Ag Drone School

Triangle Hall, High Prairie
November 29-30, 2022

Day One: Morning — Tuesday, November 29

8:30 a.m. **Welcome & Introductions**

9:00 a.m. **Introduction to RPAS**
Remotely Piloted Aircraft Systems: history of development, purposes and applications; airframes and propulsion systems, and the theory of flight.

10:00 a.m. **On-Farm Uses of Drones**
Once students are familiar with the basic flight technology and its capabilities, we will go through many different uses for drones on the farm. This presentation will start with a brief discussion of the different types of sensors that have applicability to agriculture (RGB, NIR, thermal, lidar) and we will then give many examples of how those are being actively used on farms today.

11:00 a.m. **Certification Process & Intro to Air Law**
Introduction to the legislation around RPAS operations, the *Canadian Aviation Regulations*, and the process for acquiring a Pilot's Certificate. Participants will examine the airspace restrictions in their area to determine which level of certification will be required.

Day One: Afternoon — *12:00-1:00 lunch provided*

1:00 p.m. **Human Factors, Site Survey & Pre-Flight Planning**
Continuation of RPAS ground school, including review of the human factors in aviation. This session will also include discussion of many factors to be considered for safe flight operations, including meteorology, field hazard assessment, navigation, radiotelephony and flight operations.

2:00 p.m. **Manual Flight Manoeuvres**
Participants will learn to fly through a series of practice flights, under the direct supervision of an experienced operator and instructor. Typically, this will be conducted indoors, space permitting. We will use DJI Mavic Mini aircraft, beginning with first takeoff and ending with a manual "point of interest" flight. You will be comfortable flying in tight indoor space before the day is out.

3:30 p.m. **Best Practices: Emergency Management, Maintenance, Storage & Travel**
Prudent operation of an unmanned aircraft requires preparation for various emergency scenarios. We will discuss various real-life scenarios and how to prepare for them. Topics also include the human factors in aviation and flight operations. Practical advice to ensure that your aircraft and its ground support elements are always in good repair, to ensure safe flight. Considerable focus will be put on battery management using DJI systems as examples.

4:00 p.m. **Semi-Autonomous Mapping Workflows**
We will present the theory behind the generation of maps and 3D models from semi-autonomous RPAS flights. Discussion of the most common vegetative indexes and the opportunities for multispectral imaging. Several examples of complete workflows will be presented including flight planning, flight execution and map processing.

4:30 p.m. **School concludes for the day**

Day Two: Morning — Wednesday, November 30

8:30 a.m. **Map Data Processing & Analysis**

Software workflows from drone to final maps will be demonstrated for visible-spectrum RGB and multispectral datasets using MapsMadeEasy and Pix4Dfields software. Sample crop imagery and its agronomic interpretation will be discussed.

10:00 a.m. **Livestock & other Farm RPAS Uses**

There are many other uses for drones on the farm, both simple and complex, and those will be discussed during this session. We will also go through the applications for drones with focus on cattle – examples of thermal and zoomable cameras that can be used for finding, monitoring, or counting livestock.

10:30 a.m. **Spraying by Drone**

From multispectral mapping to spot application of herbicide, we will inform you about the practical realities of drone use for product application. We will discuss practical and regulatory aspects of spraying herbicides or liquid fertilizers, and broadcast seeding of cover crops. We'll present our view of the future of product application by drone, including information on the DJI Agras T10, T30, and T40 drones.

11:30 a.m. **The Business of Drones**

Business models for agricultural applications, from on-farm RPAS to imagery service providers. Discussion about business pain points, costing, and insurance. We will also compare the different drone models currently available and provide information on LandView's farm-ready packages.

Day Two: Afternoon "Fly Day" — *12:00-1:00 lunch provided*

1:00 p.m. **Test Preparation**

Review of ground school concepts and the relevant sections of the *Canadian Aviation Regulations* (we will hand out a study guide at the end of Day 1 for overnight study and then review as a group)

1:30 p.m. **Online Transport Canada test (*optional, $10 fee payable to Transport Canada*)**

We encourage you to bring a laptop or tablet to take Transport Canada's Small Basic Operations test at the end of class. We are not able to assist you during the test, but it may be best to just take the test while the material is fresh.

3:00 p.m. **Fly Day:**

Participants will have the opportunity to operate several RPAS models outdoors, from the Mavic 3 to Matrice-series and even an Agras T10 spraying drone. Various scenarios will allow participants to gain experience and to understand both site survey and emergency procedures, while taking turns as pilots and visual observers.

There will be a selection of "missions" to complete in small groups, with all participants getting "stick time". You will **learn to do by doing**.
Note: Dependent on weather allowing flight within manufacturer's specifications

4:30 p.m. **School concludes – thank you for attending!**