



C. Management and Technical Approach

Our firm brings a proven, client-focused approach to on-call aerial mapping, LiDAR, and orthophoto services. We combine experienced project management with industry-leading geospatial technology to deliver accurate, timely, and fully compliant deliverables for transportation, infrastructure, and land development projects. The following sections describe our management structure, internal quality procedures, and technical capabilities that directly support effective on-call project delivery.

C.1 FIRM QUALIFICATIONS AND RELEVANT EXPERIENCE

Our firm specializes in airborne and ground-based geospatial data acquisition, processing, and deliverable production for public-agency clients. We hold active contracts with transportation departments, municipal agencies, and regional planning organizations, with experience spanning urban corridors, rural rights-of-way, and complex infrastructure environments. Key qualifications include:

- **Caltrans Experience:** We have completed numerous projects under Caltrans oversight, including projects compliant with Caltrans Survey Manual, CADD Users Manual, and Plans Preparation Manual standards.
- **On-Call Contract History:** We have performed on-call task-order services for multiple agencies, demonstrating our capacity to mobilize rapidly, manage variable workloads, and meet compressed project schedules.
- **Insurance and Compliance:** We maintain all required professional liability, general liability, and commercial auto insurance coverage, and are fully compliant with prevailing wage and DBE requirements where applicable.

C.2 MANAGEMENT APPROACH AND INTERNAL PROCEDURES

Our management approach for on-call services is built on clear lines of authority, proactive communication, and disciplined use of project controls. We designate a single Project Manager (PM) for each task order, who serves as the primary point of contact from Notice to Proceed (NTP) through final deliverable acceptance.

Key management practices include:

- **Dedicated Project Manager:** Each task order is assigned a dedicated PM who coordinates all field, processing, and QA activities, and is responsible for budget, schedule, and deliverable compliance.
- **Task Order Mobilization Protocol:** Upon receipt of an NTP, the PM convenes an internal kick-off within 24 hours to assign personnel, confirm equipment availability, review scope, and establish the project schedule and communication plan.



- **Schedule Management:** We use Microsoft Project and cloud-based project management tools to track milestones, flag schedule risks early, and maintain transparent progress reporting for the agency.
- **Subconsultant Oversight:** Where subconsultants are engaged, we require them to adhere to our internal QA/QC procedures and maintain all required certifications, and we take full contractual responsibility for their work product.
- **Document Control:** All project files, correspondence, field notes, calibration records, and deliverables are stored in a structured, version-controlled document management system accessible to both project staff and agency reviewers upon request.
- **Invoicing and Progress Reporting:** We provide monthly progress reports and invoices with detailed labor and expense breakdowns, ensuring full transparency and compliance with agency financial reporting requirements.

C.3 TECHNICAL CAPABILITIES

Our firm maintains an integrated suite of airborne sensors, ground-based survey equipment, and processing infrastructure to deliver complete aerial mapping, LiDAR, and orthophoto products. Our in-house capabilities eliminate dependence on third-party data providers for core acquisition and processing services.

C.3.1 Aerial Mapping and Photogrammetry

We operate fixed-wing and multi-rotor aerial platforms equipped with calibrated large-format metric cameras for photogrammetric mapping. Our photogrammetric workflow follows ASPRS Accuracy Standards for Digital Geospatial Data and supports the production of:

- Topographic mapping at scales of 1:600 to 1:12,000 (1" = 50' to 1" = 1,000')
- Digital Elevation Models (DEMs) and Digital Terrain Models (DTMs)
- Contour generation at 0.5-ft, 1-ft, 2-ft, and 5-ft intervals
- Feature extraction for planimetric mapping (roads, structures, vegetation, utilities, hydrography)
- Aerial triangulation and bundle block adjustment using aerotriangulation software (MATCH-AT, Agisoft Metashape, or Trimble Inpho)

All aerial acquisition missions are planned using industry software (UASMaster, Pix4D Mapper, or equivalent) to ensure required forward and side overlap, GSD targets, and sun angle constraints are met.

C.3.2 Airborne LiDAR Acquisition and Processing

We provide end-to-end airborne LiDAR services, from mission planning through classified point cloud and derivative deliverable production. Our capabilities include:

- **Sensors:** We operate multispectral and topographic LiDAR sensors (Riegl VUX, Leica ALS, or equivalent) capable of achieving point densities from 8 to 100+ points per square meter depending on project requirements.



- **Boresight Calibration:** All LiDAR sensors are boresight-calibrated prior to each project and verified using calibration ranges to ensure angular and positional accuracy.
- **Ground Control and Base Stations:** We establish primary and check control using GPS/GNSS static surveys and maintain base stations at densities consistent with project accuracy requirements and ASPRS standards.
- **Point Cloud Classification:** Post-processing includes automated and manual classification of ground, vegetation, buildings, water, and feature classes using TerraScan, LAStools, and custom scripting pipelines.
- **Derivative Products:** From classified point clouds we generate bare-earth DEMs, first-return DSMs, canopy height models, intensity images, and breakline-enforced TINs.
- **Accuracy Verification:** We perform independent vertical accuracy testing using check points collected by GNSS and conventional survey methods, reported in full accuracy assessment reports per ASPRS guidelines.

Our LiDAR deliverables are provided in LAS/LAZ 1.4 format with full WKT projection metadata, compatible with MicroStation, Civil 3D, Global Mapper, and ArcGIS platforms.

C.3.3 Orthophoto Production

We produce true and color-balanced orthophotos and orthomosaics using digital orthorectification processes that account for sensor geometry, camera calibration, lens distortion, and terrain relief displacement. Our orthophoto production capabilities include:

- **Resolution:** We routinely produce orthophotos at 3", 6", 1-ft, and 2-ft ground sample distance (GSD) to meet project-specific scale and accuracy requirements.
- **Radiometric Processing:** We apply automated and manual radiometric balancing, color normalization, and seamline editing to produce visually seamless orthomosaics across large corridor and areal projects.
- **Multispectral Imagery:** In addition to standard RGB, we offer near-infrared (NIR) and NDVI-processed orthophotos for vegetation analysis and environmental assessments.
- **Formats:** Deliverables are provided as GeoTIFF with embedded metadata, ECW, MrSID, or as tiled products in ESRI, OGC, or Caltrans-specified formats.
- **Coordinate Systems:** All products are delivered in the specified project coordinate system, including SPCS Zone 3 (NAD83), UTM, or agency-defined datums, with full metadata documentation.

C.4 QUALITY ASSURANCE AND QUALITY CONTROL

Quality control is embedded at every phase of our workflow, not applied as a final-step review. Our QA/QC program follows a three-tier model:

- **Tier 1 – Technician Self-Check:** Each data processor performs an independent review of their own work against project specifications before handoff.
- **Tier 2 – Senior Technical Review:** A senior technician or chief of survey independently reviews all processed data, accuracy reports, and draft deliverables against contract specifications and agency standards.



- **Tier 3 – PM / PLS Final Approval:** The Project Manager and/or licensed PLS performs a final review and signs off on all deliverables before submission, including verification of coordinate systems, datums, accuracy compliance, and metadata completeness.

Non-conformances identified at any tier are documented, corrected, and re-checked before advancing. We maintain internal QA checklists for each product type that are archived as part of the project record.

C.5 SPECIALIZED EXPERTISE AND UNIQUE QUALIFICATIONS

We offer several specialized capabilities that distinguish our team for on-call work within the applicable Service Groups:

- **Transportation Corridor Mapping:** We have extensive experience mapping active freeway and highway corridors, including managing FAA coordination, Caltrans encroachment permits, Temporary Traffic Control (TTC) plans, and night-flying operations when required.
- **Mobile LiDAR and Ground Survey Integration:** We integrate airborne LiDAR data with mobile LiDAR and conventional survey data to provide seamless, full-detail mapping in areas of dense overhead canopy, under-bridge zones, and urban canyons where aerial systems cannot achieve sufficient coverage.
- **SPCS and Geodetic Control Expertise:** Our survey team is experienced in establishing and certifying SPCS CA Zone 3 geodetic control networks consistent with NGS standards, ensuring seamless integration with existing agency control infrastructure.
- **As-Built and ROW Mapping:** We have produced as-built topographic surveys and right-of-way mapping for transportation agencies, including breakline extraction, utility mapping from exposed facilities, and field-verified feature attribution.
- **Rapid Turnaround Capability:** We maintain a standing field crew and processing team available for expedited mobilization, and have completed emergency response mapping projects within 48 to 72 hours of NTP on short-notice task orders.
- **Software and Format Compatibility:** Our deliverables are routinely formatted for direct import into MicroStation (DGN V8), AutoCAD Civil 3D (DWG), ArcGIS (SHP, GDB, TIFF), and QGIS, ensuring seamless integration into agency workflows.

We are committed to delivering accurate, timely, and agency-compliant geospatial products that support informed decision-making throughout the project lifecycle. Our team is prepared to meet the full scope of on-call service demands under any applicable Service Group and looks forward to partnering with your agency on future projects.