
Regional GIS Imagery Procurement

Funding provided by the
District Local Technical Assistance program

Prepared for

Town of Arlington
Adam Chapdelaine, Town Manager
730 Massachusetts Avenue
Arlington, MA 02476
Tel (781) 316-3010

December 31, 2013



Prepared by

Metropolitan Area Planning Council
60 Temple Place, 6th Floor
Boston, Massachusetts 02111
Tel (617) 451-2770

www.mapc.org

Acknowledgements

Assistance with this project was provided by the Massachusetts Orthoimagery Consortium, the Town of Arlington, and the U.S. Geological Survey. The Metropolitan Area Planning Council's work was funded by the District Local Technical Assistance (DLTA) program administered by the Massachusetts Executive Office of Housing and Community Development. We wish to acknowledge in particular the invaluable work of Adam Kurowski, GIS director for the Town of Arlington and member of the Massachusetts Orthoimagery Consortium, whose leadership of MassOrtho and commitment to coordinating the effort's many components were essential to the success of the project.

METROPOLITAN AREA PLANNING COUNCIL

Officers

President	Michelle Ciccolo, Town of Hudson
Vice President	Lynn Duncan, City of Salem
Secretary	Marilyn Contreas, MA Department of Housing and Community Development (DHCD)
Treasurer	Taber Keally, Town of Milton
Executive Director	Marc D. Draisen

MAPC staff members involved in this project include Peter Dunn, Municipal Services Specialist; Stephen J. Daly, Director of Municipal Governance; and Jennifer Garcia, General Counsel.

ORTHOIMAGERY PROCUREMENT WORKING GROUP

Massachusetts Orthoimagery Consortium Leadership

Town of Arlington	Adam Kurowski
Town of Andover	Laura DeGroot
Town of Reading	Kim Honetschlager
Town of Concord	Matthew Barrett

State and Federal Project Participants

MassGIS	Neil MacGaffey
U.S. Geological Survey	Dan Walters

Table of Contents

ACKNOWLEDGEMENTS	2
EXECUTIVE SUMMARY	4
CHAPTER ONE: BACKGROUND.....	4
CHAPTER TWO: PROJECT SUMMARY	5
CHAPTER THREE: OUTCOMES.....	6
APPENDIX A: MEMORANDUM OF UNDERSTANDING.....	8
APPENDIX B: MAP OF PARTICIPANTS	11

Executive Summary

Orthoimagery is a foundational dataset for municipal geographic information systems (GIS). Taken from airplanes, orthoimagery has been “ortho-rectified” to correct any distortions caused by the tilt of the camera of the topography of the land. Higher resolution orthoimagery is especially useful to municipalities because of the additional detail it provides on utilities, building footprints, transportation infrastructure, and other areas of interest to cities and towns. This imagery also can be used to derive new GIS data, such as contour lines or land cover, with further municipal applications.

Because of the high fixed costs of acquisition flyovers, orthoimagery can be prohibitively expensive for many municipalities. However, these costs drop dramatically when a larger area is covered in a single flyover. The vendor acquiring the imagery can plan a more efficient flight path, and many of the fixed preparation and processing costs can be spread across the larger area. The Massachusetts Orthoimagery Consortium, a volunteer group of municipal GIS specialists, was formed with the goal of reducing municipal acquisition costs by forming a region of multiple municipalities in a single orthoimagery procurement.

MAPC joined the effort with the support of DTLA funding to provide expertise in joint procurement and regional collaboration. The primary project activities supported by DTLA funding include planning and hosting an initial informational session, supporting the development of a procurement plan with the U.S. Geological Survey, and developing a memorandum of understanding used by all participating municipalities. As a result of this project, nearly 60 Massachusetts municipalities have agreed to join the regional acquisition, with a flyover planned for the spring of 2014. In addition to providing high quality imagery with many applications to municipal GIS, this project could be as much as \$1 million less costly than if the municipalities had attempted to acquire this imagery separately.

Chapter One: Background

A group of municipal GIS specialists formed the Massachusetts Orthoimagery Consortium, or MassOrtho, in 2012 with the goal of reducing the cost of acquiring orthoimagery for participating communities. Led by Adam Kurowski of Arlington, Laura DeGroot of Andover, Kim Honetschlager of Reading, and Matthew Barrett of Concord, MassOrtho prepared an application to the Executive Office of Administration and Finance’s 2013 Community Innovation Challenge Grant program in the fall of 2012. A total of 31 municipalities joined the application, which requested funding to support procurement activities, imagery acquisition, municipal outreach, and project management.

To prepare this application, MassOrtho participants researched costs and developed a project plan. Using information from comparable orthoimagery procurements in other states, MassOrtho developed a rough estimate of \$1,045 per square mile for imagery acquisition costs, plus additional costs for quality control. Because of the high fixed costs of conducting an image acquisition flyover, the costs per square mile are greatly reduced when the vendor is covering a larger area. A municipality attempting to acquire this imagery alone might pay as much as double this amount.

MassOrtho further developed a plan to share expertise among participating municipal staff during the procurement process and on an ongoing basis. The initial regional procurement was expected to lay the groundwork for a sustainable model for recurring imagery procurement.

By February, 2013, MassOrtho was notified that they were not selected for CIC funding. Adam Kurowski reached out to Peter Dunn at MAPC to discuss opportunities to support the project using DLTA funding. In a discussion on February 19, Peter and Adam determined that the proposed project would be eligible for DLTA funding with some modifications from the previous CIC application. Most significantly, DLTA funds would not be available to offset the cost of the imagery itself. However, it was determined that many municipalities would likely be willing to pay the full costs of the flyover, assuming these costs would be less in a regional flyover than in a separate procurement. DLTA funding would instead provide a role for MAPC to support the project by managing a joint procurement, developing any necessary memoranda of understanding, supporting municipal outreach, and providing project management. Shortly after this conversation, MAPC executive director Marc Draisen appropriated \$5,000 of DLTA funds to the project.

Chapter Two: Project Summary

On April 9, MAPC met with the core MassOrtho members from the towns of Arlington, Concord, Andover, and Reading for a project kickoff at Arlington Town Hall. MAPC presented a preliminary project plan, with MAPC primarily responsible for the procurement activities and the members of MassOrtho primarily responsible for the technical issues related to the imagery. MAPC raised several issues related to the joint procurement activities, including the development and signing of a memorandum of understanding, the collection of participant payments, and the completion of an RFP process in compliance with M.G.L. Chapter 30B. In particular, MAPC emphasized the importance of documenting commitment from municipalities, as it would be difficult for a municipality to withdraw from the project once the procurement is underway. MassOrtho agreed to lead the development of technical specifications for the RFP in consultation with all other participants. The also agreed to form a selection committee to evaluate vendor proposals and select a winner.

As a result of this meeting, MAPC and MassOrtho agreed to host a meeting to inform prospective participants of the project and to generate an initial list of participating communities. On May 20, MAPC hosted an informational meeting at its Boston office attended by more than 30 municipal GIS officials from across the MAPC region and beyond. Both MAPC and MassOrtho used their networks to notify municipalities who might be interested in learning about the program. At the meeting, MAPC and MassOrtho gave an overview of the project background and the current procurement plans. Neil MacGaffey of MassGIS presented on the state's separate orthoimagery program, which is complementary to the MassOrtho program but uses a different image resolution and has a different schedule.

The project plan changed direction after a presentation by Dan Walters, a GIS liaison from the the U.S. Geological Survey's office in Augusta, Maine, who joined the meeting via conference call. He informed the group of a USGS program to manage orthoimagery acquisition through federal contracts, effectively taking over the procurement responsibilities. After a series of questions and discussion, the MassOrtho members and prospective participants agreed to proceed with the USGS

program rather than manage the procurement themselves. This approach presented several advantages. First, USGS has contracts and relationship with the vendors most appropriate for this work, which greatly simplifies the procurement process. In addition, USGS has enough experience with similar flyovers that they can more accurately predict the final price per square mile, based on the proposed technical specifications and geography to be covered. This gives municipalities a much greater ability to plan their budgets. Finally, the USGS procurement allows for somewhat more lenient requirements and timeline for municipalities' final commitment to the project than if MassOrtho had managed the procurement themselves. USGS charges an administration fee of 5% of the total project costs for the procurement services, which MassOrtho participants agreed was well worth the saved time and reduced risk.

After the May 20 meeting, progress continued on several fronts. Over the summer, MassOrtho worked with USGS to finalize a technical spec and secure an initial cost estimate. MassOrtho also led the effort to promote the project to municipalities across the state. With a preliminary list of potential participants, MassOrtho was able to secure a cost estimate from USGS in September that was below initial estimates.

In the revised project plan, MAPC was less involved in procurement activities than originally anticipated, as this responsibility was largely transferred to USGS. Instead, MAPC focused on developing a memorandum of understanding for participating communities. Because USGS requested a single point of contact for the project and was not prepared to sign dozens of separate agreements, the Town of Arlington agreed to serve as the lead municipality on behalf of the MassOrtho participants. Arlington would sign the contract with USGS and pay the full amount of the imagery procurement, and the other participants would sign MOUs with Arlington and pay their portion of the cost through Arlington. MAPC worked with the Town of Arlington to produce an MOU (Appendix A). In the fall months, MassOrtho continued to conduct targeted outreach to invite municipalities to join the orthoimagery acquisition project. Participants demonstrated their commitment by sending a signed MOU and payment to Arlington before the December deadline.

Chapter Three: Outcomes

At the end of December, 59 participants (including 58 municipalities and Harvard University) covering 800 square miles have signed up for the 2014 flyover. These include all of Cape Cod, a concentration of communities north and east of Boston, and a scattering of other municipalities across the state as far west as Northampton. (See Appendix B for a map of participants.) Arlington has received nearly all participant payments.

The flyover is expected to take place in early spring, after most snow has melted and before leaves return to the trees. Before then, the Town of Arlington will sign a joint funding agreement with USGS. USGS will then put the project out to bid and select a vendor. After the image acquisition, MassOrtho will work with USGS and the vendor to ensure that all imagery meets quality standards and is prepared in the appropriate format. It will then be distributed to all participants.

MassOrtho has been using a conservative price estimate when requesting participants' payments to Arlington. If the final price is less than participants have already paid, then Arlington will refund the difference. In the less likely event that the actual price is higher, then Arlington will need to request additional funds from the participants. USGS has estimated \$701 per square mile, plus a 5% administrative fee. At this price, and based on the 800 square mile coverage area, participating communities will together save an estimated \$1 million compared to the \$2,000 per square mile cost they might typically pay for a single-municipality flyover. Moreover, these communities are benefiting from the shared experience and expertise of USGS and the MassOrtho community.

The imagery itself will have many benefits to the participants. The high resolution of the imagery has many applications for municipal GIS services. Unlike orthoimagery provided through MassGIS, which is typically at 1 foot squared per pixel, the MassOrtho imagery will show features such as fire hydrants, curbs, light poles, traffic signs, and individual trees at a resolution of 3 inches squared per pixel. Municipalities can use this data to derive new GIS data sets, including contours, planimetrics, and building footprints. Many municipal activities, including public works, public safety, planning, tax assessment, and asset management, will be able to benefit from this more accurate data.

Appendix A: Memorandum of Understanding

MEMORANDUM of UNDERSTANDING
Between
The Town of Arlington, MA, fiscal agent for the
Massachusetts Orthoimagery Consortium and
<city>

Purpose

The purpose of this Memorandum of Understanding (MOU) is to specify the responsibilities of <city> (hereafter "The Participant"), the Massachusetts Orthoimagery Initiative (hereafter "MassOrtho"), an ad-hoc group of municipal GIS volunteers, and the Town of Arlington, the fiscal agent for MassOrtho (hereafter "Arlington") concerning a project to acquire orthoimagery in collaboration with a federal agency, the United States Geological Survey (hereafter "USGS").

Reference

MassOrtho has been organized by municipal GIS staff on a volunteer basis and has been managed by staff from the Towns of Andover, Arlington, Concord, and Reading. MassOrtho and is receiving assistance from the Metropolitan Area Planning Council (hereafter "MAPC") and the Office of Geographic Information (hereafter "MassGIS"). Under Chapter 30B of Mass. General Laws, municipalities are allowed to purchase supplies or services from any agency or instrumentality of the federal government, the Commonwealth or any of its political subdivisions or any other state or political subdivision thereof. [M.G.L. c.30B, §1(b)(9).]

Background

This is a cooperative project between USGS and MassOrtho to produce high-resolution orthoimagery that is detailed enough to support local, regional, state, and national purposes. The aerial images will be collected in an acceptable window in spring 2014, generally thought to be from February 1, 2014 through April 30, 2014. Through this MOU, The Participant is providing funding to acquire orthoimagery for its entire geographic area, as described in the Scope of Work attached to this document. In addition, Arlington and the USGS will enter into a Joint Funding Agreement (JFA). Through this JFA, Arlington will provide funds for all participants to USGS. Funds provided by The Participant to Arlington will be held in trust and used to fulfill the JFA with the USGS to cover the cost of procuring, acquiring, quality checking, and delivering the orthoimagery.

The orthoimagery being procured by The Participant through this MOU are a public record and are subject to the requirements of the Massachusetts Public Records Law. Under the Public Records law, the orthoimagery can be requested by a member of the public. In responding to such a request, the orthoimagery must be provided for a fee that covers the cost of the time for the lowest paid employee with the skills needed to create the copy plus the cost of the media on which the copy is provided.

Terms of MOU

The Participant agrees to the following:

- provide funding for the project to Arlington, as described in the preliminary cost estimate listed below, by the required deadline of December 1, 2013.
- receive a refund or provide additional funds to account for the difference between the preliminary cost estimate and the final cost. The preliminary cost estimate will be determined by USGS calculations and is detailed in this document. The final cost will be determined by the vendor contract and will be provided by USGS to MassOrtho to The Participant.
- if available and appropriate, agrees to assist the USGS Quality Assurance team by providing supplemental independent horizontal accuracy test points.
- if requested, agrees to assist USGS and/or MassOrtho with imagery quality assurance by reviewing the imagery and providing feedback to MassOrtho, in a timely manner.
- provide feedback on local ground conditions to MassOrtho to support USGS efforts, as needed.
- provide detailed delivery information to MassOrtho for receipt of the final products through USGS.
- to receive all final products from USGS.

Arlington, as MassOrtho's fiscal agent, agrees to the following:

- create a trust account to hold all MassOrtho participant's funds, including the funds of The Participant.
- receive the funds delivered from The Participant
- if necessary, provide The Participant with a written notice of request/refund as determined by the final cost. The preliminary cost estimate will be determined by USGS calculations and is detailed in this document. The final cost will be determined by the vendor contract and will be provided by USGS to MassOrtho to The Participant.
- Provide USGS with payments from the trust account for The Participant as needed.

The Participant's preliminary cost estimate for the orthoimagery is \$ <app_cost>.

The only portion of this payment that is refundable is the portion that exceeds The Participant's final cost. The Participant's final cost will be determined upon USGS finalizing the contract with the selected vendor.

Upon signing this MOU, the Participant agrees to send payment made out to Town of Arlington at 730
nd
Massachusetts Avenue, Town Hall Annex, 2 Floor ATTN: Domenic Lanzillotti, Purchasing. The payment
shall be made out to "MassOrtho procurement 2014."

Effective Period of MOU

This MOU will remain in effect until the orthoimagery and other files listed above are received by The Participant OR until December 31, 2014, whichever comes first.

Authorized Signatures

<city>

The Participant (print name)	Authorized Agent Signature	Date
---------------------------------	----------------------------	------

Arlington, fiscal agent

(print name)	Authorized Agent Signature	Date
--------------	----------------------------	------

Appendix B: Map of Participants

