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2.0 Acronyms & Glossary

Aeronautics Act	The Aeronautics Act (R.S.C, 1985, c. A-2) governs civil aviation in Canada.
ACC	Area Control Centre of Navigation Canada.
AEP	Alberta Environment and Parks
AOI	Area of Interest. A point feature or area where an RPAS mission occurs
Authorized Staff	Person to whom an RPAS Flight Certificate (RFC) has been issued.
BVLOS	Beyond Visual Line-of-Sight
CARs	Canadian Aviation Regulations (SOR/96-433) of the Aeronautics Act. Part IX governs the use of RPAS.
CFS	Canadian Flight Supplement
Drone	Synonym for Remotely Piloted Aircraft (RPA).
Emergency Medical Facility map	Map can be found on the RPAS SharePoint site and forms part of the Flight Crew Package (FLP).
FC	Flight Crew
FCP	Flight Crew Package
Fleet Tracker	Tracks GoA RPAs on the RPAS Share Point site.
Flight	A single launch and landing of an RPAS or multiple launches and landings resulting in the depletion of a single battery. For planning purposes, a flight lasts 20 minutes.
Flight Log	Personal log of all flights conducted by a Pilot.
FPV	First-person view; method used to control a radio-controlled vehicle from the Pilot's point of view.

GoA	Government of Alberta
Ground Supervisor	Person on-site who is in charge of a RPA flight.
Maximum Range	The maximum distance an RPAS can theoretically fly on a single battery. Calculated by multiplying the maximum velocity of the unit by the manufacturer rated flight time.
Mission	A set AOI within an operation. Missions are made up of multiple flights.
NM	Nautical miles
NOTAM	Notice to Airmen
OHS	Occupational Health and Safety
OC	Operations Coordinator
Operation	An overall plan to conduct RPAS flights over an area for a specific purpose. Depending on the extent of the AOI, it may include multiple missions.
ROC-A	Restricted Operator Certificate - Aeronautical
RTH	Return-to-Home
SFOC	Special Flight Operations Certificate
Standard 921	Recency requirements for RPAS Pilots in Canada
TC	Transport Canada
TP 15263	Transport Canada. (2014). *TP 15263 – Knowledge Requirements for Pilots of Unmanned Air Vehicle Systems (RPA) 25 kg or Less, Operating within Visual Line of Sight*
RFC	RPAS Flight Certificate issued by the GoA Operations Coordinator to authorize pilots to conduct RPAS operations on behalf of the GoA
RPAS	Remotely Piloted Aircraft System(s)
RPA	Remotely Piloted Aircraft
RPASGC	RPAS Governance Committee, GoA
VFR	Visual Flight Reference
Visual Observer	Assists the pilot and monitors the local air space for aircraft and hazards.
VLOS	Visual Line-of-Sight
VNC	VFR Navigation Chart
VO	Visual Observer
VTA	VFR Terminal Area

3.0 Introduction

Remotely Piloted Aircrafts (RPAs) are power-driven aircraft, other than model aircraft, that are designed to fly without a human operator onboard. RPAs are small, often battery powered, fixed-wing, or rotor-wing craft deployed to acquire aerial photography and video. Remotely Piloted Aircraft Systems (RPASs) are the RPA as well as the software, communication, control and data links, launch and recovery elements, support and maintenance equipment, operating personnel, handling, storage and transport equipment, and all documentation required for successful RPA flights. These aircraft have grown significantly in popularity with both the general public and within the public service. RPASs have been used within the Government of Alberta (GoA) for a wide variety of purposes such as crop monitoring, forest health evaluation, sand and gravel monitoring, bridge inspections, and wellsite and pipeline monitoring, to name a few applications. All GoA staff are required to operate RPASs in a safe and professional manner in accordance with all applicable laws (both federal and provincial) and GoA policies. Transport Canada (TC) regulates the use of all aircraft, manned or unmanned, to keep the aviation community, public, and Canadian airspace safe. RPAS operators are considered Pilots and legitimate airspace users. The *Aeronatics Act*, R.S.C. 1985, c. A-2 and Part IX of the *Canadian Aviation Regulations* (CARs) establish the framework in which RPASs are to operate. Staff require special training and federal authorization in order to operate a RPAS.

This Directive is a companion document to the GoA Policy on RPAS. The purpose of this Directive is to identify federal regulations and provincial policies to help ensure a safe flight and compliance. It is also important to communicate flight intentions with people, organizations, and government agencies around the project area in which you plan to fly so that they are not alarmed or surprised by the flight. This includes reassuring them that you have the appropriate authorizations and procedures to perform your work as RPAS operators. Any conflict between this Directive and federal requirements shall be resolved in favour of TC's requirements.

4.0 Prerequisites to Fly a RPAS

Within the GoA, RPA flights are restricted to authorized staff only. Staff are considered "authorized" once they have successfully passed the Transport Canada exam for RPAS operation (basic or advanced), met the requirements of the GoA RPAS Governance Committee (RPASGC) and, have been issued a GoA RPAS Flight Certificate (RFC). The RPASGC is accountable for maintaining a list of authorized RPAS Pilots.

4.1 Federal Regulations
1. Successful completion of a written examination created and administered by TC through their website.
2. For an advanced certificate, successful completion (pass/fail) of a flight review conducted by a Pilot possessing a TC Flight-Reviewer rating.
3. All RPAs are required to be registered and clearly marked according to CARs 901.02 and CARs 901.05.
4. Maintain a personal flight log as per CARs 901.48

4.2 Government of Alberta Policies
1. Complete GoA Flight School training and GoA flight review (basic) or TC Flight Review (advanced).
2. Record flights weekly on network flight list.
3. Have a current First Aid certificate.
4. RPAs will be marked with GoA stickers with contact information.

4.3 Recency Requirements
CARs 901.56 and 901.65 require that all pilots undergo periodic reassessment of skills to ensure that a consistent level of training is maintained. In addition to federal regulations, GoA pilots are required to maintain a minimum number of flights per year and, in absence of meeting the following criteria, must undergo a GoA or TC flight review to ensure that the pilot still has the minimum skillsets required to pilot an RPAS as part of the GOA program:

1. All Pilots, regardless of RPAS certificate level, must record ten (10) hours of flying time per year. Hours can include a combination of operational flights, training flights, educational flights (teaching others to fly) and, if a pilot has a personal RPAS unit, recreational flights, provided that the hours are recorded on the flight tracker.

2. GoA RPAS Flight Certificates are valid for two years. Upon which time the pilot must undergo recurrent training as per Standard 921.04 and, pass a GoA Flight Review (basic) or, TC Flight Review (advanced).

5.0 RPAS Hardware Requirements
All RPAs used within the GoA will meet the following standards:
1. The model type must be approved by the RPASGC.
2. Labeled clearly and in accordance with TC regulations and GoA policy.
3. Must be maintained in good flying condition.
4. Must be stored and transported in a container that minimizes the chance of damage.
5. All batteries are stored in a safe manner.
6. Follow all manufacturers' maintenance requirements.

6.0 Flight Crew Roles and Responsibilities
Flying RPAs in a safe and legally-compliant manner requires coordination between multiple people and often organizations and departments. Each Flight Crew (FC) is comprised of four roles: Operations Manager, Pilot, Ground Supervisor, and Visual Observer. Often the Pilot or Visual Observer will act as the Ground Supervisor depending on the specific case. Two people are required on-site for operations classified as advanced-complex (see section 8.0.1).

6.1 Operations Coordinator
The GoA Operations Coordinator (OC) is the person tasked with overall accountability for the operational control of the RPA flight and GoA RPAS program, including planning and communications, and is responsible for making safety related decisions about the operation. The OC has the responsibility to use their discretion and may waive any requirements in this Directive based on operational necessity without contravening federal requirements. The OC will ensure all persons connected with the operation are familiar with their responsibilities.

Specifically, the OC has the following responsibilities:
1. Ensure all Pilots are qualified to fly under the SFOC and GoA policy:
    a. Manage Ground School Certificates.
    b. Manage RPAS Certificates
    c. Manage ROC-A Certificates.
    d. Issue and manage GoA RPAS Flight Certificates.
2. Communicate all TC regulatory changes to ministry or departmental RPAS coordinators
3. Ground RPASs for regulatory, operational, or environmental risk factors.
4. Receive the proposed flight plan if the flight is to occur under a basic certificate.
5. Approve flight plans for advanced certificates, communicate clearance and conditions to the FC, and confirm that CARS part IX conditions are being followed.
6. Ensure that the pilot has notified the appropriate agencies required for the flight and if necessary gained clearance from:
    a. Local wildfire centers.
    b. Local airspace authorities if flying advanced operations.
    c. NAV Canada as applicable
7. Provide appropriate agencies with the following information regarding each flight:

a. A general purpose statement or a summary of the business reasons for the flight, e.g. "inspection of bridges under Program X'.
b. The OC's contact information and include instructions that the OC's contact information may be provided to any individuals calling in, in order to direct their questions to the OC about their images potentially being collected by a RPAS or to address any privacy concerns being raised.
8. Be available via email, phone, or radio during the operation.
9. Ensure ongoing communication is maintained between all necessary agencies during flights.
10. Advise any callers with privacy concerns that provincial collection authority primarily falls under section 33(c) of the *Freedom of Information and Protection of Privacy Act*, unless the business purpose is for law enforcement (s 33(b)) or authorized by legislation (s 33(a)).
11. Report incidents to TC as required.
12. Meet all records requirements in accordance with CARS 901.48.

6.2 Ground Supervisor

The Ground Supervisor (GS) is the person responsible for on-site supervision of the operation. The Ground Supervisor may be the same person as the Operations Manager, Visual observer and/or the pilot if they will be on-site for all operations. For advanced/complex operations, unless approved otherwise by OC, the Ground Supervisor role is mandatory and must be filled by a person other than the pilot.

6.3 Pilot

The Pilot is the person in physical control of the craft while it is in the air. Often the Pilot will also serve as the payload (camera or video) operator and will have demonstrated competency in both flying the RPA and operating the payload simultaneously. The Pilot is responsible for the following:

1. Recording their location and TC contact information, as detailed in the Emergency Action Plan described in section 10.0, so they can quickly report incidents, such as a fly-away RPA.

2. Mission Planning:
   a. Complete a flight plan detailing the particulars of the operation using the flight plan example in Appendix 15.3, including informing the OC of any RPAS payloads.
   b. File a flight plan with and obtain approval from the OC, as required for advanced operations, in accordance with section 8.1.2.
   c. Within basic operations, the Pilot will notify the OC according to section 8.1.1.
   d. Review and comply with CARs part IX, GoA policies, and all other applicable laws (i.e. *Freedom of Information and Protection of Privacy Act* (Alberta), *Criminal Code of Canada* (Canada), etc.), including;
      i. Assessing relevant aeronautical information prior to commencing operation including airspace, aerodromes, air traffic services unit contact and radio frequencies to ensure there is no breach of regulated airspace, and
      ii. Consulting the OC regarding updates to the *Aeronautics Act* and *CARs* prior to operation as guidelines continue to evolve.
      iii. Ensure RPAS is operated consistent with manufacturers' instructions (CARs 901.31).
   e. Prepare pre-programmed flights.
   f. Ensure the RPA and control system have current firmware and software installed.
   g. Verify control software is set-up properly.
      i. The altitude limitation set out in the flight authorization must be set with the control software to ensure TC compliance (see CARs 901.25 for additional information on altitude restrictions).
      ii. Establish a radial working area based on the size class of the RPA. If the flight software does not provide constraints, it is the responsibility of the Pilot to ensure compliance with these radiuses:
         a. <1kg – radius set to ¼ Nm (450m).
         b. 1kg – 25kg – radius set to ½ Nm (900m).

> c. Ranges may be extended under OC guidance or emergency situations as long as VLOS is maintained.

    h. Notify appropriate internal agencies prior to flight.

    i. Obtain the appropriate permissions from landowner(s), lease holders, and land managers, or notify as required according to legislative authorities.

    j. Identify hazards; this is confirmed in the field on the day of the flight.
> i. Reference any ministry or department safety documents.
> ii. Identify any built-up areas.
> iii. Identify additional flight and safety hazards including, but not limited to, power lines, towers, random camping, and raptor nesting.

    k. Assess and record weather conditions as detailed in section 9.0 prior to and during the flight to determine if the weather will be favourable and ensure winds and temperatures do not exceed the operating limits of the RPA.

    l. Make final determination that it is safe to fly (Go/NoGo).

3. Pre-flight checks prior to departure to the field:
   a. Ensure a NAV Canada approval has been issued for advanced operations if needed.
   b. Weather is sufficiently monitored prior to the flight.
   c. The Flight Crew Package (FCP) is up-to-date; ensure all necessary paper work such as license, RFCs, landowner permissions, etc., is readily accessible on site.
   d. The RPA and control station software are up-to-date.
   e. Batteries are charged.
   f. Cell phone is charged and charger is in the flight kit.
   g. For Advanced operations, 2-way radios are programmed to the appropriate air traffic frequency (126.7mHz) or other frequency for the project area if other than 126.7 MHz.

4. Pre-Flight checks on the day of the flight at the project site:
   a. Assess the project area from the ground within a 1 km radius (if accessible) for any hazards or unexpected restrictions such as airstrips, buildings, people, animals, or facilities not identified in the initial mission planning that may restrict or prevent flight operations.
   b. Ensure that a Site Specific Hazard Assessment (SSHA) has been filled out.
   c. Ensure each member of the flight crew has been properly briefed and understands their role.
   d. Pre-flight hardware checks (rotors, batteries, motors, RPA shell, navigation systems, control systems and camera mounting). Defective system components, controls and software issues will compromise air-worthiness or RPAS control and the operator must not operate the RPAS.
   e. Report any pre-flight damage or malfunctions immediately to the OC via email.
   f. Mitigate control signal loss and GPS loss that may result in loss of control of the RPAS by:
      i. Ensuring the battery is fully charged prior to takeoff.
      ii. Ensuring GPS lock and home point are acquired prior to takeoff.
      iii. Ensuring the operation is within the operating specifications as outlined by the manufacturer.
      iv. Boosters/signal-extenders may be used if there is concern for control signal loss.
      v. Ensuring that flights are completed with no less than 30% battery life.

5. Flight Operations:
   a. Unless exempt for operational reasons, Wear clearly identifiable GOA visual identity, (uniform, reflective vest) including any observers.
   b. Block off with signs, cones, or ribbons an area at least 100' (30 metres) to prevent spectators from distracting the Pilot and to keep the landing area clear and safe.
   c. Operate the RPA only within its operating range in regards to altitude, temperature, wind speed, etc.
   d. Operate the RPA safely and cease operation immediately if safety is jeopardized, or if the RPAS is not functioning as expected as per Section 10.
   e. Operate the RPA in VLOS at all times. If a FPV is used, there must be a Visual Observer to keep primary VLOS. If line of sight is lost, Pilot shall initiate the return-to-home function.

f.   RPAs under 1kg shall not exceed a ¼ nautical mile flight radius.
g.   RPAs over 1kg and under 25kg shall not exceed ½ nautical mile flight radius.
h.   Always give right-of-way to all other aircraft (i.e. Hot air balloons, gliders, ultra-light aeroplanes, aeroplanes, and helicopters).
i.   Operate RPAs during daylight hours unless RPAS is equipped for night-time operations as per CARs 901.39.
   i.   Daylight Hours are ½ hour before sunrise to ½ hour after sunset, as long as VLOS is maintained.
j.   Only operate the RPA in airspace classes approved under the pilot's licensing level.
k.   Do not fly where interference could occur with first responders (fire department, police, etc.) not involved in GoA Emergency Response activities. Respect the privacy of others.
l.   Do not operate within 5 NM of a forest fire unless under coordination with the Wildfire Branch of Alberta Agriculture and Forestry.
m.   Do not operate within 1 NM of a Department of National Defence property or controlled airspace without specific authorization.
n.   Do not operate within 1 NM of any active emergency scene or emergency response personnel without specific authorization.
o.   Maintain separation from people, animals, structures, buildings, or vehicles not involved in the mission according to the specific restrictions based on the RPAS being flown and the pilot's licensing level.
p.   Do not fly in populated areas or near large groups of people (e.g. long weekend random camp gatherings, etc.) unless the RPAS certificate specifically allows.
q.   Ensure that the appropriate Air Traffic Service Unit is advised immediately anytime the flight of the RPA inadvertently enters into controlled airspace. The Pilot must also notify the OC and their supervisor once incident is over.
r.   Ensure that TC and the OC are notified immediately if personal injury or property damage occurs during operation. In the event of personal injury, first aid procedures shall be immediately initiated as required.
s.   Ensure that TC, the OC, and the ministry or departmental RPAS Coordinator are notified immediately if there is a fly away or lost link resulting in loss of the RPA.
t.   Emergency procedures shall be initiated if an unsafe situation develops.
u.   The Pilot shall notify the OC of an incident via email. The incident must also be filed on the incident reporting system.
6.   Post Flight checks:
a.   Post-flight hardware check (rotors, batteries, motors, and control system). Any defective parts or control issues must be reported to the OC via the online maintenance log.
b.   Charge batteries, controller, and peripheral devices for next operation.
c.   Record flight log, aerial imagery, and incident reporting.
d.   Complete flight logbook entry including Pilot/co-Pilot, RPA serial number, weather, date, time, duration, and location.
e.   To avoid fire, serious injury, and property damage, observe the Battery Safety Guidelines outlined by the manufacturer.
f.   Maintain the Pilot log as per CARs 901.48.
g.   Record flights in the online Flight Tracker.
h.   Report any post flight damage or malfunctions immediately on the RPAS Maintenance Tracker.

6.4 Visual Observer

The GoA recommends Visual Observers(VO) for all flights but are specifically required for advanced complex operations. The main role of the VO is to assist the Pilot and monitor the local air space for aircraft and hazards. The VO must be briefed as to their responsibilities as per CARs 901.20 & 901.28(b). The VO is not the same as a payload operator who may be operating a camera on a RPA. In some cases, the VO will also act as the Ground Supervisor. The VO has the following responsibilities:

1. Ensure the Pilot is not distracted by any spectators or other activities during the pre-flight, flight and post flight operations by:
    a. Ensuring spectators respect the 100' boundary.
    b. Answering any questions from the spectators.
    c. Ensuring any other activities in the area do not affect the Pilot.
2. Assist the Pilot with the pre-flight site hazard assessment.
3. Help monitor radio communication.
4. Monitor the weather and notify the Pilot of any changes that may affect the flight.
5. Assist the Pilot in maintaining VLOS.
    a. The observer may NOT use binoculars to aid in maintaining VLOS; however, polarized sunglasses are encouraged.
6. Watch and listen for approaching aircraft.
7. Assist the Pilot in identify potential hazards during the flight, such as birds.
8. Assist the Pilot in any emergency situations, which may include helping track a fly-way RPA and assisting with documentation.

7.0 RPAS Training and Certification

It is departmental policy that every RPAS Pilot must successfully complete both Ground School and Flight School in order to fly a RPA. External trainers provide Ground School training whereas Flight School and flight qualifications are certified internally by the ministry RPAS Lead(s). RPAS Leads are ministry or department specific experienced RPAS Pilots. The RPAS Leads are responsible for the following, subject to the direction of the OC:
1. Delivering GoA Flight School training and ensuring operators meet all training requirements.
2. Ensuring communications from the OC are disseminated to Pilots.
3. Ensuring training records are retained and submitted to the OC in accordance with the RPAS Directive, GoA policies and standards, and ministry or departmental business rules.

The GoA RPAS Training manual details the requirements that pilots must meet to be authorized to fly as part of the GoA RPAS program. Once the training is completed, the OC will register the new Pilot and issue an RFC. Training will be conducted in accordance with section 7.1.

7.1   Restrictions for RPAS Training

Training is important to maintain currency and to develop new pilot skills in each and every program that uses RPAS within the GoA. It is imperative that training is conducted in a consistent and organized fashion. The GoA RPAS Training manual follows industry best practices and is designed to build confidence in RPAS operation. All training flights count towards annual flight hour requirements. Training flights must be conducted according to the following conditions:

1) All Federal, Provincial, and Municipal laws are followed,
2) The GoA RPAS Policy is adhered to,
3) Indoors using a training RPAS such as a DJI Tello or,
4) For outdoor flying, a flight plan is prepared as per Section 8,
5) Outdoors during working hours where:
    a) the student is supervised by a pilot trainer possessing a valid GoA RPAS Flight Certificate or,
    b) The student has been granted permission by a GoA RPAS pilot trainer to fly solo for training purposes as long as:
        i) the student has passed the TC basic exam,
        ii) the student has had previous flight training sessions with a GoA certified pilot,
        iii) the training flight is in preparation of a GoA flight review,
        iv) the student files a flight plan as per section 8.1.2 endorsed by the supervising pilot,

v) maximum flight altitude does not exceed 164ft (50m) and,

vi) maximum flight radius does not exceed 330 ft (100m).

7.2 Certification and Licensing

All staff are required to meet the federal requirements and obtain an RPAS certificate before becoming authorized under the GoA RPAS program. In addition to the federal requirements, all pilots must pass a flight review before becoming authorized to fly. The process and minimum requirements are detailed as follows.

7.2.1 Basic RPAS Certificate:

1. Attend and complete a ground school program recognized by the RPAS GC
2. Pass the TC Basic Exam
3. Be issued a TC Basic RPAS Certificate
4. Complete a minimum of two (2) hours flying time under an authorized RPAS pilot
5. Understand the RPAS policy, this directive and, the RPAS training manual
6. Pass a GoA flight review
7. Be issued a Basic GoA RPAS Flight Certificate by the OC

7.2.2 Advanced RPAS Certificate

1. Complete all requirements for a Basic RPAS Certificate
2. Accumulate ten (10) hours of flying time under a basic certificate
3. Understand the RPAS Policy, Directive, Training Manual and, CARs part IX Division V
4. Serve as advanced operations flight crew (other than pilot) for a minimum of two (2) hours flying time
5. Pass TC Advanced Exam
6. Pass TC Advanced Flight Review
7. Be issued a TC Advanced RPAS Certificate
8. Be issued a GoA Advanced RPAS Flight Certifcate by the OC

8.0 Mission Planning

Mission planning is the responsibility of the Flight Crew (FC) as detailed in Section 6 of this Directive. The FC is responsible for determining what TC regulations are applicable in the project area. An air space assessment must be conducted to determine if the flight falls under a basic or advanced certificate.. All relevant aeronautical information must be consulted prior to commencing a flight (airspace, aerodromes, air traffic services unit contact, radio frequencies etc.). The Natural Resources Canada RPAS Site Selection Tool: is a useful source of information.

The flight plan and initial hazard assessment are conducted as a desktop review and/or a site visit using all available information. The flight plan is a document that shows the particulars of an operation and is detailed in Section 8.1.

8.0.1 Mission Complexity Determination

The pilot is responsible for determining the airspace in which the operation takes place. Controlled airspace (C,D,E,F) and uncontrolled (G) provide the starting point to determining the licensing level needed to conduct the RPAS operation. Other factors such as location to controlled areas, proximity to people and infrastructure must also be considered. The GoA uses the

following definitions to determine the complexity of the mission and the level of licensing needed:

1. Basic - Class G (uncontrolled) airspace, more than 100' from bystanders.
2. Advanced/simple - Complex Airspace. Class C,D, or E (controlled) airspace, more than 100' from bystanders.
3. Advanced/complex – Any airspace, within 100' of bystanders or built-up areas.

Definition	Class G	Class F	Class E	Class D	Class C	<100' from bystanders	Built-up areas	Example
Basic	X							grazing lease, gravel pit, farm fields etc. away from bystanders
Advanced/simple			X	X	X			within an airport/helipad buffer, but away from bystanders
Advanced/complex	X	X	X	X	X	X	X	in any airspace **and** in a built-up area or near people

8.1 Flight Planning

Flight plans are required for all RPAS operations within the GoA RPAS program. Procedures must be in place in accordance with CARS 901.23 and 901.24. Failure to file the flight plan with the OC constitutes a violation of Section 8.1 of the Directive and will result in **administrative** action. At any time, the OC reserves the right to join the FC including acting as Pilot, Ground supervisor or, Visual Observer. A sample flight plan is provided in section 15.3.

8.1.1 Flying Basic Operations

Much of the time, Pilots will be operating in class G (Uncontrolled) airspace under a basic certificate. Typically, if no specific class of airspace is noted on the Visual Navigation Chart (VNC), the operator is in class G airspace. To fly basic operations, it is sufficient to notify the OC, by submitting the flight plan by email to AEP.uas-ops@gov.ab.ca, that a RPAS is being deployed. The following information should be included in the flight plan:

1. Map and date of the proposed operation.
2. The business purpose of the flight.
3. Phone number and name of the nearest medical facility.
4. List all aerodromes **within the maximum range of the RPAS being flown** or, the nearest aerodrome when there are no aerodromes within the maximum range of the RPAS being flown, with:
   a. Local radio frequency and phone number.
   b. Distance in nautical miles from the operation to the aerodrome. (i.e 8 nM SE of AOI).
   c. Direction of the aerodrome using standard cardinal directions (NW, SE, etc.).
5. The centroid of the AOI in the format of latitude/longitude to four decimal places.
6. Detail of the airspace class in which the flight will occur.
7. The phone numbers of the FC including the OC.

There is no requirement to wait for clearance from the OC to fly basic operations but the flight plan shall be on-hand at all times as part of the FCP. A sample flight plan is included in section 15.3.

8.1.2 Flying Advanced Operations

To obtain authorization for advanced operations, the Pilot shall:

(a) Submit a request for advanced operation to NAV Canada if needed. Once an authorization has been obtained,

(b) Submit a flight plan as detailed in Section 8.1.1 with the OC for approval, including the approval notification from NAV Canada The OC will review and approve via email.

(c) Once approved, the flight plan becomes part of the FCP and must be on hand during operations

8.1.3 Flying Public Safety or Emergency Operations

RPAS are a valuable tool in the event of an environmental emergency or a risk to public safety. To ensure that RPAS can be deployed in a safe and timely manner, a separate protocol is followed. If a situation has developed that requires RPAS deployment immediately, the pilot shall, with respect to CARs 901.27:

1. Confirm that the operation is in class G airspace.
2. Send notification to the OC < aep.uas-ops@gov.ab.ca>:
    a. Under the subject line: "8.1.3".
    b. Detail the Lat/Long in decimal degrees or ATS location at the section level
    c. State the name(s) of the flight crew.
3. Complete a site survey (in accordance with CARS 901.27).
4. Conduct a full crew briefing.
5. Once the operation has concluded, detail the flight log entry stating that the flight was conducting under 8.1.3 of the directive.
6. If the flight is part of an investigation, only the investigation or file number is required under flight details.

8.1.4 Flying in the Forest Protection Area

As the RPA flying season coincides with the fire season, all flights within the Forest Protection Area (FPA) of Alberta will require coordination with the local wildfire centre. A contact list for the wildfire centres is part of the FCP and must be updated annually. When flying within the FPA, you must ensure that the local fire center is copied on the email notification to the OC. During a wildfire event, there is an automatic 5 NM buffer around the fire, which is class F airspace. As such, refer to section 8.1.2 for the process to fly in class F airspace.

8.1.5 Flying Beyond Visual Line-of-Sight (BVLOS)

The GoA RPAS Program is authorized for VLOS flight only. BVLOS operations in Canada require an SFOC as per CARs 901.11. Pilots with an Advanced RPAS certificate are authorized to contact the OC if BVLOS flight is required. The OC will determine if a BVLOS operation is of an operational necessity and will assist the pilot in the SFOC application.

8.2 Site Survey

A site survey is required for all flights in accordance with CARs 901.27 (be aware there are specific site survey requirements in CARS 901.27).The site survey shall be conducted as part of the crew briefing. A site survey is performed as a review of the flight plan with the addition of identification of on-site hazards, weather observations and confirmation of horizontal distances from persons not involved in the operation. The additional information shall be recorded either on the flight plan itself or, in the pilots personal flight log and, the updated information shall be recorded on the on-line flight tracking log.

8.3 Flight Crew Package

The FCP is the field manual that must be present while conducting flights. The FCP is tailored to the specific unit that is being flown and shall include, but is not limited to:

1. Registration Certificate for the RPAS being flown (CARs 901.09).

2. Flight plan (and NAV Canada and OC approval if required) (CARs 901.27).
3. Emergency Action Plan.
4. This RPAS Directive.
5. Copy of the Emergency Medical Facility map.
6. Copy of the RPAS Pilot's certificate and documentation demonstrating that the pilot meets the recency requirements (CARs 901.57).
7. Canadian Flight Supplement (hard or soft copy).
8. RPAS Operator contact information.
9. RPAS system limitation (user manual) (CARs 901.30).
10. RPAS Flight Certificate.
11. Government issued personal identification.
12. Evidence of permission from the owner of the property from which the UAV operator intends to take-off and/or land (legislatively delegated authorities may supercede this requirement).

8.4 Crew Briefing

A crew briefing is required for all operations that are conducted with more than one person on site as per CARS 901.28(b). the crew briefing will be conducted prior to launching the RPAS and include:

1. Review of the site survey.
2. Weather observations.
3. On-site hazards identification.
4. Roles and responsibilities of all crew members, including pre-arranged instructions for hand-off, if hand-off is part of the mission.
5. Location and use of emergency procedures and emergency equipment.

9.0 Weather

Having a basic understanding of the weather and monitoring it prior and during the flight is critical to safe operation of the RPAS. The RPAS Pilot will not operate their aircraft in any weather conditions that exceed the operating capability of the aircraft (including the batteries and the controller). Weather observations will be recorded before the flight and will include:

1. Wind speed and direction.
2. Topographic influences.
3. Cloud cover (8th scale).
4. Temperature.
5. Visibility.

Temperature will affect the operating capacity of batteries and temperature extremes will affect the battery length. In addition, colder temperatures and humidity may result in icing of the rotors and/or wings of the RPAS and can severely affect its ability to fly. If conditions are favorable for icing to occur, the Pilot will suspend the flight until conditions improve as per CARs 901.35.

The Pilot and Observer will also monitor any fronts passing through the area and anticipate changes in wind speed and direction. If thunder storms are passing through the project area, the Pilot will suspend the flight until conditions improve. RPAS are not authorized to fly during active thunderstorms.

10.0 Emergency Action Plan

The ability to react quickly in an emergency situation is paramount to ensuring the safety of our pilots and the public. Specific procedures have been established to ensure pilots are able to react and respond in an RPAS emergency (in accordance with CARS 901.23). All RPAS pilots must ensure that the return to home function of their RPAS units are enabled and functioning. The following section outlines the procedures for various emergency situations. To expedited notifications to TC, the Pilot must fill out an RPAS Emergency Action Plan

(Appendix 15.2) prior to lift off. The same action plan can be used for an entire mission providing the launch area home point has been updated on the plan for each new launch site.

10.1 Lost link
A fly-away occurs when the Pilot loses control of the RPAS and the RPA exits the project area in either a vertical or horizontal direction. The procedures to recover control will vary depending on the RPAS; however, in general the Pilot will action the following procedure:
1. Check antenna angle.
2. Check screen / controller cord.
3. Check screen / controller battery level.
4. Restart DJI Controller.
5. Restart DJI App.
6. If unable to establish control, and the automatic RTH function fails to function, execute fly-away procedure as detailed in 10.1.1 or 10.1.2

If the link is re-established, the Pilot will immediately land the RPA and cease all flying until the issue is resolved. If the Pilot cannot regain control of the RPA, the Pilot will activate emergency procedures as follows:

10.1.1 Vertical Fly-away
1. Continually attempt to regain control
2. Record following information:
   a. Vertical speed
   b. Battery life (minutes)
   c. Potential range
   d. Wind direction (flags, trees etc.)
3. Connection is established
   a. Attempt RTH (subject to the safety requirement in CARs 901.44)
4. Inconsistent or no connection
   a. Check / adjust antennas
   b. Attempt RTH
   c. Descend by pulling back on left thumbstick, or
   d. Attempt to disarm motors
5. Contact ACC 780-890-8397 and provide:
   a. RPA Registration#
   b. RPA Model, weight, colour
   c. Location
   d. RPA direction
   e. Battery life (minutes)
   f. Last known speed
   g. Potential range
6. Contact ACC Shift Manager in Edmonton at 780-890-8397
7. Contact nearest aerodrome using information provided on the RPAS Emergency Action Plan:
8. Contact the OC

10.1.2 Horizontal Fly-away
1. Continually attempt to regain control
2. Record following information:
   a. Direction of travel
   b. Battery life (minutes)
   c. Last known speed
   d. Potential range
   e. Wind direction (flags, trees etc.)
3. Connection is established

a. Gain altitude
                b. Attempt RTH (subject to the safety requirement in CARs 901.44)
                c. With FPV
                        i. Rotate left thumbstick and point RPA 180˚
                d. No FPV
                        i. Don't rotate left thumbstick
                        ii. Pull back on right thumbstick
                e. Listen for RPA
        4. Inconsistent or no connection
                a. Check / adjust antennas
                b. Attempt RTH
                c. Descend by pulling back on left thumbstick, or
                d. Attempt to disarm motors
        5. Contact nearest aerodrome as recorded on RPAS Emergency Action Plan and provide:
                a. RPA Registration#
                b. RPA Model, weight, colour
                c. Location
                d. RPA direction
                e. Battery life (minutes)
                f. Last known speed
                g. Potential range
        6. Contact ACC shift Manager in Edmonton at 780-890-8397 and provide information above:
        7. Contact OC.

10.2 Crash

If the RPA is involved in a crash the following steps are followed:
1. Turn off the controller and ensure the RPAS is deactivated to avoid further damage or injury.
2. Determine if there are any injuries and if so follow standard first aid procedures.
    a. Ensure the area is safe and secure.
    b. Call 911 if required.
3. Assess if the RPA has caused damage to vehicles, buildings, or infrastructure.
    a. Ensure there is no further risk of damage or danger.
4. Call the ACC Shift Manager in Edmonton at 780 890 8397 and follow their instructions.
5. Notify the OC.
6. Once safe to do so, record the following:
    a. Time of incident.
    b. Weather conditions.
    c. Events leading to the crash.
    d. Pictures of any damage.
7. Record the incident on the incident tracker. Attach all applicable documentation to the incident report including:
    a. Pilot record of incident.
    b. OHS report.
    c. Pictures of damage if applicable.

10.3 Airspace Incursion

If the RPAS has an unexpected close encounter with another aircraft that is within 150 meters (500ft), action the following procudure:
1. Take manual control
2. Maneuver to descend below treeline
3. Broadcast location on air-traffic frequency
4. Attempt to communicate with aircraft
5. Terminate flight until safe to continue

10.4 Hard Landing

If, while landing in an otherwise controlled manner (i.e. it was a normal landing sequence), the RPAS flips or lands hard, do the following:

1. Turn off the RPA and controller.
2. If the RPA damages private or public property treat it as a crash.
3. If only the RPA is damaged:
    a. Shut the RPA down.
    b. Assess the RPA for damage.
        i. If there are only broken rotors then replace and do a test flight to ensure the RPA is functioning normally and there was no motor damage.
        ii. If other components such as the landing gear, airframe, gimbal or camera are damaged, further flights will cease and the RPA will be sent in for repairs or replacement.
    c. Document the events leading to the hard landing in the same manner as a crash but there is no need to report it to TC.
4. In all cases, inform the OC for further advice.
5. If the RPA appears to be undamaged, perform low-level test flights and slowly extend the flight time until you are confident it is flying correctly.
6. Once flying is completed, attach a note to the RPA indicating the unit had a hard landing and that when the next flight occurs the Pilot should do a low-level test flight to ensure the unit is still working correctly.

10.5 Emergency Landing

In the event that a situation requires the immediate landing of an RPAS without a RTH, action the following procedure:

1. Pick landing location
    a. Near the aircraft
    b. Safe
    c. Flat
    d. Away from people / buildings
2. Hover at low altitude
3. Throttle idle to land or,
4. Disarm motors

10.6 Compromised Security

If a situation develops that puts in to question whether the pilot is still in control of the RPAS, it is imperative that the pilot acts quickly to ensure the safety of the flight crew and the public. In all cases, if the craft does not respond to manual commands and the RTH function fails, this is considered a compromised security situation. Follow the procedures detailed in section 10.1.

11.0 Security Plan

All Pilots and Ground Supervisors listed on the SFOC will have a good understanding of airspace classification and structure, weather, notice to airmen (NOTAM) reporting services, VTA and VNC, the Canadian Flight Supplement (located in an emergency backpack with First Aid kit and Fire extinguisher), and relevant sections of the *Canadian Aviation Regulations*, particularly sections 602.01, 602.07, 602.11, 602.21 and 602.4.

NOTAMs should only be filed for an RPAS operation when the airspace owner has indicated that this is required. Not all aerodromes require NOTAM and it is up to each aerodrome authority to determine if a NOTAM is required. NOTAMs should be filed by the pilot at least 24 hours in advance of the mission and the flight plan should be sent to the OC 72 hours prior to the flight; however exemptions exist for emergency situations as detailed in section 8.1.3. The following information is pertinent to air navigation services and users:

1. Dimensions of RPAS Operations area (within 1 NM is considered standard) with reference to the:
   a. Area of operation, expressed as latitude/longitude, and
   b. Planned operational altitudes, in feet above ground level.
   c. RPA size.
   d. RPA weight.
   e. RPA colour.
   f. Date and time of operation.
   g. User contact information.

All RPAS operations will be conducted so that the safety of persons and property on the ground and other air space users is not jeopardized. The procedures listed below will be reviewed prior to each RPAS activity:

1. The RPAS users are responsible for compliance with TC rules and guidelines at all times. As RPAS technology and the rules for operations are evolving frequently, it is mandatory to refer to the TC website for current rules prior to operation.
2. Alberta Parks Division has developed a *Use of Remote Cameras and Unmanned Air Vehicles (RPAS) Directive*. This document will be referenced by all Pilots when applicable.
3. RPAS users are responsible for complying with all other Canadian laws that might apply (e.g. Privacy Act, Criminal Code of Canada etc.) during operation. All provincial, territorial, and municipal laws and regulations must also be followed.
4. RPAS use is restricted to authorized staff only. The SFOC Certificate Holder/Operations Manager is accountable for maintaining the authorized RPAS Pilot list. Only Pilots who have received a GoA Flight Readiness Certificate (FRC) are permitted to fly.
5. Always have on hand the RPAS Directive, SFOC, proof of liability insurance, VHF air band transceiver, RPAS user contact info, maps/charts, aircraft system limitation (user manual), means of communication (cell phone, satellite radio), and fire extinguisher.
6. RPAS Lithium Polymer batteries will be transported according to the *Dangerous Goods Transportation and Handling Act* (Alberta). Each battery must be separated from metal objects and battery terminals insulated with electrical tape or other non-conductive material as this will prevent short circuits.
7. RPAS users shall adhere to all responsibilities outlined in section 6.0.
8. Remote control signal loss and/or GPS loss may result in loss of control of the RPA and will be mitigated by:
   a. Calibrating the RPAS compass before each flight.
   b. Ensuring battery is above 90% prior to takeoff.
   c. Ensuring GPS lock and home point are acquired.
   d. Ensuring the mission is within the RPAS operating specifications.
   e. Planning flight to complete with 30% battery power remaining.
9. RPAs not being operated shall be stored in a secure way (i.e. pelican case inside a flammable cabinet).

12.0 RPAS Maintenance

The type of maintenance performed on a RPAS will depend on the RPAS type and the recommendations from the manufacturer of the RPAS. The Pilot and/or owner of the RPAS will follow these guidelines:

1. Never open the body of a RPAS or attempt to perform any maintenance on a RPAS that is not prescribed in the RPAS's user manual.
2. Follow the manufacturer's recommended maintenance cycles and storage recommendations.
3. Before and after each flight, inspect the RPA for visible signs of damage to any of the components paying close attention to the rotors.
4. Replace damaged rotors immediately and discard them.
5. Firmware upgrades must be performed regularly. Ensure that:

a. The craft is up to date before operational flights.
b. The controller and batteries are updated at the same time.
c. After all updates, a test flight must be performed to ensure that the update was successful and that there are no conflicts between the RPA, batteries, and the controller.

13.0 Grounding of RPAS

Due to the rapid advancement of RPAS technology, updates are frequent with the classes of RPAS deployed by the GoA. There is the potential for these updates to cause conflicts with the software/firmware of the units and as such, it may be required to ground specific units if problems are encountered. Grounding of RPAS can occur for several other reasons including:

1. Unsafe environmental conditions.
2. Regulatory or policy changes.
3. Physical damage to units.
4. Emergencies.
5. Software/firmware bugs discovered.
6. Failed software/firmware updates.

In the event of a Pilot grounding a specific unit, the unit status on the online Fleet Tracker will be updated with details of the condition of the craft that caused the grounded status.

If, in the event that a systemic issue arises and the entire fleet must be grounded, or a specific make or model must be grounded, a notification will be sent from the OC to all Pilots with details of the situation that is affecting the ability to fly safely. Once the issue is resolved, Pilots will be notified that the grounding has lifted and normal RPAS operations can continue.

14.0 Incident Reporting

Reporting of incidents is imperative to ensuring the operation of a safe and legally compliant RPAS program. Incident reporting serves not only as a way to stay legally compliant, but also serves as a mechanism that will enable the GoA to track issues that may prove to undermine the effectiveness of a specific RPAS. Incident reporting will also enable the GoA to identify gaps in training and provide an avenue to address those gaps.

Additionally, CARs 901.49 dictates that a Pilot of a RPAS cease operations if any of the following incidents or accidents occurs, until such time as the cause of the occurrence has been determined and corrective actions have been taken to eliminate the risk of reoccurrence:

1. Injuries to any person requiring medical attention.
2. Unintended contact between the unmanned aircraft and persons,.
3. Unanticipated damage incurred to the airframe, control station, payload or command and control links that adversely affects the performance or flight characteristics of the aircraft.
4. Anytime the aircraft is not kept within lateral boundaries or altitude limits.
5. Any collision with or loss of separation from another aircraft.
6. Anytime the aircraft becomes uncontrollable, experiences a fly-away or is missing.
7. Any incident not referred to above for which a Canadian Aviation Daily Occurrence Report (CADORS) has resulted.

In situations where a FC reports interference from any persons that jeopardized the safety of the flight (either direct interference with the crew and/or the aircraft), the crew will notify the OC and cease operations until the issue is resolved.

Section 10.0 of this Directive outlines an order of operations for internal reporting of incidents in the Emergency Action Plan. Internal incidents are reported through an online form. This is a live system that immediately notifies the OC that an incident has occurred. If the incident resulted in damage to any personal or public property, or

resulted in an injury to the public or the FC, an OHS incident form must also be completed. The RPA involved in the incident is automatically grounded until the internal investigation is completed and if required, permission is obtained from TC. Filing of incident reports with TC is the responsibility of the the OC and shall be done within 24 hours of the incident or by the next business day. Pilots are not to file incidents with TC directly.

15.0 Appendices

The following appendices are provided to aid pilots in completing their flights in a safe and legally compliant manner. Checklists are written specifically for the DJI Mavic 2 Enterprise, but can be adapted to all multicopter models in the GoA Fleet.

15.1 Flight Checklists

15.1.1 Preflight Checklist

1. Documents
    a. RPAS Pilot Licence (basic or advanced)
    b. Restricted Radio Operators Certificate
    c. Navigation Chart, Maps etc.
    d. GOA Directive and Policy
    e. RPAS Operations Manual
    f. SFOC (if applicable)
    g. Operations Flight Plan – COMPLETE / SUBMITTED
    h. RPAS Emergency Action Plan – COMPLETE
2. Weather and NOTAM's
    a. Long Range GFA (suitable for flight duration)
    b. Current (within parameters)
        i. Nearest METAR / TAF or Environment Canada Forecast
    c. Temperature / Dewpoint
    d. Wind Direction / Speed
    e. Cloud Height
    f. Precipitation
    g. Altimeter Setting
    h. Visibility
    i. 3nm
    j. 1000' ceiling
    k. Check NOTAM's with Nav Canada
3. Equipment
    a. High-visibility clothing (if required)
    b. Two-way radio (air-traffic) (if required)
    c. Two-way radio (ground crew) (if required)
    d. Pylons or barriers (if required)
    e. Operations Signs (if required)
    f. Fire Extinguisher
    g. First Aid Kit
    h. Other safety equipment if required

4. Site Inspection
    a. Hazards
        i. Public, animals, buildings, obstacles, air traffic etc.
    b. Landing zone

i.   Free of ground debris
       ii.   Obstacle clearance

5.   Crew Member Briefing – if required
     a.   Mission Overview
            i.   Objective
           ii.   Altitude
          iii.   Flight Path
          iv.   Duration
     b.   Airspace Classification
     c.   Weather
     d.   ATC Frequencies
     e.   NOTAM's
     f.   Known Hazards
     g.   Crew Member Roles
     h.   Pilot in Command
           ii.   Overall control
          iii.   Main point of contact
          iv.   Others
           v.   Watch for hazards and advise PIC
          vi.   Specific tasks
         vii.   Emergency Procedures
7.   Emergency equipment location (fire extinguisher, first aid kit)
8.   Flight termination (any risk or hazard occurs)
9.   Emergency Form – COMPLETE
10. Address Questions and Concerns from FC

15.1.2 RPAS Preparation **Checklist**

1.   Aircraft Inspection / Preparation
     a.   Inspect for damage
     b.   Registration number displayed
     c.   front arms – FULLY DEPLOY
     d.   rear arms – FULLY DEPLOY
     e.   arms secure – CONFIRM
     f.   motors free moving and functional – CONFIRM
     g.   (4) propellers – ATTACH / INSTALL / SECURE
            i.   grey propellers
           ii.   Closed
          iii.   Ensure upright
          iv.   Insert (3) slots into slats
           v.   Rotate motor to lock
          vi.   Confirm locked
     h.   black propellers
            i.   Closed
           ii.   Ensure upright
          iii.   Insert (3) slots into slats
          iv.   Rotate motor to lock
           v.   Confirm locked
     i.   Propellers – EXTEND

        j.   Check for damage

        k.   Propellers – RETRACT

2. (10) Obstacle sensors unobstructed / clean – CONFIRM
3. cooling ports unobstructed and clear – CONFIRM
4. Battery
    a. Insert slot not damaged – CONFIRM
    b. Fully charged – CONFIRM (4 green lights)
    c. Insert into slot
    d. Secure – CONFIRM
5. Gimbal cover – REMOVE
    a. Gimbal free moving and clear – CONFIRM
6. SD Card present / inserted – CONFIRM
7. Accessory install – AS REQUIRED

8. Controller Inspection / Preparation
    a. Inspect for damage
    b. antenna's – EXTEND
    c. control sticks – ATTACH / SECURE
    d. control sticks – FREE MOVING
    e. Screen mount – ATTACH / SECURE
    f. Screen battery - ATTACH / SECURE
    g. Screen – ATTACH / SECURE
    h. Screen cord to controller – CONNECT
9. Controller Start-up
    a. Screen – POWER ON
    b. Fully charged – CONFIRM
    c. Turn on controller
        i. Power button – PRESS / RELEASE
        ii. Power button – PRESS / HOLD
        iii. Fully charged – CONFIRM
        iv. DJI Flight App – START
10. Aircraft starting
    a. Power button – PRESS / RELEASE
    b. Power button – PRESS / HOLD
    c. Battery fully charged – CONFIRM (4 green lights)
    d. Listen for tone
11. Controller connecting
    a. Screen – ON
    b. DJI App – ON
        i. Updated firmware – CONFIRM
        ii. Control mode - SELLECT (1,2, or 3)
        iii. C1 Button setting – SELLECT PREFERENCE
        iv. C2 Button setting – SELLECT PREFERENCE
        v. Measurement units setting – SELLECT PREFERENCE
        vi. Select mode
            1. Training – ON
            2. Mission – OFF
        vii. Account information – CONFIRM
        viii. DJI App – ACTIVATE

15.1.3 Pre-Flight Checklist

12. Aircraft
    a. (4) arms fully deployed – CONFIRM
    b. (4) propellers extended – CONFIRM
    c. (4) propellers secure – CONFIRM
    d. Battery secured and locked – CONFIRM
    e. Gimbal cover removed – CONFIRM
    f. If accessory installed, secure – CONFIRM
13. Controller
    a. (2) antenna's fully deployed – CONFIRM
    b. (2) control sticks attached / secure – CONFIRM
    c. (2) control sticks free moving – CONFIRM
    d. Screen mount attached / secure – CONFIRM
    e. Screen attached / secure – CONFIRM
    f. Screen cord to controller connected – CONFIRM
    g. Mode – SET TO "P"

15.1.4 Launching RPAS Checklist

1. Landing Site
    a. Clear of obstructions / personal – CONFIRM
    b. Position aircraft on landing site
2. Controller (if not on)
    a. Power button – PRESS / RELEASE
    b. Power button – PRESS / HOLD
    c. Controller on – CONFIRM
    d. Battery fully charged – CONFIRM
3. Aircraft (if not on)
    a. Power button – PRESS / RELEASE
    b. Power button – PRESS / HOLD
    c. Aircraft on – CONFIRM
    h. Battery fully charged – CONFIRM (4 green lights)

PRE-TAKEOFF

1. Communications
    a. Radio set to 126.7 or appropriate frequency – CONFIRM
    b. Ground communication established – CONFIRM
2. Controller / Screen Checklist
    a. Aircraft status – OK
    b. GPS signal "ready to go" – CONFIRM
    c. GPS home lock – CONFIRM
    d. RTH altitude > 30m – CONFIRM
    e. Flight mode correct – CONFIRM
    f. Compass normal – CONFIRM
    g. IMU normal – CONFIRM
    h. Electronic condition normal – CONFIRM
    i. Vision sensor normal – CONFIRM

        j.   Remote controller mode – CONFIRM
        k.   Remote controller battery level - CHECK
        l.   Aircraft battery temperature – OK
        m.   Gimbal status normal – CONFIRM

3. Flight Control Settings
        a.   RTH altitude > 30m – CONFIRM
        b.   Maximum altitude 120m – CONFIRM
        c.   Maximum distance 450m – CONFIRM
        d.   Distance limit enabled – CONFIRM
        e.   Failsafe set to RTH – CONFIRM
        f.   Obstacle avoidance enabled – CONFIRM
        g.   RTH obstacle detection enabled – CONFIRM
        h.   Precision landing enabled – CONFIRM
        i.   (4) battery indicators full and w/i 0.2v – CONFIRM
        j.   Visual obstacle avoidance – ENABLED
        k.   Display screen unobstructed / clear – CONFIRM
        l.   Gimbal free moving and correct – CONFIRM

4. Aircraft
        a.   On suitable takeoff site – CONFIRM
        b.   Flight Confirmed – "GOOD TO GO"
        c.   Aircraft / personal clear of obstructions – CONFIRM / ANNOUNACE "CLEAR TAKEOFF ZONE"
        d.   Time-up – RECORD

TAKEOFF

1. Arm aircraft – "ARMING MOTORS"
        a.   Left thumbstick down/left, right thumbstick down/right
        b.   (4) Propellers rotating – CONFIRM
2. Perform takeoff – "LAUNCHING RPAS"
        a.   Manual
             i.   Left thumbstick forward to takeoff
        b.   Automatic
             i.   Press takeoff button
             ii.   Slide to takeoff

CONTROL TEST

1. Aircraft hovering eye level 20 to 30 seconds – CONFIRM
2. Throttle
        a.   Climb to 3 to 5 metres AGL
        b.   Hover
        c.   Descend to original altitude
        d.   Hover
        e.   No dropped connection – CONFIRM
3. Yaw
        a.   Aircraft hovering – CONFIRM
        b.   Left 90˚ turn
        c.   Right 90˚ turn
        d.   Hover

      e.   No dropped connection – CONFIRM

  4. Forward / Reverse
      a.   Aircraft hovering – CONFIRM
      b.   Forward 3 metres
      c.   Rearward 3 metres
      d.   Hover
      e.   No dropped connection – CONFIRM

  5. Roll
      a.   Aircraft hovering – CONFIRM
      b.   Left slide
      c.   Right slide
      d.   Hover
      e.   No dropped connection – CONFIRM

LANDING

  1. Landing site clear of obstructions / personal – CONFIRM
  2. Hover over landing site
  3. Hold throttle down or press landing button

Propellers stopped – CONFIRM

POST LANDING

  1. Time down – RECORD
  2. Propellers stopped – CONFIRM
  3. Approach and obtain aircraft
      a.   Power button – PRESS / RELEASE
      b.   Power button – PRESS / HOLD
      c.   Aircraft off – CONFIRM
  4. Controller
      a.   Power button – PRESS / RELEASE
      b.   Power button – PRESS / HOLD
      c.   Controller off – CONFIRM
  5. Screen
      a.   Exit DJI App
      b.   Screen – OFF

15.1.5 Post Flight Checklist

  1. Controller
      a.   Controller off – CONFIRM
      b.   Screen / mount – REMOVE
      c.   Connection cord – REMOVE
      d.   Antennas – RETRACT
      e.   Secure in case
  2. **Aircraft**

a. Aircraft off- CONFIRM
b. Check for damage
c. (4) Propellers
    i. Check for damage
    ii. REMOVE or RETRACT
d. (2) rear arms – FULLY RETRACT
e. (2) front arms – FULLY RETRACT
f. Gimbal protector – INSTALL
g. Secure in case

3. Screen
a. Screen off – CONFIRM
b. Secure in case

□

15.2 Emergency Action Plan

This is available in a fillable PDF format on the RPAS online system

EMERGENCY ACTION PLAN

RPAS INFORMATION GATHERING			
Lat:	**Long:**	**General Location:**	
Date:		**Emergency Time:** to	
RPA Reg#		**RPA Make / Model:**	
RPA Direction:		**RPA Speed:**	
Battery Endurance:		**Wind Direction / Speed:**	
Potential Range:		**RPA Colour:**	
EMERGENCY COMMUNICATION			
HORIZONTAL FLY-AWAY		VERTICAL FLY-AWAY	
Nearest Aerodrome:		**NavCan Shift Manager:**	1-780-890-8397
2ⁿᵈ Nearest Aerodrome:		**Nearest Aerodrome:**	
NavCan Shift Manager:	1-780-890-8397	**2ⁿᵈ Nearest Aerodrome:**	
Edmonton FIC:	1-866-922-7433	**Edmonton FIC:**	1-866-922-7433

RPAS Operations Coordinator:	780-404-4864	RPAS Operations Coordinator:	780-404-4864
Notes:			

15.3 Sample Flight Plan

RPA Flight Plan

Pilot(PIC)	Daniel Abera
Observer (flight reviewer)	Scott Nels
Flight Date and Time	September 23, 2019 : 1330
Flight Area Center Location	-113.1336, 53.2225
Flight Area Township Location	QS-SE SEC-15 TWP-049 RGE-22 MER-4
Flight Area MD / County	Camrose County
Private Land (Yes/No)	Yes
Private Land Owner	The McPherson Family
Permission Granted (Yes / No)	Yes

RPA Model	DJI Phantom 3 Pro
RPA Max Speed (mph)	35
RPA Max Distance (mile)	13
RPA Max Flight Time (min)	23
VLOS (meter)	500
Max Flight Altitude (AGL)	50 m
Temperature (°C)	16 - 20
Windspeed & Direction	NW 25 - 30 km/hr
Cloud Cover (%)	25 - 30 %

Additional Info:

This is a GOA flight review flight with Scott Nels as reviewer.
The flight will be conducted in a class G airspace on private land.
Default class G air traffic frequency : 126.7 mHz

Nearest Aerodrome:

Edmonton/Gartner Airport (CFQ7)
Coordinates: N53°16.90' / W113°27.30'
Elevation is 2390 feet MSL.
Magnetic Variation from 2013 is 15° East
Time Zone is UTC-7(6)
Mandatory Frequency (MF) Edmonton Intl twr 118.3
Instructions : NOTAM FILE CYEG
Flight Information Centre (FIC) Edmonton 780-890-8386
or Edmonton 866-WXBRIEF
(Toll free within Canada) or 866-541-4102
L. Gartner 780-660-7621 or 250-428-7621 Reg PPR

Nearest Medical Facility:

Leduc Community Hospital
4210 48 St, Leduc, AB T9E 5Z3
Phone: 780-986-7711

flight center to aerodrome center:
distance: 12.1 nm , bearing 272°(MN)
flight center to 3nm boundary : 9.1 nm

Horizontal fly away prediction;
distance per 5 min of flight time
with a maximum flight time of 20 min
*Star symbol indicates True North

distance (mile)
- 3
- 6
- 9
- 12

Edmonton RPAS/ UAV Desk / Area Control Center:

Planning / Emergency 1:
866-992-7433 OR 780-890-8397
Emergency 2: 780-890-4739

RPAS Operations Manager

Dan Juhlin
780-404-4864 (cell), 780-623-5392 (office)