

CITY OF SAN ANTONIO  
INTERDEPARTMENTAL MEMORANDUM  
INFORMATION TECHNOLOGY SERVICES DEPARTMENT

**TO:** Mayor and City Council

**FROM:** Gary Moeller, Director of Information Technology Services Department

**THROUGH:** Terry M. Brechtel, City Manager

**COPIES:** J. Rolando Bono, Deputy City Manager; Melissa Byrne Vossmer, Assistant City Manager; Andrew Martin, City Attorney; Jim Campbell, Director External Relations; File

**SUBJECT:** Inter-local Agreement with San Antonio River Authority and amendment to High Resolution Digital Orthophotography Contract Ordinance 97065.

**DATE:** March 18, 2004

**SUMMARY AND RECOMMENDATIONS**

This Ordinance approves an Inter-local agreement between the City of San Antonio and the San Antonio River Authority (SARA) and amends Ordinance 97065 and the High Resolution Digital Orthophotography contract between the City and Aero-Metric, Inc. d/b/a Markhurd for Fiscal Year 03-04 as requested by SARA for the additional cost of \$291,860 to be paid entirely by SARA.

Staff recommends approval.

**BACKGROUND INFORMATION**

The City of San Antonio has been working with Bexar County and the San Antonio River Authority (SARA) through an Inter-local Agreement (ILA) for Regional Flood Control Management since December 2002. This regional management approach will maximize the delivery of regional flood control, drainage and storm water projects through the combined efforts and resources of the partners. The agreement itself did not bring any additional funding. The partnership will allow for the coordinate use of all the currently available sources of funding such as: Bexar County Flood Control Tax, City of San Antonio Storm Water Fee, the SARA Ad Valorem Tax, and existing bonding capacities. The ILA mandates coordination amongst the partners and the effective and efficient use of public resources. This ordinance is an example of the collaboration that was intended in creating the ILA.

The current contract between the City and Markhurd for High Resolution Digital Orthophotography provides high resolution digital orthophotography at a 1"=800' flight scale. Markhurd coordinates airplanes to fly over the City at a given flight level to take

photos at a 1 inch for every 800 feet scale with a plus or minus 2-foot accuracy. The data collected is used by Geographical Information Systems (GIS) at the Information Technology Services Department to create maps and data records that are presented on the City's Web to all departments and the public.

SARA has requested an inter-local agreement with the City to modify the City's High Resolution Digital Orthophotography contract with Markhurd. This modification would apply the option for 2' color contour and high resolution digital orthophotography at a 1"=600' flight scale. The air flight would be flown at a lower altitude and photos taken at a 1-inch for every 600 feet scale. The result is higher quality data and photos.

The City, SARA and Bexar County would receive this data for the benefit of regional flood control through a shared network that is being planned as part of the partnership

The City will receive higher accuracy and quality of data to produce higher quality maps and GIS data, which will be available on the Web for all departments and citizens.

SARA will receive data that meets Federal Emergency Management Agency Class 1 accuracy standards and will aid in hydrologic and hydraulic studies. The higher resolution data will also allow SARA to develop higher quality regional watershed models that can be used to measure the impact of development on surface water quantity and quality.

This inter-local agreement is to apply the modifications now, before foliage reaches its peak later this spring and improve the accuracy of information. If this action were not taken, the next opportunity to obtain this digital data would be January 2005.

Should SARA withdraw prior to the flights for FY 03-04, then the initial contractual terms and conditions between Markhurd and the City will apply.

This amendment will not effect the exiting terms and conditions between Markhurd and the City for the FY 04-05 extension. The City's cost will remain at \$197,375.

### **POLICY ANALYSIS**

Approval of this ordinance will be a continuation of Council policy previously approved by Council through ordinance 97065, dated January 23, 2003.

### **FINANCIAL IMPACT**

The cost for the current contract is \$197,375 per year and is appropriated for FY 03-04 in the Information Technology Services Department budget.

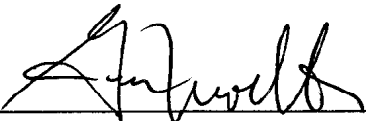
The additional cost for this modification is \$291,860 and is to be paid entirely by SARA in full by a lump sum payment prior to the schedule flights.


## COORDINATION

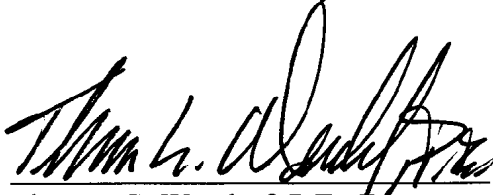
This item has been coordinated with the City Attorney's Office, Public Works and External Relations.

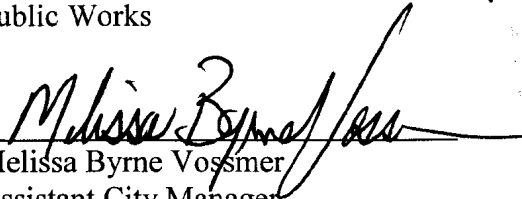
## ATTACHMENTS

1. Letter from San Antonio River Authority requesting the inter-local agreement with the City and includes a statement of financial commitment for \$291,860.
2. Inter-local agreement between San Antonio River Authority and City of San Antonio to amend the current High Resolution Digital Orthophotography contract between City of San Antonio and Markhurd and select the option for 2 foot contours and 1"=600' flight scale at an additional cost of \$291,860 to be paid fully by SARA.
3. High Resolution Digital Orthophotography contract between the City and Aero-Metric, Inc. d/b/a Markhurd.


  
\_\_\_\_\_  
Gary Moeller, Director  
Information Technology Services

  
\_\_\_\_\_  
J. Rolando Bono  
Deputy City Manager

  
\_\_\_\_\_  
Thomas G. Wendorf, P.E., Director  
Public Works 3/11/04

  
\_\_\_\_\_  
Melissa Byrne Vossmer  
Assistant City Manager

Approved:

†   
\_\_\_\_\_  
Terry M. Brechtel  
City Manager



**SAN ANTONIO  
RIVER AUTHORITY**

Water Brings Us Together

March 9, 2004

The Honorable Ed Garza  
Members of San Antonio City Council  
San Antonio City Hall  
P.O. Box 839966  
San Antonio, Texas 78283-3966

Re: 2004 Aerial Photography (CITY OF SAN ANTONIO CONTRACT #03-015)

Dear Mayor and City Council:

The partnership established between the City of San Antonio, Bexar County and the San Antonio River Authority to jointly address flooding and drainage issues is producing great benefits for our community. One of the most recent accomplishments of the program is the collaboration between the City and SARA to perform the 2004 aerial photography. By combining our resources we will enhance the value of the work to be performed by Markhurd, Inc. for the collective benefit of both of our agencies.

This letter confirms that the San Antonio River Authority, in accordance with the terms of the Interlocal Agreement between our agencies to conduct the aerial photography, will pay the City \$291,860 immediately upon approval of the Interlocal Agreement by the City Council. The City has agreed to provide the San Antonio River Authority with 2003 aerial photography data from Markhurd, Inc. for the Leon Creek Watershed and the Upper San Antonio Watershed. The San Antonio River Authority will arrange with Markhurd, Inc. to provide data in the form of contact prints and diapositives. This data will be used by consultants already under contract with the San Antonio River Authority.

Upon completion of the 2004 aerial photography, the San Antonio River Authority will also have complete access to and use of the data collected.

Should you have any questions, please contact me at 302-3600.

Respectfully,

Gregory E. Rothe, P.E.  
General Manager

/ch

**EXECUTIVE  
COMMITTEE**



**CHAIRMAN**

H.B. Ruckman, III

**VICE CHAIRMAN**

Louis E. Rowe

**SECRETARY**

JC Turner

**TREASURER**

Adair R. Sutherland

**MEMBER-AT-LARGE**

Thomas G. Weaver

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Adair R. Sutherland

**GENERAL  
MANAGER**



Gregory E. Rothe

**INTERLOCAL AGREEMENT BETWEEN THE  
CITY OF SAN ANTONIO, TEXAS  
AND THE  
SAN ANTONIO RIVER AUTHORITY**

**AUTHORIZING AN EXPENDITURE OF FUNDS PAYABLE TO  
AERO-METRIC, INC. D/B/A MARKHURD  
FOR COSTS ASSOCIATED WITH THE ADDITIONAL MONIES NEEDED TO  
CHANGE THE CURRENT 1"=800' AERIAL PHOTOGRAPHY SCALE TO 1"=600'**

This **AGREEMENT** is entered into this \_\_\_\_ day of \_\_\_\_, 2004 by and between the San Antonio River Authority, a Texas conservation and reclamation district (hereinafter referred to as "SARA") and the City of San Antonio, Texas, a Texas Municipal Corporation (hereinafter referred to as ("CITY")) collectively referred to as "**THE PARTIES**";

**WITNESSETH THAT:**

**WHEREAS**, CITY has a contract dated January 23, 2003 with Aero-Metric, Inc. d/b/a MARKHURD to do high resolution digital orthophotography at a 1"=800' flight scale for \$197,375.00 and

**WHEREAS**, SARA is a regional government entity concerned with flooding and is requesting orthophotography to be flown at the lower 1"=600' scale to allow for future compilation of 2' contours to meet Federal Emergency Management Agency (FEMA) Class 1 accuracy standards that would aid in hydrologic and hydraulic studies; and

**NOW THEREFORE**, CITY and SARA have agreed on the terms and conditions pursuant to which said local funds can be issued, which are as follows:

**DEFINITIONS**

"**AGREEMENT**" means this agreement.

"**MARKHURD**" means Aero-Metric, Inc., d/b/a MARKHURD

"**PROJECT**" means the high-resolution digital orthophotography project, authorized by city contract dated January 23, 2003 by Ordinance No. 97065.

"**CITY**" means the City of San Antonio, Texas.

"**PARTIES**" and/or "**PARTY**" mean the parties to this **AGREEMENT**, namely COSA and SARA.

"**SARA**" means the San Antonio River Authority.

**A. CITY agrees:**

1. To coordinate control need by MARKHURD as described in Attachment "A".
2. To modify the existing contract with MARKHURD, passed and approved by the San Antonio City Council in Ordinance No. 97065, to perform High Resolution Digital Orthophotography at the 1"=600' scale to be applied to fiscal year October 1, 2003 to September 30, 2004 only.

**B. SARA agrees:**

1. To pay the difference between the costs of \$487,235.00 to fly at the 1"=600' scale and the amended CITY contract cost of \$197,375.00 to fly at the 1"=800' scale, a total expenditure from SARA of \$291,860.00, as described in Attachment "B".

**C. THE PARTIES mutually agree:**

1. SARA is to make a lump sum payment for \$291,860.00 to the City prior to the performance of the scheduled flights.

**NOTICES**

**To CITY** Notices to CITY required or appropriate under this AGREEMENT shall be deemed sufficient if in writing and mailed, registered or certified mail, postage prepaid, addressed to:

City of San Antonio  
City Manager  
P.O. Box 839966 / 1st Floor, City Hall  
San Antonio, Texas 78283-3966  
Attn: Terry Brechtel

with copy being sent to the:

Mr. Gary J. Moeller  
Director, Information Technology Services Department  
City of San Antonio  
515 S. Frio  
San Antonio, Texas 78207

and to such other addresses as may hereafter be designated in writing by the City Manager of the City of San Antonio.

**To SARA.** Notices to SARA shall be addressed to:

Gregory E. Rothe, P.E.  
General Manager  
San Antonio River Authority  
P.O. Box 839980  
San Antonio, Texas 78283-9980

Or to such other addresses as may herein be designated in writing by the General Manager of SARA.

Nothing contained herein shall be deemed or construed by the PARTIES, or by any third party, as creating the relationship of principal and agent, joint venture or any other similar relationship between the PARTIES. It is understood and agreed that no provisions contained herein nor any acts of the PARTIES hereto create a relationship between the PARTIES other than that of independent contractor. In keeping with the provision of its services as an independent contractor, each PARTY shall be responsible for its respective acts or omissions. No PARTY has the authority to bind the other or to hold out to third parties that it has the authority to bind the other.

This AGREEMENT shall be construed under and in accordance with the laws of the State of Texas and all obligations of the PARTIES created hereunder are performable in Bexar County, Texas.

In case any one or more of the provisions contained in this AGREEMENT shall for any reason be held to be invalid, illegal or unenforceable in any respect, such shall not affect any other provisions hereof and this AGREEMENT shall be construed as if such invalid, illegal, or unenforceable provision had never been contained herein.

The PARTIES hereby agree to comply with all federal, state, and local laws and ordinances applicable to the work or services to be performed under this AGREEMENT. The PARTIES acknowledge that they are subject to the Texas Public Information Act and the exceptions stated in such Act.

This AGREEMENT shall be binding upon and inure only to the benefit of the PARTIES hereto and their respective successors and assigns where permitted by this AGREEMENT.

All prior and contemporaneous agreements of THE PARTIES are incorporated in this written AGREEMENT.

This AGREEMENT may be amended, changed or varied only by written instrument signed by both SARA and CITY.

**IN TESTIMONY WHEREOF**, THE PARTIES hereto have caused these presents to be executed in duplicate on the day above stated.

<b>CITY</b>  <b>CITY OF SAN ANTONIO</b> a Texas Municipal Corporation   <hr/> <b>TERRY BRECHTEL</b> City Manager  <b>ATTEST:</b>   <hr/> <b>YOLANDA L. LEDESMA</b> Acting City Clerk   <b>APPROVED AS TO LEGAL FORM:</b>    <hr/> <b>ANDREW MARTIN</b> City Attorney	<b>SARA</b>  <b>SAN ANTONIO RIVER AUTHORITY</b> a Political Subdivision of the State of Texas   <hr/> <b>H. B. RUCKMAN, III</b> Chairman  <b>ATTEST:</b>   <hr/> <b>JC TURNER</b> Secretary   <b>APPROVED AS TO LEGAL FORM:</b>    <hr/> <b>RALPH BROWN</b> General Counsel
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ATTACHMENT A

CITY OF SAN ANTONIO  
INFORMATION TECHNOLOGY DEPARTMENT  
CONTRACT WITH AERO-METRIC, INC. D/B/A MARKHURD  
(SEE ATTACHED)

ATTACHMENT B  
ADDENDUM TO CITY OF SAN ANTONIO CONTRACT #03-015

COSTS Associated with 1"=600' flight scale

Aerial Photography (Includes Airborne GPS)	\$141,700
Scanning	\$60,730
DEM Updates	\$16,645
Digital Ortho/Color Image Enhancement	\$79,400
Digital Photo Index (ESRI -Shape Format)	\$540
Composite Mosaic Bexar Co. (MrSID)	\$350
Composite Mosaic Bexar Co. (ECW)	\$350
Tile Mosaic Bexar Co. (MrSID)	\$1,690
Tile Mosaic Bexar Co. (ECW)	\$1,690
2 Set CD-ROMs (TIFF)	\$2,200
2 Set CD-ROMs (ErMapper-ECW format)	\$560
2 Set CD-ROMs (MrSID)	\$560
Analytical Triangulation	\$82,420
Vertical Control and Targeting	\$96,875
Performance Bond	<u>\$3,525</u>
 Total COSTS for the 1"=600' flight scale	 \$489,235
 Less: CITY Contract Cost for 1"=800' flight scale	 <u>\$197,375</u>
 SARA Expenditure (Difference between 1"=800' and 1"=600' flight scales)	 <u>\$291,860</u>

**CITY OF SAN ANTONIO**  
**INFORMATION TECHNOLOGY SERVICES DEPARTMENT**

**TO:** Travis M. Bishop, Assistant City Manager

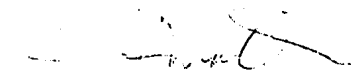
**FROM:** Gary Moeller, Director, Information Technology Services Department

**SUBJECT:** STANDARD CONTRACT – SUBMITTAL FOR SIGNATURES

**DATE:** January 28, 2003

<b>CONTRACT AWARDED TO:</b>	Markhurd for High Resolution Digital Orthophotography
<b>ORDINANCE AUTHORIZATION #:</b>	97065
<b>ORDINANCE AUTHORIZATION DATE:</b>	01-23-03
<b>POLICY ANALYSIS:</b>	
<p>This ordinance authorizes the City of San Antonio to accept a proposal from Markhurd to provide the City of San Antonio Information Technology Services with high-resolution digital orthophotography.</p> <p>The total cost of this contract is \$197,375.00.</p>	

Should you have any questions, please feel free to contact me at 207-8373. Thank you.



Gary Moeller  
Director  
Information Technology Services Department

Attachments

**HIGH TECHNOLOGY PROCUREMENT AGREEMENT**  
**FOR**  
**HIGH RESOLUTION DIGITAL ORTHOPHOTOGRAPHY**

STATE OF TEXAS           §  
                                     §  
COUNTY OF BEXAR       §

This Agreement is entered into by and between the City of San Antonio, a Texas Municipal Corporation (hereinafter referred to as "City") acting by and through its City Manager, pursuant to Ordinance No. 97065 passed and approved on the 23<sup>rd</sup> day of January, 2003 and Aero-Metric, Inc. d/b/a MARKHURD by and through its Vice President, Marvin E. Miller (hereinafter referred to as "Contractor"), both of which may be referred to herein collectively as the "Parties".

The Parties hereto severally and collectively agree, and by the execution hereof are bound, to the mutual obligations herein contained and to the performance and accomplishment of the tasks hereinafter described.

**I. DEFINITIONS**

As used in this Agreement, the following terms shall have meanings as set out below:

"City" is defined in the preamble of this Agreement and includes its successors and assigns.

"Contractor" is defined in the preamble of this Agreement and includes its successors.

"Director" shall mean the acting director of City's Information Technology Services Department.

**II. TERM**

2.1 Unless sooner terminated in accordance with the provisions of this Agreement, the term of this Agreement shall commence on the awarding of the contract by City Council and terminate on September 30, 2003. The City reserves the right to renew this contract for additional (2) 1-year periods for the same compensation set forth in Article IV. Compensation to Contractor. The City also reserves the right to extend this contract at 30 day increments up to a maximum of 90 days.

2.2 If funding for the entire Agreement is not appropriated at the time this Agreement is entered into, City retains the right to terminate this Agreement at the expiration of each of City's budget periods, and any subsequent contract period is subject to and contingent upon such appropriation.

### III. SCOPE OF SERVICES

Contractor agrees to provide the services described in this Article III entitled Scope of Services in exchange for the compensation described in Article IV. Compensation.

The high-resolution digital orthophotography services are to cover the entire Bexar County Area.

Contractor shall perform color digital orthophotography. The orthophotography shall meet National Map Accuracy Standards for 1"=200' with a pixel resolution of 6". Images should be delivered based on the 5,000' x 5,000' Stateplane grid NAD83. All orthorectification and images for this project shall extend 300' past the City's project boundary. Product delivery formats are Tagged Image File Format (TIFF) & (TWF) plus MrSid and ECW compressed formats. These are to be delivered on CD-ROM with multiple copies for supporting countywide entities. This product will be used in conjunction with the City's GIS system. The orthophotography will underlay the City's planimetric and parcel mapping data, which ties to the City's First Order Control Network. The City's projection datum is NAD 83 Stateplane, Texas South Central zone. The resulting coverage information will be a part of a countywide base map that will be used by different entities for the addition of their own spatial and attribute information. This information will become the copyrighted property of the City.

General requirements shall include:

- Aerial photography, at 1" = 800' @ 65.28% forward overlap for tile centered photos and 80% overlap for downtown area to correct building lean
  - Deliverables include:
    - Flight map
    - Digital Photo Index
- Survey control via GPS and Airborne GPS and or Inertial Measuring Unit (IMU)
  - Deliverables include:
    - Survey Report
- Fully analytical aerotriangulation adjustment or use data from (IMU)
  - Deliverables include:

- Independent Survey on minimum of 40 points that will be provided by the CITY.
- Color digital orthophotos
- Deliverables include:
  - TIFF images with world files
  - Composite MrSid file
  - Composite ECW file
  - Original Film Negatives (to be stored by Contractor for the City of San Antonio)

Detailed requirements and technical specifications for this project are set forth in the document entitled "High Resolution Digital Orthophotography Requirements," which is attached hereto and incorporated herein by reference as Exhibit A.

City shall provide the following data to Contractor:

- A. Digital Elevation Model (DEM) from 2001 Digital Orthophotography Project
- B. Coordinates For Primary Control From 2001 Digital Orthophotography Project  
Vendor must incorporate 1<sup>st</sup> order points provided by CITY (40 targeting points).
- C. Tile Layout for Tiling Structure.

All data provided by City to Contractor will be deleted from the Contractor's computer system and all media (CD ROM, tape, and etc.) that contain the data will be destroyed upon termination of the contract or any extensions of the contract. Contractor will also provide on company letter head a document stating that they have complied with disclaimer.

All work performed by Contractor hereunder shall be performed to the satisfaction of the Director of City's Information Services Technology Department. The determination made by Director shall be final, binding and conclusive on all Parties hereto. City shall be under no obligation to pay for any work performed by Contractor, which is not satisfactory to Director. City shall have the right to terminate this Agreement, in accordance with Article IX. Termination, in whole or in part, should Contractor's work not be satisfactory to Director; however, City shall have no obligation to terminate and may withhold payment for any unsatisfactory work, as stated herein, even should City elect not to terminate.

For any issues of dispute and/or disagreement about the delivered services, quality of work or quality of product, the City reserves full rights to make final decisions for settlement. The Contractor will be responsible for the reproduction of services, work or product at no cost to the City.

#### **IV. COMPENSATION TO CONTRACTOR**

4.1 In consideration of Contractor's performance in a satisfactory and efficient manner, as determined solely by Director, of all services and activities set forth in this Agreement, City agrees to pay Contractor an amount not to exceed One hundred ninety seven thousand three hundred seventy five dollars (\$197,375.00) as total compensation, to be paid to Contractor as follows:

<u>Project Phase</u>	<u>Bid Amount</u>
Targeting	\$4,400
Aerial Photography (Includes Airborne GPS)	\$65,040
Contact Prints (1 set)	\$9,985
Airborne GPS/IMU and ground GPS	\$77,470
Observations, data processing, scanning, DEM updates and digital orthophoto processing	
Digital Photo Index (ESRI - Shape Format)	\$500
Composite Mosaic Bexar Co. (MrSID)	\$350
Composite Mosaic Bexar Co. (ECW)	\$350
Tile Mosaic Bexar Co. (MrSID)	\$1,690
Tile Mosaic Bexar Co. (ECW)	\$1,690
2 Set CD-ROMs (TIFF)	\$2,200
2 Set CD-ROMs (ErMapper-ECW format)	\$560
2 Set CD-ROMs (MrSID)	\$560
Color Image Enhancement	\$32,580
Total	\$197,375.00

4.2 No additional fees or expenses of Contractor shall be charged by Contractor nor be payable by City. The parties hereby agree that all compensable expenses of Contractor have been provided for in the total payment to Contractor as specified in section 4.1 above. Total payments to Contractor cannot exceed that amount set forth in section 4.1 above, without prior approval and agreement of all parties, evidenced in writing and approved by the San Antonio City Council by passage of an ordinance therefore.

4.3 Payment shall be made upon completion of each of the phases described in section 4.1. Final acceptance of work products and services require written approval by City. The approval official shall be Director. Payment will be made to Contractor following written approval of the final work products and services by Director. City shall not be obligated or liable under this Agreement to any party, other than Contractor, for the payment of any monies or the provision of any goods or services. City agrees to reimburse Contractor for work performed under this contract's scope of work within thirty (30) days after completion of the aforementioned phase and City has received an itemized bill for services performed provided that all services shall be performed to

City's satisfaction, and City shall not be liable for any payment under this Contract for services which are unsatisfactory and which have not been approved by City.

4.4 Withholding of Payment. The City shall withhold twenty percent (20%) of each payment phase of the contract to insure that the project is completed successfully. In addition, this amount shall be withheld to insure compliance with provisions in Article VII. HOMELAND SECURITY REQUIREMENTS, requiring that all work done by Respondent and their subcontractors be performed in the United States. The decision on whether Respondent has complied with this provision shall be made by the Director of the Information and Technology Service Department. City shall pay the final twenty percent (20%) of the contract price within thirty (30) days after receiving a final invoice for the delivery of the final product and the determination by the Director of Information and Technology Service's Department that the contract was completed successfully.

4.5 Contractor will distribute data to private individuals or organizations at a fixed cost. Contractor may charge up to the following amounts for these services:

Distribution of Data	Price
Set-up Fee for Distribution	\$500 (\$250 for City)
1 Set CD-ROMs (TIFF)	\$2,200
1 Set CD-ROMs (ErMapper-ECW format)	\$560
1 Set CD-ROMs (MrSID)	\$560
Any single or additional CD-ROM (TIFF, ErMapper-ECW format or MrSID)	\$50

These costs will remain the same for the term of the contract and any extensions.

The CITY will direct all requests, from private individuals or organizations, for the data to the Contractor.

## V. OWNERSHIP OF DOCUMENTS

5.1 The copyright in and to any and all writings, documents or information in whatsoever form and character produced by Contractor pursuant to the provisions of this Agreement is the exclusive property of City; and no such writing, document or information shall be the subject of any copyright or proprietary claim by Contractor. Contractor will execute reasonable documents confirming City's copyright ownership and will supply similar documents executed to Contractor's employees, and any authorized subcontractor and employees of the subcontractor.

5.2 Contractor understands and acknowledges that as the exclusive owner of any and all such writings, documents and information, City has the right to use all such writings, documents and information as City desires, without restriction to copying, distributing or making derivative works.

5.3 Contractor shall require that any private individual or organization receiving



data from Contractor shall execute a release document containing the following language:

The City of San Antonio has attempted to assure the accuracy of this data for its internal uses and for no other purposes. The City of San Antonio did not develop this data as a commercial product. Consequently, the City of San Antonio makes no warranty, representation or guaranty as to the content, sequence, accuracy, timeliness or completeness of all or any part of the data. The user should not rely on the data provided for any reason unless and until the user independently verifies the accuracy of any such data to the user's personal satisfaction. The City of San Antonio explicitly disclaims any representations and warranties, including, without limitation, the implied warranties of merchantability and fitness for a particular purpose. The City of San Antonio assumes no liability for any errors, omissions or inaccuracies in the data provided regardless of how caused.

The City of San Antonio assumes no liability for any decisions made or actions taken or not taken by the user of this data in reliance upon any data furnished hereunder.

## **VI. INTELLECTUAL PROPERTY**

Contractor shall pay all royalties and licensing fees that may be due and owing to any third party. Contractor shall hold the City harmless and indemnify the City from the payment of any royalties, damages, losses or expenses including attorney's fees for suits, claims or otherwise, growing out of infringement or alleged infringement of copyrights, patents, materials and methods used in the project. It shall defend all suits for infringement of any Intellectual Property rights. Further, if Contractor has reason to believe that the design, service, process or product specified is an infringement of an Intellectual Property right, it shall promptly give such information to the City.

Upon receipt of notification that a third party claims that the program(s), hardware or both the program(s) and the hardware infringe upon any United States patent or copyright, Contractor will immediately:

1. Either:

- a) obtain, at Contractor's sole expense, the necessary license(s) or rights that would allow the City to continue using the programs, hardware, or both the programs and hardware, as the case may be, or,
- b) alter the programs, hardware, or both the programs and hardware so that the alleged infringement is eliminated, and

- c) reimburse the City for any expenses incurred by the City to implement emergency backup measures if the City is prevented from using the programs, hardware, or both the programs and hardware while the dispute is pending.

2. Contractor further agrees to:

- a) assume the defense of any claim, suit, or proceeding brought against the City for infringement of any United States patent or copyright arising from the use and/or sale of the equipment or software under this Agreement,
- b) assume the expense of such defense, including costs of investigations, reasonable attorneys' fees, expert witness fees, damages, and any other litigation-related expenses, and
- c) indemnify the City against any monetary damages and/or costs awarded in such suit;

Provided that:

- Contractor is given sole and exclusive control of all negotiations relative to the settlement thereof, but that Contractor agrees to consult with the City Attorney of the City during such defense or negotiations and make good faith effort to avoid any position adverse to the interest of the City,
- that the Software or the equipment is used by the City in the form, state, or condition as delivered by Contractor or as modified without the permission of Contractor, so long as such modification is not the source of the infringement claim,
- that the liability claimed shall not have arisen out of the City's negligent act or omission, and
- that the City promptly provide Contractor with written notice within 15 days following the formal assertion of any claim with respect to which the City asserts that Contractor assumes responsibility under this section.

## VII. RECORDS RETENTION

7.1 Contractor and its subcontractors, if any, shall properly, accurately and completely maintain all documents, papers, and records, and other evidence pertaining to the services rendered hereunder (hereafter referred to as "documents"), and shall make

such materials available to the City at their respective offices, at all reasonable times and as often as City may deem necessary during the Agreement period, including any extension or renewal hereof, and the record retention period established herein, for purposes of audit, inspection, examination, and making excerpts or copies of same by City and any of its authorized representatives.

7.2 Contractor shall retain any and all documents produced as a result of services provided hereunder for a period of four (4) years (hereafter referred to as "retention period") from the date of termination of the Agreement. If, at the end of the retention period, there is litigation or other questions arising from, involving or concerning this documentation or the services provided hereunder, Contractor shall retain the records until the resolution of such litigation or other such questions. Contractor acknowledges and agrees that City shall have access to any and all such documents at any and all times, as deemed necessary by City, during said retention period. City may, at its election, require Contractor to return said documents to City prior to or at the conclusion of said retention.

7.3 Contractor shall notify City, immediately, in the event Contractor receives any requests for information from a third party, which pertain to the documentation and records referenced herein. Contractor understands and agrees that City will process and handle all such requests.

## **VIII. HOMELAND SECURITY REQUIREMENTS**

Due to the current National Security issues and to the number of military installations in the project area it is required that all work conducted for this project, including but not limited to filming, photographic production, photographic processing, scanning, surveying and image creation be performed in the United States of America. Under no circumstances shall it be permitted to send any film, film derivatives or any other data, whether hard copy or digital form, associated with the performance of this contract to destinations outside of this Country.

All proposals are required to identify the work locations of all tasks and the key personnel who will work on the project. The City requires that any change in either location or personnel be requested in writing and approved by the City's Project Manager prior to any change. Submission of a proposal warrants that the company awarded this contract will meet these and all other contract conditions.

## **IX. TERMINATION**

9.1 For purposes of this Agreement, "termination" of this Agreement shall mean termination by expiration of the Agreement term as stated in Article II. Term, or earlier termination pursuant to any of the provisions hereof.

9.2 Termination Without Cause. This Agreement may be terminated by the City upon 30 calendar days written notice, which notice shall be provided in accordance with Article X. Notice.

9.3 Termination For Cause. Upon written notice, which notice shall be provided in accordance with Article X. Notice, City may terminate this Agreement as of the date provided in the notice, in whole or in part, upon the occurrence of one (1) or more of the following events, each of which shall constitute an Event for Cause under this Agreement:

9.3.1 The sale, transfer, pledge, conveyance or assignment of this Agreement without prior approval, as provided in Article XIV. Assignment and Subcontracting.

9.3.2 Violation of the provisions of Article VIII. Homeland Security Requirements.

9.4 Defaults With Opportunity for Cure. Should Contractor default in the performance of this Agreement in a manner stated in this section 9.4 below, same shall be considered an event of default. City shall deliver written notice of said default specifying such matter(s) in default. Contractor shall have fifteen (15) calendar days after receipt of the written notice, in accordance with Article X. Notice, to cure such default. If Contractor fails to cure the default within such fifteen-day cure period, City shall have the right, without further notice, to terminate this Agreement in whole or in part as City deems appropriate, and to contract with another Contractor to complete the work required in this Agreement. City shall also have the right to offset the cost of said new Agreement with a new Contractor against Contractor's future or unpaid invoice(s), subject to the duty on the part of City to mitigate its losses to the extent required by law.

9.4.1 Failure to comply with the terms and conditions stated in Article XVI. SBEDA.

9.4.2 Bankruptcy or selling substantially all of company's assets

9.4.3 Failing to perform or failing to comply with any covenant herein required

9.4.4 Performing unsatisfactorily

9.5 Termination By Law. If any state or federal law or regulation is enacted or promulgated which prohibits the performance of any of the duties herein, or, if any law is interpreted to prohibit such performance, this Agreement shall automatically terminate as of the effective date of such prohibition.

9.6 Regardless of how this Agreement is terminated, Contractor shall affect an orderly transfer to City or to such person(s) or firm(s) as the City may designate, at no additional cost to City, all completed or partially completed deliverables identified in Article III. Scope of Services, as well as any documents, papers, records, charts, reports, and any other materials or information produced as a result of or pertaining to the services rendered by Contractor, or provided to Contractor, hereunder, regardless of

storage medium, if so requested by City, or shall otherwise be retained by Contractor in accordance with Article VII. Records Retention. Any record transfer shall be completed within thirty (30) calendar days of a written request by City and shall be completed at Contractor's sole cost and expense. Payment of compensation due or to become due to Contractor is conditioned upon delivery of all such documents, if requested.

9.7 Within forty-five (45) calendar days of the effective date of completion, or termination or expiration of this Agreement, Contractor shall submit to City its claims, in detail, for the monies owed by City for services performed under this Agreement through the effective date of termination. Failure by Contractor to submit its claims within said forty-five (45) calendar days shall negate any liability on the part of City and constitute a **Waiver** by Contractor of any and all right or claims to collect moneys that Contractor may rightfully be otherwise entitled to for services performed pursuant to this Agreement.

9.8 Upon the effective date of expiration or termination of this Agreement, Contractor shall cease all operations of work being performed by Contractor or any of its subcontractors pursuant to this Agreement.

9.9 Termination not sole remedy. In no event shall City's action of terminating this Agreement, whether for cause or otherwise, be deemed an election of City's remedies, nor shall such termination limit, in any way, at law or at equity, City's right to seek damages from or otherwise pursue Contractor for any default hereunder or other action.

9.10 In the event of termination Articles VI, VII, VIII and XI shall continue to be in effect.

## X. NOTICE

Except where the terms of this Agreement expressly provide otherwise, any election, notice or communication required or permitted to be given under this Agreement shall be in writing and deemed to have been duly given if and when delivered personally (with receipt acknowledged), or three (3) days after depositing same in the U.S. mail, first class, with proper postage prepaid, or upon receipt if sending the same by certified mail, return receipt requested, or upon receipt when sent by a commercial courier service (such as Federal Express or DHL Worldwide Express) for expedited delivery to be confirmed in writing by such courier, at the addresses set forth below or to such other address as either party may from time to time designate in writing.

If intended for City, to:

City of San Antonio  
Attn: Mr. Joe Chapa  
Information and Technology Services Division  
515 South Frio Street  
San Antonio, TX 78207

If intended for Contractor, to: Markhurd

Attn: Mr. John Bloodgood  
P.O. Box 794145  
Dallas, TX 75379

## **XI. WARRANTY**

Contractor will provide a one-year warranty on final deliverables: services, work and products. If any of the media (CD Rom) delivered is defective upon delivery it will be replaced at no cost to the City. The Contractor will keep an archived copy in TIFF, ECW, and MrSID formats for one year.

## **XII. INSURANCE**

12.1 Any and all employees, representatives, agents or volunteers of **CONTRACTOR** while engaged in the performance of any work required by the **CITY** or any work related to a Lease of space, License **CONTRACT**, or Concession **CONTRACT** with the **CITY** shall be considered employees, representatives, agents or volunteers of **CONTRACTOR** only and not of the **CITY**. Any and all claims that may result from any obligation for which **CONTRACTOR** may be held liable under any Workers' Compensation, Unemployment Compensation or Disability Benefits law or under any similar law on behalf of said employees, representatives, agents or volunteers shall be the sole obligation and responsibility of **CONTRACTOR**.

12.2 Prior to the commencement of any work under this **CONTRACT**, **CONTRACTOR** shall furnish an original completed Certificate(s) of Insurance to Information and Technology Services Department and City Clerk's Office, which shall be completed by an agent authorized to bind the named underwriter(s) and their company to the coverage, limits, and termination provisions shown thereon, and which shall furnish and contain all required information reference or indicated thereon. The original certificate(s) must have the agent's original signature, including the signer's company affiliation, title and phone number, and be mailed directly from the agent to the **CITY**. The **CITY** shall have no duty to pay or perform under this **CONTRACT** until such certificate shall have been delivered to the **CITY'S** Director of Information and Technology Services Department and the City Clerk's Office, and no officer or employee shall have authority to waive this requirement.

12.3 The **CITY** reserves the right to review the insurance requirements of this section during the effective period of the **CONTRACT** and any extension or renewal hereof and to modify insurance coverages and their limits when deemed necessary and prudent by the **CITY'S** Risk Manager based upon changes in statutory law, court decisions, or circumstances surrounding the **CONTRACT**, but in no instance will the **CITY** allow modification whereupon the **CITY** may incur increased risk.

12.4 A **CONTRACTOR'S** financial integrity is of interest to **CITY**, therefore, subject to right to maintain reasonable deductibles in such amounts as are approved by **CITY**,

**CONTRACTOR** shall obtain and maintain in full force and effect for the duration of the Lease **CONTRACT**, and any extension hereof, at **CONTRACTOR'S** sole expense, insurance coverage written, on an occurrence basis, by companies authorized and admitted to do business in the State of Texas and rated A-or better by A.M. Best Company and/or otherwise acceptable to the **CITY**, as approved by the Risk Manager, in the following types and amounts:

1. Workers' Compensation ** Employers' Liability **	Statutory \$100,000/\$500,000/\$100,000
2. Commercial General (public) Liability Insurance to include coverage for the following: a. Premises operations *b. Independent contractors *c. Products/completed operations d. Personal Injury e. Contractual Liability *f. Explosion, collapse, underground *g. Broad form property damage, to include fire legal liability	For <u>Bodily Injury</u> and <u>Property Damage</u> of \$1,000,000 per occurrence; \$2,000,000 General Aggregate, or its equivalent in Umbrella or Excess Liability Coverage  \$50,000
3. Business Automobile Liability* a. Owned/leased vehicles b. Non-owned vehicles c. Hired Vehicles	<u>Combined Single Limit</u> for <u>Bodily Injury</u> and <u>Property Damage</u> of \$1,000,000 per occurrence
4. Professional Liability (Claims Made Form)	\$1,000,000 per claim to pay on behalf of the insured all sums which the insured shall become legally obligated to pay as damages by reason of any act, malpractice, error or omission in professional services.
5. Aircraft Liability	\$1,000,000 CSL, per occurrence
* If Applicable	
** Alternate Plans Must Be Approved by Risk Management	

12.5 The City shall be entitled, upon request and without expense, to receive copies of the policies and all endorsements thereto as they apply to the limits required by the City, and may require the deletion, revision, or modification of particular policy terms, conditions, limitations or exclusions (except where policy provisions are established by law or regulation binding upon either of the parties hereto or the underwriter of any such policies). Contractor shall be required to comply with any such requests and shall submit a copy of the replacement certificate of insurance to City at the address provided in Section 12.6 herein within 10 days of the requested change. Contractor shall pay any costs incurred resulting from said changes.

12.6 CONTRACTOR agrees that with respect to the above required insurance, all insurance contracts and Certificate(s) of Insurance will contain the following required provisions:

- Name the City and its officers, employees, volunteers, and elected representatives as additional insureds as respects operations and activities of, or on behalf of, the named insured performed under contract with the City, with the exception of the workers' compensation and professional liability policies;
- Provide for an endorsement that the "other insurance" clause shall not apply to the City of San Antonio where the City is an additional insured shown on the policy;
- Workers' compensation and employers' liability policies will provide a waiver of subrogation in favor of the City.

12.7 When there is a cancellation, non-renewal or material change in coverage which is not made pursuant to a request by City, CONTRACTOR shall notify the City of such and shall give such notices not less than thirty (30) days prior to the change, if CONTRACTOR knows of said change in advance, or ten (10) days notice after the change, if the CONTRACTOR did not know of the change in advance. Such notice must be accompanied by a replacement Certificate of Insurance. All notices shall be given to the City at the following address:

City of San Antonio  
Information and Technology Department  
P.O. Box 839966  
San Antonio, Texas 78283-3966

City of San Antonio  
City Clerk's Office  
P.O. Box 839966  
San Antonio, Texas 78283-3966

12.8 If CONTRACTOR fails to maintain the aforementioned insurance, or fails to secure and maintain the aforementioned endorsements, the City may obtain such insurance, and deduct and retain the amount of the premiums for such insurance from any sums due under the CONTRACT; however, procuring of said insurance by the City is an alternative to other remedies the City may have, and is not the exclusive remedy for failure of CONTRACTOR to maintain said insurance or secure such endorsement. In addition to any other remedies the City may have upon CONTRACTOR's failure to provide and maintain any insurance or policy endorsements to the extent and within the time herein required, the City shall have the right to order CONTRACTOR to stop work hereunder, and/or withhold any payment(s) which become due to CONTRACTOR hereunder until CONTRACTOR demonstrates compliance with the requirements hereof. (Note: This is not applicable to Tenants.)

12.9 Nothing herein contained shall be construed as limiting in any way the extent to which CONTRACTOR may be held responsible for payments of damages to persons or property resulting from CONTRACTOR's or its subcontractors' performance of the work covered under this CONTRACT.

12.10 It is agreed that CONTRACTOR's insurance shall be deemed primary with respect to any insurance or self insurance carried by the City of San Antonio for liability arising out of operations under this contract.



### **XIII. INDEMNIFICATION**

**13.1 Contractor covenants and agrees to FULLY INDEMNIFY and HOLD HARMLESS, the CITY and the elected officials, employees, officers, directors, volunteers and representatives of the CITY, individually or collectively, from and against any and all costs, claims, liens, damages, losses, expenses, fees, fines, penalties, proceedings, actions, demands, causes of action, liability and suits of any kind and nature, including but not limited to, personal or bodily injury, death and property damage, made upon the CITY directly or indirectly arising out of, resulting from or related to Contractor's activities under this AGREEMENT, including any acts or omissions of Contractor, any agent, officer, director, representative, employee, Contractor or subcontractor of Contractor, and their respective officers, agents, employees, directors and representatives while in the exercise of performance of the rights or duties under this AGREEMENT, all without however, waiving any governmental immunity available to the CITY under Texas Law and without waiving any defenses of the parties under Texas Law. IT IS FURTHER COVENANTED AND AGREED THAT SUCH INDEMNITY SHALL APPLY EVEN WHERE SUCH COSTS, CLAIMS, LIENS, DAMAGES, LOSSES, EXPENSES, FEES, FINES, PENALTIES, ACTIONS, DEMANDS, CAUSES OF ACTION, LIABILITY AND/OR SUITS ARISE IN ANY PART FROM THE NEGLIGENCE OF CITY, THE ELECTED OFFICIALS, EMPLOYEES, OFFICERS, DIRECTORS AND REPRESENTATIVES OF CITY, UNDER THIS AGREEMENT. The provisions of this INDEMNITY are solely for the benefit of the parties hereto and not intended to create or grant any rights, contractual or otherwise, to any other person or entity. Contractor shall advise the CITY in writing within 24 hours of any claim or demand against the CITY or Contractor known to Contractor related to or arising out of Contractor's activities under this AGREEMENT and shall see to the investigation and defense of such claim or demand at Contractor's cost. The CITY shall have the right, at its option and at its own expense, to participate in such defense without relieving Contractor of any of its obligations under this paragraph.**

**13.2 It is the EXPRESS INTENT of the parties to this AGREEMENT, that the INDEMNITY provided for in this section, is an INDEMNITY extended by Contractor to INDEMNIFY, PROTECT and HOLD HARMLESS, the CITY from the consequences of the CITY'S OWN NEGLIGENCE, provided however, that the INDEMNITY provided for in this section SHALL APPLY only when the NEGLIGENT ACT of the City is a CONTRIBUTORY CAUSE of the resultant injury, death, or damage, and shall have no application when the negligent act of the City is the sole cause of the resultant injury, death, or damage. Contractor further AGREES TO DEFEND, AT ITS OWN EXPENSE and ON BEHALF OF THE CITY AND IN THE NAME OF THE CITY, any claim or litigation brought against the CITY and its elected officials, employees, officers, directors, volunteers and representatives, in connection with any such injury, death, or damage for which this INDEMNITY shall apply, as set forth above.**

13.3 Defense Counsel - City shall have the right to select or to approve defense counsel to be retained by Contractor in fulfilling its obligation hereunder to defend and indemnify City, unless such right is expressly waived by City in writing. Contractor shall retain City approved defense counsel within seven (7) business days of City's written notice that City is invoking its right to indemnification under this Agreement. If Contractor fails to retain Counsel within such time period, City shall have the right to retain defense counsel on its own behalf, and Contractor shall be liable for all costs incurred by City. City shall also have the right, at its option, to be represented by advisory counsel of its own selection and at its own expense, without waiving the foregoing.

13.4 Employee Litigation - In any and all claims against any party indemnified hereunder by any employee of Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation herein provided shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for Contractor or any subcontractor under worker's compensation or other employee benefit acts.

#### **XIV. ASSIGNMENT AND SUBCONTRACTING**

14.1 Contractor shall supply qualified personnel as may be necessary to complete the work to be performed under this Agreement. Persons retained to perform work pursuant to this Agreement shall be the employees or subcontractors of Contractor, if subcontracting is approved as set out in this agreement. Contractor, its employees or its subcontractors shall perform all necessary work.

14.2 It is City's understanding and this Agreement is made in reliance thereon, that Contractor intends to use the following subcontractors in the performance of this Agreement:

Flores Technical Services  
J.D. Russell & Associates

Any deviation from this subcontractor list, whether in the form of deletions, additions or substitutions shall be approved by City of San Antonio City Council (hereafter "City Council"), as evidenced by passage of an ordinance, prior to the provision of any services by said subcontractor.

14.3 Any work or services approved for subcontracting hereunder shall be subcontracted only by written contract and, unless specific waiver is granted in writing by the City, shall be subject by its terms to each and every provision of this Agreement. Compliance by subcontractors with this Agreement shall be the responsibility of Contractor. City shall in no event be obligated to any third party, including any subcontractor of Contractor, for performance of services or payment of fees. Any

references in this Agreement to an assignee, transferee, or subcontractor, indicate only such an entity as has been approved by the City Council.

14.4 Except as otherwise stated herein, Contractor may not sell, assign, pledge, transfer or convey any interest in this Agreement, nor delegate the performance of any duties hereunder, by transfer, by subcontracting or any other means, without the consent of the City Council, as evidenced by passage of an ordinance. As a condition of such consent, if such consent is granted, Contractor shall remain liable for completion of the services outlined in this Agreement in the event of default by the successor Contractor, assignee, transferee or subcontractor.

14.5 Any attempt to transfer, pledge or otherwise assign this Agreement without said written approval, shall be void ab initio and shall confer no rights upon any third person. Should Contractor assign, transfer, convey, delegate, or otherwise dispose of any part of all or any part of its right, title or interest in this Agreement, City may, at its option, cancel this Agreement and all rights, titles and interest of Contractor shall thereupon cease and terminate, in accordance with Article IX. Termination, notwithstanding any other remedy available to City under this Agreement. The violation of this provision by Contractor shall in no event release Contractor from any obligation under the terms of this Agreement, nor shall it relieve or release Contractor from the payment of any damages to City, which City sustains as a result of such violation.

## **XV. INDEPENDENT CONTRACTOR**

Contractor covenants and agrees that he or she is an independent contractor and not an officer, agent, servant or employee of City; that Contractor shall have exclusive control of and exclusive right to control the details of the work performed hereunder and all persons performing same, and shall be responsible for the acts and omissions of its officers, agents, employees, contractors, subcontractors and Contractors; that the doctrine of respondent superior shall not apply as between City and Contractor, its officers, agents, employees, contractors, subcontractors and Contractors, and nothing herein shall be construed as creating the relationship of employer-employee, principal-agent, partners or joint venturers between City and Contractor. The parties hereto understand and agree that the City shall not be liable for any claims which may be asserted by any third party occurring in connection with the services to be performed by the Contractor under this Agreement and that the Contractor has no authority to bind the City.

## **XVI. SBEDA**

B. Contractor hereby acknowledges that it is the policy of the City of San Antonio to assist in increasing the competitiveness and qualifications of small ("SBE"), women ("WBE"), African American ("AABE"), and minority-owned business ("MBE") enterprises in order to afford greater opportunities for obtaining and participating in contracts, related subcontracts, and leases and concessions awarded by the City. This policy and its implementation are known as the Small, Business Economic Development Advocacy Program (hereinafter referred to as "SBEDA Program").

C. Contractor shall implement the plan (hereafter "SBEDA plan") submitted with its proposal under the SBEDA Program for Small, African American, Minority and Women-owned Business Participation in this Agreement, thereby meeting the percentages for participation of those groups as submitted in its proposal. Contractor's SBEDA plan, as submitted with Contractor's proposal, is attached hereto and incorporated herein by reference as Exhibit B. Contractor shall be in full compliance with this article by meeting the percentages listed in its proposal no later than 60 days from the date of execution of this Agreement, and shall remain in compliance throughout the term of this Agreement. Contractor further agrees to continue to make every effort to utilize businesses for subcontracting and supplying during the duration of this Agreement, as may be approved pursuant to this Agreement, which will meet the percentages submitted in its proposal.

D. Contractor shall maintain records showing all contracts, subcontracts, and supplier awards to SBE/MBE/AABE/WBE's. Further, such records shall be open to inspection by City or its authorized agent at all reasonable times. Should City find that Contractor is not in compliance with this article, City shall give notice of non-compliance to Contractor. Contractor shall have 15 calendar days after notice of non-compliance to correct any and all deficiencies in compliance with this article. Failure to comply with this article and/or to correct any deficiencies within the time allotted shall be considered a material breach of this Agreement, for which this Agreement may be terminated in accordance with Article IX. Termination.

E. In all events, Contractor shall comply with the City's Small Business Economic Development Advocacy Program, contained in San Antonio Ordinance No. 77758, and the amendments thereto. Said ordinances are incorporated herein for all purposes, as if fully set forth herein.

## **XVII. FORCE MAJEURE**

In the event that performance by either the Respondent or the City of its obligations or undertakings hereunder shall be interrupted or delayed by any occurrence and not occasioned by the conduct of either party hereto, whether such occurrence be an act of God or the common enemy or the result of war, riot, civil commotion, sovereign conduct or the act or conduct of any person or persons not party or privy hereto, then such party shall be excused from performance for a period of time as is reasonably necessary after such occurrence to remedy the effects thereof, and each party shall bear the cost of any expense it may incur due to the occurrence.

## **XVIII. CONFLICT OF INTEREST**

18.1 Contractor acknowledges that it is informed that the Charter of the City of San Antonio and its Ethics Code prohibit a City officer or employee, as those terms are

defined in Part B, Section 10 of the Ethics Code, from having a financial interest in any contract with the City or any City agency such as city owned utilities. An officer or employee has a "prohibited financial interest" in a contract with the City or in the sale to the City of land, materials, supplies or service, if any of the following individual(s) or entities is a party to the contract or sale: a City officer or employee; his parent, child or spouse; a business entity in which the officer or employee, or his parent, child or spouse owns ten (10) percent or more of the voting stock or shares of the business entity, or ten (10) percent or more of the fair market value of the business entity; a business entity in which any individual or entity above listed is a subcontractor on a City contract, a partner or a parent or subsidiary business entity.

18.2 Pursuant to the subsection above, Contractor warrants and certifies, and this Agreement is made in reliance thereon, that it, its officers, employees and agents are neither officers nor employees of the City. Contractor further warrants and certifies that it has tendered to the City a Discretionary Contracts Disclosure Statement in compliance with the City's Ethics Code.

#### **XIX. AMENDMENTS**

Except where the terms of this Agreement expressly provide otherwise, any alterations, additions, or deletions to the terms hereof, shall be effected by amendment, in writing, executed by both City and Contractor, and subject to approval by the City Council, as evidenced by passage of an ordinance.

#### **XX. SEVERABILITY**

If any clause or provision of this Agreement is held invalid, illegal or unenforceable under present or future federal, state or local laws, including but not limited to the City Charter, City Code, or ordinances of the City of San Antonio, Texas, then and in that event it is the intention of the parties hereto that such invalidity, illegality or unenforceability shall not affect any other clause or provision hereof and that the remainder of this Agreement shall be construed as if such invalid, illegal or unenforceable clause or provision was never contained herein; it is also the intention of the parties hereto that in lieu of each clause or provision of this Agreement that is invalid, illegal, or unenforceable, there be added as a part of the Agreement a clause or provision as similar in terms to such invalid, illegal or unenforceable clause or provision as may be possible, legal, valid and enforceable.

#### **XXI. LICENSES/CERTIFICATIONS**

Contractor warrants and certifies that Contractor and any other person designated to provide services hereunder has the requisite training, license and/or certification to provide said services, and meets all competence standards promulgated by all other authoritative bodies, as applicable to the services provided herein.

#### **XXII. COMPLIANCE**

Contractor shall provide and perform all services required under this Agreement in compliance with all applicable federal, state and local laws, rules and regulations.

### **XXIII. NONWAIVER OF PERFORMANCE**

Unless otherwise specifically provided for in this Agreement, a waiver by either Party of a breach of any of the terms, conditions, covenants or guarantees of this Agreement shall not be construed or held to be a waiver of any succeeding or preceding breach of the same or any other term, condition, covenant or guarantee herein contained. Further, any failure of either Party to insist in any one or more cases upon the strict performance of any of the covenants of this Agreement, or to exercise any option herein contained, shall in no event be construed as a waiver or relinquishment for the future of such covenant or option. In fact, no waiver, change, modification or discharge by either party hereto of any provision of this Agreement shall be deemed to have been made or shall be effective unless expressed in writing and signed by the party to be charged. In case of City, such changes must be approved by the City Council, as described in Article XIX. Amendments. No act or omission by a Party shall in any manner impair or prejudice any right, power, privilege, or remedy available to that Party hereunder or by law or in equity, such rights, powers, privileges, or remedies to be always specifically preserved hereby.

### **XXIV. LAW APPLICABLE**

**24.1 THIS AGREEMENT SHALL BE CONSTRUED UNDER AND IN ACCORDANCE WITH THE LAWS OF THE STATE OF TEXAS AND ALL OBLIGATIONS OF THE PARTIES CREATED HEREUNDER ARE PERFORMABLE IN BEXAR COUNTY, TEXAS.**

24.2 Any legal action or proceeding brought or maintained, directly or indirectly, as a result of this Agreement shall be heard and determined in the City of San Antonio, Bexar County, Texas.

### **XXV. LEGAL AUTHORITY**

The signer of this Agreement for Contractor represents, warrants, assures and guarantees that he has full legal authority to execute this Agreement on behalf of Contractor and to bind Contractor to all of the terms, conditions, provisions and obligations herein contained.

### **XXVI. PARTIES BOUND**

This Agreement shall be binding on and inure to the benefit of the parties hereto and their respective heirs, executors, administrators, legal representatives, and successors and assigns, except as otherwise expressly provided for herein.

## XXVII. CAPTIONS

The captions contained in this Agreement are for convenience of reference only, and in no way limit or enlarge the terms and/or conditions of this Agreement.


## XXVIII. ENTIRE AGREEMENT

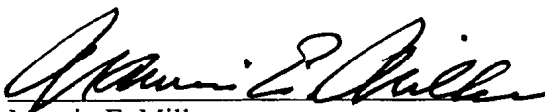
This Agreement, together with its authorizing ordinance and its exhibits, if any, constitute the final and entire agreement between the parties hereto and contain all of the terms and conditions agreed upon. No other agreements, oral or otherwise, regarding the subject matter of this Agreement shall be deemed to exist or to bind the parties hereto, unless same be in writing, dated subsequent to the date hereto, and duly executed by the parties, in accordance with Article XIX. Amendments.

EXECUTED and AGREED to this the 6 day of February, 2003.

CITY:  
CITY OF SAN ANTONIO

Contractor:  
Aero-Metric, Inc. d/b/a MARKHURD

  
Terry Brechtel  
City Manager

  
Marvin E. Miller  
Vice-President

Approved as to Form:

 *AM*  
City Attorney

## **Exhibit A**

### **High Resolution Digital Orthophotography Requirements**

#### **I. DIGITAL ORTHOPHOTO REQUIREMENTS.**

##### **A. Area coverage**

This project shall involve the production of digital orthophotos for the entire project area. Coverage shall extend 300' beyond the project boundary. The only exception to that is if the 300' boundary necessitates creation of an additional file. Image data that extends past this 300' requirement shall be blacked out.

##### **B. Equipment and production**

###### **1. Production Steps**

Creation of the digital orthophotos shall utilize several types of inputs—1) the unrectified raster image file acquired by scanning of negatives, 2) a digital elevation model (provided by the CITY), 3) coordinates of ground control acquired from aerotriangulation or IMU, and 4) camera calibration information. These four input sources shall be used to register the raw image file mathematically to the scanner to determine the location of the image with respect to the ground and to remove relief displacement from the image file. 5) One digital image (tile) should be created from one negative. Mosaicing is only allowed with CITY prior approval.

The steps to be used in digital orthophoto production are as follows:

1. Negative scanning
2. Geometric transformation
3. Radiometric processing
4. Internal mosaicing and edge matching (with CITY approval)
5. Formatting
6. Resampling

###### **2. Scanning**

Only Scanning of film negatives shall be allowed. Prior to scanning, all film sources are to be inspected for markings, dust, dirt, or any other foreign objects or markings that would degrade image quality. All such markings are to be removed without damaging the source.

All fiducial marks must be clearly visible in each scanned image. The CONTRACTOR shall store raw scans for one year after project completion, and acceptance of all materials by the CITY.



The scanner to be used must be a flatbed, transmissive scanner specifically designed and manufactured for use on aerial film. The unit must have a geometric repeatability of 1 micron and must be minimally capable of scanning resolutions at or below 15 microns.

The scanner must be capable of scanning red, green, and blue bands, providing 256 hue levels for each if color photography is used.

The 1" = 800' photography shall be scanned using a sufficient dpi scan to result in a ground resolution of 0.5'. Scanning at a smaller aperture and resampling to 0.5' shall be acceptable. Scanning at a coarser pixel size and interpolating, or down-sampling, is not acceptable.

### **3. Ground Resolution**

The horizontal ground resolution (x and y components) of the digital orthophotos shall be 0.5' foot, with multiple resolution data sets as described below. If the digital orthophotos are scanned at a level that results in an image resolution finer than 0.5' foot, resampling techniques shall be used to process the data so that digital data at the 0.5' foot resolution level can be provided.

### **4. Tiling Structure**

The CITY shall require the image database to be delivered as individual 5,000' x 5,000' tiles at 1" = 200' accuracy. The CITY estimates there will be approximately 1,670 1" = 200' images with .5' pixels to cover the 1331 square miles, including partial tiles around the edge of the project. The lower-left corner of each tile shall align with an even State Plane coordinate value. The CITY will provide the tile layout.

### **5. Mosaicing and Image Radiometry**

If image mosaicing will be necessary within individual sheets, mosaicing shall be accomplished using both automated and interactive methods; sole use of fully automated methods is not acceptable. Mosaic lines shall not cross through buildings, bridges or other structures. Join lines between overlapping images shall be interactively selected so as to minimize tonal variations and visible join lines.

All other images shall have their contrast and brightness values adjusted to that of the pilot images. The goal is to produce digital imagery of consistent tone and contrast across the entire Project Area, as well as within single images. The CITY understands that there are no published standards in place to govern image tone and contrast, and that achieving perfection is not necessarily practical, or even possible. However, CONTRACTORS should be aware that the CITY expects a high quality product, and will be reviewing all digital orthophoto submittals carefully.

## **6. Image Distortions**

Orthophotos shall not contain defects such as out-of-focus imagery, dust marks, scratches, or inconsistencies in tone and density between individual orthophotos and/or adjacent sheets.

The CONTRACTOR will be responsible for enhancing the image quality of areas of high distortion. Photo selection and advanced image processing tools shall be used to correct or remove excessive distortions resulting from elevated surfaces in particular. This will include all bridges and overpasses. Any distortion of buildings or bridges at map sheet edges shall be corrected or removed by using advanced image processing tools, or interactive means if deemed necessary by the CITY. Mosaic lines may not pass through buildings or bridges.

## **7. Visual Verification**

Visual verification shall be performed by the CONTRACTOR before submittal to insure image completeness and to ensure that no gaps occur in the image area or over edge coverage.

The CONTRACTOR's Project Manager shall verify Radiometric accuracy by visual inspection of the digital orthophoto with the original unrectified image to determine if the digital orthophoto has the same or better image quality as the original unrectified aerial photography.

# **II. AERIAL PHOTOGRAPHY REQUIREMENTS**

The location and boundaries of the areas to be flown under the contract are outlined in the enclosed Aerial Photo Index ("Project Area"), which shall be attached to, and become part of this agreement.

## **A. Softcopy Photogrammetry**

The CONTRACTOR may utilize digital photogrammetric workstations (softcopy photogrammetry) to complete this project. The softcopy system shall provide accurate and efficient interactive extraction of terrain and feature data from digital imagery. The CONTRACTOR shall specify the softcopy system utilized for the project, including software and hardware. The experience and number of trained staff on this system shall also be included.

The softcopy system shall have the following capabilities:

- Interior orientation
- Point measurements

- Aerial triangulation
- Stereopair generation
- Interactive (manual) feature extraction
- Ortho-rectification and mosaicing.

Point measurements and aerial triangulation can also be performed using conventional methods and the result imported into the softcopy system. After the aerial triangulation process is successfully completed, digital stereopairs shall be generated. A stereopair is defined as a pair of overlapping images that have been resampled in an epipolar orientation. A stereopair shall be created by resampling and rectifying the triangulated images into an "epipolar" orientation so that parallax in the y (line) direction is removed and parallax in the x (sample) direction (x-parallax) is interpreted as differences in elevations. The display of a stereopair shall provide the ability to view the imagery with apparent depth or height perception.

#### **B. Project area**

New aerial photography is to be flown for the entire Project Area. The flight plan(s) ("Flight Plan") to be used by the CONTRACTOR shall be attached to, and become part of this agreement. The CONTRACTOR shall panel all necessary horizontal and horizontal/vertical ground control points prior to the date of photography. The CITY will provide the locations and coordinates of 38 control positions to be used from the 2001 Digital Orthophotography Project.

#### **C. Conditions during photography**

Aerial photography shall be accomplished using a camera with a calibrated focal length of 152mm ( $\pm 3$ mm), during the period when deciduous trees are barren, and generally within two hours before and two hours after maximum sun angle, when the sun angle is not less than 30.55 degrees. Photography shall not be undertaken when the ground is obscured by snow, haze, fog or dust; when streams are not within their normal banks; or when cloud shadows shall appear on more than five percent (5%) of the area in any one photograph. The photographs shall not contain objectionable shadows caused by relief or low solar altitude. Photography flights shall be conducted between January 1, 2003, and February 28, 2003. Photography flights shall be flown during the first acceptable day(s) available, and as close together as possible, weather permitting, preferably on consecutive days.

#### **D. Scale of Aerial photography negatives**

The areas to be covered by the 1" = 200' mapping shall be flown with a negative scale of 1" = 800' with 65.28% forward overlap and 30.55% sidelap and 80% overlap for downtown area to correct building lean. The intent of this project is to achieve the centered photography for 5000' x 5000' tiles.

#### **E. Flight Plan**

The CONTRACTOR shall prepare flight plans on a base map of known scale. All flight lines shall be flown in a North-South direction over the centerlines of the CITY's grids.

The principal points of the first three and the last three exposures of each flight strip shall fall outside the boundaries of the project area. All side boundary areas shall be covered by a minimum 25% of photo image format. The Flight Plan shall be detailed to show the number of flight lines, the spacing between successive exposures, and the focal length of the camera used for each strip. The CONTRACTOR shall be responsible for securing authorization for over flights of areas that have restricted air space.

#### **F. Re-flights**

The CONTRACTOR shall ensure quality control compliance within the specifications and requirements. Aerial photography not meeting requirements, or unacceptable upon review by the CITY, shall be reflighted by the Contractor at no additional cost to the CITY within the prescribed flying period. All re-flight coverage shall overlap the accepted photography by at least two stereomodels. Immediately upon completion, within one week of the flight mission, the Contractor shall submit a detailed quality control report to the CITY's Project Manager confirming compliance to aerial photography specifications.

#### **G. Forward Overlap**

Consecutive photos in each flight line shall have an average forward overlap of 65.28% ( $\pm 5\%$ ) to achieve tile-centered images. 80% overlap for downtown area to correct building lean also required with equal number of cross flights.  
Note: Provide Tile Map for this area so tiles can be estimated.

#### **H. Sidelap**

Sidelap between adjacent parallel flight lines shall average 30.55% ( $\pm 5\%$ ) for the remaining Project Area. Any parallel flight lines not centered having sidelap of less than 25% or greater than 35% shall be rejected and reflighted.

#### **I. Crab**

Crab in excess of three degrees ( $3^\circ$ ) measured with respect to both lines of flight may cause for rejection of a flight strip or any portion thereof in which the excess crab occurs. This includes relative crab between any two successive exposures.

## **J. Tilt**

Tilt of the camera from vertical at the instant of exposure shall not exceed three degrees (3°), nor shall it exceed five degrees (5°) between successive exposure stations. Average tilt over the entire project area shall not exceed one degree (1°).

## **K. Aircraft**

The aircraft to be used shall be adequately equipped with all essential navigational, geodetic, and photographic instruments to meet the aerial photographic and airborne specifications of this project. An aircraft equipped with GPS enhanced navigational systems is required for all photographic missions related to this project. Performance of the aircraft shall be adequate to complete the project in accordance with the technical specifications.

The design of the aircraft shall be such that, when the camera is mounted with all of its parts above the outer structure, an unobstructed view is obtained, shielded from exhaust gases, oil, effluence, and air turbulence. No window of glass or other material shall be interposed between the camera and the ground to be photographed.

The CONTRACTOR shall submit the appropriate Federal Aviation Administration documentation indicating that the aircraft is within current requirements and operating specifications. It shall be the responsibility of the CONTRACTOR to secure all licenses and authorizations for over-flight of the project sites. The CONTRACTOR shall notify the CITY as soon as possible if difficulties in obtaining the appropriate authorizations are encountered. **The CONTRACTOR shall be responsible for operating and maintaining the aircraft in accordance with the regulations of the Federal Aviation Administration and the Civil Aeronautics Board.**

The aircraft shall have a proven service ceiling with an operating load of not less than the highest altitude requirements to secure the specified photography.

## **L. Aerial Camera**

The aerial camera shall be a precision aerial mapping camera equipped with a low distortion, high-resolution lens. The lens must have a maximum aperture of f/4, or f/4.5, and must meet the requirements outlined below based on **U.S. Geological Survey Report of Calibration.**

If awarded, a **U.S.G.S. Camera Calibration Report**, no more than three years old, will be required for each aerial camera to be used to assure that the camera lens, focal length, light filter, shutter, image format, and its platen are all photographically adequate and within acceptable accuracy.

The calibration of the camera shall include the magazine matched to it, and only that combination of camera cone and magazine shall be used to take the photographs. Failure of the camera to meet all of the specified requirements may be cause for rejection.

Calibrated Focal Length—152.0mm + 3.0mm (6" focal length).

Usable Angular Field—At least 90°.

Radial Distortion—Radial distortion in the usable angular field based on the calibrated focal length referred to the calibrated principal point (point of symmetry) shall not exceed 10  $\mu$ m for any tested point. In addition, at least 15 of the tested points shall have radial distortion values not exceeding 5  $\mu$ m.

Resolution—The lens should have an area weighted average resolution (AWAR) of at least 90.0 line pairs per millimeter as determined by the U.S. Geological Survey Report of Calibration.

Filters—An appropriate glass filter with a metallic antivignetting coating shall be used. The filter shall have surfaces parallel within 10 seconds of arc, and its optical quality shall be such that its use shall not cause an undesirable reduction in image definition.

Shutter—The camera shall be equipped with a between-the-lens shutter with variable speed settings such that, in conjunction with flight height and aircraft speed, the camera shall produce high definition photographs at full aperture. The shutter shall have a minimum efficiency of 70 percent at a speed of 1/200 or 1/250 of a second.

Magazine Platen—The camera shall be equipped with an approved means of flattening the film at the instant of exposure. The platen against which the film is pressed shall not depart from a true plane by more than 13  $\mu$ m when the camera/magazine vacuum is applied.

Fiducial Marks—The camera shall produce eight fiducial marks that are clear and well defined on each negative. The marks shall be located in each corner and at the center of each side.

Stereomodel Flatness—The average departure from flatness (at negative scale) to computer-simulated stereomodels may not exceed 13  $\mu$ m for any symmetrical point tested by USGS. The difference between the highest and lowest value shall not exceed 25  $\mu$ m. The average of values given for points tested by USGS (which are averages themselves) shall not exceed 6  $\mu$ m.

Forward Motion Compensation—The camera shall have the capability to compensate for forward image motion.

The entire project area shall be flown using one type of camera assembly for each mission. If the dimensional stability of either camera has been disturbed since its last calibration, the CONTRACTOR should have the camera recalibrated prior to acquisition of photography. The CONTRACTOR shall be ultimately responsible for errors caused as a result of incorrect calibration of the camera.

**M. Flight data**

The following data is to appear on the inter-frame margin of each negative as clear, uniformly illuminated images of the actual display instruments:

- Time of day clock, set in either standard or daylight savings time, as appropriate
- Altimeter reading in feet or meters above mean sea level
- Platen ID number
- Camera identification number, lens focal length.

**N. Aerial Film**

Color aerial film shall be used for the project. All film utilized for this contract shall be from the same manufacturer and from the same lot or batch to insure minimal variation in chemical composition. The film must be fine grain, high-speed photographic emulsion on a dimensionally stable polyester base, and must be recommended to serve as the source for the creation of digital orthophotos. Outdated film shall not be used. The film must be stored and handled in accordance with the manufacturer's instructions.

**O. Film processing and image quality**

The development, fixing, washing, and drying of all exposed photographic film shall result in a quality image, with optimal contrast, tone, balance, resolution, uniformity in range of density, and fine grain quality. Before, during, and after processing, the film shall not be subjected to extremes of temperature, or rolled tightly on drums, or in any way stretched, distorted, scratched, or marked, and shall be free from finger marks, dirt, chemical, and other stains, or blemishes of any kind.

**P. Disposition of Aerial Film**

**The original aerial film negatives shall be the property of the CITY. The CONTRACTOR will be responsible for storage of the film under proper conditions of controlled temperature and humidity for a period of 5 years. Storage of negatives will be at no cost to the CITY.**

The CONTRACTOR shall not make, sell, or loan copies of the aerial negatives or any other products without the written approval of the CITY. The film shall be handled carefully before, during, and after authorized use to ensure that the quality is not

degraded and is safeguarded from the defects mentioned previously. All film shall be stored in plastic containers designed specifically for that purpose.

#### **Q. Film Labeling**

Each exposure shall be clearly labeled by mechanical means in ink or with an automatic film titler at the edge of the negative, just inside the image area, on the north edge. No thermal processes shall be used. This labeling shall include the following information at a minimum:

- Date of photography
- Scale of photography
- Flight strip number
- Exposure number.

The scale of photography shall be given in inches and feet, e.g., 1" = 800'. Flight strip numbers are not to be repeated anywhere within the photographic coverage of the contract and shall be numbered consecutively, starting with Strip No. 1 and continuing sequentially over all flight lines.

Exposure numbers for each flight strip shall be numbered consecutively starting with "Exposure No. 1," and increasing sequentially to the end of that flight line. Exposure numbers shall increase toward the north.

All lettering and numbering required shall be one-fifth (1/5) inch high and shall result in easily read, sharp, uniform letters and numbers on all exposures. The CONTRACTOR shall provide a sample of the proposed titling to the CITY for review and approval prior to beginning film-titling work.

#### **R. Photo Indexes**

A digital photo index/flight diagram showing locations of all actual photo centers exposed shall be provided to the CITY in Arc/Info e00 format. Each photo center shall be annotated and attributed with the flight strip and exposure number.

#### **S. Packaging of photographic products**

All prints and diapositives shall be packaged and delivered flat.

#### **T. Handling of film**

This film will be utilized to produce digital orthophotos. Therefore, it is critical that the film be handled as little as possible, and as carefully as possible, when laboratory processes are required. The CONTRACTOR is expressly forbidden to utilize this film for the production of any products not specified herein.



#### **U. Datum and State Plane Grid**

Photography shall be referenced horizontally to the Texas State Plane Coordinate System, South Central Zone, North American Datum of 1983 (NAD83), and map units, US Survey Feet.

#### **V. Rectification**

The rectification process shall involve solutions of the appropriate photogrammetric equations for each pixel in the output image. It will not be permissible to solve photogrammetric equations at anchor points only and then warp the content of the original image between the anchor points.

Interpolation (or resampling) of intensity values from the input image to the output image shall be accomplished using either the bilinear or the cubic convolution algorithm. Use of (nearest neighbor) will not be acceptable.

#### **W. Aerial Coverage**

The geographic extent of each image should be 5,000' x 5,000' for the 1"= 200' areas See Attachment L. The digital orthophoto shall contain only the neat area of the corresponding map unit and there shall be no image overlaps or gaps between digital orthophotos. The 5,000 grid lines shall be based on the State plane grid in feet, Texas South Central, in NAD83.

#### **X. Deliverable Product Formats**

The CONTRACTOR shall provide two sets of digital orthophotos to the CITY on CD-ROM's in each of three formats, a 24-bit TIFF format, edged matched and two complete mosaic of the CITY in a MrSID and ECW format. Each CD-ROM and jewel case shall be labeled with the CITY's name, address, phone number, CONTRACTOR's name, phone number, address, sheet numbers, file size, type of file (TIFF, ECW or MrSID), date of photography, pixel resolution, datum, projection, map units, ellipsoid and any other data that would be pertinent to the aeriels.

Each CD-ROM shall include a Readme file that contains information described in previous paragraph. Each CD-ROM shall also contain a copy of the digital orthophoto index.

### **III. AERIAL TRIANGULATION REQUIREMENTS**

#### **A. General**

Fully analytical aerial triangulation shall be performed to obtain a high accuracy solution. The CONTRACTOR shall provide a detailed description of the equipment, software packages, and procedures to be used to perform the aerial triangulation work.

The CITY retains the right to obtain any and all readings, model set-up data, calculations, or any other information that impacts the accuracy of the aerotriangulation solution from the CONTRACTOR. All information shall be furnished within 10 days of a written request from the CITY.

The CITY will allow the use of Digital Photogrammetric Workstations (Softcopy) or the use of an Inertial Measuring Unit (IMU) Integrated with camera's Airborne GPS system in the performance of the aerotriangulation work. Conventional, film-based approaches will also be allowed should the CONTRACTOR wish to use them. In either case, the accuracy requirements listed in Section X (C) below, Aerotriangulation standards, shall be adhered to.

All Respondents shall be required to state clearly in their technical approach if they choose to utilize IMU, softcopy or conventional techniques. If a combination of approaches is to be used, it must be clearly stated for each step that is affected.

#### **B. Area to be triangulated**

If not using an IMU the entire project area shall be aerotriangulated. The CONTRACTOR shall be responsible for including any and all stereomodels that may be needed to perform mapping and/or digital orthophoto production.

#### **C. Aerotriangulation standards**

At a minimum, the positional accuracy of all photo control established by FAAT shall meet or exceed each of the following conditions:

- Root mean square error of the final block adjustment shall not exceed  $1/7,500$  of the flight height.
- The maximum allowable error of any point shall not exceed  $\pm 1/5,000$  of the flight height.

Compliance shall be verified by evaluating the field coordinates of the independent checkpoints against the values generated by the aerotriangulation process for the same points. The Respondent shall detail the software programs and photogrammetric equipment to be used to accomplish the analytical aerotriangulation solution in their proposal. The Respondent shall specifically identify the aerotriangulation tolerances

they expect to achieve, with the tolerance level expressed as a fraction of the aircraft flight height above mean ground elevation. These accuracy tolerance requirements shall be expressed as root mean square (RMS), average, and maximum tolerance levels.

#### **D. Scanning Resolution (softcopy)**

The resolution of the scanned image used for softcopy aerotriangulation shall be finer than 0.5'.

#### **E. Interior orientation (softcopy)**

Interior orientation refers to the orientation of a digitized standard frame image relative to the camera. The interior orientation is defined by measurement of the camera's fiducial points. These fiducials must have already been entered in the Camera file. The purpose of the Interior Orientation is to mathematically tie the digital imagery pixel coordinates to the fiducial system of the original photograph. The RMSE of the interior orientation shall be less than  $\frac{1}{2}$  of the scanned pixel resolution.

#### **F. Accuracy of derived mapping products**

The accuracy requirements stated below apply to the digital orthophotos and all photogrammetric mapping that is compiled from the aerotriangulated photography. These requirements shall apply to both conventional, softcopy, and IMU approaches.

##### **1. Horizontal Accuracy**

The positional accuracy (vector of both Northing and Easting coordinate errors) of passpoints established by aerial triangulation shall be sufficient to support the production of digital orthophotos and digital photogrammetric mapping to meet (National Map Accuracy Standards).

#### **G. Control Photographs**

One (1) set of control prints shall be produced after flyover is completed for aerotriangulation and control marking purposes. All ground control points to be used in aerial triangulation shall be located and symbolized on the image side and symbolized, labeled, and diagrammed on the reverse side of one set of photo-controlled contact prints of the aerial negatives. This requirement applies to conventional, softcopy, and IMU approaches.

## **H. Passpoints**

### **1. General Requirements**

In cases where conventional methods are used, all passpoint locations shall be manually selected by reviewing the control photographs with a pocket stereoscope or other suitable stereo-viewing device. Selected passpoints shall be located, symbolized, and labeled on the image side of the control photographs.

All selected passpoint locations shall lie on unobscured, level ground whenever topographic conditions permit. Particular care shall be taken in the selection of natural tie points as passpoints; when possible passpoints should be field-recoverable. An additional effort should be made to avoid the placement of passpoints in areas of very bright background that could render a passpoint unusable (not locatable) on the orthophoto negatives. These requirements shall apply to both conventional and softcopy approaches.

### **2. Distribution of Passpoints**

For combined analytical aerial triangulation, each frame shall carry a minimum of nine passpoints, with the exception of end frames of flight lines, which shall carry a minimum of six passpoints. A point shall lie near the corner of each neat model, and one point shall lie near each nadir position of each frame. It is recognized that deviation from the ideal distribution may be necessary for those photographs covering bodies of water and areas of heavy ground cover. Tie points between strips shall occur with a frequency of at least one per frame. As a general rule, wing passpoints within lines of flight shall also serve as tie points between strips. No points shall be closer than 5mm to the photo edge. These requirements shall apply to both conventional and softcopy approaches.

## **I. Diapositives**

As stated earlier, the CONTRACTOR will be allowed to utilize digital photogrammetric workstations ("softcopy") to complete the project. Should the firm elect to use traditional, film-based methods, the requirements of Section Aerial Triangulation Requirements shall apply.

### **1. Materials Used**

All diapositives shall be printed from original aerial photography negatives (i.e., not from duplicate negatives). Film positives shall be printed on 9" cut sheets of diapositive film on a printer having a flat platen. Film diapositives shall be prepared emulsion up (E<sup>^</sup>). Outdated emulsions shall not be used under any circumstances.

A separate set of diapositives for orthophoto production shall be prepared. If the CONTRACTOR intends on scanning original film negatives, it shall be specifically stated in the response.

## **2. Printing and Processing**

The printing and processing of all diapositives, including development, fixation, washing, and drying, must produce diapositives that are free from tears, scratches, abrasions, light fog, light streaks, static marks, finger marks, stains, spots, and blemishes of any kind, except blemishes resulting from corresponding defects of the original aerial photography negatives. Extreme care shall be exercised to prevent lint from collecting on both the original negatives and diapositives. To the extent permitted by the original aerial negatives, all diapositives shall be clear and sharp in detail, and shall have uniform tone and a degree of contrast permitting ground details to show clearly in dark-toned and high light areas, as well as in the middle tones between the dark and light, with particular emphasis on legibility in the shadows.

## **3. Point Marking**

All point marking shall be performed on the diapositives. Under no circumstances shall any marking be performed on the original negatives. As a general rule, targets shall not be marked, except targets that are poorly defined on the diapositives. Maximum care should be exercised in the passpoint selection, marking, and transfer process.

All passpoints shall be well-defined, symmetrical patterns drilled, punched, or otherwise marked on the emulsion. A stereoscopic point marking and transfer instrument shall be used. When parallel flight strips are being used, all passpoints shall be transferred from one flight line to each adjacent flight line using a point marking and transfer device. The only exception to this requirement shall be applicable to points falling in side-laps, but which are not intended to be used as strip tie points.

The CITY realizes that using softcopy will eliminate the need for photo preparation and pugging processes performed in the conventional photogrammetric systems. Pass and tie points will be marked and measured in a digital environment. However, ground control points used in the aerial triangulation process shall be marked on the contact prints.

## **J. Point Mensuration**

In cases where conventional methods are used, point measurement shall occur on an analytical stereoplotter having a least count of one micrometer or less and an intrinsic accuracy (calibration applied) of at least two micrometers (RMS). The stereoplotter shall be in good condition and accurately calibrated. The

stereoplotter(s) to be used shall be recalibrated no more than 30 days prior to the commencement of point mensuration.

Where softcopy technology is used, point measurement and/or editing shall be executed manually. If autocorrelation is used in point measurement for the aerial triangulation process, a thorough manual check of all passpoints, tie points, and control points is required to verify that no errors in point correlation have occurred. In no instance shall the CITY's acceptance of the autocorrelation techniques excuse the CONTRACTOR from meeting the accuracy requirements listed herein.

#### **K. Processing**

The program used for aerial triangulation computations must be capable of adjusting strips, as well as large blocks, of photos. It must also have the facility for removing systematic errors and for incorporating photo coordinate values collected via Airborne GPS. The software package(s) must at a minimum have combined block adjustment capabilities and gross error detection capabilities.

The analytical aerotriangulation software must also be capable of self-calibration. The CONTRACTOR shall be responsible for providing results from the program both with and without utilization of self-calibration techniques. These requirements shall apply to both conventional and softcopy approaches.

#### **L. Aerial triangulation reports**

Within 10 calendar days upon completion of all aerial triangulation work, the CONTRACTOR shall prepare a formal aerial triangulation report for submission to the CITY. Two (2) copies of the report are required and shall include, but not necessarily be limited to, the following. These requirements shall apply to both conventional and softcopy approaches.

##### **1. Control and Flight Line Indexes**

- a. Flight lines
- b. Exposure stations or model layout
- c. All control points appropriately labeled with station designations, computer designations (if any), the agency responsible for establishing the stations, and orders of accuracy.

##### **2. Aerial Triangulation Results**

- a. Sigma naught.
- b. GPS accuracy of camera station.

- c. Standard errors of adjusted tie-point terrain coordinates (RMS errors in x,y for horizontal coordinates) referenced to photo scale in micron and ground units.
- d. Standard error of adjusted tie-point terrain coordinates (RMS errors of z vertical coordinates) referenced to photo scale in microns and ground units.
- e. RMS errors (absolute accuracy) of x, y and z at independent checkpoints in microns at photoscale and in ground units.
- f. Space resection parameters for each frame of aerial photography included in the aerotriangulation adjustment.
- g. Photogrammetric measurements for each camera fiducial mark and photo center measured for each frame included in the aerotriangulation adjustment.
- h. All misclosures at ground control points with and without use of checkpoints.
- i. Computer printout of the final adjusted aerotriangulation solution to horizontal and vertical ground control. The printout should contain the final State Plane Coordinates for all ground control points, pass points, and check points.
- j. Identification of all points which were included in the initial solution and were subsequently discarded, *with an explanation of the reasons for being discarded.*
- k. Identification of the weighting factors applied to all points used in the final solution.
- l. Windows-compatible diskette containing the coordinate data and the results of the FAAT adjustments.

The CONTRACTOR must supply the requested information within 10 business days of a written request from the CITY. The CITY retains the right to obtain any and all information relating to the control and aerotriangulation solution, including raw measurements both in the field and in the production facility, should the CITY require them.

### 3. Narrative

The report deliverable shall include a brief narrative tying together items 12b.1 and 12b.2, as well as descriptions of equipment, procedures, and computer programs used. Root-mean-square (RMS) error summaries shall be provided for bundle adjustment photographic measurement residuals or strip tie point residuals and misclosures at control/check points. In addition, significant misfits encountered at control points, *and steps taken to analyze such misfits and to rectify the discrepancies*, shall be fully described. All control shall be listed in the report with an explanation of how the control was used in the FAAT.

#### **M. IMU Accuracy**

If using an IMU in place of aerotriangulation the CONTRACTOR must provide a report of the 38 existing control points. The CITY will also provide the locations of 73 photo ID points from the 2001 Digital Orthophotography Project. Coordinates for all of the positions will be withheld by the CITY under these circumstances. The CONTRACTOR will prepare a coordinate list for review by the CITY. Written approval will signify the ability to proceed with the remainder of the work.

Should the resulting accuracy not meet specifications aerotriangulation will be required.

#### **N. Digital Elevation Model (DEM)**

A DEM was captured during the 2001 Digital Orthophotography Project to meet National Map Accuracy Standards for 1" = 200' scale orthophotography. This DEM will be made available to the selected CONTRACTOR for use in the orthorectification process.

CONTRACTOR shall be required to update the DEM in areas of change.