

**STATE OF OKLAHOMA  
DEPARTMENT OF TRANSPORTATION  
SURVEY DIVISION  
SPECIFICATIONS FOR AERIAL PHOTOGRAPHY**

**January 2024**

**THE CONTRACTOR AGREES:**

To furnish all materials, labor and equipment necessary to provide precision aerial photography of the areas as specified by the Oklahoma Department of Transportation (ODOT), and to deliver to ODOT the materials specified in Section 11. All work shall be executed to the satisfaction of ODOT in complete accordance with these specifications.

**1. COORDINATION OF PHOTOGRAPHY WITH GROUND TARGETING**

All projects will be targeted prior to the flight unless otherwise specified. These operations must be coordinated with the ground crew so that a minimum of time elapses between the targeting and photographic flight. ODOT will notify the contractor when the projects can be flown.

**2. AIRCRAFT**

Aircraft used on this contract shall be maintained and operated in accordance with the regulations of the Federal Aviation Administration and shall be capable of flying at an operational ground speed to ensure ODOT accuracy standards.

**3. PRECISION AERIAL DIGITAL MAPPING CAMERA**

Digital cameras utilized in conjunction with this contract must be large format, direct digital, frame-based camera systems (e.g. Z/I DMC Camera, Vexcel's UltraCam-D, etc). Small or medium frame format systems, or Line Scanning (push broom technologies) will not be considered.

### **3.1 CAMERA SYSTEM CAPABILITIES**

- 3.1.1 Ground Sampled Distance (GSD) of less than 2 inches, at a flying height of 1500 feet above ground level.
- 3.1.2 Four band imagery from separate red, green, blue, and infrared bands.
- 3.1.3 High geometric accuracy and forward motion compensation.
- 3.1.4 Images that are directly compatible with existing softcopy photogrammetric environments, to include Intergraph Photogrammetry Suite.
- 3.1.5 Stereo Pairs, suitable for high accuracy Engineering Design Mapping Applications.

### **3.2 GPS REQUIREMENTS**

The camera utilized shall be interfaced to a GPS receiver capable of computing coordinates with accuracies acceptable for use in ODOT analytical adjustment programs. Operation of ground-based GPS receivers will be the responsibility of the contractor.

The contractor will provide Airborne Global Positioning System (ABGPS) and Inertial Measurement Unit (IMU) data, and shall be responsible for the post processing of all data. At a minimum the consultant will provide the Frame number, GPS Coordinates, Omega, Phi, Kappa values of the photo centers, and the time stamp information for each frame of project photography. Processed data will be delivered in an ASCII format on specified media. The contractor will retain a Professional Land Surveyor, currently licensed to practice in the State of Oklahoma. The Land Surveyor will directly supervise and certify the procedures and accuracy of the GPS Control, and Ground Control (if applicable).

ODOT reserves the right to restrict the use of any camera based on operational results.

## **4. TIME FOR UNDERTAKING PHOTOGRAPHY**

- 4.1 Photography shall not be taken when the sun is less than 30 degrees above the horizon. Excessive shadows will be cause for rejection.

- 4.2 Photography shall not be taken when streams are at flood conditions, when standing water, or snow cover is on the ground, or when the ground is obscured by haze, smoke or dust.
- 4.3 Clouds or cloud shadows shall not exceed five percent of any image.
- 4.4 Windy conditions causing motion in vegetation may be grounds for rejection.

## **5. IMAGERY**

- 5.1 Photography shall be taken at an altitude that will ensure a ground sample distance of less than 2 inches.
- 5.2 Digital imagery shall be tiled tiff format, and shall be compatible with Imagestation Photogrammetric Workstations

## **6. NAMING OF DIGITAL IMAGES**

Digital image file naming conventions shall include the flight line and exposure number.

## **7. FLIGHT LINES**

- 7.1 The center of the first and last exposure shall be outside the limits of the designated flight line.
- 7.2 A horizontal deviation from the designated flight line of more than ten percent of the flight height shall be cause for rejection.

**8. TILT**

Tilt shall in no case exceed three degrees from the vertical and shall not average more than one degree for the flight line. Relative tilt between any two successive images exceeding four degrees may be cause for rejection.

**9. OVERLAP**

The overlap in the line of flight shall average approximately sixty percent. Any overlap of less than fifty-five percent or more than sixty-five percent shall be cause for rejection of the entire flight line.

**10. CRABBING**

Any series of two or more consecutive images crabbled in excess of three degrees as measured from the line of flight shall be cause for rejection of the entire flight line.

**11. ITEMS TO BE DELIVERED**

- 11.1 Digital Images as described above, delivered by sftp site and on a thumb drive, or other approved digital media.
- 11.2 Camera Calibration Report
- 11.3 ABGPS IMU Data in ASCII Format
- 11.4 Metadata of flight height and equipment parameters, including date and time of photography, flight line number, and exposure number, in ASCII Format.

**12. TIME OF COMPLETION**

All projects must be coordinated with survey crews. The contractor will notify ODOT as soon as the mission is complete and quality control has been performed. All photo deliverables must be delivered with the rest of the project deliverables, unless otherwise specified in the Task Order.

ANY DEVIATION FROM THESE SPECIFICATIONS, MUST BE SPECIFICALLY AUTHORIZED BY ODOT SURVEY DIVISION.

ANY DEVIATION FROM THESE SPECIFICATIONS, UNLESS SPECIFICALLY AUTHORIZED BY THE SURVEY DIVISION, SHALL BE SUFFICIENT CAUSE FOR THE REJECTION OF ANY PART OF THE WORK PERFORMED.

A DESIGNATED OFFICIAL FROM THE CONTRACTING STATE AGENCY WILL REPRESENT THE STATE OF OKLAHOMA DURING THE WORKING STAGES OF THIS CONTRACT AND ALL WORK WILL BE RECEIVED, CHECKED, APPROVED OR REJECTED BY HIM/HER.

SEPARATE PURCHASE ORDERS WILL BE ISSUED AGAINST THE CONTRACT AND WILL RELATE TO EACH SEPARATE PROJECT.

THE STATE OF OKLAHOMA RESERVES THE RIGHT TO DELETE ANY PORTION OF A PURCHASE ORDER AT ANY TIME. IN THAT INSTANCE, THE TOTAL PURCHASE ORDER AMOUNT SHALL BE RE-COMPUTED FOR THE REDUCED SCOPE OF WORK IN THE SAME MANNER USED FOR DETERMINING THE ORIGINAL PURCHASE ORDER AMOUNT AND A CHANGE ORDER WILL BE ISSUED.

IN THOSE INSTANCES WHERE THE ENTIRE PROJECT IS TO BE DELETED, BUT WHERE THE CONTRACTOR HAS ALREADY BEGUN THE WORK PRIOR TO NOTIFICATION, THE CONTRACTOR SHALL BE PAID ON THE BASIS OF THE ESTIMATED PERCENTAGE OF COMPLETION.

ANY DISPUTE CONCERNING A QUESTION OF FACT IN CONNECTION WITH THE CONTRACT SHALL BE REFERRED FOR DETERMINATION TO THE CONTRACTING DEPARTMENT, THE AGENCY DIRECTOR OR HIS DULY AUTHORIZED REPRESENTATIVE WHOSE DECISION IN THE MATTER SHALL BE FINAL AND CONCLUSIVE ON THE PARTIES TO THE CONTRACT.

THE STATE OF OKLAHOMA AGREES:

TO GRANT A REQUEST FOR A REASONABLE EXTENSION OF TIME FOR COMPLETION OF WORK BEGAN, IF THE CONTRACTOR SUBMITS A REQUEST IN WRITING SHOWING THAT HE IS UNABLE TO COMPLETE THE WORK IN THE TIME SPECIFIED. UNDER NO CIRCUMSTANCES ARE PURCHASE ORDERS TO BE ISSUED AFTER 6/30 OF THE CURRENT FISCAL YEAR, AND IN THOSE INSTANCES WHERE A PURCHASE ORDER HAS BEEN ISSUED, BUT NO PORTION OF THE PROJECT HAS BEGUN, THE PURCHASE ORDER IS TO BE CANCELED AND RE-ISSUED UNDER THE APPLICABLE CONTRACT.