STATE OF MONTANA
JOB DESCRIPTION

Montana state government is an equal opportunity employer. The State shall, upon request, provide reasonable accommodation to otherwise qualified individuals with disabilities.

Job Title: Unmanned Aerial System - Photogrammetrist Specialist (I, II)

Position Number: 30002 **Location: Helena** **Department: MDT**

Division and Bureau: Engineering Division/ Highways Bureau

Section and Unit: Photogrammetry and Survey Section/Survey Unit

Job Overview: This position is an Unmanned Ariel System Photogrammetrist Specialist (I, II) for the Montana Department of Transportation Photogrammetry and Survey Section. The position is responsible for the collecting, analyzing, and interpretating the geographic information provided by control surveys, aerial photographs, LiDAR, UAV Drone and satellite. Position is also responsible for planning and performing photogrammetric processes to develop engineering design level 3D models including DEM (Digital Elevation Models), DSM (Digital Surface Models) and DTM (Digital Terrain Models) from aerial survey data. The UAV specialist will fly a variety of field missions including Surveying & Mapping, visual inspection and as-built surveys. The position reports directly to the Photogrammetry and Survey Section Supervisor.

Essential Functions (Major Duties or Responsibilities):

Aerial Survey Data assimilation, orientation, bridging & aerial triangulation - 50%
Level I

- Supervised activities subject to review and approval by supervisor or senior Photogrammetrists:
    - Enters imagery into aerial survey software along with additional information regarding camera lens distortion, fiducial coordinates, photo control coordinates, photograph information, horizontal and vertical datum information.
    - Rectifies digital imagery to remove digital image distortion which provides the mapping quality stereo imagery for aerial correlation routines and mapping purposes.

Level II

- Enters imagery into aerial survey software along with additional information regarding camera lens distortion, fiducial coordinates, photo control coordinates, photograph information, horizontal and vertical datum information.
- On the digital photogrammetric systems, performs interior, relative, and absolute orientation of stereoscopic instruments of the direct projection type or universal type.,
- Analyze interior orientation results and identify and resolve any ambiguities.

- Observes and measures photo control and pass points for each stereoscopic model and executes the aerial triangulation program for determining the mathematical relationship between the photogrammetric models and the ground.
- Reviews and analyzes aerial triangulation results for inconsistencies and/or problem areas and resolves any ambiguities to ensure bridging results meet project requirements for mapping accuracy, and other subsequent photogrammetric processes using photogrammetric knowledge, applying mathematical and statistical knowledge as it pertains to least squares adjustments.

Compilation of Aerial Survey Data - 20%

Level I

- Supervised activities subject to review and approval by supervisor or senior Photogrammetrists:
    - Reviews, edits and makes cartographic additions to aerial survey information captured in the design file to ensure accuracy and uniformity to MDT design Standards.
    - Combines data from multiple data sources including, terrestrial and Mobile, and airborne LiDAR, Static and Real Time Kinematic (RTK) Global Positioning Systems (GPS), photogrammetric systems used on manned and unmanned (UAS) aircraft, as well as a variety of new systems and technology as they emerge into the geospatial arena into a single 3D model per project specific design.
- Performs quality control checks of compiled aerial survey data to ensure adherence to MDT standards and accuracy of the final model to meet ASPRS (American Society for Photogrammetry and Remote sensing) for positional Accuracy Standards for Digital Geospatial Data.
- Converts final 3D surface models from the aerial survey software to the standard XML format for placement on PCMS (Project Content Management System).

Level II

- Compiles planimetric and topographic map detail of difficult areas as exemplified by extremely congested culture, precipitous terrain, heavy vegetative cover, and hidden areas, wherein extensive interpretation of aerial photography is required to create a 3D CADD design file to be used in Engineering and design operations.
- Reviews, edits and makes cartographic additions to aerial survey information captured in the design file to ensure accuracy and uniformity to MDT design Standards.
- Constructs and analyzes 3D models including DEM (Digital Elevation Models), DSM (Digital Surface Models) and DTM (Digital Terrain Models) from compiled aerial survey data.
- Combines data from multiple data sources including, terrestrial and Mobile, and airborne LiDAR, Static and Real Time Kinematic (RTK) Global Positioning Systems (GPS), photogrammetric systems used on manned and unmanned (UAS) aircraft, as well as a variety of new systems and technology as they emerge into the geospatial arena into a single 3D model per project specific design.
- Performs quality control checks of compiled aerial survey data to ensure adherence to MDT standards and accuracy of the final model to meet ASPRS (American Society for Photogrammetry and Remote sensing) for positional Accuracy Standards for Digital Geospatial Data.

- Converts final 3D surface models from the aerial survey software to the standard XML format for placement on PCMS (Project Content Management System).
- Produces final photo mosaics and geo referenced orthophotos and geo referenced photo mosaics.

Project Planning - 20%

Level I

- Makes landowner contacts to obtain permission to survey and to identify and resolve minor survey related complaints and concerns.
- Supervised activities subject to review and approval by supervisor or senior Photogrammetrists
    - Designs of individualized control layouts and designs aerial flight plans to be used for acquisition of the aerial survey photography. This includes determining flight line locations; determines flying height, photographic endlap and sidelap which is necessary information to be used by the pilot and the aerial photographer.
    - Compiles photo identification control point information to be used in the bridging operations.
    - Performs operational photogrammetric work in the field or office to assist in establishing horizontal and vertical values of control points using applicable survey procedures dependent upon terrain conditions and accuracy requirements.

Level II

- Coordinates with the Project Manager to identify project specific design, project mapping issues, mapping limits and accuracy requirements.
- Designs the individualized photo control plan and designs aerial flight plans to be used for acquisition of the aerial survey photography. This includes determining flight line locations; determine flying height, photographic endlap and sidelap which is necessary information to be used by the pilot and the aerial photographer.
- Inspects the final photography for quality and determines if the aerial photography is acceptable for aerial surveying and design mapping purposes.
- Directs the process of identifying and transferring photo control point information from flight plans to the final imagery and drafting a schematic for use in subsequent aerial survey operations.
- Compiles or directs the compilation of photo identification control point information and requests a field survey of these points to be used in the bridging operations.
- Verifies ROE's (Right of Entry) for the project have been obtained prior to surveying and review ROEs to identify any landowner related complaints and concerns.

Engineering Survey Review and Approval, Equipment Calibration - 10%

Level I

- Reviews consultant surveys to ensure quality, consistency, efficiency, and compliance with standards and policies.
- Adjusts, maintains and cleans aerial survey equipment to assure proper alignment, operation, and safety in accordance with manufactures recommendations.

- Supervised activities subject to review and approval by supervisor or senior photogrammetrists:
    - Routinely verifies calibration and/or calibrates aerial survey equipment (e.g.- stereoscopic instruments, aerial film scanner. etc.) to ensure accurate information is being compiled. Equipment is run through a series of calibration verification procedures and programs and by using mathematical and aerial survey knowledge in analyzing the results.
- Orders and maintains an inventory of supplies to assure availability when needed.

Level II

- Coordinates review of in-house and consultant surveys to ensure quality, consistency, efficiency, and compliance with standards and policies.
- Manages and regularly maintains Survey/Drone equipment (e.g.- camera and lidar sensors).
- Routinely verifies calibration and/or calibrates aerial survey equipment (e.g.- stereoscopic instruments, aerial film scanner. etc.) to ensure accurate information is being compiled. Equipment is run through a series of calibration verification procedures and programs and by using mathematical and aerial survey knowledge in analyzing the results.
- Tests and analyzes new procedures and equipment and evaluates time efficient and cost-effective aerial survey methods and procedures. Report findings and recommendations to management.

Supervision: The number of employees supervised is: 0

Physical and Environmental Demands:

- Extensive statewide travel (travel is estimated to range from 10% to 30% of the time)
- Lifting objects more than 30 lbs.
- Continual walking or standing and the ability to walk over uneven terrain or in water.
- Exposure to extreme weather conditions and high-speed traffic.
- Operation of motor vehicles, survey, and related equipment.

Knowledge, Skills and Abilities (Behaviors):

Level I:

- Knowledge of basic mathematics of photogrammetry including algebra, geometry, and trigonometry.
- Knowledge of stereoscopic instruments and photogrammetric applications; photo-identification of control; topographic and cartographic practice; aerial photographic practice.
- Knowledge of field procedure for control surveys; photointerpretation; concepts of photogrammetric engineering and surveying.

Level II:

- Knowledge of stereoscopic instruments and photogrammetric applications; photo-identification of control and control planning; surveying practice related to photogrammetry; aerial survey contract preparation and administration.
- Working knowledge of the principles of photogrammetric engineering and surveying; map accuracy evaluation.

- Ability to effectively communicate in writing and verbally.
- Ability to prepare plans, specifications and estimates for large and complex aerial survey projects; plan, direct, and coordinate the work of others.
- Ability to analyze situations accurately and take effective action.
- Ability and skilled to dictate correspondence and prepare reports.

Minimum Qualifications (Education and Experience):

Level I Photogrammetrist:

The required knowledge and skills are typically acquired through a combination of advanced education and experience equivalent to an Associate's Degree in Land Surveying, Geomatics, GIS Planning, or a related field from an accredited college or university. Related degree must include significant coursework in survey related math, drafting, and surveying techniques, engineering, and planning.

Six (6) months experiencing performing Aerial Survey Data assimilation, orientation, bridging & aerial triangulation, Engineering Survey Review and Approval, Equipment Calibration, Project Planning and or Compilation of Aerial Survey Data. Or other duties and responsibilities closely related to Photogrammetrist.

Certifications: FAA Part 107 Remote Pilot certificate is required and must be obtained within 180 days of employment.

Alternative qualifications include: Any combination of additional related work experience and education equivalent to the minimum qualifications.

Level II Photogrammetrist:

The required knowledge and skills are typically acquired through a combination of advanced education and experience equivalent to an Associate's Degree in Land Surveying, Geomatics, GIS Planning, or a related field from an accredited college or university. Related degree must include significant coursework in survey related math, drafting, and surveying techniques, engineering, and planning.

Preferred Bachelor's Degree in Land Surveying, Geomatics, GIS Planning, or a related field from an accredited college or university. Related degree must include significant coursework in survey related math, drafting, and surveying techniques, engineering, and planning.

Two (2) years' experience performing Aerial Survey Data assimilation, orientation, bridging & aerial triangulation, Engineering Survey Review and Approval, Equipment Calibration, Project Planning and or Compilation of Aerial Survey Data. Or other duties and responsibilities closely related to Photogrammetrist.

Certifications: Registration as a Montana Professional Land Surveyor (PLS) is preferred.
FAA Part 107 Remote Pilot certificate is required and must be obtained within 180 days of employment.

Alternative qualifications include: Any combination of additional related work experience and education equivalent to the minimum qualifications.

Special Requirements:

☐	Fingerprint check	☒	Valid driver's license
☐	Background check	☐	Other; Describe.
035	Union Code		Safety Responsibilities

The specific statements shown in each section of this description are not intended to be all inclusive. They represent typical elements and criteria considered necessary to perform the job successfully.

Signatures

My signature below indicates the statements in the job description are accurate and complete.

Immediate Supervisor	**Title**	**Date**

Administrative Review	**Title**	**Date**

My signature below indicates that I have read this job description.

Employee	**Title**	**Date**

Human Resources Review

Level 1
Job Code Title: Photogrammetrist 1 **Job Code Number: D11101**

Level 2
Job Code Title: Photogrammetrist 2 **Job Code Number: D11102**

My signature below indicates that Human Resources has reviewed this job description for completeness and has made the following determinations:

☐	FLSA Exempt	☒	FLSA Non-Exempt
☐	Telework Available	☒	Telework Not Available
☒	Classification Complete	☐	Organizational Chart attached.

Human Resources:

Tiffany Thornton	HR Generalist	5-30-2024
Signature	**Title**	**Date**