

**Standard Operating Procedures (SOP)
for Aviation Crews
in Aerial Desert Locust Operations
in Ethiopia**



**Food and Agriculture Organization
of the United Nations**

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Desert Locust Aviation Crew SOP

Ethiopia

Standard Operating Procedures (SOP) for Aviation Crews in Aerial Desert Locust Operations

Objective

The objective of this Standard Operating Procedures (SOP) for Aviation Crews in Aerial Desert Locust Operations is to provide contracted aviation operators and aircrews with the best practical guidance for conducting survey and control operations under the United Nations (UN) Food and Agricultural Organizations (FAO) and the Ministry of Agriculture (MoA) and its Desert Locust Control Unit.

Regular survey and targeted control operations based on best evidence from the field are critical in the effort to limit the number of dangerous Desert Locust infestations that may pose a risk to people's livelihoods. FAO along with the national partner organisation, the Ministry of Agriculture, have gained significant experience on how to conduct both survey and control flights, manage the logistics of these operations and to ensure ground and air teams are adequately guided. FAO has utilized this experience in the development of these recommendations and SOPs.

1. Definitions

Desert Locust operations require different aspects and considerations in support of more accurate and sensible decision making at the National Desert Locust Control Unit that operates under the MoA.

This SOP provides guidance to aviation crews on aspects such as handover/takeover procedures, communication, rules of control, survey, logistical procedures, notice to move or standby and other information. It is intended to cover flights in both fixed-wing and rotary aircraft.

This SOP belongs to the aircrews and will be regularly updated with any relevant information as required.

DEFINITIONS

- **Control Flight** – A qualified pilot carrying out aerial Desert Locust (DL) pesticide spraying activity in a recommended and coordinated manner as directed by the joint FAO/MoA Operations Office.
- **Survey Flight** – A qualified pilot carrying out aerial DL survey operations in coordination with an experienced DL Survey Officer as directed by the joint FAO/MoA Operations Office.
- **Ferry Flight** – A qualified pilot carrying personnel from one point to another as directed by the joint FAO/MoA Aviation Coordinator.

2. Brevity words

PLAY TIME	The maximum flight time available according to the fuel capacity and load of the aircraft
RTB	Returning to Base
BINGO	Out of fuel or chemical and RTB
FENCE IN	To be used when coordinating with other aircraft and entering a control area
FENCE OUT	To be used when coordinating with other aircraft and exiting the control area
NO JOY	No locust seen at the target location
TALLY	Locust seen at target location, or as described by another pilot in flight
COMPLETE	I have now completed my operation and ready to SWITCH or RTB
CANCEL	The current target is cancelled, awaiting or await further instructions
VISUAL	Sighting of another DL operations aircraft; I am now in charge of coordinating collision avoidance
BLIND	I have no visual of the other DL operations aircraft
POSIT	To be used to give your location or to ask for another aviation assets location, e.g. LAA POSIT ROBE 350/25nm
SWITCH	To be used when the original target is either COMPLETE or NO JOY and you are now moving to a secondary target
STATUS	Send the status of your aircraft in terms of PLAYTIME and chemical
NTM	Notice to move (30NTM = 30 minutes, 1NTM = 1hr and 2NTM = 2hrs)

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3. Handover / takeover procedures

NEW ARRIVAL

Any new pilot or crew arriving in country or base should make contact with the below operational entities, providing their name, phone number and email address and length of stay. The new arrival should also update the information on the DL Aviation Asset Contact List.

1. The FAO Aviation Coordinator
2. The joint FAO/MoA Operations Office
3. Local DL Base Manager
4. Local Airport Manager
5. Local Security Manager

HANDOVER NOTES

A brief Handover Note should be prepared for the FAO Aviation Coordinator and the incoming pilot or crew on:

- Aircraft parking area
- Maintenance, equipment and storage area
- Water and electricity facilities at the airport
- Security and clearance requirements
- Fuel logistics process
- Any issues with the aviation asset
- Chemical pesticide handling, storage, safety procedures
- Aviation authority contact list
- DL operations contact list
- Coordination such as daily briefings at the Ops Base with MoA Base Manager and local FAO Asset Coordinator
- Other observations and information as required

The local FAO Asset Coordinator should make sure that the handing over procedures are followed correctly.

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4. Coordination & communication

It is crucial that the local FAO Asset Coordinator and the MoA Base Manager organise with the aviation crew at the referring bases daily briefing meetings in the evening to discuss the day's observations, make proposals for operations on the following day, and advise the Joint FAO/MoA Operations Office for decision-making.

FLIGHT REPORTS

Control and survey flight reports should be communicated before 2000 hours each day as per the format in Annex A or as stipulated in each vendor's contract. All flight reports should be countersigned by either the local FAO Asset Coordinator or the local Base Manager. Once the report is countersigned, the correctness of flights is approved and validated. The FAO Asset Coordinator has the overall responsibility of ensuring that the report has been completed correctly and the operations justified according to the contract.

COMMUNICATION USING WHATSAPP APPLICATION

All communications from the joint FAO/MoA Operations Office provided on WhatsApp should be at the pilot's discretion and in accordance with international safety guidelines. All pilots should be aware of the following:

An approval of each flight is required by the joint FAO/MoA Operations Office before each flight. The approval can be communicated either by voice or WhatsApp.

4. Coordination & communication (cont.)

TASKING

Tasking will be communicated each day by the Desert Locust Operations Centre in the following format:

Base Name – Base Aviation Code

Tail No:

ETD:

Grid:

Location:

Elevation:

Prevailing wind direction:

Type of Operation:

Target Area (Coordinates):

Survey Officer:

Other:

ACKNOWLEDGMENT

Each pilot should affirm their tasking's on the WhatsApp ET DL Aviation Coordination Group, if no acknowledgment is received, the FAO/MoA Operations Officer in charge will call the pilot an hour before their flight to ensure that the operational tasking has been received and is understood.

4. Coordination & communication

REPORTING DESERT LOCUST INFESTATIONS (SWARMS OR HOPPER BAND) FOR CONTROL

When reporting Desert Locust infestations (hopper band or swarm) that have been seen during a survey flight, the following reporting format should be used:

Date and time:

GPS coordinates of target:

Location (if known):

Type of Locust:

Size of infestation (swarm or hopper band):

Behaviour:

Comments:

Type of Locust

- Immature (pink) swarm
- Mature (yellow) swarm
- hopper bands

Behaviour

- Settled (on ground)
- Roosting (on treetops)
- Flying

4. Coordination & communication (cont.)

LEAVING AND RETURNING TO BASE

Each pilot should communicate on the *ET DL Aviation Coordination* WhatsApp Group when they are leaving and returning to base in the following format:

1. *Airborne, Playtime X Hrs/minutes*
2. *Safe at 'Airport Code'*

Example:

1. LAA Airborne, Playtime 2Hrs
2. LAA Safe at HAGB

RADIO COMMUNICATION

The Area of Responsibility (AOR) frequency should be used to de-conflict when working in tandem with other aircraft on control operations or whilst transiting to the target area. For more information on the communication plan and airport frequency guidance, see Annex B.

USING eLOCUST3g AND eLOCUST3m

The procedure in Annex C should be followed when reporting an infestation on eLocust3g. It is not mandatory for pilots to send reports on eLocust3g or eLocust3m. However, pilots should ensure that the seconded Survey Officers are reporting regularly during survey flights. It is important that a message of locust presence or absence is sent every 10 to 20 km during a survey flight.

5. Loading & unload aircraft

The pilot has the final say on the quantity of fuel and pesticide loaded into the aircraft. The pilots take overall responsibility for the vessels. Their authority on the loading of the aircraft should not be challenged by any associated agencies.

1. Loading of fuel is based on the Airport Authorities Rules at your local base.
2. Loading of pesticides is to be conducted by the local MoA representative using a motorised closed circuit or electric loading pump.
3. Unloading of chemical is to be conducted by the local MoA representative using a motorised closed circuit or electric pump.
4. While adhering to aircraft chemical loading procedures, water and soap must be available at the point of loading to clean off any accidental skin contamination of pesticide operators.
5. The local MoA representative should also ensure that chemical loaders are wearing adequate Personal Protective Equipment (PPE) such as closed shoes, masks, gloves or face shield, hat and protective apron.

6. Guidance for survey flights

The following are the basic principles for conducting aerial survey operations by a rotary aircraft:

- **Detecting roosting swarms:** survey flights should be conducted early in the morning (start shortly after sunrise) or in the evenings shortly before sunset.
- **Detecting flying swarms:** survey flights should be conducted from mid to late morning (once adults have warmed up and taken off) until shortly before sunset (when they land). Fly either about 50 m above the ground so that the maximum number of locusts are above the horizon or fly higher and look downwards into the sun. A swarm will look similar to smoke.
- **Detecting hopper bands:** survey flights should be conducted early in the morning (starting about one hour after sunrise) from the East to the West with the sunlight in the back to detect basking hopper bands on open ground (up to about 2 hours after sunrise) and marching bands (up to about midday), and again in late afternoon. Look ahead and to the side of the aircraft. It will be difficult to see hopper bands in dense vegetation; otherwise, bands should be visible up to about 500 m or more from the aircraft when there is little vegetation or in areas of scattered trees and shrubs.
- **Green vegetation:** surveys should be undertaken at the beginning of the rainy season to identify those areas where annual grasses and low-lying bushes are first becoming green.

6. Guidance for survey flights (cont.)

- When green vegetation or suitable breeding grounds are detected, fly towards it and level off 5 to 10 m above the ground, reduce speed to 40-50 km/h, and swing the tail from side to side, looking to the rear to see if any locusts were flushed out.
- Make sure that a qualified locust survey officer equipped with an eLocust reporting device is on board during the aerial survey.
- Fly not higher than 300 m above the ground when searching for locusts or green vegetation.
- Track Spacing = 50 m (for swarms and vegetation) or 10 m (for hopper bands).
- Land regularly and ask the local population for desert locust infestations observed.
- When you spot an infestation, use measure map (or any other application able to send KML and KMZ file) to measure the outer perimeter of the swarm and send to the ET DL Aviation Coordination Group.
- Ensure that all information is recorded on the Daily Flight Report as per Annex A.
- Unauthorized passengers are under no circumstances permitted on board of a survey helicopter.

7. Guidance for control flights

The following are the basic principles for conducting aerial control operations:

- **Minimum area** which can be accurately and efficiently sprayed by a fixed wing spray aircraft is 50 to 100 ha.
- **Spraying settled swarms** must be done early in the morning before they warm up and take off or late in the afternoon after they have landed.
- **Swarms settled on crops** may be sprayed at any time during the day when the weather is cool and there is no convection.

Standard control parameters

Volume median diameter (VMD): 75-100 μm

Blade angle: set to give the correct VMD

Emission height: 5-10 m, depending on wind

Aircraft speed: according to aircraft flight manual

Application rate: one litre per hectare

Swath width: 100 m

7. Guidance for control flights (cont.)

LIMITS FOR A QUALITY CONTROL OPERATION

- Do not spray during the hottest part of the day, usually 1100–1600 hours
- Do not spray at low wind speed less than 2 m/s
- Do not spray at high wind speed more than 10 m/s
- Do not spray when locusts are in flight
- Do not spray when it is raining

AVOIDING COLLATERAL DAMAGE

- Do not spray over inhabited areas
- Do not spray over water bodies, wells, rivers, lakes, streams, etc.
- Do not spray near ruminates
- Do not spray over parks
- Alert the local population before spraying

8. Notice-To-Move times

The Notice-to-Move times below are guidance notes on how ready each pilot and crew should be for flight for the purposes of survey or control operations. These times will be used when putting an aircraft on standby for imminent future operations.

- 30NTM** Crew are at the airport with dust covers removed, engineer on standby to fill the required fuel and MoA representative on standby to fill the aircraft with chemical pesticide.
- 1NTM** Crew and MoA staff at the airport awaiting further instruction.
- 2NTM** Crew and MoA staff are situated at their relevant hotels awaiting further instruction, drivers within 10 minutes of the crew's location.

Requesting a day off

Any maintenance days or crew rest days should be requested at least two days in advance to the joint FAO/MoA Operations Office. This is to provide ample time for the Asset Coordinator to ensure that there will be no gaps in operational capacity whilst the asset in question is grounded.

Annex A. Flight report example

Contract No. **XYZ777356**
Form Nb: TA067

DAILY FLIGHT REPORT FORM

Base Location: Arba Minch Coordinates: N04 29 39 E38 17 19 Remarks:

Aerial Base		Helicopter Registration		Pilot		Aviation Engineer		Base Manager		Date		
Tropic Mobile		SV-BWV		V.Ferry		C.Kaduna		Muluyem		6/2/21		
Flight/Hopper	Start	End	Conveying	Survey	Control		Total Flying Hours	Star-pass (m)	Swath (m)	Treated area (ha)	Height (m)	
	Time	T°C	Time	T°C	Wind (m/s)	Duration						Duration
1	08:15	20	09:37	25	09/10			1.22		80	100	10
2	15:55	32	17:46	36	12/10	1.85	1	0.4				
3	18:12	35	18:57	28	21/10/05	0.75		0.45				
4			0									
5			0									
Day totals		0	2.6	1	0.4	0		3h 58m	-	-	100	-
Total cumulative hours flown		Pesticide (type and quantity in litres)		Number of drums								
299.81		Commercial name	Q. received	Q. used	Q. remains	Received	Full	Empty				
		Malathion	100	100	0	1	0.5	0.5				
Desert Locust Observations												
Flight/Hopper	Control/Survey location		Area Sprayed (hectares)	Stage of locust spread (M/N/U/M/S)	Any other observations							
	Latitude - DD MM	Longitude - DD MM SS										
1	N04 55 04.27	E38 50 47.83	100	Immature pink, flying	Treated 100 ha. No locusts at coordinates which were very close to area treated yesterday however 100 ha located after survey of wider area.							
2				Immature pink, flying	Survey due east of camp then along Kenyan border. 1000 ha swarm located N04 14 01.98 E37 26 45.05. Landed to wait for swarm to settle.							
3				Immature pink, flying	Located the location of settled swarm, N04 17 41.24 E37 29 08.25 for early morning treatment.							
4												

Pilot's Signature:  Base Managers Signature: 

Annex B. Ethiopian DL airfields

ICAO	Name	APP	TWR	GND	ATIS	Elevation	QFU	Runway	Latitude	Longitude	Update
HAAB	Bole Int.	119.7	118.1	121.9	128.5	7625'	07/25 R/L	3700x45m	8°58'36.64"N	38°47'55.94"E	20/03/21
HAGB	Goba Robe		118.4			8093'	15/33	2500x45m	7°07'05.85"N	40°02'45.01"E	20/03/21
HAIJ	Jijiga		118.5			5935'	03/21	2500x45m	9°19'55.36"N	42°54'42.33"E	20/03/21
HADR	Dire Dawa	102.3/118.3	118.3	121.9		3792'	15/33	2700x46m	9°37'26.42"N	41°51'16.89"E	20/03/21
HAAM	Arba Minch		118.6			3895'	03/21	2800x45m	6°02'22.08"N	37°35'26.78"E	20/03/21
HAGO	Gode		118.6			834'	04/22	2400x35m	5°56'04.33"N	43°34'41.14"E	20/03/21
HADC	Combolcha		118.9			6134'	17/35	2000x35m	11°47'20.92"N	39°43'33.43"E	20/03/21
HAKD	Kabri Dar		125.9			1770'	08/26	2500x45m	6°43'58.07"N	44°14'31.30"E	20/03/21
HASH	Semera		125.9	121.9		1365'	13/31	2500x45m	11°47'20.92"N	40°59'23.88"E	20/03/21
HALA	Hawassa		118.7			5702'	01/19	2500x45m	7°05'59.59"N	38°23'46.78"E	20/03/21
HAMK	Mekele		118.8			7401'	11/29	3000x45m	13°28'01.85"N	39°32'02.42"E	20/03/21

uncontrolled airfield frequency

For any changes, contract FAO at locustet@51degreesitd.com

AOR Frequency: 133.55

Annex C. eLocust3g procedure

