

STATE OF MICHIGAN
 DEPARTMENT OF TECHNOLOGY, MANAGEMENT & BUDGET
 PROCUREMENT

525 W. ALLEGAN STREET
 LANSING, MI 48933

P.O. BOX 30026
 LANSING, MI 48909

NOTICE OF CONTRACT NO. 071B6600034

between
 THE STATE OF MICHIGAN
 and

NAME & ADDRESS OF CONTRACTOR	PRIMARY CONTACT	EMAIL
Axis GeoSpatial LLC 101 Bay Street Easton, MD 21601	Meghan Lahman	mlahman@axisgeospatial.com
	PHONE	VENDOR TAX ID # (LAST FOUR DIGITS ONLY)
	410.822.1441 x109	1409

STATE CONTACTS	AGENCY	NAME	PHONE	EMAIL
PROGRAM MANAGER	DTMB - CSS	Everett Root	517-335-7180	RootE@michigan.gov
CONTRACT ADMINISTRATOR	DTMB - Procurement	Terry Mead	517-284-7035	meadt@michigan.gov

CONTRACT SUMMARY			
DESCRIPTION:			
Aerial Imaging services to include: Ortho-Imagery and Optional Oblique Services – DTMB CSS			
INITIAL TERM	EFFECTIVE DATE	INITIAL EXPIRATION DATE	AVAILABLE OPTIONS
3 Years	1/11/2016	1/10/2019	5, 1-Year Options
PAYMENT TERMS	F.O.B.	SHIPPED TO	
Net 45	NA	NA	
ALTERNATE PAYMENT OPTIONS		EXTENDED PURCHASING	
<input type="checkbox"/> P-card <input type="checkbox"/> Direct Voucher (DV) <input type="checkbox"/> Other		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
MINIMUM DELIVERY REQUIREMENTS			
NA			
MISCELLANEOUS INFORMATION			
<p>It is the State's intent to acquire ortho-imagery for approximately 20% of the State each year over the next 5 years. In addition, the State plans to extend services and pricing established through this Contract to State partners, which may include, but are not limited to, local and federal government entities (collectively, "State Partners"). The Contract also includes oblique imagery data as optional services that the State may need in the future.</p> <p>Ortho-imagery requirements in the amount of \$1,453,875.00, and optional Oblique Imagery requirements in the amount of \$445,500.00</p>			
ESTIMATED CONTRACT VALUE AT TIME OF EXECUTION		\$1,899,375.00	

For the Contractor:

Justin Lahman,
Contract Administrator

Date

Axis GeoSpatial LLC

For the State:

Sharon Walenga-Maynard,
Sourcing Director DTMB Procurement
State of Michigan

Date



STATE OF MICHIGAN

STANDARD CONTRACT TERMS

This STANDARD CONTRACT (“**Contract**”) is agreed to between the State of Michigan (the “**State**”) and **Axis GeoSpatial LLC** (“**Contractor**”), a **Maryland Limited Liability Company**. This Contract is effective on January 11, 2016 (“**Effective Date**”), and unless terminated, expires on January 10, 2019 (the “**Term**”).

This Contract may be renewed for up to five (5) additional one (1) year periods. Renewal must be by written notice from the State and will automatically extend the Term of this Contract.

The parties agree as follows:

1. **Statements of Work.** Contractor shall provide the services (“**Services**”) and deliverables (“**Deliverables**”) for each project pursuant to an executed Statement of Work entered into under this Contract (each, a “**Statement of Work**”). No Statement of Work shall be effective unless signed by each party’s Project Manager. The term of each Statement of Work shall commence on the parties’ full execution of the Statement of Work and terminate when the parties have fully performed their obligations. The terms and conditions of this Contract will apply at all times to any Statements of Work entered into by the parties under this Contract. The State shall have the right to terminate a Statement of Work as set forth in **Sections 20 and 21** of this Contract. Once a Statement of Work has been agreed to by the parties, the State will issue a corresponding purchase order (“**Purchase Order**”). The Statement of Work must identify each parties’ project manager for that particular Statement of Work (“**Project Manager**”).
2. **Change Control Process.** The State may at any time request in writing (each, a “**Change Request**”) changes to a Statement of Work, including changes to the Services and Deliverables (each, a “**Change**”). Upon the State’s submission of a Change Request, the parties will evaluate and implement all Changes in accordance with this **Section 2**.
 - a. As soon as reasonably practicable, and in any case within fifteen (15) business days following receipt of a Change Request, Contractor will provide the State with a written proposal for implementing the requested Change (“**Change Proposal**”), setting forth:
 - i. a written description of the proposed Changes to any Services or Deliverables;
 - ii. the schedule for commencing and completing any additional or modified Services or Deliverables; and
 - iii. any increase or decrease in costs resulting from the proposed Changes, which increase or decrease will reflect only the increase or decrease in time and expenses Contractor requires to carry out the Change.
 - b. Within fifteen (15) Business Days following the State’s receipt of a Change Proposal, the State will by written notice to Contractor, approve, reject, or propose modifications to such Change Proposal. If the State proposes modifications, Contractor must modify and re-deliver the Change Proposal reflecting such modifications, or notify the State of any disagreement, in which event the parties will



negotiate in good faith to resolve their disagreement. Upon the State's approval of the Change Proposal or the parties' agreement on all proposed modifications, as the case may be, the parties will execute a written agreement to the Change Proposal ("**Change Notice**"), which Change Notice will be signed by the State's Contract Administrator and will constitute an amendment to the Statement of Work to which it relates.

- c. If the parties fail to enter into a Change Notice within fifteen (15) Business Days following the State's response to a Change Proposal, the State may, in its discretion:
 - i. require Contractor to perform the Services under the Statement of Work without the Change;
 - ii. require Contractor to continue to negotiate a Change Notice;
 - iii. initiate a dispute resolution procedure under **Section 38**; or
 - iv. notwithstanding any provision to the contrary in the Statement of Work, terminate the Statement of Work.
 - d. No Change will be effective until the parties have executed a Change Notice. Except as the State may request in its Change Request or otherwise in writing, Contractor must continue to perform its obligations in accordance with the Statement of Work pending negotiation and execution of a Change Notice. Contractor will use its best efforts to limit any delays or cost increases from any Change to those necessary to perform the Change in accordance with the applicable Change Notice. Each party is responsible for its own costs and expenses of preparing, evaluating, negotiating, and otherwise processing any Change Request, Change Proposal, and Change Notice.
 - e. The performance of any functions, activities, tasks, obligations, roles and responsibilities comprising the Services as described in this Contract are considered part of the Services and, thus, will not be considered a Change. This includes the delivery of all Deliverables in accordance with their respective specifications, and the diagnosis and correction of deficiencies discovered in Deliverables prior to their Acceptance by the State.
 - f. Contractor may, on its own initiative and at its own expense, prepare and submit its own Change Request to the State. However, the State will be under no obligation to approve or otherwise respond to a Change Request initiated by Contractor.
3. **Performance of Services.** Contractor will provide all Services and Deliverables in a timely, professional and workmanlike manner and in accordance with the terms, conditions, and specifications set forth in this Contract and the applicable Statement of Work.
- a. **State Standards**
 - i. To the extent that Contractor has access to the State's computer system, The Contractor must adhere to all existing standards as described within the comprehensive listing of the State's existing technology standards at <http://www.michigan.gov/dmb/0,4568,7-150-56355-108233--,00.html>
 - ii. To the extent that Contractor has access to the State's computer system, Contractor must comply with the State's Acceptable Use Policy, see



http://michigan.gov/cybersecurity/0,1607,7-217-34395_34476---,00.html. All Contractor personnel will be required, in writing, to agree to the State's Acceptable Use Policy before accessing the State's system. The State reserves the right to terminate Contractor's access to the State's system if a violation occurs.

b. Contractor Personnel

- i. Contractor is solely responsible for all Contractor personnel and for the payment of their compensation, including, if applicable, withholding of income taxes, and the payment and withholding of social security and other payroll taxes, unemployment insurance, workers' compensation insurance payments and disability benefits.
- ii. Prior to any Contractor personnel performing any Services, Contractor will:
 1. ensure that such Contractor personnel have the legal right to work in the United States; and
 2. require such Contractor Personnel to execute written agreements, in form and substance acceptable to the State, that bind such Contractor Personnel to confidentiality provisions that are at least as protective of the State's information (including all Confidential Information) as those contained in this Contract and intellectual property rights provisions that grant the State rights in the Deliverables consistent with the provisions of **Section 10** and, upon the State's request, provide the State with a copy of each such executed Contract.
- iii. Contractor and all Contractor Personnel will comply with all rules, regulations, and policies of the State that are communicated to Contractor in writing, including security procedures concerning systems and data and remote access, building security procedures, including the restriction of access by the State to certain areas of its premises or systems, and general health and safety practices and procedures.
- iv. The State reserves the right to require the removal of any Contractor personnel found, in the judgment of the State, to be unacceptable. The State's request must be written with reasonable detail outlining the reasons for the removal request. Replacement personnel for the removed person must be fully qualified for the position. If the State exercises this right, and Contractor cannot immediately replace the removed personnel, the State agrees to negotiate an equitable adjustment in schedule or other terms that may be affected by the State's required removal.

c. **Background Checks.** Upon request, Contractor must perform background checks on all employees and subcontractors and its employees prior to their assignment. The scope is at the discretion of the State and documentation must be provided as requested. Contractor is responsible for all costs associated with the requested background checks. The State, in its sole discretion, may also perform background checks.

d. Contractor's Key Personnel

- i. The State has the right to recommend and approve in writing the initial assignment, as well as any proposed reassignment or replacement, of any key personnel, identified in a



Statement of Work (“**Key Personnel**”). Before assigning an individual to any Key Personnel position, Contractor will notify the State of the proposed assignment, introduce the individual to the State’s Project Manager, and provide the State with a resume and any other information about the individual reasonably requested by the State. The State reserves the right to interview the individual before granting written approval. In the event the State finds a proposed individual unacceptable, the State will provide a written explanation including reasonable detail outlining the reasons for the rejection.

- ii. Contractor will not remove any Key Personnel from their assigned roles on this Contract without the prior written consent of the State. The Contractor’s removal of Key Personnel without the prior written consent of the State is an unauthorized removal (“**Unauthorized Removal**”). An Unauthorized Removal does not include replacing Key Personnel for reasons beyond the reasonable control of Contractor, including illness, disability, leave of absence, personal emergency circumstances, resignation, or for cause termination of the Key Personnel’s employment. Any Unauthorized Removal may be considered by the State to be a material breach of this Contract, in respect of which the State may elect to terminate this Contract for cause under **Section 20**.
- iii. It is further acknowledged that an Unauthorized Removal will interfere with the timely and proper completion of this Contract, to the loss and damage of the State, and that it would be impracticable and extremely difficult to fix the actual damage sustained by the State as a result of any Unauthorized Removal. Therefore, Contractor and the State agree that in the case of any Unauthorized Removal in respect of which the State does not elect to exercise its rights under **Section 20**, Contractor will issue to the State the corresponding credits set forth below (each, an “**Unauthorized Removal Credit**”):
 1. For the Unauthorized Removal of any Key Personnel designated in the applicable Statement of Work, the credit amount will be \$25,000.00 per individual if Contractor identifies a replacement approved by the State and assigns the replacement to shadow the Key Personnel who is leaving for a period of at least 30 calendar days before the Key Personnel’s removal.
 2. If Contractor fails to assign a replacement to shadow the removed Key Personnel for at least 30 calendar days, in addition to the \$25,000.00 credit specified above, Contractor will credit the State \$833.33 per calendar day for each day of the 30 calendar-day shadow period that the replacement Key Personnel does not shadow the removed Key Personnel, up to \$25,000.00 maximum per individual. The total Unauthorized Removal Credits that may be assessed per Unauthorized Removal and failure to provide 30 calendar days of shadowing will not exceed \$50,000.00 per individual.
- iv. Contractor acknowledges and agrees that each of the Unauthorized Removal Credits assessed under **Subsection iii** above: (i) is a reasonable estimate of and compensation for the anticipated or actual harm to the State that may arise from the Unauthorized Removal, which would be impossible or very difficult to accurately estimate; and (ii) may, at the State’s option, be credited or set off against any fees or other charges payable to Contractor under this Contract.



4. **Notices.** All notices and other communications required or permitted under this Contract must be in writing and will be considered given and received: (a) when verified by written receipt if sent by courier; (b) when actually received if sent by mail without verification of receipt; or (c) when verified by automated receipt or electronic logs if sent by facsimile or email.

If to State:	If to Contractor:
Terry Mead 525 W. Allegan, 1st Floor Lansing, MI 48913 meadt@michigan.gov 517-284-7035	Meghan Lahman 101 Bay Street, Easton MD 21601 mlahman@axisgeospatial.com 410.822.1441 x109

5. **Contract Administrators.** The Contract Administrator for each party is the only person authorized to modify any terms and conditions of this Contract (each a “**Contract Administrator**”):

State:	Contractor:
Terry Mead 525 W. Allegan, 1 st Floor Lansing, MI 48913 meadt@michigan.gov 517-284-7035	Justin Lahman 101 Bay Street, Easton MD 21601 jlahman@axisgeospatial.com 410.822.1441 x106

6. **Program Manager.** The Program Manager for each party will monitor and coordinate the day-to-day activities of the Contract (each a “**Program Manager**”):

State:	Contractor:
Everett Root 111 S. Capitol Avenue, 10 th Floor Lansing, MI 48933 roote@michigan.gov 517-335-7180	Allan Blades, Project Manager 101 Bay Street, Easton MD 21601 ablades@axisgeospatial.com 410.822.1441 x102

7. **Insurance Requirements.** Contractor must maintain the insurances identified below and is responsible for all deductibles. All required insurance must: (a) protect the State from claims that may arise out of, are alleged to arise out of, or result from Contractor's or a subcontractor's performance; (b) be primary and non-contributing to any comparable liability insurance (including self-insurance) carried by the State; and (c) be provided by an company with an A.M. Best rating of "A" or better and a financial size of VII or better.

Insurance Type	Additional Requirements
Commercial General Liability Insurance	
<u>Minimal Limits:</u> \$1,000,000 Each Occurrence Limit \$1,000,000 Personal & Advertising Injury Limit \$2,000,000 General Aggregate Limit \$2,000,000 Products/Completed Operations	Contractor must have their policy endorsed to add “the State of Michigan, its departments, divisions, agencies, offices, commissions, officers, employees, and agents” as additional insureds using endorsement CG



<p><u>Deductible Maximum:</u> \$50,000 Each Occurrence</p>	<p>20 10 11 85, or both CG 2010 07 04 and CG 2037 07 0.</p>
<p>Umbrella or Excess Liability Insurance</p>	
<p><u>Minimal Limits:</u> \$5,000,000 General Aggregate</p>	<p>Contractor must have their policy endorsed to add “the State of Michigan, its departments, divisions, agencies, offices, commissions, officers, employees, and agents” as additional insureds.</p>
<p>Automobile Liability Insurance</p>	
<p><u>Minimal Limits:</u> \$1,000,000 Per Occurrence</p>	
<p>Workers' Compensation Insurance</p>	
<p><u>Minimal Limits:</u> Coverage according to applicable laws governing work activities.</p>	<p>Waiver of subrogation, except where waiver is prohibited by law.</p>
<p>Employers Liability Insurance</p>	
<p><u>Minimal Limits:</u> \$500,000 Each Accident \$500,000 Each Employee by Disease \$500,000 Aggregate Disease.</p>	
<p>Privacy and Security Liability (Cyber Liability) Insurance</p>	

<p><u>Minimal Limits:</u> \$1,000,000 Each Occurrence \$1,000,000 Annual Aggregate</p>	<p>Contractor must have their policy: (1) endorsed to add “the State of Michigan, its departments, divisions, agencies, offices, commissions, officers, employees, and agents” as additional insureds; and (2) cover</p>
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	information security and privacy liability, privacy notification costs, regulatory defense and penalties, and website media content liability.
Hired and Non-Owned Motor Vehicle Insurance	
<u>Minimal Limits:</u> \$1,000,000 Per Accident	Contractor must have their policy endorsed to add “the State of Michigan, its departments, divisions, agencies, offices, commissions, officers, employees, and agents” as additional insureds.
Professional Liability (Errors and Omissions) Insurance	
<u>Minimal Limits:</u> \$3,000,000 Each Occurrence \$3,000,000 Annual Aggregate <u>Deductible Maximum:</u> \$50,000 Per Loss	

If any of the required policies provide **claims-made** coverage, the Contractor must: (a) provide coverage with a retroactive date before the effective date of the contract or the beginning of Services; (b) maintain coverage and provide evidence of coverage for at least three (3) years after completion of the Services; and (c) if coverage is canceled or not renewed, and not replaced with another claims-made policy form with a retroactive date prior to the contract effective date, Contractor must purchase extended reporting coverage for a minimum of three (3) years after completion of work.



Contractor must: (a) provide insurance certificates to the Contract Administrator, containing the agreement or purchase order number, at Contract formation and within 20 calendar days of the expiration date of the applicable policies; (b) require that subcontractors maintain the required insurances contained in this Section; (c) notify the Contract Administrator within 5 business days if any insurance is cancelled; and (d) waive all rights against the State for damages covered by insurance. Failure to maintain the required insurance does not limit this waiver.

This Section is not intended to and is not be construed in any manner as waiving, restricting or limiting the liability of either party for any obligations under this Contract (including any provisions hereof requiring Contractor to indemnify, defend and hold harmless the State).

8. **Extended Purchasing Program.** This Contract is extended to MiDEAL members. MiDEAL members include local units of government, school districts, universities, community colleges, and nonprofit hospitals. A current list of MiDEAL members is available at www.michigan.gov/mideal. Upon written agreement between the State and Contractor, this Contract may also be extended to other states (including governmental subdivisions and authorized entities).

If extended, Contractor must supply all Services and Deliverables at the established Contract prices and terms. The State reserves the right to negotiate additional discounts based on any increased volume generated by such extensions.

Contractor must submit invoices to, and receive payment from, extended purchasing program members on a direct and individual basis.

9. **Independent Contractor.** Contractor is an independent contractor and assumes all rights, obligations and liabilities set forth in this Contract. Contractor, its employees, and agents will not be considered employees of the State. No partnership or joint venture relationship is created by virtue of this Contract. Contractor, and not the State, is responsible for the payment of wages, benefits and taxes of Contractor's employees and any subcontractors. Prior performance does not modify Contractor's status as an independent contractor.
10. **Intellectual Property Rights.** Contractor hereby acknowledges that the State is and will be the sole and exclusive owner of all right, title, and interest in the Deliverables and all associated intellectual property rights, if any. Such Deliverables are works made for hire as defined in Section 101 of the Copyright Act of 1976. To the extent any Deliverables do not qualify as works made for hire under the Copyright Act, Contractor will, and hereby does, (a) immediately on its creation, assign, transfer and otherwise convey to the State, irrevocably and in perpetuity, throughout the universe, all right, title and interest in and to the Deliverables, including all intellectual property rights therein, and (b) irrevocably waives any and all claims Contractor may now or hereafter have in any jurisdiction to so-called "moral rights" or rights of *droit moral* with respect to the Deliverables. For purposes of this Contract, "**intellectual property rights**" means the following: all deliverables provided to and accepted by the State through this Contract. Contractor will not restrict the use, modification, copying, distribution, resale, etc. of any deliverables provided via this Contract.

11. **Subcontracting.**



- a. Contractor may not delegate any of its obligations under the Contract without the prior written approval of the State. Contractor must notify the State at least 90 calendar days before the proposed delegation, and provide the State any information it requests to determine whether the delegation is in its best interest. If approved, Contractor must: (a) be the sole point of contact regarding all contractual matters, including payment and charges for all Services and Deliverables; (b) make all payments to the subcontractor; and (c) incorporate the terms and conditions contained in this Contract in any subcontract with a subcontractor. Contractor remains responsible for the completion of the Services and Deliverables, compliance with the terms of this Contract, and the acts and omissions of the subcontractor. The State, in its sole discretion, may require the replacement of any subcontractor.
- b. Prior to the provision of Services or creation of Deliverables by any subcontractor:
- i. obtain from such subcontractor confidentiality, work-for-hire and intellectual property rights assignment agreements, in form and substance acceptable by the State, giving the State rights consistent with those set forth in **Section 10** and, upon request, provide the State with a fully-executed copy of each such contract; and
 - ii. with respect to all subcontractor employees providing Services or Deliverables, comply with its obligations under **Section 3.b**.
12. **Assignment.** Contractor may not assign this Contract to any other party without the prior written approval of the State. Upon notice to Contractor, the State, in its sole discretion, may assign in whole or in part, its rights or responsibilities under this Contract to any other party.
13. **Acceptance.** All Services and Deliverables must conform to the specifications and requirements set forth in the applicable Statement of Work, including any attachments thereto. Unless otherwise provided in the applicable Statement of Work, this Section shall control acceptance of all Services and Deliverables. Services and Deliverables are subject to inspection by the State within fifteen (15) calendar days of the State's receipt of them ("**State Review Period**"). If the Services and Deliverables are not fully accepted by the State, the State will notify Contractor by the end of the State Review Period that either: (a) the Services or Deliverables are accepted, but noted deficiencies must be corrected; or (b) the Services or Deliverables are rejected. If the State finds material deficiencies, it may: (i) reject the Services or Deliverables without performing any further inspections; (ii) demand performance at no additional cost; or (iii) terminate the applicable Statement of Work in accordance with **Section 20**, Termination for Cause.
- Within ten (10) business days from the date of Contractor's receipt of notification of acceptance with deficiencies or rejection of any Services or Deliverables, Contractor must cure, at no additional cost, the deficiency and deliver acceptable Services or Deliverables to the State. If acceptance with deficiencies or rejection of the Services or Deliverables impacts the content or delivery of other non-completed Services or Deliverables, the parties' respective Project Managers must determine an agreed to number of days for re-submission that minimizes the overall impact to the Contract. However, nothing herein affects, alters, or relieves Contractor of its obligations to correct deficiencies in accordance with the time response standards set forth in this Contract.
- If Contractor is unable or refuses to correct the deficiency within the time response standards set forth in this Contract, the State may cancel the Statement of Work in whole or in part. The State, or a third party identified by the State, may perform the Services and recover the difference between the cost to cure and the Contract price plus an additional 10% administrative fee.



14. **Delivery of Physical Media.** Delivery of Physical Media must be FOB Destination, and delivered as follows:
- All GeoTIFF image tiles must be organized into one sub-directory per County and as items identified in MiSAIL Appendix A – Imagery Specifications, Section 7, Deliverables,
 - Must be delivered to SOM via non-returnable external hard drive, and
 - Each partner must also receive a non-returnable external hard drive with the GeoTIFF image tiles and items identified in MiSAIL Appendix A – Imagery Specifications, Section 7, Deliverables, for their AOI.
15. **Title and Risk of Loss.** Until final acceptance, title and risk of loss or damage to physical media Deliverables remains with Contractor. Contractor is responsible for filing, processing, and collecting all damage claims. The State will record and report to Contractor any evidence of visible damage. The risk of loss of rejected or non-conforming physical media Deliverables remains with Contractor. Contractor must reimburse the State for costs and expenses incurred in storing or effecting removal, return or disposition of rejected physical media Deliverables.
16. **Warranty.** Defects in imagery and LiDAR that are reported by the customer during the customer Quality Control (QC) period shall be corrected by re-acquisition and/or re-processing. Defects in image processing reported by the customer within 12 months of the delivery of final deliverables shall be corrected by re-processing.

17. **Terms of Payment.** Invoices must conform to the requirements set forth in the Statement of Work. Overtime, holiday pay, and travel expenses will not be paid. **For this Contract, an invoice must be submitted for 25% of the project cost when *acquisition* is complete, with the remaining balance invoiced following final acceptance of Deliverables by the State.** All undisputed amounts are payable within 45 days of the State's receipt. Contractor may only charge for Services and Deliverables performed as specified in the Statement of Work. Invoices must include an itemized statement of all charges. The State is exempt from State sales tax for direct purchases and may be exempt from federal excise tax, if Services and Deliverables purchased under this Contract are for the State's exclusive use. Notwithstanding the foregoing, all prices are inclusive of taxes, and Contractor is responsible for all sales, use and excise taxes, and any other similar taxes, duties and charges of any kind imposed by any federal, state, or local governmental entity on any amounts payable by the State under this Contract.

The State has the right to withhold payment of any disputed amounts until the parties agree as to the validity of the disputed amount. The State will notify Contractor of any dispute within a reasonable time. Payment by the State will not constitute a waiver of any rights as to Contractor's continuing obligations, including claims for deficiencies or substandard Services or Deliverables. Contractor's acceptance of final payment by the State constitutes a waiver of all claims by Contractor against the State for payment under this Contract, other than those claims previously filed in writing on a timely basis and still disputed.

The State will only disburse payments under this Contract through Electronic Funds Transfer (EFT). Contractor must register with the State at <http://www.michigan.gov/cpexpress> to receive electronic fund transfer payments. If Contractor does not register, the State is not liable for failure to provide payment.

Without prejudice to any other right or remedy it may have, the State reserves the right to set off at any time any amount then due and owing to it by Contractor against any amount payable by the State to Contractor under this Contract.

18. **Liquidated Damages.**



- a. The parties agree that any delay or failure by Contractor to timely perform its obligations in accordance with the Statement of Work will cause loss and damage to the State. Further, the State will incur major costs to perform the obligations that would have otherwise been performed by Contractor. The parties understand and agree that any liquidated damages Contractor must pay to the State as a result of such nonperformance are described in the Statement of Work, and that these amounts are reasonable estimates of the State's damages in accordance with applicable law.
 - b. The parties acknowledge and agree that Contractor could incur liquidated damages for more than one event if Contractor fails to timely perform its obligations for acquisition services and production services.
 - c. The assessment of liquidated damages will not constitute a waiver or release of any other remedy the State may have under this Contract for Contractor's breach of this Contract, including without limitation, the State's right to terminate a Statement of Work for cause under **Section 20**, and the State will be entitled in its discretion to recover actual damages caused by Contractor's failure to perform its obligations under this Contract. However, the State will reduce such actual damages by the amount of liquidated damages received for the same events causing the actual damages.
 - d. Amounts due the State as liquidated damages may be set off against any fees payable to Contractor under this Contract, or the State may bill Contractor as a separate item and Contractor will promptly make payments on such bills.
19. **Stop Work Order.** The State may suspend any or all activities under the Contract at any time. The State will provide Contractor a written stop work order detailing the suspension. Contractor must comply with the stop work order upon receipt. Within 90 calendar days, or any longer period agreed to by Contractor, the State will either: (a) issue a notice authorizing Contractor to resume work, or (b) terminate the Contract. The State will not pay for Services or Deliverables, Contractor's lost profits, or any additional compensation for work begun after the effective date of the stop work order and/or initiated during a stop work period.
20. **Termination for Cause.** The State may terminate this Contract, or an individual Statement of Work, for cause, in whole or in part, if Contractor, as determined by the State: (a) endangers the value, integrity, or security of any State location, data, or personnel; (b) becomes insolvent, petitions for bankruptcy court proceedings, or has an involuntary bankruptcy proceeding filed against it by any creditor; (c) engages in any conduct that may expose the State to liability; (d) breaches any of its material duties or obligations under this Contract; or (e) fails to cure a breach within the time stated in a notice of breach. Any reference to specific breaches being material breaches within this Contract will not be construed to mean that other breaches are not material.

If the State terminates this Contract, or an individual Statement of Work, under this Section, the State will issue a termination notice specifying whether Contractor must: (a) cease performance immediately, or (b) continue to perform for a specified period. If it is later determined that Contractor was not in breach of the Contract, the termination will be deemed to have been a termination for convenience, effective as of the same date, and the rights and obligations of the parties will be limited to those provided in **Section 21**, Termination for Convenience.

The State will only pay for amounts due to Contractor for Services and Deliverables accepted by the State on or before the date of termination, subject to the State's right to set off any amounts owed by the Contractor for the State's reasonable costs in terminating this Contract. Contractor must reimburse the



State for any prepaid fees. The Contractor must pay all reasonable costs incurred by the State in terminating this Contract for cause, including administrative costs, attorneys' fees, court costs, transition costs, and any costs the State incurs to procure the Services and Deliverables from other sources.

21. **Termination for Convenience.** The State may immediately terminate this Contract, or an individual Statement of Work, in whole or in part without penalty and for any reason, including but not limited to, appropriation or budget shortfalls. The termination notice will specify whether Contractor must: (a) cease performance of the Services immediately, or (b) continue to perform the Services in accordance with **Section 22** Transition Responsibilities. If the State terminates this Contract for convenience, the State will pay all reasonable costs associated with this Contract that the Contractor has incurred up to the date of termination, and all reasonable costs associated with termination of the Contract; provided, however, the Contractor shall not be reimbursed for any anticipatory profits that have not been earned up to the date of termination. The State will pay all reasonable costs, as determined by the State, for State approved Transition Responsibilities.
22. **Transition Responsibilities.** Upon termination or expiration of this Contract for any reason, Contractor must, for a period of time specified by the State (not to exceed 90 calendar days), provide all reasonable transition assistance requested by the State, to allow for the expired or terminated portion of the Services and Deliverables to continue without interruption or adverse effect, and to facilitate the orderly transfer of such Services and Deliverables to the State or its designees. Such transition assistance may include, but is not limited to: (a) continuing to perform the Services at the established Contract rates; (b) taking all reasonable and necessary measures to transition performance of the work, including all applicable Services, reports and other documentation, to the State or the State's designee; (c) taking all necessary and appropriate steps, or such other action as the State may direct, to preserve, maintain, protect, or return to the State all materials, data, property, and confidential information provided directly or indirectly to Contractor by any entity, agent, vendor, or employee of the State; (d) transferring title in and delivering to the State, at the State's discretion, all completed or partially completed Deliverables prepared under this Contract as of the Contract termination date; and (e) preparing an accurate accounting from which the State and Contractor may reconcile all outstanding accounts (collectively, "**Transition Responsibilities**"). This Contract will automatically be extended through the end of the transition period. Any Transition Responsibilities efforts beyond those defined under **Section 22. a-e** required of the contractor by the State not listed in the Statement of Work shall be considered a "Change Request" in accordance with Section 2, Change Control Process.
23. **General Indemnification.** Contractor must defend, indemnify and hold the State, its departments, divisions, agencies, offices, commissions, officers, and employees harmless, without limitation, from and against any and all actions, claims, losses, liabilities, damages, costs, attorney fees, and expenses (including those required to establish the right to indemnification), arising out of or relating to: (a) any breach by Contractor (or any of Contractor's employees, agents, subcontractors, or by anyone else for whose acts any of them may be liable) of any of the promises, agreements, representations, warranties, or insurance requirements contained in this Contract; (b) any infringement, misappropriation, or other violation of any intellectual property right or other right of any third party; (c) any bodily injury, death, or damage to real or tangible personal property occurring wholly or in part due to action or inaction by Contractor (or any of Contractor's employees, agents, subcontractors, or by anyone else for whose acts any of them may be liable); and (d) any negligent acts or omissions of Contractor (or any of Contractor's employees, agents, subcontractors, or by anyone else for whose acts any of them may be liable).

The State will notify Contractor in writing if indemnification is sought; however, failure to do so will not relieve Contractor, except to the extent that Contractor is materially prejudiced. Contractor must, to the satisfaction of the State, demonstrate its financial ability to carry out these obligations.



The State is entitled to: (i) regular updates on proceeding status; (ii) participate in the defense of the proceeding; and (iii) employ its own counsel. Contractor will not, without the State's written consent (not to be unreasonably withheld), settle, compromise, or consent to the entry of any judgment in or otherwise seek to terminate any claim, action, or proceeding. To the extent that any State employee, official, or law may be involved or challenged, the State may, at its own expense, control the defense of that portion of the claim.

Any litigation activity on behalf of the State, or any of its subdivisions under this Section, must be coordinated with the Department of Attorney General. An attorney designated to represent the State may not do so until approved by the Michigan Attorney General and appointed as a Special Assistant Attorney General.

24. **Infringement Remedies.** If, in either party's opinion, any of the Services or Deliverables supplied by Contractor or its subcontractors, or its operation, use or reproduction, is likely to become the subject of a copyright, patent, trademark, or trade secret infringement claim, Contractor must, at its expense: (a) procure for the State the right to continue using the Services or Deliverables, or if this option is not reasonably available to Contractor, (b) replace or modify the same so that it becomes non-infringing; or (c) accept its return by the State with appropriate credits to the State against Contractor's charges and reimburse the State for any losses or costs incurred as a consequence of the State ceasing its use and returning it.
25. **Limitation of Liability.** THE STATE WILL NOT BE LIABLE, REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT, TORT, NEGLIGENCE, STRICT LIABILITY OR BY STATUTE OR OTHERWISE, FOR ANY CLAIM RELATED TO OR ARISING UNDER THIS CONTRACT FOR CONSEQUENTIAL, INCIDENTAL, INDIRECT, OR SPECIAL DAMAGES, INCLUDING WITHOUT LIMITATION LOST PROFITS AND LOST BUSINESS OPPORTUNITIES. IN NO EVENT WILL THE STATE'S AGGREGATE LIABILITY TO CONTRACTOR UNDER THIS CONTRACT EXCEED THE MAXIMUM AMOUNT OF FEES SPECIFIED IN THE APPLICABLE STATEMENT OF WORK.
26. **Disclosure of Litigation, or Other Proceeding.** Contractor must notify the State within 14 calendar days of receiving notice of any litigation, investigation, arbitration, or other proceeding (collectively, "**Proceeding**") involving Contractor, a subcontractor, or an officer or director of Contractor or subcontractor, that arises during the term of the Contract, including: (a) a criminal Proceeding; (b) a parole or probation Proceeding; (c) a Proceeding under the Sarbanes-Oxley Act; (d) a civil Proceeding involving: (1) a claim that might reasonably be expected to adversely affect Contractor's viability or financial stability; or (2) a governmental or public entity's claim or written allegation of fraud; or (e) a Proceeding involving any license that Contractor is required to possess in order to perform under this Contract.
27. **Non-Disclosure of Confidential Information.** The parties acknowledge that each party may be exposed to or acquire communication or data of the other party that is confidential, privileged communication not intended to be disclosed to third parties. The provisions of this Section survive the termination of this Contract.
- a. Meaning of Confidential Information. For the purposes of this Contract, the term "**Confidential Information**" means all information and documentation of a party that: (a) has been marked "confidential" or with words of similar meaning, at the time of disclosure by such party; (b) if disclosed orally or not marked "confidential" or with words of similar meaning, was subsequently summarized in writing by the disclosing party and marked "confidential" or with words of similar meaning; and, (c) should reasonably be recognized as confidential information of the disclosing party. The term "Confidential Information" does not include any information or documentation that



was or is: (a) subject to disclosure under the Michigan Freedom of Information Act (FOIA) by the receiving party; (b) already in the possession of the receiving party without an obligation of confidentiality; (c) developed independently by the receiving party, as demonstrated by the receiving party, without violating the disclosing party's proprietary rights; (d) obtained from a source other than the disclosing party without an obligation of confidentiality; or, (e) publicly available when received, or thereafter became publicly available (other than through any unauthorized disclosure by, or on behalf of, the receiving party).

- b. Obligation of Confidentiality. The parties agree to hold all Confidential Information in strict confidence and not to copy, reproduce, sell, transfer, or otherwise dispose of, give or disclose such Confidential Information to third parties other than employees, agents, or subcontractors of a party who have a need to know in connection with this Contract or to use such Confidential Information for any purposes whatsoever other than the performance of this Contract. The parties agree to advise and require their respective employees, agents, and subcontractors of their obligations to keep all Confidential Information confidential. Disclosure to a subcontractor is permissible where: (a) use of a subcontractor is authorized under this Contract; (b) the disclosure is necessary or otherwise naturally occurs in connection with work that is within the subcontractor's responsibilities; and (c) Contractor obligates the subcontractor in a written contract to maintain the State's Confidential Information in confidence. At the State's request, any employee of Contractor or any subcontractor may be required to execute a separate agreement to be bound by the provisions of this Section.
 - c. Cooperation to Prevent Disclosure of Confidential Information. Each party must use its best efforts to assist the other party in identifying and preventing any unauthorized use or disclosure of any Confidential Information. Without limiting the foregoing, each party must advise the other party immediately in the event either party learns or has reason to believe that any person who has had access to Confidential Information has violated or intends to violate the terms of this Contract and each party will cooperate with the other party in seeking injunctive or other equitable relief against any such person.
 - d. Remedies for Breach of Obligation of Confidentiality. Each party acknowledges that breach of its obligation of confidentiality may give rise to irreparable injury to the other party, which damage may be inadequately compensable in the form of monetary damages. Accordingly, a party may seek and obtain injunctive relief against the breach or threatened breach of the foregoing undertakings, in addition to any other legal remedies which may be available, to include, in the case of the State, at the sole election of the State, the immediate termination, without liability to the State, of this Contract or any Statement of Work corresponding to the breach or threatened breach.
 - e. Surrender of Confidential Information upon Termination. Upon termination of this Contract or a Statement of Work, in whole or in part, each party must, within 5 calendar days from the date of termination, return to the other party any and all Confidential Information received from the other party, or created or received by a party on behalf of the other party, which are in such party's possession, custody, or control. Should Contractor or the State determine that the return of any Confidential Information is not feasible, such party must destroy the Confidential Information and must certify the same in writing within 5 calendar days from the date of termination to the other party.
28. **Records Maintenance, Inspection, Examination, and Audit.** The State or its designee may audit Contractor to verify compliance with this Contract. Contractor must retain, and provide to the State or its designee and the auditor general upon request, all financial and accounting records related to the Contract through the term of the Contract and for 4 years after the latter of termination, expiration, or final payment



under this Contract or any extension (“**Audit Period**”). If an audit, litigation, or other action involving the records is initiated before the end of the Audit Period, Contractor must retain the records until all issues are resolved.

Within 10 calendar days of providing notice, the State and its authorized representatives or designees have the right to enter and inspect Contractor's premises or any other places where Services are being performed, and examine, copy, and audit all records related to this Contract. Contractor must cooperate and provide reasonable assistance. If any financial errors are revealed, the amount in error must be reflected as a credit or debit on subsequent invoices until the amount is paid or refunded. Any remaining balance at the end of the Contract must be paid or refunded within 45 calendar days.

This Section applies to Contractor, any parent, affiliate, or subsidiary organization of Contractor, and any subcontractor that performs Services in connection with this Contract.

29. **Warranties and Representations.** Contractor represents and warrants to the State that: (a) it will perform all Services in a professional and workmanlike manner in accordance with best industry standards and practices for similar services, using personnel with the requisite skill, experience and qualifications, and will devote adequate resources to meet its obligations under the applicable Statement of Work; (b) the Services and Deliverables provided by Contractor will not infringe the patent, trademark, copyright, trade secret, or other proprietary rights of any third party; (c) it has the full right, power, and authority to enter into this Contract, to grant the rights granted under this Contract, and to perform its contractual obligations; and (d) all information furnished and representations made in connection with the award of this Contract is true, accurate, and complete, and contains no false statements or omits any fact that would make the information misleading. A breach of this Section is considered a material breach of this Contract, which entitles the State to terminate this Contract under **Section 20**, Termination for Cause.
30. **Conflicts and Ethics.** Contractor will uphold high ethical standards and is prohibited from: (a) holding or acquiring an interest that would conflict with this Contract; (b) doing anything that creates an appearance of impropriety with respect to the award or performance of the Contract; (c) attempting to influence or appearing to influence any State employee by the direct or indirect offer of anything of value; or (d) paying or agreeing to pay any person, other than employees and consultants working for Contractor, any consideration contingent upon the award of the Contract. Contractor must immediately notify the State of any violation or potential violation of these standards. This Section applies to Contractor, any parent, affiliate, or subsidiary organization of Contractor, and any subcontractor that performs Services in connection with this Contract.
31. **Compliance with Laws.** Contractor must comply with all federal, state and local laws, rules and regulations.
32. **Change of Control.** Contractor will notify, at least 90 calendar days before the effective date, the State of a change in Contractor's organizational structure or ownership. For purposes of this Contract, a change in control means any of the following: (a) a sale of more than 50% of Contractor's stock; (b) a sale of substantially all of Contractor's assets; (c) a change in a majority of Contractor's board members; (d) consummation of a merger or consolidation of Contractor with any other entity; (e) a change in ownership through a transaction or series of transactions; (f) or the board (or the stockholders) approves a plan of complete liquidation. A change of control does not include any consolidation or merger effected exclusively to change the domicile of Contractor, or any transaction or series of transactions principally for bona fide equity financing purposes.



In the event of a change of control, Contractor must require the successor to assume this Contract and all of its obligations under this Contract.

33. **Nondiscrimination.** Under the Elliott-Larsen Civil Rights Act, 1976 PA 453, MCL 37.2101, *et seq.*, and the Persons with Disabilities Civil Rights Act, 1976 PA 220, MCL 37.1101, *et seq.*, Contractor and its subcontractors agree not to discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions, or privileges of employment, or a matter directly or indirectly related to employment, because of race, color, religion, national origin, age, sex, height, weight, marital status, or mental or physical disability. Breach of this covenant is a material breach of this Contract.
34. **Unfair Labor Practice.** Under MCL 423.324, the State may void any Contract with a Contractor or subcontractor who appears on the Unfair Labor Practice register compiled under MCL 423.322.
35. **Governing Law.** This Contract is governed, construed, and enforced in accordance with Michigan law, excluding choice-of-law principles, and all claims relating to or arising out of this Contract are governed by Michigan law, excluding choice-of-law principles. Any dispute arising from this Contract must be resolved in Michigan Court of Claims. Contractor consents to venue in Ingham County, and waives any objections, such as lack of personal jurisdiction or *forum non conveniens*. Contractor must appoint agents in Michigan to receive service of process.
36. **Non-Exclusivity.** Nothing contained in this Contract is intended nor will be construed as creating any requirements contract with Contractor. This Contract does not restrict the State or its agencies from acquiring similar, equal, or like Services from other sources.
37. **Force Majeure.** Neither party will be in breach of this Contract because of any failure arising from any disaster or acts of god that are beyond their control and without their fault or negligence. Each party will use commercially reasonable efforts to resume performance. Contractor will not be relieved of a breach or delay caused by its subcontractors. If immediate performance is necessary to ensure public health and safety, the State may immediately contract with a third party.
38. **Dispute Resolution.** The parties will endeavor to resolve any Contract dispute in accordance with this provision. The dispute will be referred to the parties' respective Project Managers. Such referral must include a description of the issues and all supporting documentation. The parties must submit the dispute to their Contract Administrator if unable to resolve the dispute within fifteen (15) business days. The parties will continue performing while a dispute is being resolved, unless the dispute precludes performance. A dispute involving payment does not preclude performance. Litigation to resolve the dispute will not be instituted until after the dispute has been elevated to the parties' senior executive and either concludes that resolution is unlikely, or fails to respond within fifteen (15) business days. The parties are not prohibited from instituting formal proceedings: (a) to avoid the expiration of statute of limitations period; (b) to preserve a superior position with respect to creditors; or (c) where a party makes a determination that a temporary restraining order or other injunctive relief is the only adequate remedy. This Section does not limit the State's right to terminate the Contract.
39. **Media Releases.** News releases (including promotional literature and commercial advertisements) pertaining to the Contract or project to which it relates must not be made without prior written State approval, and then only in accordance with the explicit written instructions of the State.
40. **Severability.** If any part of this Contract is held invalid or unenforceable, by any court of competent jurisdiction, that part will be deemed deleted from this Contract and the severed part will be replaced by



agreed upon language that achieves the same or similar objectives. The remaining Contract will continue in full force and effect.

41. **Waiver.** Failure to enforce any provision of this Contract will not constitute a waiver.
42. **Survival.** The provisions of this Contract that impose continuing obligations, including warranties and representations, termination, transition, insurance coverage, indemnification, and confidentiality, will survive the expiration or termination of this Contract.
43. **Entire Agreement.** This Contract, including Statements of Work, constitutes the sole and entire agreement of the parties to this Contract with respect to the subject matter contained herein, and supersedes all prior and contemporaneous understandings and agreements, both written and oral, with respect to such subject matter. In the event of any conflict between the terms of this Contract and those of any Statement of Work or other document, the following order of precedence governs: (a) first, this Contract; and (b) second, an individual Statement of Work as of the Effective Date of that Statement of Work. NO TERMS ON CONTRACTOR'S WEBSITE, BROWSE-WRAP, SHRINK-WRAP, CLICK-WRAP OR OTHER NON-NEGOTIATED TERMS AND CONDITIONS PROVIDED WITH ANY OF THE SERVICES, OR DOCUMENTATION HEREUNDER WILL CONSTITUTE A PART OR AMENDMENT OF THIS CONTRACT OR IS BINDING ON THE STATE OR ANY AUTHORIZED USER FOR ANY PURPOSE. ALL SUCH OTHER TERMS AND CONDITIONS HAVE NO FORCE AND EFFECT AND ARE DEEMED REJECTED BY THE STATE AND THE AUTHORIZED USER, EVEN IF ACCESS TO OR USE OF SUCH SERVICE OR DOCUMENTATION REQUIRES AFFIRMATIVE ACCEPTANCE OF SUCH TERMS AND CONDITIONS.



STATE OF MICHIGAN

Contract No. 071B6600034
Aerial Ortho Imagery and Optional Oblique Services

Schedule A STATEMENT OF WORK CONTRACT ACTIVITIES

I. Background

Access to high-quality, authoritative ortho-imagery has created a demand for more data at better resolution, collected in a timely manner. It is the State's intent to acquire ortho-imagery for approximately 20% of the State each year over the next 5 years. In addition, the State plans to extend services and pricing established through this Contract to State partners, which may include, but are not limited to, local and federal government entities (collectively, "**State Partners**"). Finally, this Contract includes optional oblique imagery data services that the State may need in the future.

II. Required Services and Deliverables.

Contractor must provide the following services ("**Services**") and deliverables ("**Deliverables**"):

- A. Contractor must provide aerial acquisition and production services to provide ortho-imagery and associated products. See Attachment 1 – Imagery Specifications for more detailed specifications.
- B. All Services and Deliverables will be implemented using the following process:
 1. The State will issue an initial, project-specific Statement of Work to Contractor, defining the individual project and its specific requirements (the "**Project SOW**").
 2. Within ten (10) business days of receipt of the initial Project SOW, Contractor must respond with a written proposal for implementing the requested Project SOW, which must include Contractor's: (i) proposed modifications and clarifications and (ii) proposed costs for completing the project.
 3. The State will have ten (10) business days to review and, in its discretion, approve or raise objections to Contractor's response proposal. If the State raises any objections, the parties shall negotiate in good faith to amend the proposal, provided that, to the extent the proposal does not comply with the requirements of this Contract or the State's requirements set forth in the Project SOW, it shall be amended to so comply.
 4. Upon the parties' agreement to a final Project SOW, each party shall cause the same to be executed by its project manager ("**Project Manager**"). The State will then issue a formal purchase order, which will reference the executed Project SOW (the "**Purchase Order**").
 5. After the flight and Contractor data preparation activities covered under the final Project SOW included with the Purchase Order take place, the following process will be utilized for revisions, correction and acceptance:
 - i. Contractor shall provide access to the data Deliverables via an application on a secure website as described in IV-A below. The application shall provide **timely access** to data processed for this project. Timely access means specifically, **imagery shall become available for viewing with the completion of the first Area of Interest (AOI)**.
 - ii. A 2-week time period designated for State Quality Control (QC) on each AOI made available for review will commence upon data delivery to the OGC WMS imagery service.



- iii. Imagery made available for review shall be fully processed and shall have passed the Contractor's preliminary quality control process.
- iv. The application shall allow project stake-holders the ability to review ortho-imagery, identification and attribute items requiring discussion between the State's Project Manager and the Contractor's PM to determine correction/resolution activities necessary for acceptance of Deliverables.
- v. Defects in imagery collection that are found and reported as a result of the QC process by the customer, shall be corrected by re-processing.
- vi. Final corrected imagery data including all required peripherals for each season shall be delivered to the customer within 4 months of the end of the applicable flying season. This time period includes the 2-week QC period described above. **Timely receipt of Deliverables, means specifically, all corrections are made and data is acceptable to customer within the 4-month window.**
- vii. Defects discovered after receipt and acceptance of final deliverable(s) shall be covered under the Warranty provisions, Terms and Conditions, Section 16.

III. Optional Services and Deliverables.

Contractor may provide a proposal for the following optional Services and Deliverables:

- A. Contractor may provide oblique photography and associated products. Attachment 2– Optional Oblique Imagery Services for more detailed specifications and to submit a proposed solution.

IV. Detailed Requirements for Services and Deliverables

A more detailed description of the required Services and Deliverables and the optional Services and Deliverables is provided in the Sections below.

ALL DELIVERABLES, AND ASSOCIATED DATA, ACQUIRED UNDER THIS CONTRACT ARE COVERED BY THE RULES SET FORTH IN THE MICHIGAN ENHANCED ACCESS TO PUBLIC RECORDS ACT, ACT 462 OF 1996, WHICH ALLOWS THE STATE TO CHARGE REASONABLE FEES FOR ACCESS TO THE DELIVERABLES. FURTHER, PURSUANT TO SECTION 10 OF THE STANDARD CONTRACT TERMS, THE STATE WILL BE THE SOLE AND EXCLUSIVE OWNER OF ALL RIGHT, TITLE, AND INTEREST IN THE SERVICES AND DELIVERABLES AND ALL ASSOCIATED INTELLECTUAL PROPERTY RIGHTS THERETO.

A. Required - Ortho-imagery Acquisition and Data

For purposes of this Contract, “**acquisition**” means perform all tasks necessary to plan and coordinate flying missions, maintaining and operating airborne sensors and ensuring that all data is collected and organized for further processing. Contractor will provide the Services and Deliverables in accordance with the requirements set forth in the Project SOW. Individual projects will vary, based on the specific needs of the State and its State Partners. Without making any binding commitment to purchase a specific amount of Services or Deliverables, the State expects to schedule ortho-imagery acquisition of approximately 20% of the State's area per year, during leaf-off conditions. In addition, the State anticipates a potential need for several ad-hoc ortho-imagery projects.

Tasks for each acquisition cycle will be identified within the Project SOW.

Specific types of data to be provided will be determined within the Project SOW. However, general details of the required data to be provided are listed in Attachment 1 – Imagery Specifications.



- Contractor shall have a secure product status review and acceptance application and an OGC WMS imagery service to allow internet access to near lossless full-scale viewing of the ortho-imagery. The intent is to eliminate the need to ship vast amounts of data on portable media to the State and partners for the purpose of error identification and the verification of corrections.
- The associated application shall provide the tools necessary to allow the State, partners, and consultants to perform Quality Control (QC) on:
 - the photos,
 - edge-matching,
 - tile names, and
 - geographic placement prior to final physical delivery.
- Tile boundaries and seamline boundaries shall be displayed.
- The application shall provide **timely access** to data processed for this project. **Imagery shall become available for viewing with the completion of the first AOI.**
- Imagery made available for review shall be fully processed and must have passed the Contractor's preliminary quality control process.
- A 2-week time period will be designated for State quality control on each AOI made available for review commencing upon data delivery to the OGC WMS imagery service.
- The application shall allow project stake-holders the ability to review ortho-imagery, identify and attribute items requiring discussion between the State's Project Manager and the Contractor's PM to determine correction/resolution activities necessary for acceptance of Deliverables.

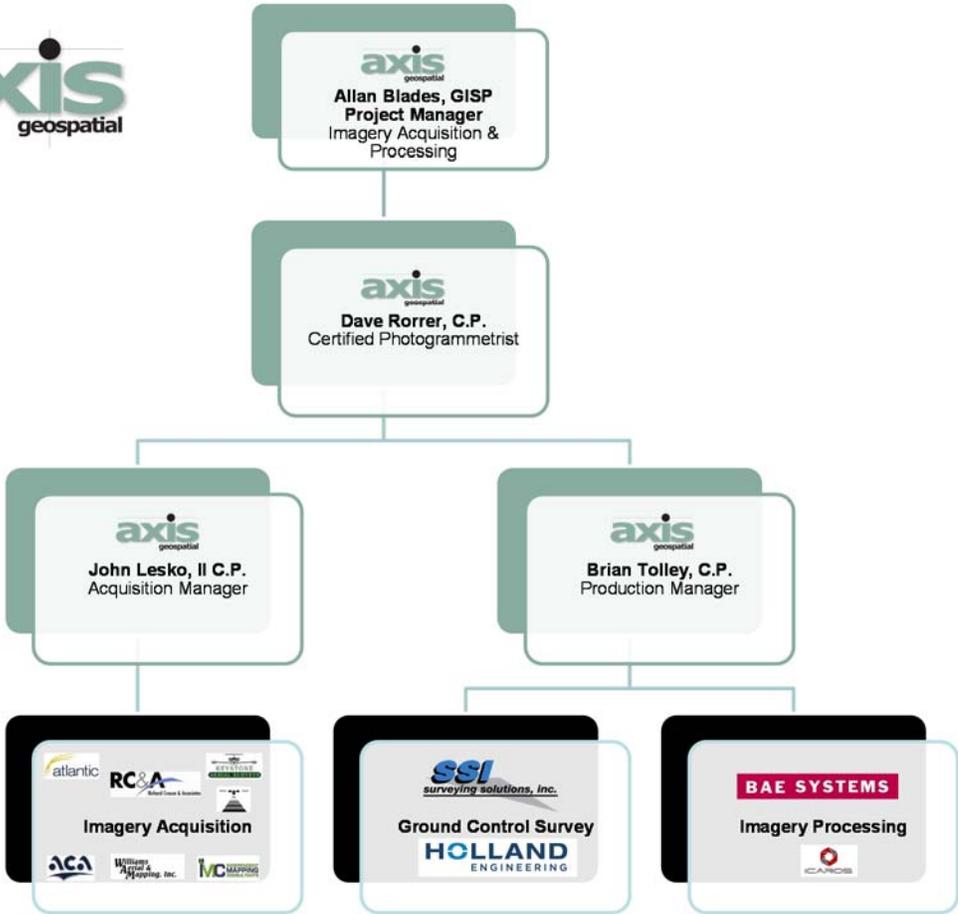
Deliverables and Acceptance Criteria

Contractor will provide Deliverables as identified in the Project SOW. All data provided under the Contract shall be considered a Deliverable of the specific Project SOW and shall be subject to the State's review and acceptance, based on the requirements and processes set forth in the Contract (see Specifications, Section 4, Quality Assurance Provisions, Schedule A, SOW, Required Services and Deliverables, Section 5, and Standard Terms and Conditions).

Contractor Commitment:

A.1 Ortho-Imagery Acquisition and Data

For the Michigan Aerial Imagery and LiDAR Services Program, the Contractor Team of partners is outlined in the graphic below.



Contractor will provide 6 digital aerial frame platforms – the Ultracam Eagle (UCE), Ultracam Falcon (UCF), Ultracam X (UCX), Zeiss DMCII-230, Zeiss DMCII-140 and the Zeiss DMC; to afford the greatest flexibility to the SOM.

Contractor will utilize the latest in ground-based GPS receivers and subscriptions to all current geopositioning reference networks for improved precision, accuracy and surveying efficiencies. Contractor will use Real Time Network technology.

Aerial Missions

Contractor must be ready to commence aerial data acquisition beginning March 1, 2016 for the SOM’s 2016 Annual Lot production cycle. As soon as weather conditions permit, the aerial platforms must begin capturing imagery.

Flight Planning

Contractor will plan each AOI with preferred north-south parallel flight lines, as a secondary option and when optimal due to flight restrictions, boundary, AOI geography, etc. Contractor may plan the acquisition with east-west parallel flight lines. Angled flight lines will be planned and utilized only if necessary to help avoid the restricted airspaces.



Flight Planning Methods & Considerations

- | Flight Planning Considerations | |
|--------------------------------|---|
| • | Restricted Airspace |
| • | Location of CORS or SmartNet Base Stations |
| • | Terrain Characteristics |
| • | Building Lean in Urban Areas |
| • | Sun Angle and Time of Day |
| • | SOM and/or project specifications for forward overlap, lateral overlap and pixel size |
| • | Type of Sensor used |
| • | The AOIs will be used |

Areas of Interest

Contractor will submit final planned 3D flight lines to the SOM in ESRI point shape file format based on the County boundary as supplied via shapefile by the SOM plus a designated buffer area totaling the desired number of square miles for the AOI. The buffer area limits will be mutually agreed upon by Contractor and the SOM prior to final acceptance of the flight plans. Islands associated with the AOI will also be included in the flight plan.

The 3D flight plans will be provided in the coordinate system and datum of the planned ortho-imagery for the corresponding AOI with planned exposure centers at flying height at least (2) weeks prior to scheduled image capture.

AGPS Basestation Planning

All flight plans must be reviewed by the Contractor’s professional land surveyor to evaluate and confirm proper spacing and coverage by the NGS CORS network prior to mobilization of the aircraft and air crews.

Ground Base Stations

Contractor will use the Applanix SmartBase technology as the primary means of supporting airborne positioning workflows, while also collecting base station data for every mission as a source of redundant data and as a way to perform an independent QA/QC check of the primary dataset.

Restricted Airspace Special Requirements

Contractor will be positioned above the Class B airspace by using the UltraCam EAGLE (UCE) at 15cm, and will thus not be required to submit a request to enter the airspace.

Execution of Acquisition

Contractor will execute its required flight missions to acquire the imagery required for each production cycle season in accordance with flight plans, airspace & FAA requirements, AGPS requirements and project requirements such as solar angle, foliage, hydrographic, atmospheric and temporal conditions. Compliance with all FAA rules and safety protocols will be maintained throughout all aerial missions. All pilots involved in aerial missions possess the necessary certifications required by FAA for commercial operations in aerial photography. All aircraft, aircrews and sensors are fully insured as well as carry a minimum \$1M in liability per aircraft in flight.



Team Aircraft Resource Plan

The following is a summary of the Contractor’s large format digital aerial platforms available for the SOM’s program.

Team AXIS Digital Image Sensors for Michigan Program				
Camera/Sensor	Owner	Quantity	Camera Type	AGPS / IMU
MEL* UltraCam Eagle	KAS ACA	3 1	Large Format	Yes
MEL* UltraCam Falcon	KAS Williams	3 1	Large Format	Yes
SEL* UltraCam X	KAS ACA	2 1	Large Format	Yes
MEL* DMCIIe-230	RCA	1	Large Format	Yes
MEL* DMCIIe-230	RCA	1	Large Format	Yes
MEL* DMCII-230	Midwest	1	Large Format	Yes
MEL* DMCII-140	Midwest	3	Large Format	Yes
MEL* DMC	Atlantic RCA Williams	1 2 1	Large Format	Yes

- * MEL = Multi-Engine Land Aircraft
- * SEL = Single-Engine Land Aircraft

Although unlikely, if an additional sensor is needed to complete an AOI, Contractor will seek written approval from the SOM Project Manager.

Project-Area Conditions for Aerial Data Acquisition

Contractor Team has planned flight missions to adhere to the following conditions/constraints/requirements for the project:

2016 / Days Needed For Imagery Acquisition							
Minimum Solar Angle (deg.)	Season Begin	Average Hours Avail per Day	Season End	Average Hours Avail per Day	No. of Contractor Sensors Required	No. of Clear Full Days Needed	Total No. of Possible Days
30°	3/1/16	4	5/15/16	6	1	8	76

* Assumed 19,400 Square Miles of Imagery per year



Imagery Collection Constraints					
Standard 12", 6", and 3" Imagery			True Ortho Imagery		
Overlap % (forward / side)	Camera Orientation Crab / Tilt	GSD Variance	Overlap % (forward / side)	Camera Orientation Crab / Tilt	GSD Variance
60 / 30	<5° / <4°	±10%	80 / 80	<3° / <3°	±10%
Camera aperture and exposure time will be adjusted for light conditions to achieve optimal image quality, consistent with manufacturer's recommendations or automated settings. Under certain condition the camera operator could adjust setting to improve quality of the imagery during acquisition based on ground and environmental conditions.					
Environmental Conditions For IMAGERY					
Sky Conditions	Cloud Shadow, Smoke, Dust Snow %	Minimum Solar Angle (deg.)	Roadway Condition	Ground Cover	Foliage (Deciduous)
Skies Clear (SKC)	0%	30°	Roads will not be wet from recent precipitation	Free of snow cover and lakes free of ice. Ground not obscured by fog.	100% Free, unless waiver is received in writing from SOM.
Contractor will consult with the SOM and the assigned Environmental Conditions (EC) contact to determine conditions when conditions are within specifications to start acquisition. The EC will also be consulted if conditions reach a stage where conditions are questionable.					

AGPS Base Station Operations during Aerial Missions

Contractor has the equipment, experience and trained personnel to establish and operate ground base stations to support aerial mapping operations in the event coverage by either the MDOT CORS, NGS CORS or Leica SmartNet networks are unavailable or fail to provide adequate control density in the area of interest for the specific mission.

Data is collected by the base station for the requisite period before and after system operation. Equipment operation is managed by a sensor operator, and the process is documented by completion of a detailed checklist of steps and critical elements required for proper operation and data integrity. Standard forms are used to record receiver setup information, digital pictures are taken to provide backup documentation and all work is reviewed by a professional land surveyor prior to processing the airborne sensor trajectory files. Data from both the airborne sensor system and base station is downloaded and archived in its original format and included as part of the metadata and reporting bundles.

Aircraft Coordination & Communication during Aerial Missions

Contractor will conduct daily morning status meetings with the flight sub-contractor(s) during the flight season. At the conclusion of each meeting the Contractor PM will prepare an acquisition status report for review by the SOM.



Daily Acquisition Call Checklist

- ✓ Planned acquisition areas for the day by flight sub-contractor(s)
- ✓ Weather conditions for the day
- ✓ Update flight acquisition to data by sub-contractor and AOI
- ✓ Restricted airspace issues/updates
- ✓ Status of acquired quality checks
- ✓ Any other issues?

The report will be prepared each morning and delivered to the SOM by 11 AM via email.

Acquisition Quality Control Steps

System Operation

Contractor camera operators perform a full system check prior to every mission. This check includes a verification of the Flight Management System (FMS), stabilized camera mount, ABGPS and IMU system, and the digital camera system. Communication between all components is verified as the final check.

Quality Control System

Contractor quality control procedures begin with the flight crews during acquisition. Flight crews confirm quality imagery is acquired before the imagery is shipped to Contractor for processing. The digital operator reviews acquired imagery after each flight as an initial step in confirming the quality of a collect. Any issues that can be identified in the field can be re-flown on the next flight usually before data is received at the home office.

An acquisition management control system known as ManageIT receives an initial photo center report via the internet after each flight. In addition to all acquired image stations, the file also includes a list of photos that the crew has deemed unacceptable. This report alerts the home office of inbound imagery for processing as well as inbound rejected or questionable imagery.

ManageIT will be used at every step of the quality control process to track progress of the imagery through the system. Imagery will be tracked on a per flight basis.

Overview images are again checked for quality once the data is uploaded to the network. Images are then checked again after the initial process in the form of PAN, RGB and CIR.

The post processed Airborne Global Positioning System and Inertial Measurement Unit data are checked for accuracy by reviewing processing reports and verifying event to camera imagery correlations before it is delivered.

A final quality control check of the deliverables will be performed before shipment.

Delivery of the processed data can be made in either ASCII Text format or in Excel spread sheet format. The data will be tailored to the SOM's requirements i.e. processing datum, coordinate system, geoid, measurement units. The raw data is archived and may also be provided in RINEX format for independent post processing and or review.



Immediate Post-Flight QA Process & Reporting Upon Completion of Daily Aerial Missions

After each flight sortie the “RAW” aerial imagery data will be reviewed to ensure project specifications are met. Individual exposures are flagged if they do not meet the required standards for overlap, crab, and sun angle. Contractor will run this process within 1 week after image capture and images found not to meet the SOM specification will be re-flown.

Contractor Aerial Mission Production QA Process & Schedule

In addition to the immediate post flight quality checks and after the imagery has been radiometrically corrected Contractor creates a reduced resolution “thumb nail” data set of all imagery by mission completion.

These data sets are reviewed for the following:

Post Flight Checklist	
✓	Verify that each line in the flight log was captured
✓	Verify that all imagery within a flight line was captured – no missing exposures
✓	Check imagery for clouds, cloud shadows, smoke, or any other atmospheric condition
✓	Check imagery for image motion “blur”; this is done through the use of an automatic blur detection algorithm and through visual inspection
✓	Check imagery for crab
✓	Check imagery for overlap
✓	Check imagery for sun angle

Imagery not meeting the SOM’s specifications will be flagged and re-flown. Contractor will plan the re-flight mission to be centered on the previously plotted flight-lines and will be captured with the same camera as the initial flight. Contractor will not deliver partial county imagery split between multiple acquisition seasons, furthermore if an entire area is missed, the re-flights will be flown for the entire county/AOI for full county coverage. Each mission’s final quality checked and accepted imagery will get divided into specific production blocks for Digital Aero Triangulation (DAT) and ortho processing.

Contractor will fly complete production AOIs with the same sensor for this project; however if necessary and with pre-approval by the SOM, mixing imagery from different sensors in the same production block is not a problem. This may be done at the tie edges between production blocks during the DAT process. Common points can be passed to the adjoining production blocks to ensure there will be no geo-referencing or shifting problems between production blocks.

Sample Raw Image Processing

Shortly after the start of image acquisition and prior to full raw image processing, Contractor will produce image samples of various areas and deliver to the SOM for their review. These image samples will contain various types of land-cover (urban, rural, mixed, marshland, etc.) to allow for the SOM review and approval of our radiometric settings. These sample images will be used as a visual guide, or target, in the remaining raw image processing to ensure tonal and color balance consistency is maintained in all images across the entire project. These images will also be used later in DOI processing as a visual assurance the DOI tiles resemble similar tonal adjustments to that of the sample images accepted by the SOM. After acceptance, Contractor will deliver 4-band, 8-bit per band, TIFF image samples of varying landcover classes for the SOM review, for input and suggestions on tonal adjustments.



SOM Review of Sample Raw Image Processing

Contractor has allowed 3 days for the SOM review of the sample images.

Raw Sample Imagery Contingency for Modifications

After SOM review, Contractor will make any adjustments or suggestions desired by the SOM and redeliver final image samples for the SOM’s final review and acceptance. From the time of the SOM’s recommendations, Contractor has allowed 2 days in the schedule for our completion of this task. If the first delivery of image samples is accepted without requiring additional adjustments, the task will not be required.

QA REVIEW PROCESS

Raw imagery acceptance is based on 100 percent inspection—each and every image is viewed, graded, and stored in a database available to all personnel in production. Quick and thorough image inspection at every phase of the process determines whether re-flights are necessary and in a timely manner without endangering the acquisition window.

AGPS/IMU PROCESSING APPROACH

The workflow for each production block will follow a structured path, modified as needed to make adjustments for buy ups or other optional tasks:

SBET Processing Workflow Chart



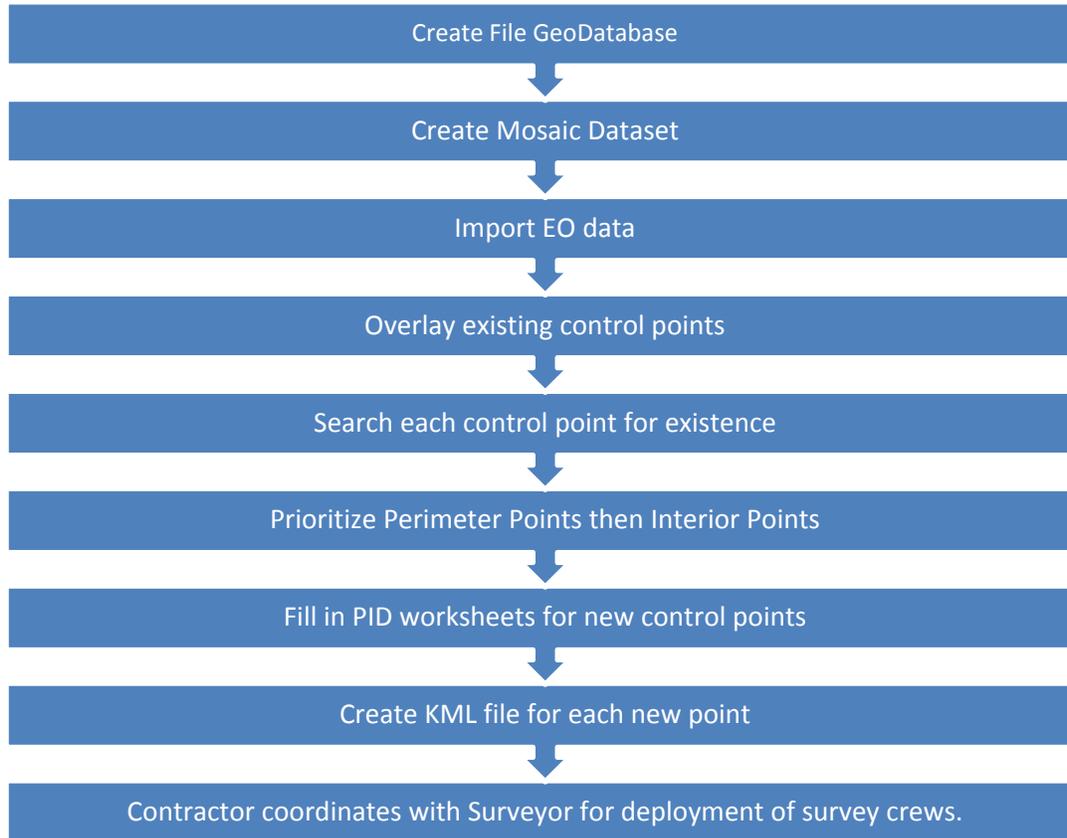
Ground Control Survey and Checkpoint Approach

Contractor anticipates that some Photo Identifiable Ground Control Points (PIDs) from previous photogrammetry and LiDAR projects are still usable for the 2016-2021 production cycles. This approach greatly increases cost savings to the project, while reducing deployment time and maintaining or improving accuracy. Contractor believes using the existing PID control points combined with a few replacements, as opposed to using all new GCPs, is the best solution.

Each new control point will be marked and identified on a PID worksheet. These worksheets will be used as a reference by surveyors to locate, identify, and survey new GCPs accurately and efficiently. In addition, a Google Earth KML file will be supplied to aid in navigation to the point location.



Identification of new PIDs will begin immediately after imagery has been received by Contractor. Contractor will examine the control within each production block and determine whether new PIDs will be needed. The steps for reviewing the existing PIDs are:



Ground Control Survey

New control will need to be established for the next series of statewide mapping tasks. We expect some control from past projects to still be in existence and usable, and is expected to remain so for the 2016-2021 flying seasons. Some existing control points may certainly take on a “lost” status due to construction, re-surfacing of roads and other activities.

Contractor understands that data supplied by the SOM may need to be marked by Contractor prior to aerial acquisition. Any new GCPs or checkpoints acquired by Contractor will be taken at locations which are clearly identifiable in the imagery. All control points used as horizontal control for the annual lot will also be used as vertical control.

Contractor will submit a control plan to the SOM prior to fieldwork showing the location of stations to be observed and indicating the procedures to be used to locate each new point. For all new points, monuments will be permanently placed, documented and provided to the SOM including a tie-diagram and “to Reach” descriptions for each new point. Any missing photo identifiable points will be flagged and a minimum of two new control point candidates will be selected to replace that point. New control photo control point candidates will be reviewed by the professional land surveyor for accessibility, proximity to suitable NGS or Michigan HARN control points and satellite visibility. Field crews will use PID



worksheets assembled during the PID Delineation process as a guide for spotting and positioning the new points. Additionally, a percentage of photo ID points that still exist and are visible in the imagery will be selected for a re-observation session as an independent confirmation of positional values and to establish redundant control network ties. Once a block of control is ready for field mobilization, a computer determined routing plan is used to guide each field crew through a pre-selected schedule, order and route of the points to be observed, ensuring initialization is checked prior to observation of new control points, routine checks to confirm initialization are made as the observation schedule progresses each day, and that all points are methodically located according to the requirements of the supervising professional land surveyor.

Field survey crews use vehicle mounted laptop computers and GPS guided routing software to navigate along a specific route each day. At each point visited along that route, a combination of control point data sheets, recovery notes, Google Earth images and new imagery are provided to streamline field workflows and make identification and occupation of the correct point as efficient as possible.

Survey Corps Blunder Mitigation Process

- ✓ Fixed height tripods and rover poles
- ✓ Proper equipment storage and handling procedures
- ✓ Daily calibration checks of plumbing vials, plummets and instruments
- ✓ Daily observation mission planning for GNSS satellite visibility optimization
- ✓ Controlled routing and observation scheduling
- ✓ Multiple GNSS initialization checks during the work day
- ✓ Existing Control values provided to facilitate quality control analysis by field personnel
- ✓ Forced ambiguity resolution resets between observation sessions
- ✓ Pre-configured equipment settings to control measurement mode and time
- ✓ Detailed checklists and standardized note forms
- ✓ All data transfers are electronic/no operator entry of control values is permitted
- ✓ Redundant measurements of height of instruments
- ✓ Digital photography of control point, surrounding area with survey instrument in place
- ✓ Detailed photographs/rubbings of NGS/MDOT HARN control points disks to confirm ID

Oversight of the field crews during the day is accomplished by intentionally random telephone calls to check progress, as well as selective field monitoring by the professional land surveyor in charge. Additionally, the exact position, operating mode and other technical information of each rover is monitored in real time to check performance and to aid in troubleshooting equipment performance or other potential problems. Location of each rover is plotted in real time on a Google Earth interface provided by the real time network provider. Instructions are in place to counter common problems experienced during previous projects, and any of the check observations that exceed our internal tolerances for positional variation are identified immediately and further guidance is sought at that time. This capability is one of the greatest benefits of using a Real Time Network positioning system, since collection of data that is not within the positional expectations of the responsible surveyor is avoided due to the situational awareness of the field personnel.



At the end of each work day, field crews immediately download all GNSS observable files, sketches, recovery notes, diagrams and make note of any deviations from expectations during the day that had any effect on their assignment. All of the data is collected in a centralized project location organized by production block, date and field crew involvement. Data reporting formats are configured prior to mobilization to control what information is displayed. The software used to monitor the data collection process stores all available data and reports are tailored to the end users' needs and does not modify or delete data in any way.

CHECK POINTS

Contractor will ensure that at least 2 check points must also be located in each County or AOI (whichever is smallest in extent). The check points will not be located in the vicinity of Ground Control points used in the aero triangulation solution nor will the check points be used in the aero triangulation solution. The accuracy of all GCPs and check points will be equal to or less than 0.10 meters in the horizontal (x,y) and equal to or less than 0.20 meters in the vertical (z).

QC OF FIELD SURVEYS BY CONTRACTOR STAFF PLS

Quality Assurance (QA) oversight of the survey work effort is conducted by the Contractor professional land surveyor in charge. It is important to note that the Survey Quality Control effort is for the field survey only. Final independent QA of the Survey Control data is the sole responsibility of Contractor.

Ground Control Survey Reporting

Once the data collection field work is completed, and secondary comparisons of field surveyed versus published control values are analyzed, control values are forwarded to the Certified Photogrammetrist (CP) for use in the Digital Aero Triangulation (DAT) process. As the DAT process moves forward, geometric measurements and calculations progress to a point where any irregularities or differences in ground surveyed control points not matching measured aero triangulation measurements are identified and reviewed by the professional land surveyor. The real time positioning capabilities of the systems in use, as well as the redundant checks of data and points of measurement requiring a re-survey of a control point are increasingly rare. Positioning quality is known in the field, control points are checked and confirmed in the field, and photographs minimize questions from office personnel regarding exactly what point was measured.

In the unlikely event that a survey point has a questionable position, a field crew is dispatched to immediately recover and locate suitable NGS or Michigan HARN control, the point in question and other available control in the vicinity that can help isolate any error that may have entered the positioning effort for that measurement series.



Ground Control Report Data	
<ul style="list-style-type: none"> ✓ All GPS Observation Data in proprietary format and RINEX2 data format written to CD or DVD ✓ A network diagram showing all points and indicating which independent vectors were observed ✓ A schedule (in table form) showing the dates, occupation times, and sessions for each station in the survey ✓ Observation form for each independent station occupation that shall include at least the following information: <ul style="list-style-type: none"> ○ Project ID ○ Vendor ID ○ Operator ID ○ Date ○ Julian Day ○ Receiver Serial # ○ Antenna Serial # ○ Brand and Name of receiver / antenna ○ Station Name ○ Session # ○ Antenna H.I. and indication for type of measurement ○ File Name ○ Actual start time and actual end time for the occupation ○ AT Block ID ○ Jurisdiction ○ Point ID ○ Point Class ○ Northing, Easting ○ Orthometric Height ○ Description and Point Photo ID ✓ Photos of new points established ✓ Visibility sky plots for each station observed in the network 	<ul style="list-style-type: none"> ✓ Printed graphical plot indicating the number of satellites above fifteen (15) degrees and the PDOP for each session of field observation ✓ Data showing the quality of processed vectors ✓ Loop closure results for all baselines (Valid loop closures must contain vectors from a minimum of two (2) different independent observing sessions following FGDC guidelines) ✓ Results of a minimally constrained least squares network adjustment report including (@ ninety-five percent [95%] confidence region): <ul style="list-style-type: none"> ○ Statistical results clearly showing which control point is held fixed, and clearly indicating standard errors applied and weighting scheme used ○ Station coordinate standard deviations (x,y,z) ○ Station coordinate error ellipses (semi-major axis, semi-minor axis, azimuth of semi-major axis, height) ✓ Results of the fully constrained adjustment, clearly showing all values held fixed, and clearly indicating standard errors applied and weighting scheme used.

Ground Control Survey Accuracy

Survey and control positional accuracy will meet or exceed stated requirements. Typical Real Time Network horizontal accuracy will be 0.05' with 95% confidence, and vertical accuracies will normally not exceed 0.07' with 95% confidence. Final positioning accuracy will depend upon the quality and availability of control, network geometry, and prevailing satellite geometry, which undergoes constant change during the work day.

Ground Control Survey Deliverables



Ground Control Survey Deliverables	
✓	Ground and check point positioning data
✓	Survey and ground control point and check point reports in project metadata structure
✓	Survey and ground control points and check point reports in printed form
✓	Horizontal datum of this project is NAD 83/NA2011 Epoch 2010.00 Michigan Plane Coordinates, annotated in International Feet.
✓	Vertical datum of this project is the North American Vertical Datum of 1988, derived using state specific geoid models built from the National Geodetic Survey Geoid 12A model. Fixed height tripods and rover poles.
✓	Data will be delivered in a nonproprietary, mutually agreed upon format.

Imagery Acquisition Communication Plan

The Contractor must establish a strong communication plan with the State’s approval and insure that it is followed with assigned authority, .for each phase and each type of the imagery collection and delivery process. The project team will consist at any given time, of the Project Manager, SOM Project Team, Acquisition Manager, Survey Manager, Production Manager (Certified Photogrammetrist), Quality Manager, Contractor’ Team Partners and other technical support staff as necessary. The Contractor communication is outlined further in the table below.

Imagery Acquisition Communication Plan					
Communication Event	Objective	Method/Frequency	Audience	Owner	Deliverable
Project Kickoff	Project Start	Face to Face/once	Project Team SOM	Project Manager	Meeting Minutes
Project AOI	Identify Project Areas	Electronic/as needed	SOM Project Manager Project Manager	SOM Project Manager	Shapefiles
Project Flight Plan	Deliver proposed flight plans	Electronic/as needed until approved by SOM	Acquisition Manager Project Manager SOM	Acquisition Manager	Shapefiles/KML files
Project Survey Plan	Deliver proposed ground control / check point plans	Electronic/as needed until approved by SOM	Survey Manager Project Manager SOM	Survey Manager	
Acquisition Production Meetings	Contractor Acquisition Team Production Meeting	Web Meeting/Daily during Acquisition Season	Acquisition Manager Project Manager Acquisition Team	Acquisition Manager	Meeting Notes
Acquisition Status Meetings	Present Acquisition	Web Meeting/Daily during Acquisition	Project Manager	Project Manager	Report Data



	Status to SOM	Season	Acquisition Manager SOM		
Major Milestones	As completed	Email/as needed	Project Team SOM	Project Manager	Data
Post-Acquisition Meeting	Present Final Acquisition Status	Face to Face/once	Project Team SOM	Project Manager	Meeting Minutes

PROJECT SCHEDULE

Contractor will develop an aggressive work breakdown structure (WBS) and Schedule Based on the first available acquisition flight window of March 1, 2016 - May 15, 2016. Taking into consideration the Contract SOW requirements, SOM review period of 2 weeks per AOI, Contractor will deliver the final deliverables within 4 months of the final flight acquisition window.

B. Optional - Oblique Imagery Acquisition and Data

This is service that the State is including as an option under this Contract. For the purpose of this Contract, Contractor must be ready to fly and begin Oblique Imagery Acquisition, if the option is exercised, by March 1, 2016. Individual projects will vary, based on the specific needs of the State and its State Partners. Without making any binding commitment to purchase the services, the State anticipates a potential need for ad-hoc, oblique imagery projects.

Specific types of Data to be provided will be determined within the Project SOW. Details of the data to be provided are listed in Attachment 2 – Optional Oblique Imagery Services.

Contractor Commitment:

B.1 Optional – Oblique Imagery Acquisition and Data

Contractor’s subcontractor, Sub Contractor TBD, will be providing all services related to this option. Sub Contractor TBD can provide oblique imagery on a state or local government agency basis in any preferred season, normally the spring or fall leaf-off seasons. Capture of the oblique imagery could be undertaken with Sub Contractor TBD’s digital camera capture system at 3”, 4”, 6” and/or 9” GSD. Sub Contractor TBD’s software, metadata and images are licensed products; the oblique imagery procured under a contract vehicle with the SOM could be licensed by all State agencies or may be contracted directly with the Sub Contractor TBD by one or more of the local government agencies throughout the State.

Oblique Imagery Acquisition Communication Plan

The Contractor must establish a strong communication plan with the State’s approval and insure that it is followed with assigned authority. The project team for oblique will consist at any given time of the Project Manager, SOM Project Team, Sub Contractor TBD Project Manager, Contractor Acquisition Manager, Contractor Survey Manager, Sub Contractor TBD Survey Manager, Contractor Production Manager (Certified Photogrammetrist), Sub Contractor TBD Production Manager, Quality Manager, Contractor’ Team Partners and other technical support staff as necessary.



The Contractor’s communication plan for Oblique is outlined further in the table below and organization chart below.

Oblique Imagery Acquisition Communication Plan					
Communication Event	Objective	Method/Frequency	Audience	Owner	Deliverable
Project Kickoff	Project Start	Face to Face/once	Contractor Project Manager Sub Contractor TBD PM SOM & Partners	Project Manager	Meeting Minutes
Project AOI	Identify Project Areas	Electronic/as needed	SOM Project Manager Project Manager Sub Contractor TBD Project Manager SOM & Partners	SOM Project Manager	Shapefiles
Project Flight Plan	Deliver proposed flight plans	Electronic/as needed until approved by SOM	Sub Contractor TBD Acquisition Manager Acquisition Manager Project Manager SOM & Partners	Sub Contractor TBD Acquisition Manager	Shapefiles/KML files
Project Survey Plan	Deliver proposed ground control / check point plans	Electronic/as needed until approved by SOM	Sub Contractor TBD Survey Manager Survey Manager Project Manager SOM & Partners	Survey Manager	
Acquisition Production Meetings	Contractor Acquisition Team Production Meeting	Web Meeting/Daily during Acquisition Season	Sub Contractor TBD Acquisition Manager Acquisition Manager Sub Contractor TBD Project Manager Project	Acquisition Manager	Meeting Notes



			Manager Acquisition Team		
Acquisition Status Meetings	Present Acquisition Status to SOM	Web Meeting/Daily during Acquisition Season	Sub Contractor TBD Acquisition Manager Acquisition Manager Sub Contractor TBD Project Manager Project Manager SOM	Project Manager	Report Data
Major Milestones	As completed	Email/as needed	Project Team SOM	Project Manager	Data
Post-Acquisition Meeting	Present Final Acquisition Status	Face to Face/once	Sub Contractor TBD Acquisition Manager Acquisition Manager Sub Contractor TBD Project Manager Project Manager SOM	Project Manager	Meeting Minutes

PROJECT UNDERSTANDING AND APPROACH

To meet the requirements of this project, Sub Contractor TBD will produce and deliver:

Oblique Imagery Project Requirements

- ✓ Color, digital oblique imagery delivered in Sub Contractor TBD’s industry standard .jpeg format with world file and all the necessary metadata for each image
- ✓ Four-way, 3-band oblique images with unobstructed views of the ground captured at nominal 9-inch GSD
- ✓ Shapefiles representing the oblique footprint of each image trapezoid



FLIGHT CONDITIONS

Sub Contractor TBD can easily capture oblique imagery for the State of Michigan in the optimal timeframe it seeks. The preferred capture windows are when the leaf canopies are off, the ground is not obscured by ice, snow, haze, fog or dust, and when the streams are within their normal banks. Sub Contractor TBD may capture images when there are clouds above the altitude of the aircraft. In fact, the best lighting for the Sub Contractor TBD images is when there is a light, high cloud cover, as this provides the most consistent lambertian lighting coverage. Because of this, Sub Contractor TBD can continue to capture imagery even if the sun angle dips below 30°.

IMAGE SPECIFICATIONS

DELIVERY

Contractor and Sub Contractor TBD will work with the State to define the AOI's of capture and deliver the oblique imagery, software and metadata within 30-60 days of the last date of image capture.

Oblique Imagery Post-Flight Checks	
✓	Digital Artifacts
✓	Precipitation
✓	Elevation
✓	Accuracy issues
✓	Misaligned edges
✓	Leaf-on issues
✓	Cloud obscuration
✓	Shadows
✓	Snow Cover
✓	Gaps
✓	Glint (glare)
✓	Polygon coverage issues

V. Contractor Staff, Roles, and Responsibilities

The Contractor will provide sufficient staffing to provide the requested Services and Deliverables, and meet all requirements under this Contract.

A. Subcontractors

Aerial Cartographics of America, Inc.

423 South Keller Road, Suite 300
 Orlando, FL 32810
 Mitch Jarrells, PSM
 407-851-7880

ACA is available to perform airborne imagery and LiDAR data collection services for the SOM. Final Workshare is To Be Determined (TBD) based on the assigned production areas, volume, subcontractor availability and workload. At time of award, based on AOI's and workload, ACA is another resource for our acquisition team.

The Atlantic Group, LLC (Atlantic)

2223 Drake Ave SW, Suite 200
 Huntsville, AL 35805
 Tim Stagg
 256-971-9991

Atlantic is an exclusive partner with Contractor to provide Imagery & LiDAR acquisition, processing. Atlantic will perform LiDAR acquisition and processing services for the SOM. Atlantic is an orthoimagery acquisition and processing resource for our team. Final Workshare is To Be Determined (TBD) based on the assigned production areas, volume, subcontractor availability and workload at time of award.

**BAE Systems**

124 Gaither Drive, Suite 100
Mt. Laurel, NJ 08054
Andrew Pickford
856-793-4316

BAE is another resource to provide imagery and LiDAR processing services for the SOM. Final Workshare is To Be Determined (TBD) based on the assigned production areas, volume, subcontractor availability and workload at time of award.

Holland Engineering, Inc.

220 Hoover Blvd., Suite 2
Holland, MI 49423
Steven Lampen, P.S.
616-392-5938

Holland Engineering is a backup resource for providing Ground Control services for the SOM. Final Workshare is To Be Determined (TBD) based on the assigned production areas, volume, subcontractor availability and workload at time of award.

Icaros, Inc.

4100 Monument Corner Drive, Suite 520
Fairfax, VA 22030
Jim Peters
724-493-0967

Icaros is another resource to provide imagery and LiDAR processing services for the SOM. Final Workshare is To Be Determined (TBD) based on the assigned production areas, volume, subcontractor availability and workload at time of award.

Independent Mapping Consultants, Inc.

508 West 5th Street, Suite 150
Charlotte, NC 28202
Paul Badr, PLS, PPS, CP, SP
704-540-0087 x3300

IMC is an additional resource to provide imagery and LiDAR processing services for the SOM. Final Workshare is To Be Determined (TBD) based on the assigned production areas, volume, subcontractor availability and workload at time of award.

Keystone Aerial Surveys, Inc.

P.O. Box 21059 NE Philadelphia Airport
Philadelphia, PA 19114
Brian Jennings
215-677-3119



Keystone will be the primary orthoimagery acquisition provider for the SOM. They are an additional resource for LiDAR data acquisition also. Upon contract award, Final Workshare is To Be Determined (TBD) based on the assigned production areas, volume, subcontractor availability and workload.

Midwest Aerial Photography

7535 West Broad Street
Galloway OH
Dale Verges
614-853-2902

Midwest is an additional acquisition resource partner available to perform airborne imagery and LiDAR data collection services for the SOM. Final Workshare is To Be Determined (TBD) based on the assigned production areas, volume, subcontractor availability and workload at time of award.

Pictometry International Corp.

100 Town Centre Drive
Rochester, NY 14623
Diane Corbin
585-486-0093

Sub Contractor TBD will provide oblique imagery acquisition and processing services for this statewide contract.

Richard Crouse & Associates, Inc.

467 Aviation Way
Frederick, MD 21701
Cassy Crouse
301-846-4865

RC&A provides aerial data collection for mapping professionals, government and other geo-based disciplines throughout the United States. Offices are located in Maryland, Maine, Kansas, and South Carolina. RC&A is an additional acquisition partner available to perform airborne imagery and LiDAR data collection services for the SOM. Final Workshare is To Be Determined (TBD) based on the assigned production areas, volume, subcontractor availability and workload at time of award.

Surveying Solutions, Inc.

4471 M-61
Standish, MI 48658
Jeffrey Bartlett, P.S.
989-846-6601

Surveying Solutions is a Michigan Licensed Surveyor with MDOT experience. SSI will provide ground control survey support to the SOM for orthoimagery and LIDAR acquisition.

Williams Aerial & Mapping, Inc.

1843 Commerce Dr., Suite 110
South Bend, Indiana 46628
Andrew Williams
574-287-2104



Williams is an additional resource available to perform airborne imagery and LiDAR data collection services for the SOM. Final Workshare is To Be Determined (TBD) based on the assigned production areas, volume, subcontractor availability and workload at time of award.

As set forth in Section 11 of the Standard Contract Terms, Contractor must ensure specific obligations of its subcontractors.

B. Key Personnel

Any Key Personnel substitution must have the prior written approval of the State. Contractor agrees that unauthorized removal of Key Personnel may be subject to monetary credits to the State. The Contractor shall be responsible for the continuous training of its staff.

The State has identified the following as Key Personnel for this Contract:

Contract Administrator: This individual will supervise all contract management activities, which include but are not limited to the following:

- supporting the management of the Contract;
- facilitating dispute resolution; and
- advising the State of performance under the terms and conditions of the Contract.

Project Manager: Contractor will provide a Project Manager to interact with designated personnel from the State to ensure on-time delivery of Services and Deliverables meeting all requirements of the Project SOW. The Project Manager will coordinate all of the activities of Contractor personnel assigned to the project and sign-off on all reports required by the State. Contractor's Project Manager is responsible, at a minimum, for all of the following:

- manage all defined Contractor responsibilities;
- manage Contractor's subcontractors, if any;
- develop the project plan and schedule, and update as needed;
- serve as the point person for all project issues;
- coordinate and oversee the day-to-day project activities of the project team including:
 - insure timely and quality provision and completion of all acquisitions and Deliverables.
- schedule and participate in daily phone calls with State personnel during acquisition season;
- assess and report project feedback and status;
- escalate project issues, project risks, and other concerns;
- review all project Deliverables and provide feedback;
- proactively propose options and alternatives for consideration;
- utilize change control procedures;
- prepare project documents and materials; and
- manage and report on the project's budget.

Certified Photogrammetrist: All production shall be under the supervision of an American Society of Photogrammetry and Remote Sensing (ASPRS) Certified Photogrammetrist. All products shall be reviewed and approved by an ASPRS Certified Photogrammetrist. The name of the supervising Certified Photogrammetrist shall be included in the metadata.



Production Manager: All steps in the Deliverable production process will be under the supervision of an identified Production Manager.

Acquisition Manager: All steps in the data acquisition process will be under the supervision of an identified Acquisition Manager.

Contractor Commitment:

Contractor has appointed the following Project Manager, Acquisition Manager, Production Manager, Contract Administrator, and Certified Photogrammetrist for the State of Michigan project as described below.

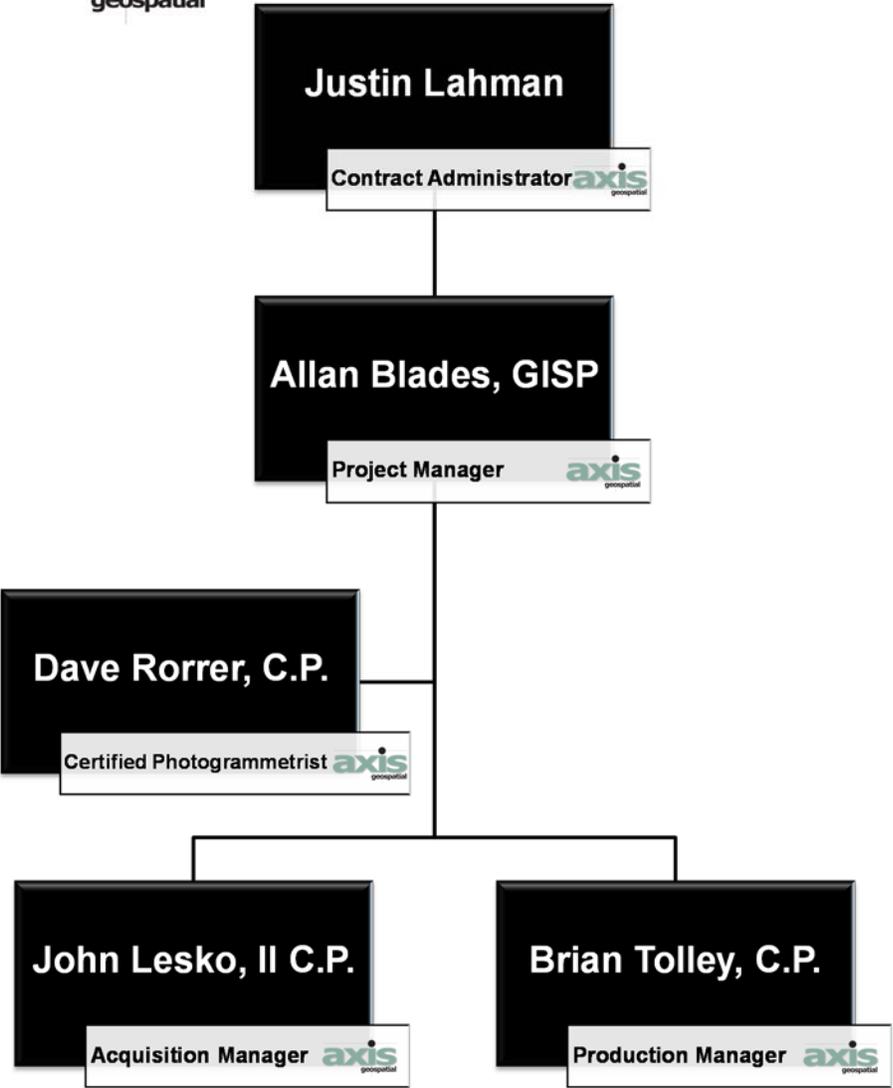


Figure 1 - Contractor Key Personnel

VI. Project Management

A. Project Management Website

Contractor must develop a secure, limited access project management website to assist in the dissemination of project communication and status information to the State project staff, subcontractors, and other project stakeholders where appropriate, updating and documenting the status of the project in relation to the project schedule and identifying any issues, concerns, decisions, outstanding items, and next steps.

Contractor Commitment:

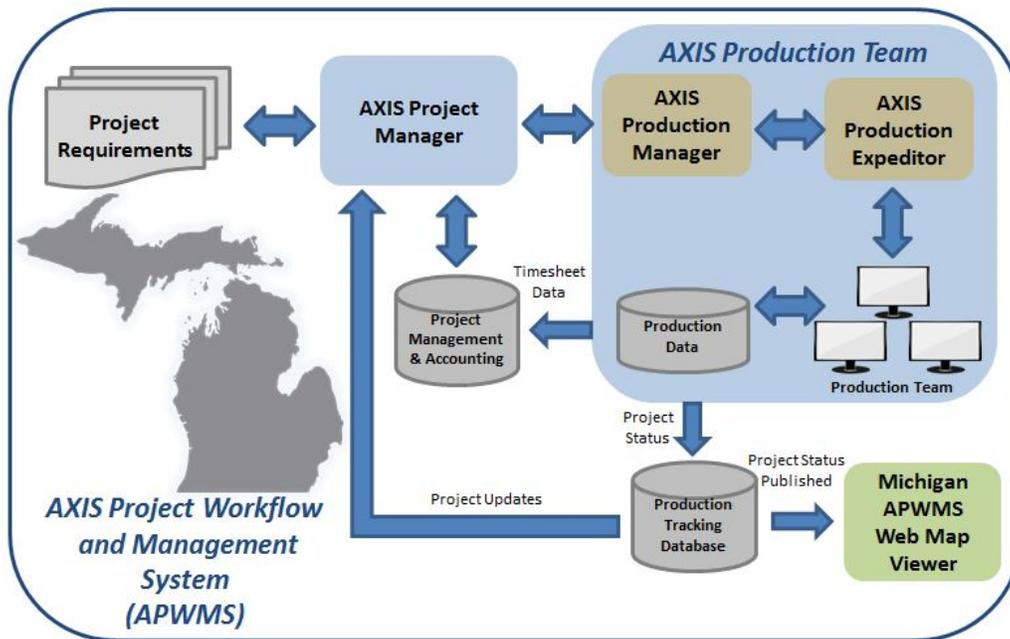


VI.A. Contractor GeoSpatial’s Project Management Website

Contractor must provide a secure web portal that allows access for SOM to view their project status.

The customized application captures project work and inputs it into an efficient production system that allows Contractor managers to track projects, manage backlog, schedule work, control time keeping, calculate and maintain schedules and increase profitability.

APWMS Project Management Workflow



The APWMS will control and maintain information on projects that flow through Contractor production and project management channels so any client, anywhere, if authorized, can view the progress and schedule information of their project.

Project information, total estimated billing units/tiles and all metadata related to the project will also be associated automatically. The application will then be set up with a scheduled DELIVERY date presented to the client who can view the project status via a secure web interface. APWMS will then be used to track project resources, project costs, tasks and milestones. This information is updated on a weekly basis and can be interactively accessed by Contractor managers with project status views available to the SOM.

The Contractor Production Expediter will log all work into a production log and assign tasks, personnel resources and schedule work for their production staff on an availability basis. The Project Managers, Management and clients, if authorized, can see tasks in progress, completed or reworked by project and task. The project map views within the APWMS application can run on either open source GIS or ESRI GIS software. Through the GIS, the SOM will have access via project status map views at the product and AOI level. Information can be viewed at the product level and AOI level or customized as necessary to meet the needs of the SOM.

It is important to capture the information in a secure and safe manner from operators and not allow access to crucial systems and data. To accomplish this we have devised a system that will be totally secure and



disconnected from the project production databases; just the project status or PM datasets are accessible through the Contractor’s Project Management website.

Contractor will provide the SOM an “open window” to their daily production effort to visually inspect project status will give the SOM confirmation that:

- 1. ***Work is progressing on the project;***
- 2. ***The level of commitment to the project is sufficient and***
- 3. ***At the current rate of commitment and resources the schedule will be met and/or exceeded.***

APWMS Security and Compatibility Requirements

The APWMS application is secured by standard web-security protocols. Access into the APWMS is controlled by the Contractor IT Department. Upon contract award the SOM will need to provide the names of those who need access to Contractor Project Manager. The users will then be granted login credentials at the user level with individual passwords. Access to APWMS will require Internet Explorer 10.0 or higher.

VII. Pricing and Payment

A. Pricing

This is a firm, fixed price Contract. For all required Services and Deliverables, pricing tables are included as Schedule B – Pricing Table. For all optional Services and Deliverables (i.e. hosting services and oblique imagery).

B. Payment Holdback

The State will pay 25% of the total project cost when *acquisition* is complete. The State will release any remaining balance upon final acceptance of the Deliverable.

C. Liquidated Damages

Contractor agrees that any delay or failure by Contractor to timely and acceptably perform its obligations in accordance with the Project SOW will interfere with the proper and timely delivery of the required Deliverables, to the loss and damage of the State. Further, the State will incur major costs to perform the obligations that would have otherwise been performed by Contractor. The parties understand and agree that liquidated damages Contractor must pay to the State as a result of such nonperformance, will be assessed in the amount of \$5,000 per affected AOI, with an additional \$250 per week for each week Contractor fails to remedy the late or improper completion of the Work, and that these amounts are reasonable estimates of the State’s damages in accordance with applicable law.

Contractor Commitment:	<ul style="list-style-type: none"> 1. Contractor has completed Schedule B – Pricing Table and uploaded separately. 2. Oblique imagery optional service pricing also provided in Schedule B – Pricing Table 3. Contractor acknowledges, understands and accepts the State of Michigan’s payment holdback terms. Contractor will be paid 25% of the total project cost once acquisitions are complete. The SOM will release the remaining balance
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upon final acceptance of the Deliverable in accordance with 08192015_Schedule A SOW.doc section VIIB.

- 4. Contractor further acknowledges understands and accepts the SOM Liquidated Damages terms in accordance with 08192015_Schedule A SOW.doc section VIIC.

VIII. Reporting Obligations

Reporting shall be accomplished through the project management website.



Attachment 1: MiSAIL State of Michigan Ortho-imagery Specification, 2015

1. Reference Documents

GeoTIFF Specification, version 1.8.2, found on the web at:
<http://www.remotesensing.org/geotiff/spec/geotiffhome.html>

2. Requirements

2.1 Characteristics

2.1.1 Image Format

Images shall be delivered in GeoTIFF format. Individual GeoTIFF images shall form a mosaic that covers the areas of interest. The file format shall conform to the GeoTIFF Specification, version 1.8.2 at <http://www.remotesensing.org/geotiff/spec/geotiffhome.html> . Proprietary tags shall not be used. Image size shall be 5000 x 5000.

The No Data value shall be specified in the metadata and shall not occur within the image data. A No Data value of (0,0,0) shall be used. No Data areas shall only occur outside the boundary of the specified Area of Interest (AOI).

Image files from each AOI shall be labeled with names that end in five digit numbers. The number fields at the end of the filenames within an Area of Interest (AOI) shall all be consecutive without omission or duplication and shall begin with "00001". The text preceding the image number within the image filename shall be of the form

(area of interest code)_(contractor code)_YYYYMMDD

where YYYY is the year, MM is the two digit month, and DD is the two digit day of acquisition.

2.1.2 Image Type

Image tiles shall be 4-band image files comprised of the three visible bands and the near-infrared band. Band order to be as follows:

- Band 1: Red
- Band 2: Green
- Band3: Blue
- Band4: Near-Infrared

Image radiometric resolution should be set to 8 bits per channel to create 32-bit image files. All bands should be balanced such that natural-color (Red, Green, Blue) and standard false-color composites (Infrared, Red, Green) are spectrally correct. Natural color composites should appear natural to a human observer.

2.1.3 Image Coordinates

All ortho-imagery and derivative data, such as tile footprints and flight line files, shall be referenced to the following coordinate space:

Coordinate System: Michigan State Plane, appropriate zone

Datum: North American Datum 1983(2011)



Units: International Feet

Vendor must be prepared to deliver data in alternative Datums. Including but not limited to: NAD1983(1986), NAD1983(CORS96), NAD1983(HARN).

Airborne Global Positioning System (AGPS), Ground Control Points (GCPs), and other pertinent data sets must be transformed to the requested Datum before image processing begins.

2.1.4 Image Resolution

Data collection shall occur at 12 inch (0.30 meter) ground sample distance (GSD) $\pm 10\%$. This will be considered the standard product GSD. Optional data collection at 6 inch (0.15 meter) GSD and 3 inch (0.075 meter) GSD will also be available as an optional product per details in Section 6 of this document.

2.1.5 Metadata

Metadata shall be supplied for each AOI and shall include

- FGDC compliant metadata for the Area of Interest
- Image location and outline
- 2D accuracy statement referencing the National Map Accuracy Standard for geospatial data at the 95% confidence level
- Camera used
- Date and time of acquisition
- Ground sample distance as collected
- Focal ratio and exposure time
- Remarks on image quality and artifacts, if any
- The name of the supervising Certified Photogrammetrist
- Projection information

2.2 Image Quality

Certified Photogrammetrist: All production shall be under the supervision of an American Society of Photogrammetry and Remote Sensing (ASPRS) Certified Photogrammetrist. All products shall be reviewed and approved by an ASPRS Certified Photogrammetrist. The name of the supervising Certified Photogrammetrist shall be included in the metadata.

2.2.1 General Image Quality

Images shall appear sharp when viewed at 1 pixel per GSD and displayed or printed on high quality equipment at 80 to 100 pixels per inch. Mosaicking artifacts and other image artifacts shall be minimal or completely unnoticeable. Color mosaics shall be free from clouds, cloud shadows, haze, prominent seams, gridding due to uncorrected camera vignetting, and other obvious, uncorrected artifacts. Hot spots and water glint shall be corrected.

2.2.2 Instrument Corrections

Instrument corrections for distortion and radiometric level shall be applied to raw data values based on most recent and up-to-date camera calibrations. Camera calibration records shall be maintained on file by the aerial photography company and copies of these records shall be provided.



2.2.3 Radiometric Correction

Images shall be color balanced to minimize perceptible differences in color tones within and between adjacent images. Color balancing shall result in colors which appear natural to a human observer.

Image contrast and brightness shall be adjusted to minimize perceptible differences within and between adjacent images.

Adjustment(s) as necessary shall be undertaken based on State of Michigan (SOM) review of each AOI.

2.2.4 Spatial Correction

The best available Digital Elevation Model (DEM) or Digital Terrain Model (DTM) representing the ground surface (e.g., Bare-earth) should be used to ortho-rectify the imagery. The elevation data may be obtained from the United States Geological Survey (USGS), or from another source, such as the State of Michigan or a partner. Elevation data may be derived from LiDAR, photogrammetry or aerial triangulation autocorrelation as long as it provides sufficient accuracy and precision to support ortho-imagery horizontal accuracy requirements.

Cultural features such as roads, bridges, overpasses, buildings and other important features that are impacted by DEM artifacts shall be repaired.

During ortho-rectification, images shall be re-sampled at the specified GSD.

2.2.5 Mosaicking

Prior to tiling, image seams shall be placed to minimize disruption of important features of cultural or geographic significance—for example, large buildings, bridges, and major rivers. Image seams shall not run through elevated structures, such as bridges, overpasses, and large buildings. When feasible, seams shall be placed at naturally occurring lines in the image to render them less noticeable. Skews greater than one pixel shall be corrected.

2.2.6 Accuracy

All ortho-imagery shall meet the horizontal accuracy requirement for 1:1,200 scale data, National Standard for Spatial Data Accuracy (NSSDA) at the 95% confidence level. The horizontal accuracy value is equal to or less than 3.80 feet, or 1.159 meters. In other words, 95% of the positions in the dataset must have an error with respect to true ground position that is equal to or smaller than 3.80 feet.

To ensure the data meets the horizontal accuracy requirement, the vendor will calculate the horizontal root mean squared error (RMSE) by comparing transformed ortho-imagery coordinates with field-based ground control point and check point coordinate locations. The vendor will then calculate the horizontal accuracy at the 95% confidence level using the following equation.

$$\text{Accuracy}_r = \text{RMSE}_r * 1.7308$$

Where:

Accuracy_r = Horizontal Accuracy at the 95% confidence level

RMSE_r = Horizontal Root Mean Squared Error



To obtain this level of horizontal accuracy the vendor shall employ Airborne Global Positioning System (AGPS) and Inertial Measurement Unit (IMU) technologies to record the precise location (X,Y,Z) and attitude (roll, pitch, yaw) of the sensor during image capture.

The vendor must also collect additional field-based Ground Control Points (GCPs) to supplement the airborne data such that minimum accuracy requirements are met. **At least 2** check points must also be located in each county or AOI, whichever is smallest in extent. In other words, if an AOI is composed of 5 counties, there must be 10 check points collected; 2 for each county. Check points may be located anywhere in the AOI but should not be in the same vicinity as the GCPs. Check points are not to be used in the Aerial Triangulation solution.

Accuracy of all GCPs and check points must be equal to or less than 0.10 meters in the horizontal (x,y) and equal to or less than 0.20 meters in the vertical (z).

Existing ground control supplied by the State of Michigan, a partner or a commercial entity may be used if available, assuming it meets the minimum accuracy requirements. Some data supplied by the State of Michigan may need to be marked by the vendor. For example, existing monuments may need to be marked prior to aerial acquisition but coordinates will be supplied.

All field-based ground control points and check points shall be taken at locations which are clearly identifiable on the aerial imagery.

2.3 Image Collection Constraints

2.3.1 Equipment

All Imagery from a single Area of Interest (AOI) shall be collected using a single digital aerial survey camera in good working order with up-to-date calibrations, an image stabilization system using an inertial measurement unit (IMU) and equipped with airborne GPS (AGPS). With prior, written permission from the State Project Manager, an additional camera of a different type may be used within an AOI.

Imagery shall be acquired using a large-format digital, metrically calibrated imaging sensor capable of simultaneous multi-spectral capture of red, green, blue and near IR bands.

The digital camera shall employ methods for preventing image smear related to forward motion if necessary. Frame-based cameras must utilize Time Delayed Integration (TDI), or an equivalent technology, to address image smear.

The camera lens and detector array shall be clean and free of excess dust or lint.

2.3.2 Flight Path

Imagery in all AOIs shall be collected on either north-south (which is preferred) or east-west lines whenever feasible, and all imagery in a single AOI shall be collected on parallel lines, unless flight path restrictions in the area make this impractical.

2.3.3 Camera Orientation

Imagery shall be collected at a crab angle of less than 5 degrees, which is measured between the camera's along-track image axis and the aircraft line of flight. The camera shall be nadir pointed within 2 degrees on average and shall not exceed 4 degrees off nadir at any time during image collection.



2.3.4 Image Overlap and Sidelap

Imagery of the AOIs shall be collected with $\geq 60\%$ in-track overlap and $\geq 30\%$ sidelap. True ortho shall be $\geq 80\%$ in-track overlap and $\geq 80\%$ sidelap. See Section 6.1.

2.3.5 Camera Settings

Camera aperture and exposure time shall be adjusted for light conditions to achieve optimal image quality, consistent with the camera manufacturer's recommendations or automated settings, unless the camera operator has data which demonstrate that a different setting produces superior results under conditions at the time of collection.

2.4 Environmental Conditions

Imagery shall be collected under clear skies. The air shall be free of smoke, dust, and excessive haze.

Imagery shall be collected at sun elevation angles greater than 30 degrees. Adjacent flight lines shall be flown at sun elevation angles which differ by less than 15 degrees.

Roadways shall not be wet from recent precipitation.

The ground shall be free of snow cover and lakes free of ice. The ground shall not be obscured by fog.

Imagery shall be collected while deciduous trees are free of leaves, unless this requirement has been waived by the customer in writing for the specific AOI. The requirement for leaf-free collection may be waived by the customer.

Each AOI will have an agreed upon Environmental Conditions (EC) contact who the State and vendor will work with to determine when conditions are within specifications for acquisition to start. EC will also be consulted if conditions reach a stage where conditions are questionable.

3. Areas of Interest

Areas of interest (AOIs) shall be identified by County boundary plus a designated buffer area. If an AOI includes an island within the Great Lakes, the island shall be flown and processed like any other land area. AOIs totaling the desired number of square miles shall be identified by the State and provided via an ESRI shapefile.

4. Quality Assurance Provisions (QA)

4.1 General

Independent quality checks shall be performed to certify the accuracy of the product and conformance to image quality specifications. Specific inspections shall be carried out at appropriate image scale and frequency to verify the Image Quality requirements.

4.2 Visual Inspection for Specific Artifacts

All Image Quality Requirements in Sections 2.2.1, 2.2.2, 2.2.3, 2.2.4, and 2.2.5 shall be inspected at a scale of 400 feet per inch or larger. Seam lines, glints, color balance, DEM artifacts, and bridges on roadways shall be addressed in this inspection, and artifacts noticeable at this scale shall be corrected. In urban areas, a scale of 200 feet per inch or larger shall be used for inspection.

Linear or hard-edge features along seamlines are to be inspected at 200-foot scale or larger on all imagery. These features include, but are not limited to: roads, railroads, vehicular trails (two-tracks), field lines,



watercourses, lake shorelines, and breaks between maintained lawns and natural fields in rural areas. Misalignment of any of these features greater than 2 pixel shifts shall be corrected.

4.3 Customer QA/QC

Contractor shall have a secure online product status review and acceptance application and an OGC WMS imagery service to allow internet access to near lossless full-scale viewing of the ortho-imagery. The intent is to eliminate the need to ship vast amounts of data on portable media to the State and partners for the purpose of error identification and the verification of corrections. The associated application shall provide the tools necessary to allow the State, partners, and consultants to Quality Control (QC) the photos, edge-matching, tile names, and geographic placement prior to final physical delivery. Tile boundaries and seamline boundaries shall be displayed. The application shall provide timely access to data processed for this project. Imagery shall become available for viewing with the completion of the first AOI and a 2 week time period will be designated for each AOI to be available for review. Imagery made available for review shall be fully processed and shall have passed the vendor quality control process. The application shall allow project stake-holders the ability to review ortho-imagery, identify and attribute items in-question for discussion with both the State's Project Manager and the PM of the Contractor. The service shall be available during the term of the Contract. Bidder shall provide a description of the software to be used for this service.

4.4 Warranty Against Image Defects

Defects in imagery collection that are reported by the customer shall be addressed in accordance with the Contract Terms and Conditions, Section 16.

5. Deliverables

5.1 Hard Drives

All GeoTIFF image tiles organized into one sub-directory per County and items identified in Section 7, Deliverables, delivered to SOM via external hard drive.

Each partner to receive an external hard drive with the GeoTIFF image tiles and Section 7 items for their AOI.

5.2 Delivery schedule

Final corrected imagery collected along with all peripherals listed in Section 7 for each season shall be delivered to the customer within 4 months of the end of the applicable flying season. This time period includes the 2 week period designated for each AOI to be reviewed by the customer per section 4.3 above.

5.3 Compressed Mosaic

A compressed image mosaic for each County to be created and delivered in JP2 or similar agreed upon file format.

6. Buy-up Options

6.1 High Resolution Areas (HRA)

In addition to 12 inch (0.30 meter) GSD imagery, the vendor will provide separate pricing for data collection at a GSD of 6 inch (0.15 meters) and a GSD of 3 inch (0.075 meters). The State of Michigan or its partners may elect to collect portions of an AOI at 12 inch (0.30 meter) GSD and other portions within that AOI at either 6 inch (0.15 meter) GSD and/or 3 inch (0.075 meter) GSD.

Spatial resolution shall match GSD $\pm 10\%$.

If this option is chosen for an AOI the area will be imaged at 6 inch or 3 inch resolution, rather than 12 inch resolution.



SOM will provide an ESRI shapefile defining HRA areas.

HRAs will meet the same image quality requirements as 12 inch (0.30 meter) GSD AOIs

6.2 True Ortho Areas (TOA)

The vendor will provide separate pricing for true ortho data to be collected with $\geq 80\%$ in track overlap and $\geq 80\%$ sidelap.

SOM will provide an ESRI shapefile defining TOAs.

TOAs will meet the same image quality requirements as 12 inch (0.30 meter) GSD AOIs.

7. Additional Deliverables at no cost to the SOM for 100% of each AOI

7.1 ESRI Shapefiles

To be delivered in the same coordinate system as the ortho-imagery.

7.1.1 Tile index

A polygon shapefile of the image tile boundaries shall be provided in the appropriate coordinate system. Each polygon will have a name attribute that corresponds with the image name.

7.1.2 Flight lines

A flight diagram or flight index that illustrates the project area outline, the location of the flight lines and the approximate location of image centers, if relevant, shall be included as a deliverable.

Flight lines and image centers shall be attributed with the acquisition date.

7.1.3 Vector seam index

A shapefile representing the vectors used during the image seaming process shall be provided with a flight date attribute.

7.2 Updated Elevation Data

Elevation data created or modified for use in the ortho-rectification process shall be provided in a nonproprietary mutually agreeable format.

7.3 Sensor Station Control

7.3.1 Airborne Global Positioning System (AGPS)

Positional data and statistical summary report shall be submitted in a nonproprietary, mutually agreeable format. In addition, the contractor shall produce a statistical report summarizing the results of the AGPS adjustment.

7.3.2 Internal Measurement Unit (IMU) Data

If IMU exterior orientation data are part of the contractor's technical proposal, the contractor shall submit this sensor orientation data and a statistical summary report in a nonproprietary, mutually agreeable format. The contractor also shall produce a statistical report summarizing the overall accuracy of the adjusted IMU data.

7.4 Supplemental Ground Control



Conventional survey or differentially corrected GPS Ground Control points collected per Section 2.2.6 and used to supplement the AGPS positional data shall be delivered in a nonproprietary, mutually agreed upon format.

7.5 Independent Check Points

Check points collected per section 2.2.6 shall be delivered in a nonproprietary, mutually agreed upon format.



Attachment 2: Optional Oblique Imagery

1. Optional Oblique Imagery

1.1 Characteristics

Provide oblique imagery over selected areas to be determined by State and/or partners at a resolution of 1-foot and/or higher. The oblique imagery must be delivered in TIFF or JPEG format with software capable of providing efficient display and manipulation of imagery as well as horizontal and vertical measurement tools.

1.2 Accessibility

Provide unlimited user access (hundreds of concurrent users) to a standalone oblique imagery viewing software. Oblique imagery viewing software must include the ability to catalog, organize, and retrieve oblique imagery easily and efficiently. The Contractor must provide unlimited use viewer software in the form of an ESRI ArcGIS extension that allows users to quickly view oblique images. Users must be able to measure on screen: the width, length, area, and height of any feature on the image.

Bidder to provide an explanation of their approach to providing the following:

System Requirement	Description of vendor offering	Pricing
Collection of oblique imagery under industry standard environmental conditions		To be provided in Schedule B pricing Table
Processing of oblique imagery in accordance with industry standards		To be provided in Schedule B pricing Table
Delivery of oblique imagery data in accordance with industry standards		To be provided in Schedule B pricing Table
Available oblique imagery resolutions		To be provided in Schedule B pricing Table
Oblique imagery viewer		To be provided in Schedule B pricing Table
Oblique imagery storage		To be provided in Schedule B pricing Table

**Schedule B - Pricing
Cost Table**

**Table 1: IMAGERY PRICING, per Exhibit A - Statement of Work, Services and Deliverables, Section A
12" GSD, 4-band, per square mile price based on the following TOTAL ANNUAL project square miles, AOIs defined by County boundaries.
Detailed specifications in Attachment 1 - Imagery Specifications**

Square Miles	Cost per sq. mile	True-Ortho Multiplier	True-Ortho Fee per sq.mi.
<4,000	\$29.10	1.50	\$43.65
4,000 - 5,999	\$27.58	1.50	\$41.37
6,000 - 7,999	\$26.57	1.50	\$39.86
8,000 - 10,000	\$26.43	1.50	\$39.65
>10,000	\$26.18	1.50	\$39.27

% Reduction for contiguous AOIs (sq. miles). Contiguous defined as two or more AOIs touching at any one point. AOIs can be of various GSDs.

Contiguous Square Miles	% Reduction
1,000 – 2,500	5%
2,501 – 5,000	7.5%
>5,000	10%

6" GSD, 4-band, per square mile price based on the following High Resolution Areas (HRA) values. Detailed specifications in Attachment 1 - Imagery Specifications - Section 6.1



Square Miles	Cost per sq. mile	True-Ortho Multiplier	True-Ortho Fee per sq.mi.
10-100	\$950.00	1.54	\$1,463.00
101-500	\$141.42	1.54	\$217.79
>500	\$122.37	1.54	\$188.45

3” GSD, 4-band, per square mile price based on the following High Resolution Areas (HRA) values. Detailed specifications in Attachment 1 - Imagery Specifications - Section 6.1

Square Miles	Cost per sq. mile	True-Ortho Multiplier	True-Ortho Fee per sq.mi.
10-100	\$1,238.43	1.58	\$1,956.72
101-500	\$424.26	1.58	\$670.33
>500	\$344.85	1.58	\$544.86

**Table 2: LIDAR PRICING, per Exhibit A - Statement of Work, Services and Deliverables, Section B
Base product collected using specifications defined in Sections 4, 5, and 6 of Attachment B - Lidar Specification and QL 2 specifications section 5, per square mile**

Deliverable Option 1

Raw Point Cloud - Calibrated-unclassified Section 7.2

square miles	Cost per sq. mile	% Increase for QL 1	% Reduction for QL 3
<100	\$270.32	102.45%	0%
101-500	\$139.76	91.98%	0%
501-1000	\$79.70	82.74%	0%
1001-5000	\$68.54	77.86%	0%
>5000	\$68.33	77.86%	0%



Deliverable Option 2

Classified Point Cloud - Section 7.3

square miles	Cost per sq. mile	% Increase for QL 1	% Reduction for QL 3
<100	\$92.40	27.60%	0%
101-500	\$51.38	21.00%	0%
501-1000	\$28.88	15.20%	0%
1001-5000	\$26.99	12.10%	0%
>5000	\$26.99	12.10%	0%

Deliverable Option 3

Bare-Earth Surface - Section 7.4

square miles	Cost per sq. mile	% Increase for QL 1	% Reduction for QL 3
<100	\$17.64	16.00%	0%
101-500	\$9.81	10.00%	0%
501-1000	\$5.51	4.70%	0%
1001-5000	\$5.16	1.90%	0%
>5000	\$5.16	1.90%	0%

Deliverable Option 4

Hydro-flattened Bare-Earth Surface, including Breaklines - Section 7.5

square miles	Cost per sq. mile	% Increase for QL 1	% Reduction for QL 3
<100	\$126.56	16.00%	0%



101-500	\$70.39	10.00%	0%
501-1000	\$39.55	4.70%	0%
1001-5000	\$36.97	1.90%	0%
>5000	\$36.97	1.9	0%

Deliverable Option 5

Hydro-Enforced Digital Elevation Model (DEM) - Section 7.6

square miles	Cost per sq. mile	% Increase for QL 1	% Reduction for QL 3
<100	\$151.76	16.00%	0%
101-500	\$84.40	10.00%	0%
501-1000	\$47.42	4.70%	0%
1001-5000	\$44.34	1.90%	0%
>5000	\$44.34	1.9	0%

Deliverable Option 6

Lidar Intensity Images - Section 7.7

square miles	Cost per sq. mile	% Increase for QL 1	% Reduction for QL 3
<100	\$14.01	16.00%	0%
101-500	\$7.80	10.00%	0%
501-1000	\$4.38	4.70%	0%
1001-5000	\$4.09	1.90%	0%
>5000	\$4.09	1.9	0%



* **Contiguous** defined as two or more AOIs touching at any one point. AOIs can be of various GSDs

Table 3: Optional Oblique, per Exhibit A - Statement of Work, Optional Services and Deliverables 9" GSD, 3-band, per square mile price based on the following TOTAL ANNUAL project square miles, AOIs defined by County boundaries. Detailed specifications in Attachment 1 - Imagery Specifications

Square Miles	Cost per sq. mile
<4,000	\$82.50
4,000 - 5,999	\$78.10
6,000 - 7,999	\$73.70
8,000 - 10,000	\$69.30
>10,000	\$66.00

% Reduction for contiguous AOIs (sq. miles). Contiguous defined as two or more AOIs touching at any one point. AOIs can be of various GSDs.

Contiguous Square Miles	% Reduction
1,000 – 2,500	2%
2,501 – 5,000	4%
>5,000	6%



6” GSD, 3-band, per square mile price based on the following High Resolution Areas (HRA) values. Detailed specifications in Attachment 1 - Imagery Specifications - Section 6.1

Square Miles	Cost per sq. mile
10-100	\$275.00
101-500	\$261.25
>500	\$247.50

3” GSD, 3-band, per square mile price based on the following High Resolution Areas (HRA) values. Detailed specifications in Attachment 1 - Imagery Specifications - Section 6.1

Square Miles	Cost per sq. mile
10-100	\$495.00
101-500	\$467.50
>500	\$438.90