ANNEX A – STATEMENT OF WORK
Riding Mountain National Park, MB
LiDAR and Orthophoto Imagery Data Collection

1. Objective

1.1. Collection of high resolution LiDAR (minimum 2 points per m^2) and 4 band (iRGB) orthophoto imagery (20 cm pixel) of Riding Mountain National Park of Canada located in southwestern Manitoba.

2. Background

The intent of this project is to acquired high quality imagery of Riding Mountain National Park to be utilized in a multitude of Parks Canada projects and applications, including: fire management, vegetation analysis, trails planning, project plans, emergency response and navigation for general operations.

3. Geographic Extent and Timing of Survey

3.1. The area of interest for the data collection is the boundary of Riding Mountain National Park including a 100m buffer around the Park boundary (Figure 1). Leaf off condition is preferred.

4. Scope of Work

4.1. The contractor will arrange to collect LiDAR of the areas indicated following the specifications outlined in the Federal airborne LiDAR data acquisition guideline. https://geoscan.nrcan.gc.ca/starweb/geoscan/servlet.starweb?path=geoscan/fulle.web&search1=R=308382 Version 2.0 of this guideline was released in the fall of 2018. The contractor must use the specifications as outlined in the Guidelines with the following additions/changes:

- Data voids are allowed where large water bodies are present.

4.2. The contractor will arrange to complete 4 band (iRGB) orthophotos coverage of all areas indicated. The orthophotos must be flown to achieve a resolution of 20 cm pixel or better. Cloud, fog, smoke or haze voids are not allowed unless deemed acceptable by Parks representative. The ground must be snow free except where deemed acceptable by the Parks Canada representative.

5. Deliverables

The contractor will be responsible for the following:

5.1. The contractor will submit all of the following deliverables to Riding Mountain National Park by 2020-12-31:

5.1.1. Classified LAS files tiled at 1 km^2 tiles. Classes include ground and non-ground only. LAS files will contain all information regarding their recorded return number. Nominal point spacing will be at >= 2 points per metre.
5.1.2. LiDAR data includes all relevant project reports, point clouds, and derived data products.
5.1.3. Project report outlining equipment, procedures and technical specifications, dates, personnel, and any problems encountered. The report must contain at minimum detail on the following:

5.1.3.1. Available LiDAR sensor specifications, including: manufacturer, model, field of view, swath width at altitude; Laser dispersion at altitude; range, pulse, repetition and scanner frequency.
5.1.3.2. System calibration procedures.

5.1.3.3. LiDAR acquisition specifications including flight altitude, flying speed, scan rate and field of view, line spacing and overlap.
5.1.3.4. Report on estimated point density and spacing characteristics.
5.1.3.5. Reports on absolute horizontal accuracy, absolute vertical accuracy, and relative vertical accuracy.
5.1.3.6. Documentation of methods of survey control using ground control points, including access to survey control data used or derived in the project.
5.1.3.7. And any additional reports as specified in the 2017 “Federal Airborne LiDAR Data Acquisition Guideline”

5.1.4. Orthophotos must be delivered as 1 km tiles on UTM Zone 14 NAD83 (CSRS) with a resolution of 20 cm pixel or better and delivered in GeoTiff format.

6. Contractor’s Responsibilities

The contractor must:

6.1. Provide all personnel and materials to complete this contract.
6.2. Verify data following flight.
6.3. Ensure that no work is done outside of this contract unless agreed to with the Project Authorities and approved in writing by the Contracting Authority. Coordination with Riding Mountain to ensure that fieldwork required for ground control is completed on time.

7. Parks Canada’s Responsibilities

7.1. Review final data before acceptance.
7.2. Assist with survey control points as required.
7.3. Provide approval in writing of accepted work performed outside of this agreement.
7.4. Provide final approval of all work.
7.5. Provide transportation for contractor personnel to locations not accessible by road and that are required for ground control, or provision to the contractor of acceptable ground control from another source. Transportation is subject to the availability of Riding Mountain personnel, vessels and subject to safety limitations.
7.6. Provide a shapefile of the boundary of the areas of interest as required.

Figure 1 - Area of Coverage