air so aerial search can sometimes be misleading as to the size of the infestation. Even when all bands visible from the air have been successfully controlled, significant swarm campaigns have followed. The aim of band control is to limit the size of the swarm infestation, and the size of the population that can migrate or lay eggs to produce another generation.

Before the sortie begins the boundaries of the area to be surveyed will be discussed/agreed with the APLC OIC. Generally the boundaries will be delimited by lines of latitude and longitude and/or by an easily identifiable geographic feature such as a range of hills, major creek line, road or river. The original boundaries of the survey area can be extended if bands are found at the edges of the search area but other APLC staff at the control base (or Canberra) need to be informed of any changes to the original flight plan and the SAR time amended if necessary.

The spotter aircraft should initially fly tracks at intervals of approximately 2 nautical miles and at a height of 700 m above ground level over the area to be searched. The interval should be reduced to 1 nautical mile if bands are observed.

Bands show up most clearly when the sun is behind you, so if you are not certain that what you are seeing is a band, circle round it a few times to check and try a change in altitude. Blocks of country (target areas) containing bands should be delimited from the air and the coordinates of the target areas locked in by the aircraft GPS (in case conditions are unsuitable for spraying and there will be a need to subsequently relocate the area). If a spray aircraft is called up the APLC observer will provide a lat/long coordinate for the block to the spray pilot. Once the spray aircraft arrives the APLC observer will describe the location of the spray block to the spray pilot and provide directions for the spraying operations by radio (normally UHF).

Helicopter Survey (Swarms)

Helicopters, though costly, are invaluable for locating locust swarms. They should be used mainly when the weather conditions are suitable for locust to undertake spontaneous flight: careful consideration needs to be given to using a helicopter when few adults are flying because of cool and/or windy conditions. Helicopters are also used to delimit the boundaries of a swarm for the spray aircraft pilot.

The search area and approximate route should be planned in advance and drawn on a map for both the pilot and the observer. Flight details must be left with somebody who is not flying, even if the pilot is following standard SAR (Search & Rescue) procedures.

There must be "intercom" between the pilot and the APLC observer(s). When a suspect area is spotted, a high level reconnaissance must be undertaken to identify any aviation hazards before a decision is made for the helicopter to descend to undertake low level survey. If the weather conditions are good and locusts flying it is possible the target area can be demarcated without a low level survey. Record the position of the target on the relevant property map or on the aircraft GPS.

The APLC observer will call up the spray aircraft if conditions are suitable for control. The location and boundaries of the target block will be described to the spray pilot by the APLC observer by radio (normally UHF). Often the helicopter will fly the boundaries of the target block to assist the spray pilot in demarcating the area.

Aerial spraying of locusts

There are three aerial spraying techniques used by the APLC:

- Blanket spraying (crosswind); and
- Wide interval track spacing using either:
 - Wide interval (cross wind); or
 - Wide interval (into and down wind alternate runs)

Both the wide interval spraying techniques are only used for the application of fipronil. The persistence of fipronil enables effective control of hopper bands by application as either a more irregular pattern (cross wind application) or by applying fipronil as narrow discrete barriers of pesticide.

The cross wind wide interval application technique results in a very irregular coverage of fipronil across the target areas whilst the “Into and downwind” technique restricts the fipronil coverage to narrow discrete strips or “barriers” approximately 80 to 100 meters wide with virtually no fipronil between the barriers.

Applying fipronil as a wide interval spray is highly cost effective in terms of the amount of insecticide applied and also in terms of the aircraft time to undertake the application when compared to a blanket treatment.

APLC staff will provide instructions to the spray pilot on which aerial spraying technique and track spacing is to be used on a specific target.

APLC Control Agents

The APLC utilises 3 products for the aerial control of locusts:

- Fenitrothion (Sumithion ulv)
- Fipronil (Adonis 3UL); and
- Metarhizium (Green Guard ulv)

The APLC is also currently evaluating Malathion ulv (Fyfanon) for locust control.

All the above products are applied as a ulv formulation using a ulv rotary atomiser (Micronair or similar) or through a Jarba Boom.

Mixing is only required for Green Guard: fenitrothion and fipronil are applied as a concentrated (ulv) product.

For Green Guard the product needs to be mixed with summer oil. The relative proportions of the mixture of Summer oil and Green Guard active ingredient are provided on the Green Guard Information Sheet. The APLC will normally provide specialised mixing equipment for the task.

Information sheets on each of the above products are included, for information, in this document. The information sheets provide the necessary information on the aircraft settings (blade angle, track spacing, application rate) for each product together with additional information.

A summary of the application methods, targets and registered use of the various control agents is presented in Table 1 (below).

Notwithstanding the information presented in the attached sheets and Table 1, spray pilots should also **read the registered label** and, if necessary, seek clarification from the APLC officer on site.

Table 1: Summary of APLC control agents characteristics and use

Control agent	Blanket spray	Wide track spray	Bands	Swarms	Registered Use (Refer label for details)
Fenitrothion	Yes	No	Yes	Yes	Wide range crops/pasture
Fipronil	Sorghum only	Yes	Yes	Restricted use	Pasture and Sorghum only
Green Guard	Yes	No	Yes	No	Wide range crops/pasture

Aircraft Hire arrangements

The APLC has a “Standing Offer” (contract) arrangement with a range of aerial operators including aerial spraying firms and aerial survey operators (fixed wing and helicopter).

Nearly all the aircraft engaged under the standing offer arrangement have a Daily Minimum Flying Charge which usually varies between 1 and 3 hours flying charge/per day (Dry rate). It is expected that the aircraft pilot will be aware of the Daily Minimum Flying Charge.

Under the Standing Offer arrangement all pilots and, if used, other aerial operator staff such as a loader/driver or mobile refueller are entitled to accommodation, meal and incidental costs at the same rates as APLC staff.

Acceptance of aircraft by APLC

Contracted aircraft are initially engaged by APLC Headquarters in Canberra. APLC Canberra initiates the aircraft engagement by exchanging an aircraft acceptance form with the contractor. The form is a checklist to ensure that the aircraft is in accord with specification and the pilot has the necessary experience and qualifications (endorsements) to undertake the task.

Once the acceptance form has been completed the aircraft is deployed to the APLC Locust Control Base. APLC Headquarters faxes a copy of the acceptance form to the OIC at the Locust Control Base and once the aircraft arrives it is cross checked against the acceptance form.

Aircraft which are not in accordance with specification or that are not fit for purpose may be returned to the contractor.

Aircraft Flying Log

The aircraft pilot should ensure that the APLC Flying Log is completed daily by the APLC OIC.


An entry should be made for any days during which the aircraft was available for operational flying but no flying was undertaken (due to, for example, poor weather conditions) and the Minimum Daily Flying Charge recorded.

If an aircraft was unavailable for operational flying (for example, due to unserviceability of the aircraft or pilot illness) the period of the day during which the aircraft was unavailable is to be entered in the Aircraft Flying Log (e.g. Aircraft unavailable due to unserviceability from 8am to 4pm).

Aircraft Fuel

The APLC Standing Offer arrangement has a provision for the aircraft contractor to purchase fuel which is subsequently reimbursed by the APLC at cost and the dry flying rate is charged. This approach is probably most convenient when survey and control operations are based in a location where aviation fuel is available at a bowser. Under some circumstances, usually where major survey and control operations are being conducted from a remote location, the APLC will provide drum fuel for aircraft operations.

1.4 **AMF 01 – Operational Briefing Checklist**

	AVIATION PROCEDURES MANUAL Aviation Management Forms				AMF 01
	ISSUE NO: 01	REVISION NO: 00	EFFECTIVE DATE: 01 February 08	PRODUCED BY: Heli-Logistics	AUTHORISED BY: APLC

The Briefing Checklist is designed to provide the OIC with a guideline for comprehensive briefing and checklist items prior to commencement of aerial activities. The briefing and checks shall be conducted on a daily (D) basis prior to commencement of flight operations in conjunction with pilots and staff involved in air ops. Further pre-task briefings are required as indicated by (T) and pre-campaign commencement (C). Unshaded boxes to be completed (ticked) by the OIC. Completed checklist must be signed.

A. BASE OF OPERATIONS	C	D	T
01 Emergency Response Checklist – safety plan, contacts, review emergency / crash rescue procedures.			
02 Aircraft safety procedures and crash / rescue responsibilities.			
03 Identify who is who in area of operations.			
04 Review aircraft capabilities and limitations for operating in the area of responsibility.			
05 Duty hours, and start and end of normal duty day.			
06 ‘Fit for Flight’ Policy and individual responsibilities.			
07 ‘Stop Work’ Policy and individual responsibilities.			
08 Local resources and location			
09 Occurrence / Near Miss reporting responsibilities			
B. PRE-TASK OPERATIONS	C	D	T
01 Operational area of responsibility: Provide map overview.			
02 Weather briefing.			
03 Aircraft: Details of all known aircraft operating within operating area and vicinity.			
04 Review Task Profile including vertical separation and loss of visual contact protocols			
05 Significant changes that may pose additional risks: Review the 4 M’s (Method, Medium [environment], Man, Machine) [Refer to AMF 07]			
06 Identification of known hazards			
07 Mission Risk Analysis			
08 Fuel locations and additional resources			
09 Fueling procedures, including ‘Hot Refuel’.			
10 Aircraft safety brief (including appropriate ‘brace’ positions)			
11 Aircraft and Pilot approvals			
12 Aircraft configuration, preparation and readiness.			
13 Sterile Cockpit / Hazard Verbalisation / Pilot descent & departure briefs.			
14 Sensitive and ‘no-go’ areas			
15 Review local concerns, constraints and permissions.			
16 Overview of local airspace coordination issues and procedures.			
C. COMMUNICATION PROCEDURES	C	D	T
01 Discuss and provide a copy of the communication plan.			
02 Local frequencies for Flight Following / Air Traffic Control / Air to Ground / Air to Air			
03 Review of flight following sequencing and loss of communication procedures.			
04 Notification to military and other external low level flight operators where applicable.			
05 Notification requirements to APLC communications center.			
D. POST FLIGHT DEBRIEF	C	D	T
01 Review task performance in relation to the 4 M’s			
02 Update hazard register with any newly identified hazards.			
03 Record, discuss and log any occurrence / near-miss events. Evaluate the event and rectify issues. Ensure non-punitive action.			
04 Locust information of operational nature.			
05 Review available flight times of crew and aircraft for following day’s operations.			

OIC Name: _____ OIC Signature: _____ Date: _____

Section 2: Information for Spray Pilots

2.1 Acceptance Checklist: Fixed Wing Spray Aircraft

2.2 Locust Control: Instructions to Spray Pilots

2.3 Tasking and Safety Direction No. 2: Spray Operations

2.4 Aerial spraying checklist

2.5 Fenitrothion: Guideline for control of Australian Plague locust

2.6 Fipronil: Guideline for control of Australian Plague locust nymphs

2.7 Green Guard: Guideline for control of Australian Plague locust nymphs

2.8 Malathion: Draft Guideline for control of Australian Plague locust

2.1 Acceptance Checklist: Fixed Wing Spray Aircraft



Australian Government
Department of Agriculture, Fisheries and Forestry
Australian Plague Locust Commission

Acceptance Checklist: Fixed Wing Spray Aircraft

Company: _____ Pilot: _____ Registration: _____

Operator APLC (✓) (✓) (✓= Accepted, ✗= Rejected)

Operator

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Current Air Operators Certificate (AOC) for aerial work [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Aircraft and certified operations listed on AOC [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Aircraft Third Part Liability insurance (\$10 m minimum) [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Chemical Liability Insurance [Preferable] |

Pilot

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Valid CPL(A) [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Current Class 1 Medical [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Grade 1 Agricultural Rating [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Current SpraySafe Certification [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Total PIC(A) ≥ 2000 hours [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | ≥ 500 hours agricultural flying in previous 2 years [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | ≥ 200 hours on aircraft type [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Minimum 5 hours on type in previous 6 months [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Proficient in operation of integrated DGPS – Application data logging and transfer [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Proficient in interpretation of ‘smoke’ and other industry recognised indicators of estimating wind speed and direction [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Wire environment training [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Survival and First aid training [Preferred] |
| <input type="checkbox"/> | <input type="checkbox"/> | Chemcert or Dangerous Goods training [Mandatory] |

Aircraft

- | | | |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | ≥ 3.5 hours Endurance [Preferable] |
| <input type="checkbox"/> | <input type="checkbox"/> | ≥ 390 kg payload [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | ≈ 200 km/h flying speed [Mandatory] |

Maintenance Release

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | (Sighted & verified) [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Aircraft hours remaining to 100 hour service (hrs) |
| <input type="checkbox"/> | <input type="checkbox"/> | Pilot hours remaining to mandatory rest break (hrs) |

Spare parts (reasonably foreseeable critical items)

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Aircraft (basic / common spares) |
| <input type="checkbox"/> | <input type="checkbox"/> | Communications / navigation equipment (basic / common spares) |
| <input type="checkbox"/> | <input type="checkbox"/> | Application equipment (basic / common spares) |
| <input type="checkbox"/> | <input type="checkbox"/> | Fuel pump (rotary / manual) [Preferred] |

Communications (fitted & functional)

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Cabin intercom (transmit / receive + headsets) – all personnel [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | VHF (CASA compliant for aircraft-to-aircraft contact) [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | UHF (transmit / receive + noise-limiting microphone) – all personnel (Air-to-air & Air-to-ground) [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | HF transceiver with APLC & RFDS frequencies [Preferred - in remote areas] |
| <input type="checkbox"/> | <input type="checkbox"/> | Telephone (fitted in aircraft) [Preferred] |

Navigation (fitted & functional)

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | DGPS with application data logging, compatible data transfer and relevant operator’s manual [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Sufficient quantity (& capacity) of compatible ‘Flash’ cards [Mandatory] |

Occupational Health & Safety

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | First Aid Kit [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Survival Kit [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Functional Particle Separator (or equivalent - as <u>minimum</u> standard) [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Functional Wire Strike Protection [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Pre-flight aircraft safety & emergency briefing [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Inertial-reel shoulder harness –all personnel [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Emergency radio signal device (CASA approved) [Mandatory] |

Application equipment (Spray) (fitted & functional)

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Spray tank capacity (≥ 250 litres) [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Rotary Cage Atomiser (e.g. Micronair AU5000 – or equivalent) (≥ 2) [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Shut-off valves [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Flow meter [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | In-line pressure gauge [Preferable] |
| <input type="checkbox"/> | <input type="checkbox"/> | Totaliser [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Rotary cage atomiser tachometer (cage RPM) [Preferable] |
| <input type="checkbox"/> | <input type="checkbox"/> | Flow rate calibration (able to be calibrated on ground) ($\pm 5\%$) [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Facility for in-flight adjustment of flow rate [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Functional smoke generator (& smoker oil) [Mandatory] |

Administration

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Operations - Hourly rate (including GST): \$..... (wet): \$(dry) |
| <input type="checkbox"/> | <input type="checkbox"/> | Minimum Daily Flying Hours (Dry Rate) or Daily Minimum Flying Charge applicable: |

A copy of this document will be used to verify compliance on arrival of aircraft for duty but prior to acceptance. Operators must be familiar with and confirm compliance with all specifications detailed in tender and contract documents. Aircraft that do not satisfy mandatory requirements (without prior agreement) risk rejection and return at the operator's expense.

Please confirm that the services offered comply with the attached criteria (check and sign as appropriate) and return by facsimile to:

Deputy Director:
Australian Plague Locust Commission
Telephone: 02-6272 3358
Mobile: 0428-329 414
Facsimile: 02-6272 5074

Operator Check

..... (Operator Name - Print) (Operator Signature) (Date)
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Canberra HQ Check

..... (APLC Officer Name - Print) (APLC Officer Signature) (Date)
--------------------------------------	-----------------------------------	-----------------

Campaign OIC Verification Check

..... (APLC Officer Name - Print) (APLC Officer Signature) (Date)
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2.2 LOCUST CONTROL - INSTRUCTIONS TO SPRAY PILOTS

General

Spray operations will not begin until the aircraft has been formally accepted and declared ready for operations by an APLC officer. This must include confirmation of a functioning 'smoker', DGPS and calibration of the flow rate. The method of calibration shall be agreed between the Campaign OIC and applicator [Refer to APLC Application Manual]. A DGPS must be used for track guidance during application and accurate recording of the position of all spray runs.

Spray Application Records (DGPS)

At the end of each day, you are required to download from the aircraft DGPS and provide the following information to the APLC OIC for each target sprayed:

- 1) *target boundary coordinates (logfile);*
- 2) *number of litres applied;*
- 3) *flying speed; and*
- 4) *flow rate*

A separate DGPS logfile must be generated for each APLC target. Where aircraft DGPS software can output logfiles directly in GIS format (e.g. ArcView shapefiles), such a format is preferred. Included in the logfile must be a unique number to indicate the pilot's consecutive target number for each target treated on a single day. When application on an individual target is interrupted (e.g. by the need to refuel or reload additional insecticide), the current logfile should be continued when application is resumed on the relevant target. The APLC will normally provide information on meteorological parameters (e.g. wind speed, temperature) which will be amalgamated with the logfile data.

Failure of aircraft equipment

In the event of a failure in the aircraft systems (DGPS or 'smoker' or communications or spray system), application is to cease immediately and not resume until acceptable [Refer to APLC Application Manual] interim measures are adopted or equipment is again operational.

Permissions and precautions

It is the joint responsibility of the relevant landholder, the attending APLC officer and the pilot performing the application to ensure that sensitive areas are not treated or directly affected by off-target drift.

1. *Areas that **MUST NOT BE TREATED UNDER ANY CIRCUMSTANCES:** any body of water, beehives, property homesteads / public buildings, bus stops or any property that has not granted permission for application;*
2. *Areas **MUST ONLY BE TREATED WITH PRIOR CONSENT OF THE LANDHOLDER / MANAGER** Obtained by APLC: preferably in writing): National Parks, heritage listed areas and protected sites, livestock, certain crops, neighbouring properties or organic production properties.*

When applying fipronil or fenitrothion the APLC requires a minimum **1500 metre buffer** zone down wind from the boundary of a target area (e.g. the first spray run).

When applying Green Guard the minimum required downwind buffer zone is **100 metres**.

Over-flying of water bodies

Pilots must turn off application equipment when over-flying an area that could result in contamination of recognised hazards that may exist within a treatment area (e.g. farm dams and bodies of surface water).

Communications

The spray pilot must be contactable by radio or mobile phone whilst on standby at the APLC control base.

Once a locust target has been identified by APLC ground or aerial survey the spray pilot will be contacted by radio or phone and provided with the coordinates of the target location, instructions regarding the type and quantity of control agent to be loaded, and any other relevant information.

The spray pilot should confirm the target location and the details of the control agent and provide an ETA for reaching the target location.

The spray pilot should be aware that other APLC survey aircraft (fixed wing spotter or helicopter) may be in the vicinity of the target area. There is also the possibility that other non-APLC aircraft, for example, media aircraft may occasionally be present in the target vicinity.

The spray pilot should notify the approach of the spray aircraft to APLC staff and/or survey aircraft when within 5 nautical miles of the notified target area, establish visual contact with any survey aircraft and maintain safe vertical separation with aircraft in the vicinity of the target area using pre-arranged protocols (refer **AMF 01 – Operational Briefing Checklist**)

The spray pilot must be contactable by radio [UHF] throughout the spraying operation.

Instructions given by APLC Officers must be followed unless the pilot considers these unsafe. In the event of unresolved disagreement between the APLC Officer and pilot, either the Campaign OIC, Operations Manager or Director must be consulted immediately.

Control Agent Application Parameters

APLC may employ any of a range of control agents and application techniques depending on the prevailing circumstances. You will be informed of the material to be used and provided with the relevant material safety data sheet (MSDS) for your information. The application techniques to be used will be explained at

The desired area dose will vary depending on the agent and method of application employed. Current recommended control parameters to achieve a successful outcome are:

Variable	Parameters		
	'Green Guard'	Adonis 3.0 UL	Sumithion
Track spacing (metres)	• Blanket: 100m	• Barrier: 200 or 300 m • Blanket 100m (Sorghum only)	• Blanket 100 m
Blade angle (°) [RPM] [@ 200 kph]	• 45° [6,000-6,300]	• 45° [6,000-6,200]	• 50° [5,000-5,500]
Flow rate (litres/min [per 2 atomisers]) [@200 kph]	• Blanket: 16.5L/min if conditions hot (summer/autumn) or 23L/min if cool (spring)	• Blanket: 10 L/min • Barrier: 10 L/min	• Blanket: 7L/Min
Wind speed application range (steady) (metres/sec)	• 2 to 6 m/s ⁻¹	• 2 to 6 m/s ⁻¹	• 2 to 6 m/s ⁻¹
Aircraft speed (kph) [knots]	(170) [92] ↔ (200) [108] ↔ (240) [130]		
Wind speed and Flying height (metres)	Wind speed between 2 – 5 ms ⁻¹ ⇒ 10 m aircraft spray height (nymphs or settled adults) Wind speed > 5 ms ⁻¹ ⇒ use 5 m spray height (nymphs or settled adults) Higher flying adult target: spray above flying adults ¹ (<u>not to exceed 20 m</u>)		

Either the APLC officer in charge of the campaign operation, or the APLC officer at the target site, will advise the desired parameters to be used.

If recommended aircraft speed [**200 kph**] cannot be achieved, then the flow rate must be varied as indicated below to achieve the desired area dose:

$$\text{Flow rate} = (\text{actual speed}/\text{desired speed}) \times \text{desired flow rate}$$

Target Boundaries

Normally a locust target for aerial spraying will be identified by the APLC through aerial survey using either a fixed wing spotter aircraft (bands) or a helicopter (swarms).

Safe aircraft separation must be maintained between the spray aircraft and other aircraft especially APLC survey aircraft in the vicinity of the target area.


The boundaries of a target area together with any other relevant information on potential aviation and environmental hazards will normally be communicated to the spray pilot by the APLC observer in the survey aircraft.

The survey aircraft will normally fly the boundaries of the target area to assist the pilot of the spray aircraft in locating and demarcating the target boundaries on the spray aircraft GPS.

The APLC officer will normally also indicate the A-B spray line for the first spray application to the spray pilot and request that a first run be made along the A-B line using smoke to recheck wind direction prior to actual release of insecticide.

¹ Only in open rangeland using an appropriate buffer zone, do not use in closely settled agricultural areas

2.3 Tasking and Safety Direction No. 2: Spray Operations

 Australian Government Department of Agriculture, Fisheries and Forestry	AVIATION PROCEDURES MANUAL OPERATIONAL DOCUMENTATION				OD 06
	ISSUE NO: 01	REVISION NO: 01	EFFECTIVE DATE: January 2009	PRODUCED BY: Heli-Logistics	AUTHORISED BY: APLC

APLC AERIAL TASKING AND SAFETY DIRECTIONS All APLC staff & contracted pilots participating in the aerial activity must read, understand and abide by the requirements as detailed in this tasking instruction. <div style="text-align: right; color: white;">Revision: #01 28/01/2009</div>	
TASK / ACTIVITY Serial No. #02	AERIAL AGRICULTURAL OPERATIONS (SPRAY) Use of spray aircraft to control locusts through the delivery of pesticide in defined target areas.
Task Description	Upon identification of a suitable target by the survey aircraft communications will be relayed to the spray aircraft for direction to the target location. The survey aircraft crew will delineate the target boundary for the spray aircraft and communicate all known risks/hazards to the pilot. Positive identification of target boundary, associated hazards and 'No Spray Zones' are confirmed by the spray pilot prior to commencing spray operations. The spray pilot has the final decision on whether it is safe to proceed with application to the target area. Estimation of likely spray drift (normally by application of smoke) and verification of spray run shall be made by the spray aircraft pilot and locust observer prior to the survey aircraft departing the target area.
Locust Information	<ul style="list-style-type: none"> ▪ The behaviour of adult plague locusts depends largely on ambient weather conditions. ▪ Spontaneous adult flight generally occurs when ambient temperatures are 22 – 35 Deg C. ▪ Locusts are less likely to be active when the following conditions are prevalent. <ul style="list-style-type: none"> - Temperatures are less than 22 deg or higher than 35 deg. - Winds are in excess of 25 Kts. - Conditions are overcast. - During periods of rain. [consideration should be made to postpone aerial operations under these conditions] ▪ Potential hazards to aircraft when flown through locust swarms: <ul style="list-style-type: none"> - Instrument intakes - Equipment intakes - Cooling & air intake blockages - Reduced visibility - Reduced effectiveness of aircraft control surfaces
Preparations	Crew / OIC Briefing: Complete the relevant pre-task briefing in accordance with the 'Operational Briefing Checklist' Aircraft: <ul style="list-style-type: none"> ▪ Sufficient flight hours available in accordance with Maintenance Release / fatigue management guidelines (CASA) [PILOT & AIRCRAFT!]. ▪ Compliance checklist verified and all equipment operational. ▪ Pilot pre-flight inspection. ▪ Chemical & fuel uplift ▪ Communication procedures confirmed

	<p>Crew:</p> <ul style="list-style-type: none"> ▪ APLC approved pilot only. ▪ 'Fit for Flight'
PPE	As per OH&S (AAAA) guidance.
Fatigue Management	In accordance with Operating Company Policy.
SAR Requirements (Flight Following)	Flight following by the assigned agency or flight following delegate using reporting schedules by radio as specified in SOP11.
Operation Parameters	<ul style="list-style-type: none"> ▪ Hazard Reconnaissance shall be conducted prior to descent into target area. ▪ Transit between target areas shall be conducted above hazard height. ▪ Suitable agricultural landing area or aerodrome for agricultural aircraft. ▪ Avoid flight through locust swarms. In case of inadvertent flight through dense locust swarms, increase altitude to safe level [above swarm (& other hazards)] to minimise safety risk posed by locust impact and ingestion. ▪ Maintain clean windscreen to prevent increased sun glare and reduced visibility. ▪ Never operate at power line height. Remain above or below wire height except during climb or descent. ▪ Monitor aircraft intake systems (eg. oil cooler filter, air intakes) for blockages and associated risks. ▪ Establish loss of visual contact protocol with survey aircraft prior (within 5nm) to arriving at target area (maintain separation). ▪ Wherever possible, orient spray runs with a cross wind component to assist target coverage.
Hazard Reconnaissance	<ul style="list-style-type: none"> ▪ Hazard reconnaissance shall be conducted by means of the agricultural air operator's (or Ag industry standards) established means / practices / procedures. ▪ Hazard information shall be augmented by the survey aircraft through communication of known hazards to the spray aircraft. ▪ The spray pilot must satisfy himself that all hazards (& application conditions) within the target area have been identified prior to commencing spray operations.
Communications and Coordination	<ul style="list-style-type: none"> ▪ Establish "loss of visual contact" and vertical separation protocols with APLC survey aircraft during daily briefing and prior to any spraying activities. ▪ Communications are to be established and maintained with other aircraft in the immediate vicinity of the target area. ▪ Communications are to be established and maintained with the survey aircraft in order to facilitate communication of operational hazard related information. ▪ Establish and maintain visual contact and appropriate separation protocol with any other aircraft in the vicinity of the target area including APLC survey aircraft. ▪ Communications related to target description and hazards from survey aircraft to the spray aircraft shall be conducted by a competent observer. ▪ A Sterile Cockpit environment shall be maintained when operating below known hazard height. This implies the application of rigorous CRM techniques including elimination of unnecessary talk, the verbalisation and read back of hazards, the verbalisation of intentions and the questioning of actions that are not consistent with safety or previously verbalised intentions.



2.4 APLC AERIAL SPRAYING CHECKLIST

LANDHOLDER CONSULTATION UNDERTAKEN AND PERMISSION TO SPRAY OBTAINED

CONTROL AGENT IS REGISTERED FOR USE ON THE CROP/PASTURE TO BE SPRAYED

BOUNDARIES OF BLOCK DEMARCATED AND SPRAY RISK ASSESSMENT UNDERTAKEN

CONFIRM WIND SPEED CONDITIONS WITHIN APLC (OR LABEL) RANGE FOR SPRAY APPLICATION

CONFIRM ADEQUATE NO SPRAY (BUFFER ZONE) IN PLACE FOR SPRAY HAZARDS

AERIAL SPRAY HAZARDS IDENTIFIED AND COMMUNICATED TO SPRAY PILOT

SPRAY PILOT FLIES BLOCK BOUNDARIES TO CONFIRM AND TO IDENTIFY AERIAL SPRAY HAZARDS

SPRAY PILOT CONFIRMATION OF CONTROL AGENT TO BE APPLIED

APPLICATION PARAMETERS CONFIRMED WITH SPRAY PILOT (FLOW RATE, BLADE ANGLE, TRACK SPACING)

SPRAY PILOT FLIES A-B LINE ON DOWNWIND BLOCK BOUNDARY USING SMOKE

SPRAY PILOT COMMENCES SPRAYING ON DOWNWIND BOUNDARY

POTENTIAL SPRAY HAZARD FOR NEIGHBOURING PROPERTIES IDENTIFIED



Fenitrothion (Sumithion ULV) is an organophosphorous insecticide, of moderate mammalian toxicity and acts on the nervous system of the insect. Fenitrothion is registered within Australia for use against locusts on a broad range of crops including cereals, vegetable crops (cabbage, lettuce, tomatoes), fruit crops (cherries, grapes and apples) and pasture and some forage crops. The APLC uses technical fenitrothion (1.23 grams a.i./litre) applied by aircraft as a blanket spray, for the control of both locust bands and swarms. Fenitrothion is highly toxic to aquatic invertebrates and bees and a 1500m buffer is a mandatory (label) requirement for water bodies.

Application technique and parameters

The APLC uses fenitrothion against both bands and swarms using the same blanket spraying technique

- The standard application parameters are 50° blade angle, 7 L/min flow rate with a 100 m track spacing assuming an aircraft speed of 200 km/hr, resulting in a dose of 260g a.i./ha (210ml/ha).
- Wind speeds for application should be within the range of >2m/sec to <6m/sec.

Buffer Zones

- A label requirement is that Fenitrothion is not to be sprayed within **1500m** upwind of sensitive areas including wetlands, watercourses or water bodies and human dwellings or within **5km** of bee hives.

Withholding periods

- Crops for **human consumption**: do not harvest for **14** days after application.
- Crops for **animal consumption/stockfeed**:
 - Pasture/lucerne where stock have not been oversprayed: do not graze for **7** days after application or withhold stock from slaughter for **14** days;
 - Pasture/lucerne where stock have been oversprayed: withhold stock from slaughter for **14** days;
 - Cereal straw and fodder, pasture seed crops, forage crops: Do not graze or cut for stock feed for **14** days after application.

Phytotoxicity

- Fenitrothion is likely to cause phytotoxicity in a number of varieties of sorghum and it is APLC policy **NOT** to apply fenitrothion to sorghum crops.

Dangerous Good

Fenitrothion is classified as a Dangerous Good: Class 6.1 Toxic



2.6 Fipronil: Guideline for control of Australian Plague locust nymphs

(Aug 2008 P Spurgin)

Fipronil (Adonis 3UL) has proven to be highly effective for treating Australian plague locust nymph (band) targets using barrier treatments. The barrier treatment is most efficient against locust bands occurring in pasture in medium to large area blocks (ca 5 to 50km²). It use on small blocks (ca <2km²) is not recommended except in cases where the infestation occurs in a sorghum crop .Fipronil is only registered for application against locusts in pasture and sorghum crops.

DO NOT apply Fipronil:

- against locusts in any crop other than sorghum;
- on any pasture which is used for organic production;
- in designated plains wanderer habitat areas;
- as a blanket treatment (**unless** the band infestation is located in a sorghum crop)
- In areas where termite mounds are present.

ONLY apply Fipronil with:

- aircraft equipped with Micronair AU5000 rotary atomisers using a 45^o blade angle as the standard setting* (with aircraft speed 170-200 km/h);
- in wind speed between >2 m/s but less than <6m/s;
- a spray buffer zone of 1.5 km;
- the aircraft smoker is to be used to monitor conditions prior to and during application; **and**
- only as a blanket treatment against bands within a sorghum crop.

Barrier Techniques

- Two techniques can be used:
 - Wide interval track spacing (300meters) sprayed conventionally in a crosswind; and
 - Wide interval track spacing (300 metres) with the aircraft spraying “into and down wind”
- Barrier treatments on large (>5 km²) rectangular blocks may be carried out into wind and with a tail wind (using a 300 m spacing) rather than the normal crosswind procedure if this allows the pilot to fly the longest runs. This particular technique is still under evaluation so reports on efficacy would be appreciated. Note that this upwind/downwind technique still requires an environmental assessment of drift risk identical to the assessment used for normal crosswind applications.

Wide interval treatments with Adonis 3UL

Small blocks 0.5-2 km². The use of fipronil for small block treatment is not recommended. If control of a small block comprising a sorghum crop is necessary (due to potential phytotoxicity of fenitrothion) then a fipronil blanket treatment may be undertaken using a 100 m spacing between spray runs, 10 m flying height and total flow rate of 10 L/min, VAR - 110 mL/ha equivalent to an area dose of 1.0 g ai/ha.

Medium sized blocks 2-5 km² in open grassland/pasture. If no scrub/trees present use 300 m spacing, 10 m height & flow rate of 10 L/min. This will result in a mean area dose of 0.33 g ai/ha.

If scrub/trees present use a 200 m spacing, 10 L/min flow rate, mean area dose - 0.5 g ai/ha.

Large blocks > 5 km², open rangeland. Use 300 m spacing, 10 m height & flow rate of 10 L/min, for a mean area dose of 0.33 g ai/ha.

Note: when calibrating for Barrier or Wide Interval treatments calculate the required flow rate using the aircraft speed, a 100 m spacing & a VAR of 0.33 L/ha.

Buffer Zones

- APLC policy is not to apply Fipronil within **1500m** upwind of sensitive areas including wetlands, watercourses or water bodies and human dwellings or within 5km of bee hives

Withholding

- Do not graze or cut for stock food for 14 days after application or withhold stock for 21 days after application whichever is appropriate
- Sorghum: do not graze or cut for stock food for 14 days after application.



2.7 Green Guard: Guideline for control of Australian Plague locust nymphs (Aug 2008 P Spurgin)

Green Guard[®] ULV is a bio-insecticide containing a naturally occurring Australian fungus, *Metarhizium anisopliae* var. *acridum*. The product is registered for use against locusts in most, if not all, crop situations and pastures although its primary use by the APLC is the control of nymphs in environmentally sensitive areas, organic farms and against targets where the presence of buffer zones precludes treatment by pesticides or where, for example, the 14 day withholding period would cause severe inconvenience to a landholder.

Pre application measures

- It is essential that the aircraft tank be thoroughly cleaned, preferably by the aircraft company before arrival, before any Green Guard is loaded into the aircraft to avoid the risk of any pesticide residue in the tank resulting in mortality of the *Metarhizium* (Green Guard) spores.
- If you need to switch from using chemical to Green Guard, you need to wash tank and pump lines thoroughly with two washes of **strong** detergent (eg truckwash). The wash must be disposed of in the same manner as chemical waste.

Mixing

- The Green Guard concentrate needs to be mixed with summer oil before aerial application is undertaken. Mixing is normally undertaken using a specialised mixing equipment (trailer mounted).
- The procedure is to pump **one** drum (205 litres) of Summer Spray Oil (Caltex) into the specialised mixing tank then to thoroughly decant **3 pails** (3 x 14 litres) of the Green Guard concentrate into the mixing unit. The mixture is thoroughly agitated for at least 10 minutes and then pumped into the (clean) aircraft tank.
- Each batch should only be mixed where it is certain that it can be used within a few hours.
- Each batch of 247 litres (Green Guard plus summer oil) should be sufficient to treat around 490 ha at a dose rate of around 25 grams of spores/ha using the standard application parameters (refer below).

Application

- The standard application parameters are 45° blade angle, 16.6 L/min flow rate with a 100 m track spacing assuming an aircraft speed of 200 km/hr, resulting in a dose of 25 g/ha of spores in 0.5 L oil/ha.
- Wind speeds for application should be within the range of >2m/sec to 6 m/sec.
- The formula for flow rate is:
 - Flow rate (L/min) = $\frac{\text{Aircraft speed (km/hr)} \times \text{track spacing (m)} \times \text{Dose (L/ha)}}{600}$
 - Flow rate for slower (170kph) aircraft = $170 \text{ km/hr} \times 100 \text{ m} \times 0.5 \text{ L/ha} / 600 = 8500/600 = 14.2 \text{ L/min}$
- If using Green Guard in the spring in southern NSW it is recommended the dose rate is increased to around 35g spores in 0.7 L oil/ha.
- The increased dose rate is achieved by using a **ratio of 3 pails of Green Guard to one drum of summer oil** at the mixing stage and increasing the dose to 0.7 L/ha (flow rate increased to 20-23 L/min, depending on aircraft speed).

Buffer Zones

- A label requirement is that Green Guard is not to be sprayed within **100m** upwind of wetlands, watercourses or water bodies. In addition, the APLC does not spray Green Guard within 5 kilometres of bee hives.

Withholding period

- There is **no withholding period** for crops or stock.

Main APLC uses

- The broad spectrum of crops on which Green Guard can be used, the 100m buffer zone, the absence of any withholding period and the fact it is a bio-pesticide make Green Guard a very versatile control agent that can be used in situations where other conventional pesticides cannot.
- The APLC mainly uses Green Guard on organic properties (crops and rangelands) and Plains wanderer habitat areas. However, its versatility means that it can be used in situations where, for example, a long withholding period is not acceptable or where the presence of water bodies precludes the use of conventional pesticides



2.8 Malathion: Draft Guideline for control of Australian Plague locust nymphs

(July 2008)

Malathion (Fyfanon ULV) is an organophosphorus insecticide, of moderate mammalian toxicity and acts on the nervous system of the insect. Malathion is registered for use against Australian plague locust bands on Maize, Sorghum, Pasture seed crops and Pasture. The ULV formulation contains 1,169 g a.i./L.

Currently the APLC is evaluating Malathion for its effectiveness and, hence, this Guideline is a draft only. At present Malathion is only registered for use against Australian plague locust nymphs.

As with fenitrothion, Malathion is highly toxic to aquatic invertebrates, fish and bees. One significant potential benefit of malathion is the very short withholding period (1day) when compared to other locust control agents.

Application technique and parameters

The APLC will undertake trials to evaluate Malathion and to develop appropriate aerial spraying parameters. At present the recommended (label) application rate for Australian plague locust is 700ml/ha. Initially the APLC will apply Malathion as a blanket spray using parameters similar to those used for the application of fenitrothion, that is:

- The standard application parameters are 50° blade angle, 23L/min flow rate with a 100 m track spacing assuming an aircraft speed of 200 km/hr, resulting in a dose of 818 g a.i./ha (700ml/ha).
- Wind speeds for application should be within the range of >2m/sec to <6m/sec.

Buffer Zones

- Whilst there is no mandatory (label) buffer zone specified, the APLC will voluntarily adopt a 1500m buffer upwind of water bodies and 5 km for bee hives.

Withholding periods

- Maize Sorghum, Pastures, Pasture Seed crops: do not graze or cut for stock food for 1 (one) day after application.

Phytotoxicity

- Malathion is registered for use on sorghum.

Dangerous Goods

- Malathion is classified as a Dangerous Goods: Class 9 Miscellaneous (Environmentally Hazardous Substance, Liquid).

Section 3: Information for Fixed wing spotter pilots

3.1 Acceptance Checklist: Fixed-wing Spotter Aircraft

3.2 Tasking and Safety Direction No. 3: Fixed Wing Survey

3.3 Pre-Flight checklist for aerial survey

3.1 Acceptance Checklist: Fixed-wing Spotter Aircraft



Australian Government
Department of Agriculture, Fisheries and Forestry
Australian Plague Locust Commission

Acceptance Checklist: Fixed-wing Spotter Aircraft

Company: _____ Pilot: _____ Registration: _____

Operator *APLC*

(✓) (✓) (✓= Accepted, ✕= Rejected)

Operator

- Current Air Operators Certificate (AOC) for aerial work [Mandatory]
- Aircraft and certified operations listed on AOC [Mandatory]
- Aircraft Third Part Liability insurance (Minimum \$10million) [Mandatory]
- Carrier Liability Insurance (CLI) - for Charter Hire [Preferable]

Pilot

- Commercial pilot licence holder [Mandatory]
- ≥ 500 hours (PIC) [Mandatory]
- ≥ 50 hours total flying time in assigned aircraft type [Mandatory]
- Minimum 5 hours on type in preceding 6 months [Mandatory]
- Class One Medical [Mandatory]
- Current proficiency check on aircraft type [Mandatory]

Aircraft

- ≥ 4 hours Endurance [Preferable]
- Minimum 2 persons on board (including pilot) [Preferred]
- High wing aircraft [Mandatory]

Maintenance Release

- (Sighted & verified) [Mandatory]
- Aircraft hours remaining to 100 hourly service [Maximum preferred]: ... (hrs remaining)
- Pilot hours remaining to mandatory rest break [Maximum preferred]: (hrs remaining)

Spare parts (reasonably foreseeable critical items)

- Aircraft (basic / common spares)
- Communications / navigation equipment (basic / common spares)
- Fuel pump (rotary / manual) [Preferred]

Communications (fitted & functional)

- Cabin intercom (transmit / receive + headsets) – accessible by all personnel [Mandatory]
- VHF (CASA compliant for aircraft-to-aircraft contact) [Mandatory]
- UHF (transmit / receive + noise-limiting microphone) – accessible by observer ([Mandatory]
- HF transceiver with APLC & RFDS frequencies [Preferred - in remote areas]
- Telephone (fitted in aircraft) [Preferred]

Navigation (fitted & functional)

- GPS accessible to observer [Mandatory]

Occupational Health & Safety

- First Aid Kit [Mandatory]
- Survival Kit [Mandatory]
- Pre-flight aircraft safety & emergency briefing [Mandatory]
- Inertial-reel shoulder harness – all personnel [Preferable]
- Emergency radio signal device (CASA approved) [Mandatory]

Administration

- Operations - Hourly rate (including GST): \$..... (wet) : \$ (dry)
- Minimum Daily Flying Hours (Dry Rate) or Daily Minimum Flying Charge applicable:

A copy of this document will be used to verify compliance on arrival of aircraft for duty but prior to acceptance. Aircraft that do not satisfy mandatory requirements (without prior agreement) risk rejection and return at the operator's expense.

Please confirm that the services offered comply with the attached criteria (check and sign as appropriate) and return by facsimile to:

Deputy Director:
Australian Plague Locust Commission
Telephone: 02-6272 3358
Mobile: 0428-329 414
Facsimile: 02-6272 5074

Operator Check

..... <i>(Operator Name - Print)</i> <i>(Operator Signature)</i> <i>(Date)</i>
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Canberra HQ Check

..... <i>(APLC Officer Name - Print)</i> <i>(APLC Officer Signature)</i> <i>(Date)</i>
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Campaign OIC Verification Check

..... <i>(APLC Officer Name - Print)</i> <i>(APLC Officer Signature)</i> <i>(Date)</i>
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3.2 Tasking and Safety Direction No. 3: Fixed Wing Survey

 Australian Government Department of Agriculture, Fisheries and Forestry	AVIATION PROCEDURES MANUAL OPERATIONAL DOCUMENTATION				OD 06
	ISSUE NO: 01	REVISION NO: 01	EFFECTIVE DATE: 28 January 2009	PRODUCED BY: Heli-Logistics	AUTHORISED BY: APLC

APLC AERIAL TASKING AND SAFETY DIRECTIONS	
<p>All APLC staff & contracted pilots participating in the aerial activity must read, understand and abide by the requirements as detailed in this tasking instruction.</p> <p style="text-align: right;">Revision: #01 28/01/2009</p>	
TASK / ACTIVITY Serial No. #03	FIXED WING SURVEY Use of fixed wing aircraft to identify juvenile (nymph) locust infestations and determine the extent of locust activities including geographic boundaries and locations.
Task Description	Aircraft and observers may cover vast areas in search of locust bands and other noticeable locust activities. Additional information pertaining to identified hazards and environmentally sensitive areas is recorded for use during any subsequent low-level survey and spray operations.
Locust Information	The locust in their juvenile state (nymph) can often form highly concentrated bands. A band may be recognised by an area of brown or eaten vegetation surrounded by a distinct dark edge or band. The active area usually resembles a coffee stain or 'watermark' spread over the ground surface. The defined darker band edge is the locust themselves, moving outward from their egg beds.
Preparations	Crew / OIC Briefing: Complete the relevant pre-task briefing in accordance with the 'Operational Briefing Checklist' Aircraft: <ul style="list-style-type: none"> ▪ Conditions favourable for detection of locust infestations. ▪ Sufficient flight hours available in accordance with Maintenance Release & fatigue management duty hours. ▪ Compliance checklist verified and all equipment operational. ▪ Pilot pre-flight inspection. ▪ fuel uplift Crew: <ul style="list-style-type: none"> ▪ APLC approved pilot. ▪ Observers approved for task requirements ▪ 'Fit for Flight' ▪ ALL (mutually) briefed re: operational task and sortie expectations
PPE	Pilot: As determined by Operating company APLC Staff: <ul style="list-style-type: none"> ▪ Fire resistant Flying Suit or coveralls (Preferred) ▪ Safety Boots ▪ Emergency Personal Locator Beacon PLB / Mobile phone / Sat Phone ▪ Remote area survival kit & First Aid ▪ Flying helmet (optional)
Fatigue Management	In accordance with SOP 15 and Operating Company Policy.
SAR Requirements (Flight Following)	<ul style="list-style-type: none"> ▪ Flight following by the assigned agency or flight following designee using 60 minute reporting schedules by radio (or as otherwise agreed), as per SOP 11. ▪ If contact is not established at the next scheduled call time, the survey will be

	<p>terminated / suspended and the crew will ensure positive communication by any means possible (e.g. by way of mobile phone or by contacting a third party who can immediately relay a message) with the flight following agency regarding current status of the survey crew.</p>
Operation Parameters	<ul style="list-style-type: none"> ▪ Crew composition is subject to risk assessment by the responsible OIC. Minimum requirement is a Pilot and APLC observer. ▪ All flight operations shall be conducted above hazard height. ▪ Suitable landing area or aerodrome for aircraft being utilised. ▪ Band spotting is generally best achieved between 500 – 700 metres (1,500 – 2,100 feet) AGL. ▪ Maintain clean windscreen to prevent increased sun glare and reduced visibility.
Hazard Reconnaissance	<ul style="list-style-type: none"> ▪ Hazard reconnaissance shall be conducted by means of the agricultural air operator’s usual means. ▪ Hazard information shall be augmented by the survey aircraft communicating known hazards to the spray aircraft and supplemented by any additional advice.
Communications and Coordination	<ul style="list-style-type: none"> ▪ Establish “loss of visual contact” and vertical separation protocols with APLC survey aircraft during daily briefing and prior to any spraying activities. ▪ In control situations, communications are to be established and maintained with the spray aircraft in order to facilitate communication of operational hazard related information. ▪ Establish and maintain visual contact and appropriate separation protocol with any other aircraft in the vicinity of the target area including APLC spray aircraft. ▪ Communications related to target description and hazards from survey aircraft to the spray aircraft shall be conducted by a competent observer. ▪ A Sterile Cockpit environment shall be maintained when operating below known hazard height. This implies the application of rigorous CRM techniques including elimination of unnecessary talk, the verbalisation and read back of hazards, the verbalisation of intentions and the questioning of actions that are not consistent with safety or previously verbalised intentions.

3.3 PRE-FLIGHT CHECKLIST FOR AERIAL SURVEY OPERATIONS

Use this checklist before commencing aerial survey operations

HAS A PRE-FLIGHT PLANNING BRIEFING BEEN HELD WITH THE PILOT TO ESTABLISH THE FLIGHT PLAN AND SOPS FOR CONDUCT OF THE SURVEY?

HAVE YOU HAD A PRE-FLIGHT SAFETY BRIEFING?

HAS THE PILOT CONDUCTED A PRE-FLIGHT AIRCRAFT CHECK?

IS THE AIRCRAFT CARRYING A SURVIVAL KIT AND A FIRST AID KIT?

DOES THE AIRCRAFT COMMUNICATION EQUIPMENT WORK?

DO YOU KNOW WHERE THE AIRCRAFT WILL RE-FUEL?

ARE YOU CARRYING ALL THE RELEVANT MAPS?

DO YOU HAVE SUFFICIENT WATER AND FOOD?

DO YOU KNOW WHAT TO DO IN AN EMERGENCY?

DOES THE AIRCRAFT HAVE A FUNCTIONING EMERGENCY LOCATOR BEACON ?

ARE YOU CARRYING A SATPHONE/MOBILE PHONE?

ARE YOU WEARING YOUR PERSONAL LOCATOR BEACON?

ARE YOU WEARING THE REQUIRED PPE?

ARE FLIGHT FOLLOWING (SAR) PROCEDURES IN PLACE?

Section 4: Information for Helicopter Survey Pilots

- 4.1 Survey Helicopter Acceptance Checklist**
- 4.2 Tasking and Safety Directions No. 1: Helicopter Survey**
- 4.3 Pre-flight checklist for aerial survey**

4.1 Acceptance Checklist: Survey Helicopter



Australian Government
Department of Agriculture, Fisheries and Forestry
Australian Plague Locust Commission

Acceptance Checklist: Survey Helicopter

Company: _____ Pilot: _____ Registration: _____

Operator APLC

(✓) (✓) (✓= Accepted, ✗= Rejected)

Aircraft

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Current Air Operators Certificate (AOC) for aerial work [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Aircraft and certified operations listed on AOC [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Aircraft Third Part Liability insurance (Min \$10 million) [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Carrier Liability Insurance (CLI) - for Charter Hire [Preferable] |

Pilot

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Valid CPL (H) [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Class 1 Medical [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Aircraft type rating [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Low level rating [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Mustering OR Grade II Agricultural rating (Mandatory) |
| <input type="checkbox"/> | <input type="checkbox"/> | Total PIC (H) ≥ 2000 hours [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Minimum 100 hours on type [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Minimum 500 hours low level in previous 2 years |
| <input type="checkbox"/> | <input type="checkbox"/> | Minimum 5 hours on type in previous 6 months [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Current proficiency check on aircraft type [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Competent in wire strike risk operating environment [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Role Induction training [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Wire environment training [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Company approved CRM training [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Survival and first aid training [Mandatory] |

Maintenance Release

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | (Sighted & verified) [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Aircraft hours remaining to 100 hourly service [Maximum preferred]:(hrs remaining) |
| <input type="checkbox"/> | <input type="checkbox"/> | Pilot hours remaining to mandatory rest break [Maximum preferred]:(hrs remaining) |

Spare parts (reasonably foreseeable critical items)

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Aircraft (basic spares) |
| <input type="checkbox"/> | <input type="checkbox"/> | Communications / navigation equipment (basic spares) |
| <input type="checkbox"/> | <input type="checkbox"/> | Fuel pump (rotary / manual) [Mandatory] |

Communications (fitted & functional)

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Cabin intercom (transmit / receive + headsets) – all personnel [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | VHF (CASA compliant for aircraft-to-aircraft contact) [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | UHF (transmit / receive + noise-limiting microphone) – all personnel (Air-to-air & Air-to-ground) [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | HF transceiver with APLC & RFDS frequencies [Preferred - in remote areas] |
| <input type="checkbox"/> | <input type="checkbox"/> | Telephone (fitted in aircraft and accessible by observer) [Preferred] |

Navigation (fitted & functional)

- | | | |
|--------------------------|--------------------------|---------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | GPS (OR DGPS [Preferred]) [Mandatory] |
|--------------------------|--------------------------|---------------------------------------|

Occupational Health & Safety

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | First Aid Kit [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Survival Kit [Mandatory] |
| <input type="checkbox"/> | <input type="checkbox"/> | Functional Particle Separator (or equivalent - as <u>minimum</u> standard) [Mandatory] |

- Functional Wire Strike Protection [**Mandatory**]
- Pre-flight aircraft safety & emergency briefing [**Mandatory**]
- Inertial-reel shoulder harness –all personnel [**Preferable**]
- Emergency radio signal device (CASA approved) [**Mandatory**]

Administration

- Operations - Hourly rate (including GST): \$..... (wet) : \$
(dry)
- Minimum Daily Flying Hours (Dry Rate) or Daily Minimum Flying Charge applicable:

A copy of this document will be used to verify compliance on arrival of aircraft for duty but prior to acceptance. Operators must be familiar with and confirm compliance with all specifications detailed in tender and contract documents. Aircraft that do not satisfy mandatory requirements (without prior agreement) risk rejection and return at the operator’s expense.

Please confirm that the services offered comply with the attached criteria (check and sign as appropriate) and return by facsimile to:

Deputy Director:
 Australian Plague Locust Commission
 Telephone: 02-6272 3358
 Mobile: 0428-329 414
 Facsimile: 02-6272 5074

Operator Check

.....
 (Operator Name - Print) (Operator Signature) (Date)


Canberra HQ Check

.....
 (APLC Officer Name - Print) (APLC Officer Signature) (Date)

Campaign OIC Verification Check

.....
 (APLC Officer Name - Print) (APLC Officer Signature) (Date)

4.4 Tasking and Safety Directions: Helicopter Survey

 Australian Government Department of Agriculture, Fisheries and Forestry	AVIATION PROCEDURES MANUAL OPERATIONAL DOCUMENTATION				OD 06
	ISSUE NO: 01	REVISION NO: 01	EFFECTIVE DATE: 28 January 2009	PRODUCED BY: Heli-Logistics	AUTHORISED BY: APLC

APLC AERIAL TASKING AND SAFETY DIRECTIONS

All APLC staff & contracted pilots participating in the aerial activity **MUST** read, understand and abide by the requirements as detailed in this tasking instruction.

Revision: #01 28/01/2009

TASK / ACTIVITY Serial No. #01	HELICOPTER SURVEY Use of a Helicopter for survey to locate and direct the control of locust swarms by an agricultural spray aircraft
Task Description	<p>Aerial survey by helicopter is conducted to first establish the density of locusts over an extensive area, and second, to determine suitable targets to be sprayed by spray aircraft. Dense locust swarms most suitable for spraying are usually very localised. When ambient conditions are suitable, locusts can easily be disturbed by the helicopter downwash or noise/vibration causing them to take flight. When conditions are cold, windy or overcast, it may be difficult to locate swarm targets, and also difficult to detect hazards. Transect grid patterns and close inspection of preferred habitats may be necessary for identification of swarm targets.</p> <p>Upon identification of a suitable target, the observer will contact the spray aircraft and direct it to the target location. The helicopter crew delineates the target boundary for the spray aircraft and communicates all known risks/hazards to the pilot. Landholder permission, positive identification of target boundary, associated hazards and 'No Spray Zones' are also communicated to and confirmed by the spray pilot prior to commencing spray operations. The spray pilot has final decision as to whether it is safe to proceed with treatment of the target area to be sprayed. An observation of the spray drift and verification of, at least, the initial spray run shall be made by the observer prior to survey aircraft departing the target area.</p>
Locust Information	<ul style="list-style-type: none"> ▪ The behaviour of adult plague locusts depends largely on ambient weather conditions. ▪ Spontaneous adult flight generally occurs when ambient temperatures are 22 – 35 Deg C. ▪ Locusts are less likely to fly when: <ul style="list-style-type: none"> - Temperatures are less than 20 deg or higher than 35 deg. - Winds are in excess of 25 Kts. - Conditions are overcast. - During periods of rain. <p>[consideration should be made to postpone aerial operations under these conditions]</p> ▪ Airborne swarms are easily identifiable as a 'smokey brownish' haze on the horizon. ▪ Settled swarms are often difficult to detect. They are often found along water courses, creek lines, areas of green vegetation or against tree lines or other physical 'barriers'. ▪ Settled swarms may be disturbed into flight by helicopter downwash, vibration and noise.
Preparations	<p>Crew / OIC Briefing: Complete the relevant pre-task briefing in accordance with the 'Operational Briefing Checklist'</p>

	<p>Aircraft:</p> <ul style="list-style-type: none"> ▪ Sufficient flight hours available in accordance with Maintenance Release records.. ▪ Compliance checklist verified and all equipment operational. ▪ Pilot pre-flight inspection. ▪ Role configuration (doors / cabin security / etc). Rear doors must remain on. ▪ Fuel / endurance. <p>Crew:</p> <ul style="list-style-type: none"> ▪ APLC approved pilot. ▪ Observer approved for task requirements ▪ Pre-departure and safety briefing ▪ Trainee approved for instruction ▪ 'Fit for Flight' – follow fatigue management program
PPE (As per SOP 03)	<p>Pilot: As determined by Operating company</p> <p>APLC Staff:</p> <ul style="list-style-type: none"> ▪ Fire resistant Flying Suit ▪ Safety Boots / Footwear ▪ Helicopter approved flight helmet ▪ Emergency Personal Locator Beacon PLB/ Mobile phone / Sat Phone ▪ Remote area survival kit & First Aid
Fatigue Management (As per SOP 15)	<ul style="list-style-type: none"> ▪ An APLC staff member shall not exceed: <ul style="list-style-type: none"> - 3 consecutive days of helicopter survey activity. - 6 hours per day in helicopter <u>low-level</u> survey activity (excluding ferry flight) ▪ Short landing breaks of at least 5 minutes duration shall be taken (<u>outside</u> the aircraft) every hour during helicopter survey tasks. (Operator exemption from sub-regulation 225(1) is required).
SAR Requirements (Flight Following)	<ul style="list-style-type: none"> ▪ Flight following by the assigned agency or flight following designee using 60 minute reporting schedules by any means. ▪ If contact is lost for 15 minutes after the next scheduled call time, the survey will be terminated and the crew will ensure positive communication is made by way of mobile / satellite telephone or by contacting a third party (eg. Flight Services Australia) who can immediately relay a message to the flight following agency regarding current status of the survey crew.
Operation Parameters	<ul style="list-style-type: none"> ▪ The OIC of the control base, in consultation with pilot/s, will determine if weather conditions are suitable for survey operations. ▪ Low-level flight requires a higher-level Hazard Reconnaissance (generally above 200 ft AGL) to be conducted prior to descent. When conducting hazard recon in mountainous environments, additional height consideration should be provided to avoid potential wire hazards within / across valleys. ▪ Transit between survey areas shall be conducted above 300 ft AGL or increased height limit according to surrounding terrain / conditions. ▪ Aircraft performance and Height-Velocity limitations shall be considered for all planned flight profiles. ▪ Landing & take-off in / from non-designated landing areas (e.g.. Paddocks) is permitted, subject to: <ul style="list-style-type: none"> - Hazard recon completed. - Landing area assessed as suitable by pilot and no additional safety risk is present. - Landing / Descent brief conducted. - No landing is to occur within 250 metres of known hazard (e.g. Wires). - Confined Area Approach/Departure technique is used for landing and take-off. - Public control measures in place through on-board or external personnel. ▪ Avoid flight through locust swarms. In case of inadvertent flight through dense locust swarms, increase altitude to safe level to minimise safety risk (reduced

	<p>visibility, engine and cooler intake ingestion, etc) posed by locust impact and ingestion.</p> <ul style="list-style-type: none"> ▪ Maintain clean windscreen to prevent increased sun glare and reduced visibility. ▪ Never operate at power line height. Remain <u>above or below</u> wire height except during climb or descent. ▪ All survey areas to be searched within the wire hazard environment shall be sectioned into manageable sizes to reduce the number of identified hazards within each area. ▪ Flight time should be planned with at least a minimum fuel reserve of 30 min upon landing for refuel.
Hazard Reconnaissance	<p>A Hazard Recon must be conducted prior to descent for low level operations or landings in non-designated landing areas. Upon delineation of recon area, a systematic search for hazards shall be undertaken. Where wires are evident, or suspected, the crew shall actively scan for and observe all poles and hardware individually to ensure any Single Wire Earth Return (SWER) lines or additional strands are identified. All crew shall be actively looking for hazards during recon phase. All hazards shall be verbalised and confirmed by crew. Upon completion of hazard identification, the pilot shall conduct a verbal brief of hazard locations, flight intentions and expectations of crew prior to descent for low level operations. Descent into recon area shall be conducted using 'confined area' procedures and helicopter airspeed shall be reduced to an appropriate speed determined by the pilot.</p> <p>Consideration to hazard masking shall be provided in areas of shadow, patchy and/or heavy timber, poor sun angles, reduced visibility etc. The pilot's decision regarding descent and flight ops is final.</p>
Communications and Coordination	<ul style="list-style-type: none"> ▪ Establish "loss of visual contact" and vertical separation protocols with APLC survey aircraft during daily briefing and prior to any spraying activities. ▪ In control situations, communications are to be established and maintained with the spray aircraft in order to facilitate communication of operational hazard related information. ▪ Establish and maintain visual contact and appropriate separation protocol with any other aircraft in the vicinity of the target area including APLC spray aircraft. ▪ Communications related to target description and hazards from survey aircraft to the spray aircraft shall be conducted by a competent observer. ▪ A Sterile Cockpit environment shall be maintained when operating below known hazard height. This implies the application of rigorous CRM techniques including elimination of unnecessary talk, the verbalisation and read back of hazards, the verbalisation of intentions and the questioning of actions that are not consistent with safety or previously verbalised intentions.

4.3 PRE-FLIGHT CHECKLIST FOR AERIAL SURVEY OPERATIONS

Use this checklist before commencing aerial survey operations

HAS A PRE-FLIGHT PLANNING BRIEFING BEEN HELD WITH THE PILOT TO ESTABLISH THE FLIGHT PLAN AND SOPS FOR CONDUCT OF THE SURVEY?

HAVE YOU HAD A PRE-FLIGHT SAFETY BRIEFING?

HAS THE PILOT CONDUCTED A PRE-FLIGHT AIRCRAFT CHECK?

IS THE AIRCRAFT CARRYING A SURVIVAL KIT AND A FIRST AID KIT?

DOES THE AIRCRAFT COMMUNICATION EQUIPMENT WORK?

DO YOU KNOW WHERE THE AIRCRAFT WILL RE-FUEL?

ARE YOU CARRYING ALL THE RELEVANT MAPS?

DO YOU HAVE SUFFICIENT WATER AND FOOD?

DO YOU KNOW WHAT TO DO IN AN EMERGENCY?

DOES THE AIRCRAFT HAVE A FUNCTIONING EMERGENCY LOCATOR BEACON ?


ARE YOU CARRYING A SATPHONE/MOBILE PHONE?

ARE YOU WEARING YOUR PERSONAL LOCATOR BEACON?

ARE YOU WEARING THE REQUIRED PPE?

ARE FLIGHT FOLLOWING (SAR) PROCEDURES IN PLACE?

Annex 1: APLC Standard Operating Procedures (No. 1 to No. 13)

 Australian Government Department of Agriculture, Fisheries and Forestry	AVIATION PROCEDURES MANUAL Standard Operating Procedures				SOP 1
	ISSUE NO: 01	REVISION NO: 00	EFFECTIVE DATE: 01November 08	PRODUCED BY: Heli-Logistics	AUTHORISED BY: APLC

SOP 01 Campaign Base Site Selection and Management

Purpose: The purpose of this SOP is to provide staff with instructions for campaign base site selection, set-up, layout, operational use, and demobilisation.

Objectives: The objectives for campaign base site selection and management are to:

- Ensure the most appropriate campaign base site for aerial operations is selected, incorporating the need for flexibility at the same time as ensuring operational safety.
- Ensure the campaign base site, associated equipment and all personnel are adequately prepared prior to arrival of aircraft and commencement of operations.
- Ensure operational use and demobilisation of the campaign base site is conducted within legislative requirements and according to established safe work practices.

Responsibility: The responsibility for campaign base site selection and management should be coordinated between the **Campaign OIC** and **Director APLC or delegate**. Daily management of operational activity at the campaign base is the responsibility of the **Campaign OIC**. He/She shall ensure that all staff working, including any seconded staff, at the campaign base are fully briefed on relevant site issues, as outlined in this Standard Operating Procedure.

Procedure:


1. Check that the site under consideration is owned/controlled by an individual or entity that supports the operation being conducted and permission is obtained for use by the APLC and contracted aircraft. Contact with the relevant owner/manager must be established as soon as practicable. Consideration must be given to any proposed restrictions on use, security, cost for use, and rehabilitation of the site (if required).
2. The **Campaign OIC** shall keep written and or other records about the site, noting location, description, local hazards, use procedures, written permissions/agreements and contacts. If necessary, site inspection schedules shall be arranged with the owner/manager of the site.
3. The site shall be selected and laid out according to the requirements specified in the Campaign Base Site Plan document; refer to Part 3, Section OD 07.
4. The site layout shall allow for complete segregation of APLC aircraft activity from other passenger and vehicular traffic, with only authorised and appropriately trained personnel allowed access to the APLC aircraft operating area. Appropriate warning notices shall be prominently displayed and, where necessary, a traffic flow control system introduced to halt vehicles during APLC aircraft arrivals and departures.

5. The site layout shall allow for complete segregation of pesticide and varying fuel types. The site shall be appropriately and clearly marked so as to ensure staff and contractors have full visibility of supply locations when operating in vehicles or aircraft at the site.

6. The **Campaign OIC** shall ensure security measures are suitable for the chosen site; including compliance with required legislation (e.g. personnel must display ASIC cards when operating at security controlled aerodromes).

7. Suitable public control measures shall be implemented during on-site operational activity. All APLC personnel are responsible for implementing public control measures, and shall receive a briefing from the **Campaign OIC**.

8. The **Campaign OIC** shall consult with Director APLC or delegate when aircraft are no longer required, and a decision will be made on when aircraft and the campaign site are to be demobilised. The site must be left in its original state [or better]. Ensure all rubbish, particularly pesticide and fuel drums, is taken away and any rehabilitation issues addressed.

 Australian Government Department of Agriculture, Fisheries and Forestry	AVIATION PROCEDURES MANUAL Standard Operating Procedures			SOP 02	
	ISSUE NO: 01	REVISION NO: 00	EFFECTIVE DATE: 01 November 08	PRODUCED BY: Heli-Logistics	AUTHORISED BY: APLC

SOP 02 Aircraft Acceptance

Purpose: The purpose of this SOP is to provide the Campaign OIC with instructions for accepting aircraft when they arrive on site.

Objectives: The objectives of Aircraft Acceptance are to:

- Ensure appropriately equipped aircraft are tasked for locust management operations.
- Identify and mitigate any non-compliance with APLC specified requirements.
- Ensure all pilots and aircraft are adequately prepared prior to campaign commencement.

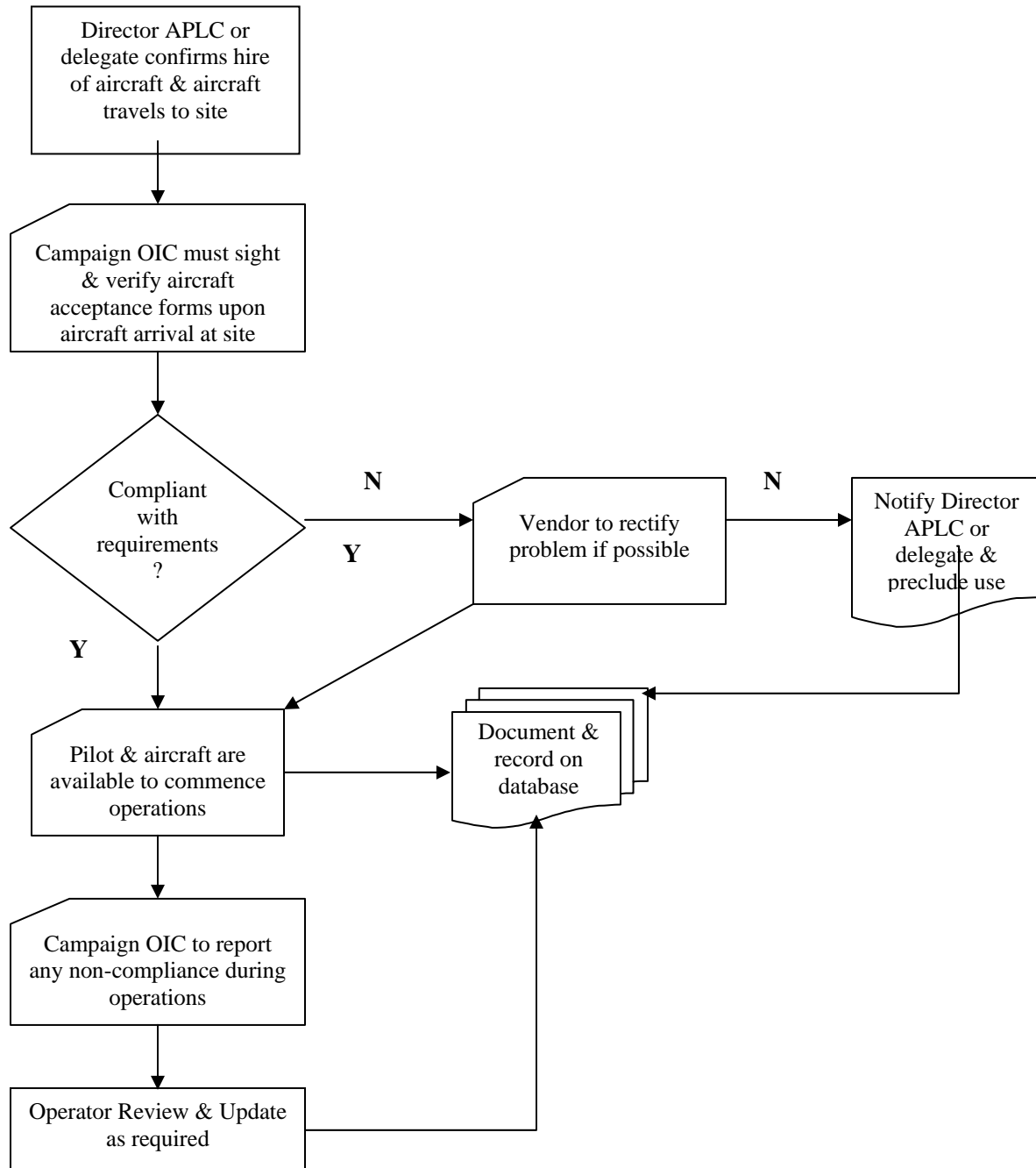
Responsibility: **Director APLC or delegate** is responsible for ordering aircraft from vendors, and ensuring timely arrival on-site for aerial operations and issuing initial aircraft and pilot acceptance forms.


The **Campaign OIC** is responsible for on-site aircraft acceptance. He/She shall ensure aircraft are inspected, and any issues identified are satisfactorily rectified prior to campaign commencement.

The **Campaign OIC** is responsible for ensuring aircraft acceptance forms are cross-checked against details supplied by the vendor.

Procedure:

1. Procedure shall adhere to the following flow chart:



 Australian Government Department of Agriculture, Fisheries and Forestry	AVIATION PROCEDURES MANUAL Standard Operating Procedures				SOP 03
	ISSUE NO: 01	REVISION NO: 00	EFFECTIVE DATE: 01 November 08	PRODUCED BY: Heli-Logistics	AUTHORISED BY: APLC

SOP 03 Safety Equipment

Purpose: The purpose of this SOP is to provide all staff with instructions for ensuring aircraft and personnel have adequate safety equipment for the required tasks, and that such safety equipment is appropriately utilised.


Objectives: The objectives for providing role specific safety equipment is to:

- Ensure occupational health and safety standards are met and minimise exposure to potential occupational risks.
- Ensure comfortable and safe working conditions for staff, with appropriate equipment available in case of emergency.

Responsibility: The **Campaign OIC** is responsible for ensuring on-site availability of necessary safety equipment (unless the required item is a vendor responsibility, linked to contract provisions). The **Campaign OIC** shall ensure the available equipment is appropriate for the task, well maintained and in good serviceable order. Responsibility for equipment maintenance, upkeep and replacement rests with the OIC. **Individual staff** are responsible for ensuring that they are issued with all required PPE, reporting any equipment failure or unserviceability and requesting replacement PPE.

Procedure:

1. All personnel shall obtain and use the equipment necessary for aerial operations by liaising with their line supervisor. The **Campaign OIC** shall provide adequate on-the-job training in use of this equipment.
2. As prescribed for the task undertaken, all personnel shall wear the appropriate complement of PPE, and carry the necessary life support equipment on board the aircraft.
3. All aircraft shall be equipped as per contract specifications.
4. If any personnel or passenger refuses to adhere to Personal Protective Equipment (PPE) requirements, the **Campaign OIC** shall terminate flight operations and report the non-compliance in writing to **Director APLC or delegate**.

 Australian Government Department of Agriculture, Fisheries and Forestry	AVIATION PROCEDURES MANUAL Standard Operating Procedures				SOP 04
	ISSUE NO: 01	REVISION NO: 00	EFFECTIVE DATE: 01November 08	PRODUCED BY: Heli-Logistics	AUTHORISED BY: APLC

SOP 04 Daily Operational Briefing / De-briefing

Purpose: The purpose of this SOP is to provide the Campaign OIC with instructions for completion of Daily Briefing / De-briefing requirements.

Objectives: The objectives of the Daily Operational Brief / De-brief are:


- To ensure comprehensive coverage of operational matters and planning requirements are clearly conveyed to all personnel involved in the daily activities.
- Ensure all critical components of the planned task/s have been discussed and addressed prior to commencing flight activity including safety and operating procedures and protocols.
- Mitigate any new additional hazards as identified from preceding operations following discussion with **Director APLC or delegate**.
- Ensure all personnel and associated equipment is adequately prepared and inspected prior to commencement of daily activities.

Responsibility: The **Campaign OIC** is responsible for the conduct and record of the daily operational brief and de-brief procedure. He/She shall ensure all personnel, including APLC and non-APLC support staff and aerial operators involved in the tasking are present and that any issues raised during the brief are closed-out satisfactorily prior to commencement of daily activities.

Procedure:

1. The Operational brief / de-brief shall be conducted:
 - Prior to commencement of any aerial activities on a daily basis;
 - Whenever any change to flight crew, nature of task, or operating environment occurs (this may not require attendance by staff, only notification, e.g. by radio);
 - Upon completion of daily activity.
2. The briefing time, attendance requirements and location shall be notified to all personnel and will be in accordance with **Campaign OIC** instructions.
3. The 'Operational Briefing Checklist' shall be utilised to ensure coverage of all critical briefing items. Instructions for relevant brief content, according to 'daily', 'pre-task' and 'post flight' requirements, are indicated on the checklist.
4. The **Campaign OIC** shall mark each item with a tick (✓) on the checklist upon completion of each requirement.

5. All required items shall be discussed within the brief prior to briefing closure.
6. All personnel shall indicate their understanding of planned activities, requirements and individual responsibilities prior to briefing closure.
7. The **Campaign OIC** will take note of any issues arising from daily debriefing and incorporate appropriate measures in any following briefing when considered necessary.
8. The **Campaign OIC** shall sign, date and file the briefing checklist upon completion and retain the file as a record of compliance with APLC 'duty of care' and policy requirements.

 Australian Government Department of Agriculture, Fisheries and Forestry	AVIATION PROCEDURES MANUAL Standard Operating Procedures			SOP 05	
	ISSUE NO: 01	REVISION NO: 01	EFFECTIVE DATE: January 2009	PRODUCED BY: Heli-Logistics	AUTHORISED BY: APLC

SOP 05 Risk Assessment

Purpose: The purpose of this SOP is to provide staff with instructions for ensuring adequate risk assessments are conducted before and during flight operations, so that risk exposure is minimised 'As Low As Reasonably Practicable' for the duration of those operations.

Objectives: Through the risk assessment process, the objectives for risk assessment are to:

- Ensure personnel at all levels have the knowledge and ability to identify, assess and manage risks.
- Enable staff to have the capacity for identification of any suitable alternative methods for undertaking the required tasks. (*Note:* In accordance with Civil Aviation Regulations, the Pilot in Command always retains final authority for aircraft operation).
- Ensure identification of any non-compliance with specified standard operating procedures, and immediate activation of suitable risk mitigation measures.

Responsibility: **Director APLC or delegate** is responsible for ensuring that risk management processes are integrated into decision making at all levels. The **Campaign OIC** is responsible for conducting relevant risk assessments during all phases of aerial operations. The **Aircrew** are responsible for conducting continual risk assessments during flight operations. **APLC senior management** is responsible for ensuring all participating staff have been trained and assessed as competent through appropriate role specific risk assessment training.

Procedure:

1. The process of assessing risk shall encompass identification of hazards, analysis of the degree of risk associated with each hazard, and prioritization of hazards relative to the mission or task at hand.
2. Risk assessment is a subjective process and shall therefore be conducted by individuals best qualified by training and experience to evaluate a proposed flight or operation (normally an OIC). This will ensure that informed decisions are made.
3. Applicable Risk Criteria and corresponding level of acceptable risk are to be pre-determined and established by **Director APLC or delegate** for purpose of the Risk Decision Process. Criteria are specific to the particular task and the context in which it is to be conducted.
4. Risk Decisions shall be made at the appropriate level of APLC management. Those accountable for the success or failure of the task or project must be included in the risk decision process. Typically the OIC or individual responsible

for executing the task or project, or the authorising manager for flying activities, is:

- Authorised to accept risk up to the delegated risk threshold defined as 'acceptable' for APLC, and
- Required to elevate decisions to the next level in the chain of command where it is determined that available risk mitigation options will not reduce the residual risk to an acceptable level.

5. 'Unacceptable' risk is when the consequences and likelihood of the risk are at a level considered to be unacceptable and steps will have to be taken to mitigate the risk to an acceptable level or remove the risk (refer to SOP 10 Stop Work Procedure)

6. Overly mission-oriented, "get the job done" attitudes shall be avoided at all times, with operational safety objectives always taking precedence over task outcome goals.

7. Performing risk assessment is often time-limited and requires flexibility and judgment. Risk assessments shall be divided into three categories according to time element:

a) Rapid Risk Assessment:

This type of assessment shall be conducted when planning time is minimal, such as during the flight, when immediate consideration of high risk hazards is necessary (e.g. a change in wind direction). This risk assessment procedure involves simple questioning of high risk hazards in relation to safety aspects of the operation, and then making an informed decision about continuation or task modification. This procedure shall be done on-the-spot by the involved officer, and does not require formal documentation. All APLC operations staff are trained to undertake this type of assessment through the Competency Based Training and Assessment (CBTA) program. Outcomes shall be discussed at the daily debriefing (refer SOP 04).


b) Deliberate Risk Assessment:

This type of assessment shall be conducted when planning time permits. It involves systematic risk identification, evaluation, consideration of risk controls, decision making, implementation of controls, and supervision. This risk assessment shall be performed by the **Campaign OIC** when planning intended operations, and by **Director APLC or delegate** when planning campaign or aerial operations several days or weeks in advance. This procedure requires completion of the standard hazard/risk template documentation (AMF 07). Once completed, this documentation should be included as part of the campaign diary, forming part of the documentation specific to that particular campaign/task.

c) In-Depth Risk Assessment:

This type of assessment shall be undertaken by APLC as part of a formal Aerial Safety Review program conducted at intervals not exceeding 5 years. . Additional in-depth assessments shall be conducted for specific items that are considered as 'Significant Change'. For example, items of significant change may include introduction of new technology, high level of APLC staff turnover, serious incident occurrence, etc. The In-Depth Risk Assessment shall be coordinated at **Director APLC or delegate** level. Standard Operating Procedures shall be developed and/or revised in accordance with the decision(s) made.

8. Operations shall be immediately aborted if a risk assessment process leads to identification of an unacceptable risk, in accordance with the established Risk Criteria and risk analysis processes.

 Australian Government Department of Agriculture, Fisheries and Forestry	AVIATION PROCEDURES MANUAL Standard Operating Procedures				SOP 06
	ISSUE NO: 01	REVISION NO: 00	EFFECTIVE DATE: 01November 08	PRODUCED BY: Heli-Logistics	AUTHORISED BY: APLC

SOP 06 Flight Conduct

Purpose: The purpose of this SOP is to provide staff with basic instructions for understanding and conducting flight operations.

Note: More detail in relation to flight conduct can be found in the Task Profiles, contained in Part 3 – Operational Documentation 06.

Objectives: The objectives for providing standard operating procedures in relation to flight conduct are to:

- Ensure uniform understanding of specific aircraft operational roles within APLC locust management activities.
- Ensure safety in all aerial operations, reduce/mitigate risks and prevent accidents/incidents.

Responsibility: The **Campaign OIC** is responsible for ensuring flights are conducted in accordance with specified operating procedures and guidelines. The **pilot in command** always retains the final decision for proceeding with any flight mission. All briefings should reflect this requirement and pilots shall acknowledge it as their responsibility.

Procedure:

1. Aircraft shall at all times be operated in accordance with procedures and practices as detailed in the following manuals and documentation:
 - a) The APLC Aviation Procedures Manual and all associated supplements
 - b) The Aircraft operator's Operations Manual
 - c) Instructions as prescribed from time to time by Director APLC or delegate
 - d) In accordance with all relevant Federal and State laws and regulations
 - e) In accordance with the requirements of the Civil Aviation Safety Authority [CASA].

Notwithstanding, the Pilot in Command shall ensure the aircraft is operated within the published operating parameters and limitations contained within the applicable Aircraft Flight Manual

2. Flight conduct shall comply with guidelines specified in the Tasking Profiles (refer Part 3 – Operational Documentation 06).

3. Use of either fixed wing aircraft or helicopter to travel between two points shall be regarded as a point-to-point flight mission. Such missions will include all ferry or positioning flights before, during and after locust management activities are conducted. APLC staff may or may not be in the aircraft on point-to-point flights.


4. Use of a fixed wing aircraft to determine the extent of locust activities (normally locust bands) including geographic boundaries and locations shall be regarded as a fixed wing survey (band spotting) flight mission. This type of flight mission may also at times include use of the fixed-wing survey aircraft to direct the control of locust swarms by a fixed wing agricultural spray aircraft. Fixed wing survey flight missions only occur under the direct supervision of competent APLC staff on board the aircraft.
5. Use of a helicopter for survey to determine the extent of locust activities (normally locust swarms) including geographic boundaries and locations shall be regarded as a helicopter survey flight mission. This type of flight mission may also include use of the helicopter to direct the control of locust swarms by a fixed wing agricultural spray aircraft. Helicopter survey flight missions only occur under the direct supervision of competent APLC staff on board the helicopter.
6. Use of agricultural spray aircraft to control locusts through the delivery of insecticide in defined target areas shall be regarded as a spraying flight mission. These flight missions only occur under the direct supervision of competent APLC staff.
7. Any flight missions other than those described above (points 3 to 6 inclusive) require prior assessment and explicit approval from the APLC Director before conduct of such flight missions may occur.
8. APLC personnel **are not** permitted on board any aircraft that is conducting aerial spraying operations.
9. APLC personnel who are required to initiate or participate in a flight mission shall consult the Aviation Procedures Manual and/or their OIC for the specific process and procedures to be followed.
10. All flights conducted shall receive a level of planning and risk assessment commensurate with the complexity and risks involved with the proposed flight mission. The goal is to reduce personal exposure, reduce/mitigate risks and prevent accidents/incidents.
11. Only operationally necessary flight missions shall be initiated; and only aircrew essential for the conduct of flight tasking and approved by **Director APLC or delegate**, shall be permitted on board the aircraft for all flight mission types.
12. All personnel operating as observers (aircrew) shall have an awareness of limitations for the particular aircraft in which the flight mission is being conducted. (Refer to Part 3 – Operational Documentation for further information).
13. Given the wide variety of situations encountered it is impossible to specify detailed planning requirements; however the following points shall provide guidance which will assist in ensuring that a flight mission will meet necessary requirements:
 - a) Ensure that the objectives of each flight mission are completely clear and that everyone involved, including the pilot, understands their role.

b) Be cautious of undue haste – a few extra minutes on the ground in preparation may save many in the air, or may prevent an accident. Even in urgent situations, take the time to ensure that everything has been considered.

c) Flight mission planning is much easier if information is readily available. For example, carry up-to-date maps, have weather information readily available, keep checklists in an accessible location.

d) Ensure you and other aircrew are fit for flight.

14. All personnel shall adhere to current APLC Fatigue Management policy and/or Flight and Duty limitations for the particular flight mission being conducted.

 Australian Government Department of Agriculture, Fisheries and Forestry	AVIATION PROCEDURES MANUAL Standard Operating Procedures				SOP 07
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SOP 07 Low Level Operations

Purpose: The purpose of this SOP is to provide Aircrew with instructions for conducting low-level aerial survey operations in an environment² where powerlines (wires) and other hazards may exist.

Objectives: The objectives of this SOP for low level aerial operations are to:

- Ensure comprehensive situational assessment and awareness prior to and during operational flight in the hazardous environment.
- Ensure all critical components of the task have been discussed and addressed prior to commencing flight within the hazardous environment.
- Identify and mitigate any additional hazards to the task that were not previously registered or known.
- Create a safety awareness and culture that leads to sensible and safe flight in the hazardous environment.

Responsibility: The **Campaign OIC** is responsible for ensuring all participating staff are aware of and fully trained in procedures for low-level aerial operations.

Director APLC or delegate is responsible for ensuring all participating staff have been assessed as competent through appropriate role specific training for aerial operations in the hazard environment prior to undertaking such activities unsupervised in an operational capacity. All staff conducting low-level aerial operations are responsible for adhering to procedures defined in this SOP.

Procedure:

1. Flight in the low-level hazardous environment shall only occur after adequate planning and when verbalised agreement between the pilot and aircrew confirms that such flight is necessary.
2. Before descent into the low-level hazardous environment, the aircraft shall make a thorough reconnaissance flight above power line height (not below 100 feet AGL) to determine the location of wires and other hazards. Only when all known wires and hazards have been identified and verbalised may flight within the proposed low flying area (hazardous environment) occur.
3. The area of low-level flight shall be clearly delineated and appropriate entry and exit points shall be determined and verbalised before descent to commence survey/search. Great care must be exercised when mentally transferring

² Referred to in this document as the ‘hazardous environment’.

information about hazards visualised from above (plan), to hazards visualised at elevation.

4. Aircrew shall not deviate from agreed low-flying routes and areas previously checked for wires.

5. Sterile Cockpit Procedures shall be maintained at all times during low-level flight operations in the wire environment. (Refer to SOP 08).

6. Aircrew shall ensure positive identification of the wire or hazard and verbalise its specific location. In no circumstance shall flight continue without positive identification. Nothing must be left on the basis of "I think that's where it goes"; aircrew must have absolute certainty about wire and hazard locations.

7. Consideration shall be given to identification and avoidance of **all** known hazards within the immediate operational area, not just wires; for example – dead trees and branches, old telephone lines, windmills, radio masts, animals, buildings, position of the sun, unexpected weather occurrences (e.g. thermal activity, wind turbulence).

8. Flight within the hazardous environment shall be conducted in a manner that provides adequate and safe vertical and lateral separation between aircraft and known hazards. Helicopter airspeed should not exceed 45 knots when operating within the hazard area.

9. The maximum duration of continuous low-level flight shall not exceed 1 hour. Short rest breaks comprising a minimum of 5 minutes duration (outside the aircraft) for each hour of low-level flight are mandatory for all personnel onboard the aircraft. The maximum permissible duration of cumulative low-level flight in any one day shall not exceed 6 hours for pilots or observers/aircrew.

10. Flight in the hazardous environment shall not occur in areas (or conditions) where locust control activities are not likely. (e.g. areas more densely populated, areas too small for controllable infestations, adverse weather, visibility, temperature, wind, etc.).

11. All aircrew shall maintain a visual scan for power poles and other hazard indicators when flying in the hazard environment, and must verbalise any potential hazard sighted. This will provide a positive reminder of the presence of the wire or other hazard.

[This visual scan is the observers' primary task, and locust survey is the secondary task, when operating in the hazard environment.]

12. Aircrew shall minimise potential exposure to the human factors that cause distraction. Categories of distraction include:

- a) Visual distraction – focusing on scenery instead of the task
- b) Auditory distraction – radio or mobile phone
- c) Biomechanical (physical) distraction – reading a map
- d) Cognitive distraction – being 'lost in thought'

Each type of distraction, both in isolation or together, can distract attention from the task at hand, and must be avoided.

13. Low-level flight shall cease immediately if radio or intercom devices become faulty. Operations at low-level may only commence again when the faults have been rectified and all radio or intercom devices are fully functional.
(Refer SOP 10 – Stop Work Procedure).


14. At all times aircrew shall utilise risk mitigation strategies to establish and maintain adequate situational awareness. These strategies shall include reading the physical structure indicators (i.e. orientation of insulators, presence of bucked arms and sighting two or more poles), self discipline, pre-flight briefing, pre-flight reconnaissance and observation, refreshed memory and awareness, minimise distractions, appropriate flying techniques, maintenance of a good visual scan, and consideration of weather factors.

15. Any aircraft operating in the hazard environment with APLC personnel on board shall be fitted with a wire-strike protection system in accordance with contract specifications.

16. All staff operating in the hazardous environment shall receive task specific training at intervals specified in APLC training documentation. This interval shall not exceed five (5) years.

17. Prior to each landing and lift-off, the Pilot in Command shall brief all aircrew of known hazards within the immediate area. Aircrew will visually identify and acknowledge all known hazards prior to descent for landing or preparation for lift-off.

18. **Never** assume the pilot has recognised or identified all wires, hazards and obstructions within the area of operation. Immediately verbalise all identified hazards and receive positive acknowledgement from the pilot, regardless of how obvious the hazard may appear.

 Australian Government Department of Agriculture, Fisheries and Forestry	AVIATION PROCEDURES MANUAL Standard Operating Procedures			SOP 08	
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SOP 08 Sterile Cockpit Procedure


Definition:	<p>“Sterile cockpit” procedures. During critical phases of flight there should be no communication except that related to the operation of the aircraft.</p> <p>Non –essential (casual) conversations should be avoided during:</p> <p>(a) the <i>starting engines</i> checklist to after completion of the <i>cruise</i> checklist;</p> <p>(b) the <i>descent/approach</i> to commence low level operations; and</p> <p>(c) the <i>shutdown</i> checklist.</p>
Purpose:	<p>The purpose of this SOP is to provide staff with instructions for implementing sterile cockpit procedures during aerial operations. The ‘sterile cockpit rule’ requires all discussion and extraneous activities to be limited only to the conduct of the task at hand during certain critical phases of flight.</p>
Objectives:	<p>The objectives for maintaining a sterile cockpit are:</p> <ul style="list-style-type: none"> • To limit potential for distraction due to non-essential conversation and activities. Crew attention remains focused on the primary objectives of safe flight conduct and identification of hazards. • To enable full concentration on the task at hand, by prohibiting cockpit discussion and activities not related to safe flight operation during critical phases of flight.
Responsibility:	<p>The pilot, as well as all aircrew, are responsible for implementing sterile cockpit procedures.</p> <p>The Campaign OIC is responsible for identification of any problems and shall ensure any issues are addressed prior to continuation of aerial operations.</p>
Procedure:	<ol style="list-style-type: none"> 1. Sterile cockpit procedures shall apply whenever the aircraft is: <ul style="list-style-type: none"> - Conducting low-level aerial operations (below 100 ft AGL) - On approach to and during landing - At take-off and departure - During peak demand periods (as determined by the pilot; e.g. in controlled airspace, in challenging weather conditions) - As directed by the Pilot in Command - During emergency procedures 2. Only communication essential to the task at hand shall be conducted when sterile cockpit procedures are active. All non-essential communication and extraneous activity is prohibited.

3. Essential communication between the pilot and observer shall include the verbalisation and read-back of identified or potential hazards, the verbalisation of intentions, and the questioning of actions that are not consistent with safety or with previously verbalised intentions.

4. The pilot retains absolute authority to implement sterile cockpit procedures at any time throughout the flight if he/she considers it necessary (e.g. operations within controlled airspace).

5. Pilots will be afforded the opportunity to manoeuvre the aircraft safely at all times without undue physical or mental interference / distraction. This is especially important during low-level operations, approach/landing and take-off/departure.

6. Observers shall maintain situational awareness at all times, and uphold their responsibility to inform the pilot of any hazards or issues in relation to immediate safety of the operation.

 Australian Government Department of Agriculture, Fisheries and Forestry	AVIATION PROCEDURES MANUAL Standard Operating Procedures				SOP 09
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SOP 09 Aircraft Cabin Management

Purpose: The purpose of this SOP is to provide staff with instructions for effectively managing their workspace (the aircraft cabin) during aerial operations.


Objectives: The objectives for specifying aircraft cabin management procedures are to:

- Ensure staff have an adequate knowledge of safe and effective workspace organisation during conduct of aerial operations.
- Identify and mitigate any risks that may result from poor workspace arrangements.

Responsibility: The **Campaign OIC** is responsible for ensuring that staff conducting aerial operations have the required knowledge and ability to correctly organise their workspace. **All staff** conducting aerial operations are responsible for ensuring appropriate and effective organisation of their own workspace.

Procedure:

1. The **pilot in command** has strict authority in relation to aircraft cabin management in flight. Always follow instructions from the pilot in relation to items permissible in the aircraft cabin during aerial operations.
2. Only items essential to the task (including safety-of-flight) shall be permissible on board the aircraft.
3. **No loose items** shall be in the cockpit during conduct of aerial operations. Any unrestrained equipment may move around in the cabin and has potential to cause injury, or distract pilots from their duties. Maps should be folded to a manageable size and aircraft transect books/note pads used to record information: not loose paper sheets.
4. **All staff** shall have a full understanding of how the aircraft cabin functions; e.g. doors, seatbelts, intercoms, radios, GPS, ELB, etc.
(Refer SOP04 – Briefing/Debriefing for further information).
5. Flight with doors removed in fixed wing aircraft is not permissible. It is permissible to remove **the front doors only** for helicopter flight operations only. It is not permissible to remove rear doors during helicopter flight operations.
6. Sterile cockpit procedures shall be followed when required.
(Refer SOP 08 – Sterile Cockpit Procedures).
7. **All staff** shall wear required personal protective equipment (PPE) and carry required safety equipment when conducting aerial operations.
8. It is not permissible for staff to conduct flight operations if they are not fit for flight. The **Campaign OIC** has final responsibility for determining whether a person is fit for flight.

 Australian Government Department of Agriculture, Fisheries and Forestry	AVIATION PROCEDURES MANUAL Standard Operating Procedures				SOP 10
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SOP 10 Stop Work Procedure

Purpose: The purpose of this SOP is to provide instructions for resolving an imminent danger situation during aerial operations, regardless of whether that danger is perceived or actual.

Objectives: The objectives for having a stop work procedure are to:

- Ensure immediate and effective defence against any unsafe act or observation during aerial operations.
- Identify and mitigate any imminent danger situation, where imminent danger is defined as any condition or practice that could reasonably be expected to cause death or significant injury, environmental harm or significant equipment damage/loss.
- Immediately remove any unsafe situation from the operating environment, and address/rectify the problem within a known safe work environment.

Responsibility: **Any person** involved in aerial operations may initiate a Stop Work Procedure.

The **Campaign OIC** is responsible for ensuring that all staff are aware of the procedure, and fully briefed in its use.

Further, **Director APLC or delegate** is responsible for determining if and when operations may resume, and for dispute resolution.

Procedure:

1. If a person involved in aerial operations identifies a situation of ‘imminent danger’ that requires immediate attention³ he/she shall warn the person/s who is at risk and ask the person to suspend work and discuss the hazardous situation; i.e. initiate a Stop Work Order.
2. Upon initiation of any Stop Work Order the person initiating the Stop Work Order shall immediately report the occurrence to the **Campaign OIC**, who will then report the occurrence to **Director APLC or delegate** at the earliest practicable opportunity.
3. A log of Stop Work Orders shall be maintained by the **Campaign OIC** within the Campaign Diary. Additional documentation may be required (completion of near miss report, incident report, remedial actions report, etc.) depending on the nature of the Stop Work occurrence and in accordance with APLC procedure.

³ Examples: Previously unseen powerline/other hazard, equipment malfunction, fatigue.

4. The **Campaign OIC** shall investigate the occurrence and recommend corrective action. (This may require additional consultation with **Director APLC or delegate**). The task or activity affected shall not continue or resume until the investigation is complete and ongoing authorisation obtained.


5. Investigation conducted by the **Campaign OIC** shall include:

- a) What was the perceived hazard/imminent danger?
- b) Were established procedures and requirements for the operation being followed?
- c) Are existing procedures adequate?
- d) What must be done to prevent recurrence?
- e) What must be done before the operation can resume?

6. **Director APLC or delegate** shall determine if and when an operation may be resumed after a Stop Work Order has been initiated. This decision shall be based on all of the pertinent information, including any consultative advice or investigation. The resulting decision and any relevant conditions and/or requirements may be notified verbally at the discretion of **Director APLC or delegate**. However, subsequent written confirmation, including any relevant reports and associated documentation shall be recorded and logged as soon as practicable.

7. If anyone in the process believes that the restart authorisation is not justified, or that modifications imposed as a precondition to the operation's re-start are inadequate, any of them may appeal the restart. Such an appeal shall be directed to **Director APLC or delegate** or the DAFF OH&S advisor (as appropriate), who then has responsibility for determining if and when it is appropriate to recommence operations.

8. The stop work procedure shall be conducted in a non-punitive manner. The intent is not to apportion blame or criticism – the intent is to immediately remove any unsafe situation from the operating environment, and address/rectify the issues within a safe environment. A Stop Work Order shall only apply to the immediate activity in which the unsafe act is recognised, unless the unsafe act is a result of a procedural or systematic problem requiring rectification.

 Australian Government Department of Agriculture, Fisheries and Forestry	AVIATION PROCEDURES MANUAL Standard Operating Procedures				SOP 11
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SOP 11 Flight Following and Communication

Purpose: The purpose of this SOP is to provide all staff with instructions for managing flight following and communication requirements during aerial operations.

Objectives: The objectives for flight following and communication are to:

- Ensure knowledge of aircraft location and condition with a reasonable degree of certainty such that, in the event of mishap, those on board may receive assistance as soon as practicable.
- Provide a safety net for pilots and aircrew during operational activities.

Responsibility: The **Campaign OIC** shall have responsibility for clearly identifying flight following requirements and allocating responsibilities. This includes confirmation of procedures; including contact schedules, landing locations, flight following facilities (if involved), individuals responsible for flight following, frequencies to be used and any special circumstances requiring check-ins.

The nominated **Flight Safety Officer** shall be an APLC employee who holds responsibility for keeping track of flight progress through contact at agreed fixed times, and initiating SAR action if contacts are not made, or if some doubt exists as to the safety of the aircraft.

The **Flight Safety Officer** shall be fully trained and competent in the role. This officer shall also be fully aware of emergency response procedures, and be capable of implementing them according to the guidelines specified (refer Part 2 Aviation Procedures Manual- Emergency Procedures).

Procedure: 1. There are two (2) approved standard methods of flight following; each method has specific requirements to allow flexibility in accommodating mission needs. The chosen method of flight following shall be documented on the Flight Safety Record form. The default / preferred flight following procedure shall be Method 1.

Method 1: A Flight Safety Record form held/maintained/monitored by a nominated **Flight Safety Officer**, with radio/telephone check-ins at least once every 60 minutes with that nominated officer. This officer will normally be within reasonable proximity (within UHF radio range) of the working aircraft for the duration of the flight. All flight following must conform to this standard method unless there is a specific reason not to do so, and in that case another method must be arranged. The **Flight Safety Officer** will consider the aircraft to be overdue if it fails to establish reliable contact at the scheduled time and the **Flight Safety Officer** will immediately commence active contact attempts by all available means. If communications or aircraft whereabouts are not established

with 15 minutes of the scheduled time, ERP Uncertainty Phase shall be initiated in accordance with Part 2 Aviation Procedures Manual - Emergency Procedures, Section 2.3

Method 2: A Flight Safety Record form held/maintained/monitored by APLC headquarters, with telephone check-ins with **Director APLC or delegate** or designated **HQ Duty Officer** at least once every 60 minutes. This method of flight following is less preferable because there is usually no ground support available within reasonable proximity of the working aircraft. The relevant HQ contact point will consider the aircraft to be overdue if it fails to establish reliable contact at the scheduled time will immediately commence active contact attempts by all available means. If communications or aircraft whereabouts are not established within 15 minutes of the scheduled time, ERP Uncertainty Phase shall be initiated in accordance with Part 2 Aviation Procedures Manual- Emergency Procedures, Section 2.3.

2. **Non-standard flight following procedures** shall only be adopted in circumstances where the standard methods are not possible or are inappropriate (e.g. in very remote locations, where long-range survey activities are undertaken, when radio communications with local ground support are limited or unreliable thereby making hourly check-in requirements unrealistic). In these situations, non-standard flight following may be approved; this approval shall be from **Director APLC or delegate** following appropriate risk assessment considerations in conjunction with the aircraft operating company.

3. **Non-standard flight following procedures** shall be documented and approved by **Director APLC or delegate** and the aircraft operating company prior to issue as a temporary procedure specific to the designated operation. The Flight Safety Record form shall still be used, and a Flight Safety Officer shall still be nominated. Aircrew will make position reports to the **Flight Safety Officer** as per the time interval agreed in the flight following agreement. Any change in plan must be reported to and agreed with the **Flight Safety Officer BEFORE** any proposed change is implemented / adopted. If the agreed reporting schedule is exceeded, the Flight Safety Officer will consider the aircraft overdue and will act accordingly.

Some examples of non-standard flight following schedules that may be used are:

- a) HF radio or satellite telephone contact with headquarters just prior to departure of flight, and again upon safe return of the flight.
- b) Use of the AirServices Australia Flight Watch system (SARWATCH/SARTIME). This can be used in conjunction with any other method – and is particularly recommended for non-standard procedures.

4. Flight following shall not be a procedural requirement for contracted spray aircraft; although close communication and monitoring of spray aircraft activity shall be conducted by the companion spotter aircraft responsible for directing operations of the spray aircraft.

5. The Flight Safety Record (FSR) form shall be the only approved method of documenting flight following information. This form contains detailed information about the aircraft, crew on board, communication channels, mission details, sortie boundaries (maximum), and emergency procedures. The FSR must be completed fully and accurately to enable maximum effectiveness of the procedure. (Refer to Part 4 for the FSR form).

6. For all operational flights check-in requirements shall occur:

- a) At intervals not to exceed sixty (60) minutes; except if conducting pre-approved non-standard flight following arrangements.
- b) Prior to and immediately after landing. If it is anticipated that terrain or distance will interfere with check-in at the landing site, check in while still at altitude, and provide a SARWATCH time for next call.
- c) Prior to and immediately after takeoff. The takeoff check-in should be made as soon as communications can be established.

7. The check-in made by aircrew shall consist of:

- a) Current location (use GPS latitude/longitude if available; otherwise legal or geographic descriptions are acceptable).
- b) "Operations Normal" confirmation.
- c) Current direction of flight.
- d) Next destination or area to be surveyed.
- e) Estimated time of arrival / estimated time of departure or time for next call.


8. The **Flight Safety Officer** or other flight following facility shall immediately implement emergency response procedures for overdue or missing aircraft failing to meet agreed check-in requirements. Response procedures for overdue aircraft require specific actions – further detail is provided in Part 2 Aviation Procedures Manual – Emergency Response Procedures.

9. Utilisation of the AirServices Australia Flight Watch service shall be the responsibility of the pilot in command.

10. On request, an internal flight watch service shall be provided by APLC headquarters for contract aircraft on ferry or positioning flights that are en route to/from locust management operations. This shall be a direct arrangement between **Director APLC or delegate** and the aircraft contractor (vendor).

11. Completed Flight Safety Record forms shall be provided to the **Campaign OIC** by the **Flight Safety Officer** as soon as practical after completion of the flight. The Flight Safety Record forms shall be forwarded to **APLC HQ** at the end of each campaign, where they will be maintained and stored for a period of no less than 3 years.

12. All radio communication during aerial operations shall be clear, concise and professional at all times. Further detail regarding common radio protocol and phraseology is found in Part 3 Aviation Procedures Manual – Operational Documentation.

 Australian Government Department of Agriculture, Fisheries and Forestry	AVIATION PROCEDURES MANUAL Standard Operating Procedures			SOP 12	
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SOP 12 Aircraft Landing Areas

Purpose: The purpose of this SOP is to provide instructions for the **Campaign OIC** in choosing suitable operational sites that have facilities where aircraft can land at, and take off from, the place in safety, having regard to all the circumstances of the proposed landing and take-off (including the prevailing weather conditions).

Objectives: The objectives for this SOP on Aircraft Landing Areas are to:

- Ensure the **Campaign OIC** has an adequate understanding of the requirements for a suitable and safe Aircraft Landing Area.
- Ensure that operational use of the Aircraft Landing Area (ALA) is conducted within legislative requirements and according to established safe work practices.

Responsibility: The **Campaign OIC** is responsible for all preliminary work in regard to the selection and potential suitability of an Aircraft Landing Area, including negotiations for and receipt of permission to use the site.

The final responsibility for choosing the most suitable landing area rests with the **pilot in command**. The pilot may request certain advice from the **Campaign OIC**, but must make a final determination that overall safety of the site is acceptable.

Procedure:

1. Wherever possible, if appropriate permission can be obtained from the relevant authority, APLC aerial operations shall be conducted from licensed aerodromes, as published in the En Route Supplement Australia (ERSA).
2. If a licensed aerodrome is not available or suitable, then operations shall be conducted from unimproved landing sites (non-licensed aerodromes), providing the following conditions are met:
 - a) If operations can be safely conducted from the site.
 - b) Permission has been granted to use the site.
 - c) Consideration has been given to the specified minimum ALA requirements.
3. When operating from unimproved ALA's, a nominated person who has received appropriate safety briefing and instruction from the pilot shall take control of all movements within the immediate vicinity of the aircraft until such time as the aircraft shuts down or departs.
4. Public control measures shall always be provided when operating to/from unimproved ALA's. Public control must be conducted by personnel who have

received appropriate briefing and instruction from the pilot and may be conducted by a nominated aircraft occupant where necessary. Public control measures shall be in accordance with guidelines specified in Part 3 – Operational Documentation 08.

5. When choosing an aircraft landing area (ALA), the essential requirement shall be that the place where aerial operations are being conducted is safe for the aircraft type being operated. To achieve this, it is important to consider all of the following factors in a holistic way. These guidelines are for APLC consideration when selecting aircraft landing areas. However, the pilot in command shall always retain final responsibility for acceptance of a landing area, having given due regard to physical characteristics, environmental conditions and aircraft performance considerations.

a) Wherever possible, an ALA with a runway direction aligned as closely as possible with the prevailing wind in the area shall be chosen.

b) The desired airstrip width is 40 metres, with a minimum of 30 metres if terrain or other obstacles make 40 metres unobtainable. The whole of the defined area of the strip should be suitably prepared for the needs of the aircraft that are expected to use it.

c) The minimum width of the runway itself should be 15 metres.

d) The runway shall be of such a length that a fully loaded (agricultural) aircraft of the type that will use the runway must be in controlled flight by the end of the runway when carrying its full legal load in nil wind and prevailing atmospheric conditions. Aircraft performance information and minimum landing site requirements for specific aircraft being utilised shall be provided by the contracted aircraft operator within RFT documentation.

e) The maximum slope along the length of the strip should not exceed 1 in 5 (20%). This means that for every 5 metres one moves horizontally, the land must not rise/fall more than 1 metre.

f) The runway should have a smooth, consolidated surface free of bumps and hollows, and preferably be a dense, hard-wearing surface or other all-weather surface such as gravel or tar seal. The runway surface shall be of sufficient strength for the take-off and landing of the aircraft types the runway is intended to serve. The runway surface shall be capable of taking a motor vehicle comfortably at 80 kilometres per hour.

g) The runway itself should have an evenly graded surface not higher than 200 mm above the level of the strip to allow water runoff and prevent washout from heavy rain.

h) A loading area of sufficient size to allow for the manoeuvring and loading of the aircraft shall be provided. The surface strength must be such as to withstand the wheel loads of both the aircraft and the loader (truck) turning and manoeuvring, fully laden, without causing significant wheel ruts.

i) A wind direction indicator (or windsock) shall be provided to aid the pilot in judging both the wind direction and velocity. Wind indicators need not be highly

technical; a simple length of red or orange ribbon attached to a pole can be quite sufficient.

j) The airstrip, storage and loading area shall preferably be completely fenced so that stock can be reliably excluded.


k) There should be no obstruction within 200 metres measured from each end of the runway, or from the landing threshold on a one-way runway.

l) The suitability of an airstrip shall be agreed between the aerial operator [**pilot**], the APLC and the airstrip owner/manager/landholder. The airstrip and facilities should be kept and maintained in a condition that is fit for purpose.

6. Personnel shall be aware of the potential for Foreign Object Damage (FOD), and seek to ensure that aircraft landing areas are free from any debris and loose items that may cause damage.

7. Dust abatement measures shall be considered at all aircraft landing areas. *Note:* These measures may be as simple as choosing the site that has the least potential to become dusty.

8. APLC helicopter operations should be conducted from sites that conform to CASA recognised specifications for Helicopter Landing Sites (HLS), as published by CASA in the Civil Aviation Advisory Publication (CAAP) 92-2(1). The pilot in command shall advise necessary requirements and characteristics for landing sites, having given due regard to aircraft specific dimensions, performance characteristics and environmental conditions. Final discretion for use of a HLS shall rest with the pilot in command.

 Australian Government Department of Agriculture, Fisheries and Forestry	AVIATION PROCEDURES MANUAL Standard Operating Procedures				SOP 13
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SOP 13 Aircraft Refuelling

Purpose: The purpose of this SOP is to provide staff with instructions for aircraft refuelling, and management of associated refuelling tasks.

Objectives: The objectives of this SOP for aircraft refuelling are to:

- Ensure that all staff fully understand the safety of an aircraft and its passengers is affected by their ability to deliver the correct grade of uncontaminated fuel into its tanks.
- Ensure all critical components of the refuelling operation have been addressed prior to commencing the operation.
- Ensure all personnel and associated equipment are adequately prepared prior to refuelling operations.

Responsibility: The **Campaign OIC** is responsible for ensuring safe storage, handling, disposal and overall conduct of refuelling, reloading and other dangerous goods activities during APLC aerial operations. Whenever practical, aircraft refuelling shall be the responsibility of the contracted vendor. The APLC will maintain and provide suitable pumping and safety equipment on-site during APLC operations (for use in circumstances where a vendor cannot practically provide their own refuelling requirements; e.g. use of drum stock in remote area operations).

The final responsibility for fuel quality and transfer of fuel into the aircraft rests with the **pilot in command**. The pilot may delegate some of the work in controlling the fuel but must determine that overall quality of the product is acceptable. The pilot retains authority to reject any APLC fuel stock considered unacceptable.

Procedure:

1. All refuelling operations shall be conducted in accordance with requirements specified by The Civil Aviation Safety Authority (CASA) in its Civil Aviation Orders (CAO) 20.9 and 20.10.
2. The **pilot in command** shall supervise fuelling of the aircraft. APLC personnel may assist the pilot, but shall do so only under the pilots' direct supervision.
3. **APLC personnel** involved in refuelling may immediately shut down the operation if there are any concerns about procedures or safety. It is essential not to become distracted during refuelling operations.
4. Prior to commencing refuelling, staff shall **ALWAYS** check the correct fuel type is being used for that particular aircraft. This is **absolutely critical** when using refilled¹ drum stock. **The greatest single danger to aircraft safety is from placing incorrect or contaminated fuel into an aircraft.** (Note: All aircraft are required to have their fuel type labelled beside the fuel cap).
5. **ALWAYS** check the filling/batching date does not exceed the relevant expiry date. Only drummed JetA1 and Avgas fuel within 12 months of the specified filling/batching date shall be used.

6. To minimise the hazard of static electricity, staff shall ensure the aircraft and refuelling equipment is bonded and grounded before any fuel transfer occurs, and this grounding must not be broken until the transfer is complete.

7. Aviation fuel shall **NEVER** be transferred or stored in drums of another type.

8. Fuel drums shall be handled and stored in accordance with the technical advice specified in Part 2 – Operational Documentation.

9. All **APLC staff** shall be familiar with the contents of the aircraft fuel Material Safety Data Sheets (MSDS) provided in the Appendix (and in the control kits and copies held at base offices).

10. Fixed wing aircraft shall not be refuelled and reloaded (with pesticide) simultaneously.

11. Aircraft must be fully 'shut-down' and unoccupied during refuelling or reloading operations.

12. **APLC staff** involved in refuelling aircraft;

Must wear:

a) Full length protective cotton overalls with button down sleeves.

Should wear:

b) Chemical resistant safety boots.

c) Rubber "chemical resistant type" gloves.

d) Natural fibre underclothes and socks.

13. Smoking is not permitted within 30m of an aircraft refuelling and/or the refuelling vehicle/equipment and/or fuel stock.

14. As per CAO 20.9, a minimum of two fire extinguishers (minimum size 4.5kg) must be available within 15 metres and not less than 6 metres of the aircraft and refuelling vehicle. An 80B Dry Powder plus a 20B Foam type fire extinguisher is recommended for APLC aircraft refuelling operations.

Note: CAO 20.9 specifies that fire extinguishers must be removed from the refuelling vehicle prior to refuelling commencing. Fire extinguishers do not have to be "manned" during a refuelling operation - only positioned.

15. **APLC staff** involved in aircraft refuelling shall have current first aid certificates, and shall be aware of specific first aid procedures for possible incidents with aircraft fuel. (Additional information may be obtained from the MSDS).

16. Persons not directly involved in refuelling are not permitted within 15m of any refuelling operation.

17. A refuelling operation shall be suspended when any fuel of any quantity likely to cause a hazard, is spilled within 15m of the aircraft or refuelling unit.

18. Any APLC vehicle transporting drummed aviation fuel or towing a trailer carrying drummed aviation fuel shall display the appropriate and approved dangerous goods signage when a placard load is being transported.

19. No radio or mobile telephone shall be operated within 15 metres of an aircraft refuelling operation.

20. All aircraft refuelling shall be conducted with the engine and aircraft electrical systems off.

21. Hot refuelling of helicopters may occur, but only in an emergency situation. This shall only occur under direct control from the pilot in command. The aircraft operator must have an operations manual supplement specific to this operation, and for each type of helicopter they operate. Hot refuelling shall only be conducted within parameters specified by Section 20.10 of the Civil Aviation Orders.

22. Testing of fuel for contamination is a responsibility of the pilot.

23. If it is necessary (eg. due to very low stock of available drummed fuel) to refill drum stock with aviation fuel, then this shall only be conducted with the express approval of the pilot AND the licenced aviation refueler. **APLC personnel** shall not be involved in any operation refilling drums with aviation fuel.

24. The **Campaign OIC** shall monitor fuel stock, record details in the campaign diary, and report quantities to **Director APLC or delegate** on a daily basis.

25. **APLC personnel** may assist with the operation of a bowser fuelling facility, but only after having received a safety and operational briefing from the facility owner/operator. All refuelling operations involving a bowser facility shall be conducted under the direction of the facility owner/operator.

26. **APLC personnel** may assist with approved fuel tanker operations, but only after having received a safety and operational briefing from the tanker operator/driver. APLC personnel shall not be involved in the operation of tanker pumping equipment. APLC personnel shall not be involved in the refilling of any fuel tanker. All refuelling operations from a fuel tanker shall be conducted under the direction of the tanker operator/driver.

27. Aviation fuel *may* be made available (on a cost recovery basis) to aircraft from external agencies (e.g. media) during a locust control campaign, but only if the quantities requested do not compromise fuel stocks required for the campaign. Fuel quantity, date of use, aircraft registration and operator address details are to be recorded and this information forwarded to the APLC headquarters for cost recovery. Fuel stocks must be replenished at the earliest possible time after use.

28. **NEVER ASSUME – ALWAYS CONFIRM!**