

PROFESSIONAL SERVICES AGREEMENT
City of Missoula Aerial Image Acquisition

THIS AGREEMENT is made and entered into this 6th day of January, 2020, by and between the **CITY OF MISSOULA, MONTANA**, a municipal corporation organized and existing under the laws of the State of Montana, 435 Ryman, Missoula, Montana 59802, hereinafter referred to as “City,” and Aero-Graphics, Inc., 40 West Oakland Ave, Salt Lake City, UT 84115, hereinafter referred to as “Consultant.”

In consideration of the mutual covenants and agreements herein contained, the receipt and sufficiency whereof being hereby acknowledged, the parties hereto agree as follows:

1. **Purpose:** City agrees to hire Consultant as an independent contractor to perform for City services described in the Scope of Services attached hereto as Exhibit “A” and by this reference made a part hereof.

2. **Effective Date:** This Agreement is effective upon the date of its execution and will terminate on the 1st day of September, 2020.

3. **Scope of Work:** Consultant will perform the work and provide the services in accordance with the requirements of the Scope of Services (Exhibit “A”).

4. **Payment:** City agrees to pay Consultant an amount not to exceed Thirty-four Thousand Four Hundred and 00/100Dollars (\$34,400.00) for services performed pursuant to the Scope of Services. Any alteration or deviation from the described work that involves extra costs will be performed by Consultant after written request by the City, and will become an extra charge over and above the contract amount. The parties must agree in writing upon any extra charges.

5. **Independent Contractor Status:** The parties agree that Consultant, Aero-Gracphics, Inc. is an independent contractor for purposes of this Agreement and the parties agree that Consultant is and shall be an independent contractor when performing services pursuant to this agreement. Consultant is not subject to the terms and provisions of the City’s personnel policies handbook and may not be considered a City employee for workers’ compensation or any other purpose. Consultant is not authorized to represent the City or otherwise bind the City in any dealings between Consultant and any third parties.

Consultant shall comply with the applicable requirements of the Workers’ Compensation Act, Title 39, Chapter 71, MCA, and the Occupational Disease Act of Montana, Title 39, Chapter 71, MCA. Consultant shall maintain workers’ compensation coverage for all members and employees of Consultant’s business, except for those members who are exempted by law.

Consultant shall furnish the City with copies showing one of the following: (1) a binder for workers’ compensation coverage by an insurer licensed and authorized to provide workers’ compensation insurance in the State of Montana; or (2) proof of exemption from workers’ compensation granted by law for independent contractors.

6. Indemnity and Insurance: For other than professional services rendered, to the fullest extent permitted by law, Consultant agrees to defend, indemnify, and hold the City harmless against claims, demands, suits, damages, losses, and expenses connected therewith that may be asserted or claimed against, recovered from or suffered by the City by reason of any injury or loss, including but not limited to, personal injury, including bodily injury or death, property damage, occasioned by, growing out of, or in any way arising or resulting from any intentional or negligent act on the part of Consultant or Consultant's agents or employees.

For the professional services rendered, to the fullest extent permitted by law, Consultant agrees to indemnify and hold the City harmless against claims, demands, suits, damages, losses, and expenses, including reasonable defense attorney fees, to the extent caused by the negligence or willful misconduct of the Consultant or Consultant's agents or employees.

For this purpose, Consultant shall provide City with proof of Consultant's liability insurance issued by a reliable company or companies for personal injury and property damage in amounts not less than as follows:

- Commercial General Liability - \$1,000,000 per occurrence; \$2,000,000 annual aggregate
- Professional Liability - \$1,000,000 per claim; \$2,000,000 annual aggregate

7. Professional Service: Consultant agrees that all services and work performed hereunder will be accomplished in a professional manner.

8. Compliance with Laws: Consultant agrees to comply with all federal, state and local laws, ordinances, rules and regulations.

9. Nondiscrimination: Consultant agrees that all hiring by Consultant of persons performing this Agreement will be on the basis of merit and qualification and will not discriminate on the basis of race, ancestry, color, physical or mental disability, religion, national origin, sex, age, marital or familial status, creed, ex-offender status, physical condition, political belief, public assistance status or sexual orientation, gender identity or expression, except where these criteria are reasonable bona fide occupational qualifications.

10. Default and Termination: If either party fails to comply with any condition of this Agreement at the time or in the manner provided for, the other party, at its option, may terminate this Agreement and be released from all obligations if the default is not cured within ten (10) days after written notice is provided to the defaulting party. Said notice shall set forth the items to be cured. Additionally, the non-defaulting party may bring suit for damages, specific performance, and any other remedy provided by law. These remedies are cumulative and not exclusive. Use of one remedy does not preclude use of the others. Notices shall be provided in writing and hand-delivered or mailed to the parties at the addresses set forth in the first paragraph of this Agreement.

11. Modification and Assignability: This document contains the entire agreement between the parties and no statements, promises or inducements made by either party or agents of either party, which are not contained in this written Agreement, may be considered valid or

binding. This Agreement may not be enlarged, modified or altered except by written agreement signed by both parties hereto. The Consultant may not subcontract or assign Consultant's rights, including the right to compensation or duties arising hereunder, without the prior written consent of City. Any subcontractor or assignee will be bound by all of the terms and conditions of this Agreement.

12. Ownership and Publication of Materials: All reports, information, data, and other materials prepared by the Consultant pursuant to this Agreement are the property of the City. The City has the exclusive and unrestricted authority to release, publish or otherwise use, in whole or part, information relating thereto. Any re-use without written verification or adaptation by the Consultant for the specific purpose intended will be at the City's sole risk and without liability or legal exposure to the Consultant. No material produced in whole or in part under this Agreement may be copyrighted or patented in the United States or in any other country without the prior written approval of the City.

13. Liaison: City's designated liaison with Consultant is Eric Andersen and Consultant's designated liaison with City is Kelly Francis.

14. Applicability: This Agreement and any extensions hereof shall be governed and construed in accordance with the laws of the State of Montana.

IN WITNESS WHEREOF, the parties hereto have executed this instrument the day and year first above written.

CITY OF MISSOULA, MONTANA

By _____

JOHN ENGEN, Mayor

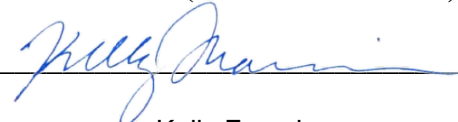
ATTEST:

By _____

MARTHA L. REHBEIN C.M.C., City Clerk

Aero-Graphics, Inc.

CONSULTANT (Print Name Above)

By  _____

Print Name: Kelly Francis

Print Title: President

APPROVED AS TO FORM

By _____
JIM NUGENT, City Attorney

Exhibit “A”

SCOPE OF SERVICES



Target Placement and Control Surveying. Prior to photography, Morrison-Maierle will target and survey the 15 aerial control points shown in RED in the Exhibit B map. Control will tie to both Montana State Plane Coordinates. Horizontal datum shall be NAD 83 (2011); Vertical datum shall be NAVD 1988. Units shall be in US Survey Foot.

New control monuments will consist of a 5/8” x 18” rebar topped with a 2” aluminum cap where practical. MAG P-K nails will be set for control points located in pavement. A 60d nail or wood hub may be set in locations where the target is located in a farm field or is to be pulled after the flight at the landowner’s request. Targets will consist of material in contrast with the ground, 1’ wide, and 6’ arms (12’

crosses). Targets will be placed within public land/right-of-way wherever practicable.

Ground control stations will be tied to the National Spatial Reference System (NSRS) using GNSS Real-Time-Kinematic (RTK) methods of survey, with the objective of providing control coordinates with an accuracy better than +/- 0.1’. It is anticipated that all proposed targets can be surveyed with RTK methods, referenced to the Missoula-Area RTK Continuously-Operating Reference Station (CORS) as well as an independent RTK base receiver. A minimum of two independent RTK vectors will be collected at each control station. Where possible, raw GNSS data will be collected, processed, and adjusted using the National Geodetic Survey’s On-Line Positioning User Service (OPUS). Fixed height tripods will be used to eliminate antenna measurement errors. Time, date, and location-stamped photographs of the control points will be taken while being occupied to verify antenna type and antenna reference point (ARP) measurement methods.

The above work will be compiled into a Survey Control Report that will include survey methods used, field notes, control station photos, and other applicable information used to derive final control station coordinates, and relative positional accuracy of those coordinates. All reporting will be in accordance with the units and method requirements of the Request for Proposal.

Aircraft. Aero-Graphics owns and operates four (4) aircraft, including twin-engine Cessna T310s, which speed acquisition and provide further redundancy and risk mitigation to our fleet. When not flying, these aircraft are housed at our 9,500-square foot hangar at Bountiful Skypark near Salt Lake City. **Our Cessna T310R will be dedicated to this project to ensure proper and timely delivery.** The UC Eagle is interchangeable between all three aircraft. If the assigned aircraft is unavailable, one of the others can replace it with ease.

Each of our aircraft is maintained and operated with strict adherence to all FAA regulations. IFR instrumentation and other equipment necessary to operate within Class A airspace are standard on all aircraft, and all are equipped with survey-grade GPS for precise acquisition over required areas.

As part of Aero-Graphics’ **Risk Management System (RMS)**, every lift requires a pre-flight inspection of the associated aircraft. This includes the following:

- Fuel Level – Instrumental and Visual
- Aileron and Control Surface freedom of movement
- Engine Oil Level
- Propeller Condition
- Landing Gear Condition

We now have an in-house A&P (airframe & power) mechanic who can quickly respond to mechanical issues in the field. We keep an on-the-shelf inventory of key parts for our aircraft to further improve the speed of necessary repairs.

To maximize safety for our flight crews, we have installed Traffic Collision Avoidance Systems (TCAS) in each of our aircraft. This provides an ATC-independent buffer around the aircraft that detects and displays the position of surrounding aircraft, up to seven (7) nautical miles and 3,500 vertical feet away.

Aircraft Assigned to Project

Cessna T310R

Flight Range: 1,300 nm
Maximum Cruise Speed: 230 kt
FAA Certified Ceiling: 25,000 ft



Imagery Sensor. Aero-Graphics' state-of-the-art **Vexcel UltraCam Eagle (UCE)** digital camera is noted as one of the finest digital camera systems currently available. It has a 100.5mm focal length and delivers 260 megapixels per image and one of the widest cross-track image formats available in any CCD frame based sensor (20,010 pixels). At a 7.5cm GSD, the swath covers nearly one mile on the ground. This configuration provides the best image-size to image-number balance, i.e. the larger footprint size allows a smaller number of images to cover the project boundary, which translates into fewer images to georeference and QC, which translates into faster delivery time for us and for the City.

The imagery flight will require 16 flight lines and 435 exposures at a 7.5cm GSD for complete coverage.

GPS/IMU Data Post-Processing. After successful acquisition, raw GPS/IMU data is processed for the flights using Applanix POSPac MMS software. At this stage, QC of flight parameters (initialization, bank angles, proximity to bases, etc.) is performed. This process refines the air point coordinates (XYZ) and angles (Omega, Phi, Kappa, or roll, pitch, and yaw) of the plane, and delivers up to 3cm accuracy. It produces a refined SBET (trajectory) for LiDAR processing.

Analytical Aerotriangulation. Industry-leading Trimble-Inpho Match-AT software is utilized to perform fully analytical digital aerotriangulation for the image block. Automatic tie points and refined GPS/IMU exposure centers (air points) extend full control for each stereo model. This project will be controlled by a combination of ground control values and airborne GPS/IMU.



Image Orthorectification

High-end Dell 64-bit workstations will be used to process the orthorectified imagery. To ensure horizontal accuracies commensurate with the requirements of this solicitation, the current bare earth lidar surface model will be used as a basis for image rectification. Some of these improvements would include removing points from buildings and generally correcting surfaces that would warp the ortho and adding breaklines where necessary, especially on bridges and overpasses.

Upon completion of QA/QC of the surface modeling, the digital imagery will undergo automatic orthorectification in a one-step batch process using Inpho's OrthoMaster software. Aero-Graphics takes great advantage of Inpho's

distributed processing features. This allows multiple idle workstations to process vast amounts of ortho tiles simultaneously, which greatly expedites turnaround time.

Orthorectified imagery will be manipulated in OrthoVista software to compute subtle radiometric adjustments that compensate for visual effects within individual images. Furthermore, OrthoVista performs a block-wide color balance by adjusting adjacent images to match in color and brightness. Tonal differences are not detectable between individual images.

Multiple orthophotos are combined into one seamless, color balanced and geometrically-perfect ortho mosaic. 3-band RGB image files will be delivered at a 3" pixel resolution in uncompressed 24-bit TIFF and ECW formats, with associated TFW world files, furnished on a portable hard drive. Imagery will be broken up into the City's predefined tiling schemes. Files will be tone matched to optimize image quality throughout the project. An overall MrSID mosaic will also be delivered at a 6" pixel size.

DSM Creation. A photo-derived Digital Surface Model will be created from the ground surface TIN model at a 3-foot cell size in GeoTIFF format and delivered in the City's predefined tile structure. There will be no voids within the project area. Tile extents that fall outside of the project area will be coded "NODATA".

Project Schedule

Control Survey:	Completion by March 31, 2020
Aerial Photography Acquisition:	Completion by April 15, 2020
Digital Orthoimagery and DSM:	Completion by June 15, 2020
Project Report and Metadata:	Completion by June 30, 2020

TOTAL COST OF WORK ELEMENTS

Control Survey:	\$12,000.00
Aerial Photography Acquisition:	\$15,165.00
Digital Orthoimagery and DSM:	\$ 5,635.00
Project Report and Metadata:	\$ 1,600.00
Total Project:	\$34,400.00

Exhibit "B"

MAP OF CONTROL POINTS

