VILLAGEREACH®
Starting at the Last Mile

Standard Operating Procedures (SOP)
VR-M SOP UAV.001 Emergency Protocol in Event of UAV Accident/Incident

Purpose:	To clearly define the protocols and procedures for UAV incident/Accident policies and procedures.	
Responsible Persons:	**VillageReach Country Office:** Country Director, Program Coordinator-Supply Chain, Procurement & Operations Coordinator, Senior Program Manager-Supply Chain	**NextWing:** Chief Operating Officer **MOH:** Director of Reproductive Health **MOH:** Public Relations Officer **MBTS:** Head of Lilongwe Office **PMPB: Chief Drug Analyst**
Target Audience:	All Staff working on the March 2019 UAV Study for Grand Challenges Canada	
Materials:	Appendix I. Emergency Checklist	

I. Background

These Standard Operating Procedures are proactive measures to ensure accident prevention and to ensure timely emergency response in case of accident in order to safeguard lives on the ground, property and mitigate impact of accidents caused directly or indirectly by a Remote Piloted Aircraft (RPA)/Unmanned Aerial Vehicle (UAV). The SOP is focused on incident/accident intervention and support. The SOP covers guiding principles, coordination mechanisms, roles and responsibilities of various players.

Note: These SOPs do not cover inflight emergency RPA protocols (for operators) or preflight safety measures as per ICAO and local Guidelines for UAVs.

II. Definitions
a. **RPA:** Remotely Piloted Aircraft
b. **UAV:** Unmanned Aerial Vehicle
c. **UAS:** Unmanned Aerial System
d. **CAA:** Civil Aviation Authority
e. **PMPB:** Pharmacy Medicines and Poisons Board
f. **MBTS:** Malawi Blood Transfusion Services
g. **Accident:** An occurrence associated with the operation of an unmanned aircraft which takes place between the time the aircraft is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down, in which:
   i. the aircraft lands unexpectedly or uncontrolled landing/crashes
   ii. the aircraft sustains damage or structural failure
   iii. the aircraft is missing
   iv. a person is fatally or seriously injured in the event of either an expected or an unexpected landing

h. **Incident:** An occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.
i. **Operator:** A person that engages in aircraft operation
j. **Coordinator:** The person responsible for ensuring all procedures in the SOP take place and that the respective parties are involved and well informed. The Coordinator needs to speak the local language.

Procedure Implementation Steps (PIS)

Impact Mitigation
PIS 1. The operator will take all preventive measure to avoid crashing in the first place. These measures include:
   a. Adhering to Aviation regulations (including relevant authorisations of the UAV and Pilot, inbuilt failsafe mechanism)
   b. Conducting all safety checks prior to flights.
   c. The operator shall not fly the UAV/RPA outside of the Kasungu Drone corridor if there is indication that there are issues with the operation of the aircraft.
   d.

PIS 2. The study team will conduct pre-sensitization meetings with communities and their leaders where the UAVs will operate as well as discussing with those around the flights during the actual flights to ensure that they avoid areas in the flight path and landing sites.
   a. Prior to the study, the coordinator shall make sure stakeholders, including communities, schools, and nearby medical facilities are aware of the flight operations, risks factors, safety enhancing behaviour as well as emergency response mechanisms including who to reach out to and what to do.
   b. The sensitizations will also include describing the flight path and how to identify something that is out of the ordinary.
   c. The sensitizations will also include reminders to children and others to avoid shooting at the UAVs with sling shots or throwing things at the UAVs.

PIS 3. Flight operations should meet/exceed existing aircraft safety requirements under the close supervision of the Department of Civil Aviation;
PIS 4. Using flight paths that avoid populated spaces where possible;
PIS 5. Designing special/safe stowage for hazardous payload to minimize contamination
PIS 6. Conducting real time electronic in-flight drone tracking and visual line of site (VLOS) at designated waypoints.

The Emergency Team

PIS 7.   The flight operation team shall hire and coordinate an emergency team with clear roles that are set to be mobilized at any time.

PIS 8.   The emergency team shall have resources designated for emergency interventions including back up fuel and the personnel needed.

PIS 9.   The emergency team shall be multi professional and should include Police, Fire Department, and medical team (trained Casualty/Trauma) Team, Study Team and the operator of the UAV/RPA.

PIS 10.   The emergency team shall wear identifiable materials such as name tags, t-shirts, and/or reflectors, if needed.

PIS 11.   The emergency team shall designate a coordinator/liaison officer/desk officer to coordinate emergency preparations and operations should an accident occur.

PIS 12.   The emergency team shall be oriented in both emergency and mitigation protocols prior to flights.

PIS 13.   The emergency team shall discuss the emergency SOP.

PIS 14.   Daily during flights, the emergency team shall meet to discuss where each person will be located and the communication that will take place.

Ground Population/Communities not part of operations

PIS 15.   The operations teams should show the UAV/RPA to communities to raise awareness, demystify it and understand community concerns at least one week in advance of the flights.

PIS 16.   The operation team should communicate flight dates, time, payload type and flight objective to local population.

PIS 17.   The emergency team shall conduct a flight risk assessment of operation areas to determine population risks factors such as markets, schools, busy roads, aerodromes, weather, social events, cultural sensitivities, water sources and take measures to reach out to relevant local leadership in areas that could be affected by UAV/RPA activities when possible.

PIS 18.   The emergency team shall share emergency contact details to key stakeholders within locations where the flights are planned to take place, including the health center/hospital in-charges, Police, School Principals on the path (if relevant), and key community leaders.

Takeoff and Landing Zones

PIS 1.   The emergency team shall cordon off the landing or departure sites with highly visible materials prior to flight commencement.

PIS 2.   The emergency team shall put warning signs, communication posters and banners near and around the landing sites to protect populations.

PIS 3.   If there are roads or busy areas nearby, the emergency team shall, in addition to efforts to fly away from such areas, provide information and designate a police officer to support crowd management.

The Operator

PIS 1. The operator shall confirm that aircraft insurance coverage is valid in the operation areas and includes coverage for people and property who could be affected but are not part of the operation.

PIS 2. Operator shall adhere to all Civil Aviation Authority stipulations.

PIS 3. Operator shall always be in touch with the air traffic control tower before using airspace.

PIS 4. The operator shall label the payload using standard conventions. If blood or other hazardous materials are being carried, the payload should be labeled accordingly.

PIS 5. The operator should alert Civil Aviation and the Emergency Team at the first sign of any issue with the UAV/RPA.

PIS 6. The operator shall immediately stop flights during official flights if there is any indication that there are issues with the operation of the aircraft and conduct a thorough assessment with DCA before being able to resume flights.

Other

PIS 1. The emergency team will have preflight briefings at least one hour in advance of every days' flights that would include possible emergency scenarios/risks, how and who will lead the responses.

PIS 2. The Emergency team shall ensure availability of emergency resources including dedicated ambulance in good working order, with sufficient fuel (including in the boot/trunk of the vehicle in case the emergency does not allow for time to stop at a fueling station), medical and police personnel, and emergency medical supplies.

PIS 3. DCA shall verify aircraft flight safety authorisations that include operator and aircraft certifications, routes, payload type and destinations. The Emergency team shall check with DCA prior to flights.

PIS 4. The emergency team shall ensure that flights are conducted during day time i.e. in normal day time light.

PIS 5. The coordinator shall develop a WhatApp group or other form of quick communication with all team members, including, DCA, study team members (MOH, PMPB, VillageReach, MBTS, etc.), the emergency team, and the UAV/RPA operators.

Preflight protocol

PIS 19. The emergency team shall have daily preflight emergency preparedness. The coordinator will liaise with the operator to commence flights only when satisfied with the emergency teams' readiness for the day.

PIS 20. The coordinator will conduct team roll call and daily briefings.

PIS 21. The coordinator will ensure availability and functionality of emergency resources each morning.

PIS 22. The coordinator will ensure all team members listed under PIS 9 are set 20 minutes before flights commence.

PIS 23.   The coordinator shall hold off flight operations until the emergency team and resources are complete and ready.

PIS 24.   The emergency team shall confirm communication and connectivity at operation sites and in between.

PIS 25.   In case of poor network coverage, the team shall put in place alternative monitoring and communication mechanism for emergencies including radios or satellite phones if possible, or if teams have not heard from one another or have not seen the aircraft in a set period of time, they will send someone to follow the last known flight path.

UAV Emergency Accident Protocol (aircraft damage, injury to persons, property damage aircraft lost):

PIS 26.   Priority shall be on people: saving lives through provision of first aid and transporting the injured for further attention.

PIS 27.   The UAV operator shall monitor flight location at all times.

PIS 28.   The UAV operator with support of ground team shall identify accident area and initiate rescue operation in close collaboration with the coordinator.

PIS 29.   Immediately upon identifying the location of the accident, the emergency team should rope off the area surrounding the accident and remove any people unrelated to the flights or the injured.

    a.   The team shall secure property in case of a fire or damage until relevant authorities or mechanisms are in place.

    b.   The team shall secure the crash site - the UAV (operator), the medical products on board, or whatever may remain after the accident and ensure the public is kept clear of the site.

PIS 30.   While part of the team is sectioning off the sight, the emergency medical team shall move in to identify victims, if any, assess nature of injury and provide first aid on site and all necessary medical support arising from the impact of the UAV or its cargo including psychosocial support where required.

PIS 31.   In case of many people injured, the medical team shall priorities do the following:

    a.   identify those in need for priority evacuation to main hospital

    b.   the medical team to divide personnel and supplies; some to treat patients on site, others escort the injured to main hospital.

PIS 32.   Payload shall be handled by relevant experts i.e. blood by medical or laboratory personnel.

PIS 33.   The emergency team shall assess the impact and damage to the environment and surrounding property;

PIS 34.   The coordinator shall keep communication channels with the affected stakeholders open. Stakeholders include, but are not limited to, the Emergency Team, the police, CAA, and the co-investigators from the MOH, VillageReach, NextWing, PMPB, MBTS and Community in which the incident/accident occurs.

PIS 35.　　The coordinator shall report the events as per the guidelines to including the communities, health centers, DCA, MOH, and National Health Sciences Research Committee (NHSRC).

PIS 36.　　Relevant authorities shall be called in immediately to investigate the incident.

PIS 37.　　DCA will make an assessment as to the cause and will determine whether flights may resume.

PIS 38.　　The investigators and in charges will also assess to determine whether flights may resume.

PIS 39.　　In all events, whether stopping or resuming, the team will tell the community and in-charges what decision has been made.

III.　　**Related Issues**

Any concerns or issues pertaining to the UAV/RPA operations and safety should be raised with the VillageReach Program Coordinator- Supply Chain and the Country Director. They will immediately report any issues to the Malawi Civil Aviation Authority. Failure to abide by these rules may result in administrative action.

IV.　　**Revision History**

Version	Date	Author	Change Reference	Reason for Change
UAV.001	10 March 2019	C. Matemba; C. Blauvelt L. Maxim	NA	Establishment

V.　　**Binding Effect**

The SOP is established on the Effective Date listed above. Any staff or other partner that does not adhere to the policy of this SOP may be subject to administrative or other action as deemed necessary by VillageReach management. Once the SOP is circulated, it is the responsibility of the staff to understand and adhere to the policies and procedure laid out in this document.