Missouri Geographic Information
MGISAC
Systems Advisory Committee

Missouri's Imagery for the State
Funding Strategies
Third in a Series

This third in a series of papers on the Imagery for the State project discusses funding strategies. Topics covered by this paper include existing and historic regional efforts, buy-up options for partnering agencies, cost savings associated with partnering, and typical imagery costs. These white papers are available on the Missouri Geographic Information Systems Advisory Committee (MGISAC) website: http://www.mgisac.org/

For the Imagery For The State 2007 project, the east side of the state, cost sharing was not much of an option due mostly to contract time constraints. For 2008, the west side of the state, cost sharing will be in place to allow counties, cities, and other agencies to share in costs for buy-up options. A map showing the counties for east (2007) and west (2008) projects is available here:
http://www.mgisac.org/uploads/DataDevelopment/Flight%20Plan%202007-08.pdf
Cost sharing is open to any agency, although the costs may be different in different areas of the state. Partners from the west side of the state may realize lower costs due to proximity with the majority of the flights for the project. Partners from the east side of the state may realize higher costs than western partners, but should realize lower costs than having the work done under separate contract.

Existing Regional Efforts

Other imagery acquisition projects and consortiums that are in place include the Mid America Regional Council (MARC), the Springfield Area Interagency GIS Policy Board, and the St. Louis metro area USGS consortium (part of the 133 Urban Areas programs).

The Mid America Regional Council (MARC)[1] acquired aerial photography with a cost sharing effort in 2006. Included were 8 counties, numerous cities, and USGS (25%). The cost model was based on area, population and development. MARC is planning a 2008 acquisition, which the State will likely cooperate on as part of the 2008 Imagery For The State project.

The Springfield area held a visioning session in 1999, which resulted in the Springfield Area Interagency GIS Policy Board[2] that led to partnering efforts for a 2001 aerial photo project. Representation for the 2001 project included Greene County, the city of Springfield, and the City of Springfield Utilities. In the urban areas, six-inch panchromatic (black and white) photos were acquired and one-foot pixel photos acquired for the rural areas. In 2005, color six-inch pixel photos were produced for Greene County and urban portions of Christian County while one-foot pixel photos were produced for rural parts of Christian County. Additional partners for 2005 included Christian County, the cities of Willard, Republic, and Highlandville.

Buy-up Options for Missouri Partners

Options likely for the 2008 project include six-inch natural color photos and one-foot natural color photos. Other possible options include adding or substituting bands such as

Color Infrared (CIR), adding LiDAR data collection for control or other purposes, (if different flight height, costs may be prohibitive for buy-up options). Other options may be available if enough interest is shown from partnering agencies.

Why Partner? Cost Savings for Partners

Real costs savings include economies of scale and better quality products for lower price. There are also overhead cost savings that can be realized by partners. Single point of contact with the contractor will be the State of Missouri. Partners will not need to directly be in contact with the contractor, only with the state of Missouri. The state will cover costs incurred to coordinate and negotiate the agreement with the contractor. The state will coordinate with the partners to ensure desired specifications for base products and buy-up options. The state will provide Quality Assurance/Quality Control (QA/QC) for the two-foot imagery, and will aid in the QA/QC of buy-up imagery as resources permit. The partners will assume the responsibility of QA/QC of their imagery or arrange a third party to perform this work. QA/QC standards and procedures based on the USGS standards will be made available soon. Check the MGISAC website or watch your listserv for notification of availability.

Typical Costs associated with Aerial Imagery Acquisition

Costs are influenced by the size of the area of interest, mobilization costs, desired accuracy and products, and availability/quality of ground control.

The size of a land area is one of the largest factors influencing acquisition costs. More area means more photos, more fuel for the plane, more flight time for the pilot, more processing time for data, more computer processing power and file space required to store and deliver the data.

Another major cost is mobilization of flights. For two counties, if each contracts separately, each will pay for getting a plane in the air, while if two or more adjacent or relatively close counties contract together, they share the cost to get a plane in the air, cutting each county's cost for this item. The more counties in close proximity to each other that join the 2008 project; the greater the savings for mobilization costs.

Having good quality ground control available affects costs also. Areas with more densely located ground control or highly accurate Digital Elevation Models will benefit from not having the contractor develop this control as part of the project, thereby saving costs for the state or partners for buy-up option products.

Recent History of Aerial Imagery Costs

These costs are very general due to the many factors that can affect them as noted above. For comparison and context, it is useful to give a summary of recent aerial imagery data acquisitions. Between 1997-2000, statewide digital ortho quarter quads (DOQQ's) were produced as part of a cost share between several State and federal agencies. The State share was 25% of a total cost of just over $5 million. Participating agencies included:

United States Department of Agriculture (USDA)

USDA Farm Services Agency (FSA)
USDA Natural Resources Conservation Service (NRCS)
United States Geological Survey (USGS)
Missouri Department of Conservation (MDC)
Missouri Department of Transportation (MoDOT)

The National Agricultural Imagery Program (NAIP)[3] awarded its first contracts in 2002. The program has yielded several years of one-meter and two-meter imagery for the state of Missouri, all during leaf-on seasons. In 2003, Color Infrared (CIR) one-meter imagery was produced as part of NAIP funded by USDA, FSA, NCRS, MDC, MoDOT, and the Missouri Department of Natural Resources (MoDNR). In 2004, 2005, and 2006, Natural Color two-meter imagery were produced funded solely by FSA. To put this in perspective, the Imagery For The State project will acquire leaf-off two-foot pixel imagery for the entire state in 2007 and 2008.

Aerial imagery currently is collected either with film or digital cameras. The cost differential is about 5% more nationally for digital (NAIP 2003-2006). Although the trend is toward more digital acquisition, estimates by the USDA predict that film will still be 34% of total acquisition nationally through 2009. Film acquisition was about $153 per square mile while digital acquisition averaged about $160 per square mile over the NAIP 2003-2006 contracts (this includes various bands and various resolutions). Nationally, NAIP costs have incrementally grown with economic inflation although in Missouri, costs have generally remained flat from 2003-2006.

The products likely to appeal to counties and cities, which may be available with the 2008 Imagery For The State project, include but are not limited to one-foot and six-inch resolution color imagery. A non-scientific national average estimate of acquisition prices currently (2007-2008) is approximately $190.00/sq. mi. for six-inch natural color photos and $120.00/sq. mi. for one-foot natural color photos, depending on the factors above. By participating in the project, local governments and other partners can acquire higher resolution imagery for reduced costs. It is assumed that any area in the state will only be covered by one set of images. The buy-up imagery will be resampled to a common two-foot resolution for the statewide public domain data.

Sources:

[1]Lenk, Frank and Parr, Brian. Mid America Regional Council (MARC). 2007. Personal interview and email correspondence. Frank Lenk, Director of Research Services. Brian Parr, GIS Manager.

[2]Fonner, Mike. 2007. Technical Advisor for the Springfield Area Interagency GIS Policy Board. Telephone interview and email correspondence.

[3]Gabbott, W. Geoffrey. 2006. National Agriculture Imagery Program: Informational Meeting. July 19, 2006. Washington, DC. United States Department of Agriculture, Farm Services Agency, Aerial Photography Field Office, Salt Lake City, UT. http://www.fsa.usda.gov/Internet/FSA_File/gabbott_naip_wdc_071906.pdf. Accessed May 25, 2007.