Recurring Aerial Imagery Acquisition Program

MSB Project No. 16-130

Report 3 of 5

Aerial Imagery Funding Opportunities

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Acronyms

AGC ..... Alaska Geospatial Council
ASPRS ..... American Society of Photogrammetry and Remote Sensing
CIAP ..... Coastal Impact Assistance Program
COH ..... City of Houston
COP ..... City of Palmer
CRMA ..... Climate Resilient Mitigation Activities
DEM ..... Digital Elevation Model
DOQQ ..... Digital Orthophoto Quadrangle
DTM ..... Digital Terrain Model
EIEN ..... Environmental Information Exchange Network
EPA ..... Environmental Protection Agency
FDS ..... Flood Diversion and Storage
FEMA ..... Federal Emergency Management Agency
FMA ..... Flood Mitigation Assistance
FSR ..... Floodplain and Stream Restoration
GINA ..... Geographic Information Network of Alaska
GIS ..... Geographic Information System
GSD ..... Ground Sample Distance
IFTN ..... Imagery For the Nation
IfSAR ..... Interferometric Synthetic Aperture Radar
KE ..... Kinney Engineering
KFA ..... Kentucky From Above
LiDAR ..... Light Imaging, Detection, and Ranging
MEA ..... Matanuska Electric Association
MOU ..... Memorandum of Understanding
MSB ..... Matanuska Susitna Borough
MTA ..... Matanuska Telephone Association
NAIP ..... National Agriculture Imagery Program
NASA ..... National Aeronautics and Space Administration
NFIP ..... National Flood Insurance Program
NRCS ..... Natural Resource Conservation Service
QA ..... Quality Assurance
QBS ..... Qualifications Based Selection
QC ..... Quality Control
RFQ ..... Request for Qualifications
RFP ..... Request for Proposal
RGB ..... Red, Green, Blue
SDMI ..... Statewide Digital Mapping Initiative
UAS ..... Unmanned Aerial Surveillance
USDA ..... U.S. Department of Agriculture
USGS ..... United States Geological Survey
URISA ..... Urban and Regional Information Systems Association
WLIP ..... Wisconsin Land Information Program
WMS ..... Web Mapping Services
WROC ..... Wisconsin Regional Orthoimagery Consortium

Executive Summary

The intent of the Matanuska-Susitna Borough Recurring Aerial Imagery Program is to provide aerial imagery on a recurring basis and in the most cost effective manner possible. The purpose of this report is to provide the results of an investigation into funding opportunities for a MSB recurring aerial imagery program.

This report uses information from four primary sources. First, the results from a survey that was distributed in September 2016. The survey was sent to over 200 organizations identified as potential program partners. The second, is information that was gathered during a series of internal and public meetings with stakeholders. The third, is research that was conducted to identify prospective federal and state funding sources. The fourth, is information gathered for Report 1, which outlines imagery program approaches across the U.S., including funding mechanisms.

Key Findings

- Estimated costs for imagery acquisition on a recurring basis depend on the imagery type and resolution decided upon, but range from $75,000 to $250,000 annually.
- Among the imagery acquisition programs studied, most receive funding for geospatial data through partnership agreements, fee or surcharge mechanisms, and/or federal or state funding, such as grants.
- Based on research, two primary funding mechanisms stand-out as options for the MSB. Both have potential for providing consistent funding for imagery acquisition.
    - Partnerships, also known as consortiums, allow the costs of imagery acquisition to be shared. They may also reduce the cost per sq/mi due to the volume of imagery that is collected and the reduction of redundant collections. Short term examples of these type of partnerships in Alaska include, the Fairbanks North Star Borough (FNSB) imagery acquisition in 2012-2013 (four partners), and the MSB LiDAR and imagery acquisition in 2011-2012 (nine partners). The FNSB is currently applying for a 2017 LiDAR grant with the same number of partners. Additional examples are described in Report 1, which highlights program approaches from across the United States. A group of potential partners, who have similar needs, and have expressed an interest in sharing costs have been identified as a result of this project. See Table 1 in section 3.3.
    - Establishment of a “geospatial surcharge” is another promising option. This idea is similar in concept to a 911 surcharge, where revenue is collected for a specific use. The Wisconsin WROC program provides a good example, where revenue for “geospatial activities” is part of a larger fee connected to a property transaction fee. This has proved successful for more than 10 years. See Section 3 for more information. In the Borough a surcharge fee for geospatial needs, or even more specifically imagery, could be tied to the property assessment process, land management or resource extraction fees, or emergency 911 since each of these services requires aerial imagery.

- Regarding funding partners, it is important to remember the following:
    - Potential funding partners expect to receive a list of imagery product specs, areas of interest for acquisition, and a preliminary delivery schedule prior to making a funding commitment.
    - Both internal and external stakeholders have funding deadlines corresponding to their budgetary processes. Operational budgets and end-of-year monies are both options for funding imagery acquisition.
- Other funding and imagery opportunities were investigated and may warrant further discussion.
    - The State of Alaska does not currently offer grant opportunities for aerial imagery acquisition. However, the Statewide Digital Mapping Initiative (SDMI) program, established in 2008, is acquiring moderate resolution imagery, across the State of Alaska, on a periodic basis. The SDMI provides imagery that meets some MSB needs, mainly for areas where only moderate resolution imagery is needed; these are typically non-developed areas.
    - Federal grant opportunities do exist, but require investigative work on the part of Borough staff to determine if these opportunities fit the MSB's timeframes and needs. Table 2 summarizes these opportunities. These programs tend to require significant effort in preparing applications and paperwork.
    - Sale of imagery data is an option frequently discussed, but this approach requires significant overhead to develop and manage a point of sales system. This can make it difficult to realize a return on investment, particularly since imagery is a static dataset that once purchased is typically shared throughout an organization. Businesses that sell imagery do not particularly recommend it as a viable way to raise revenues. The trend in most local governments is to not sell aerial imagery.

Recommendations

1. **Create Partnerships**: Partnerships (aka consortiums) are a proven and successful approach to reducing the cost of imagery acquisition. A partnership approach is recommended for the MSB. It may be worth considering a regional partnership, for example between the MSB, Anchorage, and/or the Kenai Peninsula Borough; but keep in mind that the larger the partnership more time required for management. The State of Alaska Geospatial Council (AGC) and SDMI may be able to provide partnership building assistance.

2. **Further Research Federal and State Funding Opportunities:** Several federal organizations including, the Federal Emergency Management Agency (FEMA), Environmental Protection Area (EPA), and the U.S. Geological Survey (USGS) have grants that may provide funding opportunities for imagery, or LiDAR. It is recommended that the grant opportunities in Table 2-5 be further investigated. Leveraging local federal geospatial liaisons is recommended as they can assist with grant application development as well as with networking with federal agencies regarding opportunities.

3. **Look into Creating a Geospatial Surcharge:** The WROC derives funding for geospatial efforts from a recurring property transaction fee. A certain percentage of this fee is directed to aerial imagery acquisition. Learn more about this WROC funding strategy and determine if it could be applicable to the Borough.

1 Introduction

To implement a sustainable aerial imagery acquisition program, the Matanuska Susitna Borough (MSB) needs reliable sources of funding. Opportunities for funding partnerships, grant opportunities, and funding generation methods were researched to determine the best options for the MSB.

2 Research Methods

Several activities occurred to identify funding opportunities:

1. **Survey:** A survey questionnaire focused on funding questions was developed and distributed via email to over 200 stakeholders in September 2016.

2. **Meetings:** A series of internal meetings and a public meeting were held to discuss user needs and to identify potential funding partners. Internal users from each of the MSB departments were involved. The public meeting, mostly attended by a handful of local agencies and companies, occurred on September 23, 2016.

3. **Grants Research:** Twenty grant opportunities were reviewed and narrowed down to a list of four that are most relevant to aerial acquisition efforts in the MSB.

4. **Funding Generation Research:** Report 1, compiled as part of the Recurring Aerial Imagery Program development project, focused on gaining a better understanding of other programs including a focus on funding mechanisms. Follow-up was conducted on programs that appeared to have the most potential for the MSB. Several fee and surcharge options were investigated, both nationally and locally. More detailed information on particular programs can be found in the *Report on Successful Recurring Programs* (Report 1).

The information discovered during these activities makes up the bulk of the content in this report.

3 Funding Partners

3.1 Partnership (Consortium) Examples

The *Report on Successful Recurring Programs* (Report 1) shows that a partnership approach is a successful way to provide sustainable funding for aerial imagery acquisition programs.

The partnership models studied in Report 1 ranged from three partners to forty or more. This type of collaborative effort can take time, for example, successful partnerships such as Spokane County and the Wisconsin Regional Orthoimagery Consortium took 5-10 years to develop and mature. As a result, focusing on a targeted group of likely partners is recommended. Ideally, partnerships should include both internal and external stakeholders.

A successful recurring program needs to include partners that are committed to funding regularly recurring acquisitions, not sporadic acquisitions. Spokane County (Washington) is a good example of a consortium composed of strong internal partners and a mix of external local and federal partners. The program is primarily funded by three major partners; the City of Spokane, Spokane County, and Avista Utilities (a private utility company). They each pay one-third of the costs of the imagery acquisition and final product development. Within Spokane County, there are two funding partners that each fund half of the County's share: the Sheriff's Office and the Assessor's Office. A small revenue source is derived from imagery data sales by the County. Sub-area partners (called 4th parties) are allowed to license the imagery for their specific service area; they are charged one-quarter of the actual cost of the imagery. Spokane 4th party partners include universities, small municipalities, water and sewer districts, and the local air force base.

A Spokane type model could work for the MSB with the following scenario. The major partners might consist of key MSB departments, local cities, and local utilities. The 4th party partners could consist of local public safety groups (city police and local State Troopers) and a handful of local non-governmental organizations.

In this consortium or partnership model, the imagery acquisition costs are distributed amongst a number of partners instead of one entity having to bear the entire cost of imagery acquisition.

3.2 Internal Partners

Aerial imagery is used by the majority of MSB departments; please see Report 2, *Business Needs Analysis,* for more detailed information.

To help fund a recurring aerial imagery program, IT has set up a project account, and applied for and received some Capital Budget funds. Capital Projects, Admin (Port), Public Works (Solid Waste), and Community Development have responded with interest in contributing, in exchange for updated imagery in particular areas of interest.

The following are recommended as next steps in obtaining internal funding for aerial imagery acquisition funding:

- Investigate, develop, and publish MSB imagery cost and benefit examples.
- Reach out to MSB Emergency Services and Planning to identify potential funding sources that may have been missed.
- Focus on strategies for asking for year-end money from MSB departments.
- Consider approaching the Borough Manager or Assembly to develop a process where each department contributes funding each year to help support an imagery program.

3.3 External Partners - Local

During the public meeting and in the funding survey, the following local external organizations that have expressed potential interest in being a funding partner for a recurring imagery program are shown below in Table 1.

Table 1. Potential Local External Partners

External Stakeholder	Key Application for imagery	Use MSB Aerial Imagery?	Partnership Expectations
Matanuska Electric Association	Asset Management; Right of Way; Analysis	YES	Unknown, requires further discussion regarding AOI and specifications.
Enstar Natural Gas Company	Asset Management; Right of Way; Analysis	YES	Imagery acquisition schedule, deliverables by December 31 of the acquisition year, rigid quality control, and project progress reporting.
Matanuska Telephone Association	Asset Management; Right of Way; Analysis	YES	Imagery that meets their detailed mapping needs.
City of Wasilla Emergency Dispatch	Emergency Dispatch and Public Safety	YES	Imagery in a file format that will work in CAD; specific areas of interest.
The Nature Conservancy	GIS and Science Based Projects	YES Project partner for MSB 2011 acquisition.	To be considered an equal partner in the project; receive project updates; receive pilot, sample data, interim deliverables and final products; provide input on the final products.

3.4 External Partners - State & Federal

Funding partnerships at the state and federal level are limited; however, the AGC Statewide Digital Mapping Initiative (SDMI) currently provides 2.5 meter resolution satellite imagery across most of Alaska, including the MSB. They are looking at refreshing imagery in some parts of Alaska, with 1.5 meter resolution, and evaluating how best to serve Alaska local governments with imagery services. These datasets are very helpful for providing coverage in remote areas.

Natural Resources Conservation Service (NRCS) is interested in imagery at resolutions that support their needs (e.g. soil surveys). This translates to sub-meter pixel resolution, which could fit the MSB specification of 1-2 foot resolution for much of the MSB area of interest.

4 Grant Opportunities

Grants from federal, state agencies, and non-governmental organizations were reviewed for imagery funding opportunities. Most grants are one-time grants with a detailed goal or purpose. For example, many FEMA grants were all tied to specific efforts such as emergency response, homeland security, pre-disaster hazard mitigation, flood mitigation, and port security.

These types of grants can be valuable if the conditions of the grant can be met. For example, in 2014, the Ketchikan Gateway Borough received assistance from FEMA to re-map their floodplains. FEMA flew the developed area and provided LiDAR, topographic contours, and aerial photography. The products are now being used to determine flood plain and tsunami inundation zone boundaries; mapping these features is required to meet the grant requirements.

Though not included in the table below, there are also imagery grants available for university research which emphasizes the benefits of partnering with a diverse group of entities.

The grants shown in Tables 2 - 5 are ones that appear the mostly likely to benefit the MSB.

Table 2. Federal 3DEP Grant

3D Elevation Program (3DEP)	
Grantor	USGS
Online Link	**http://nationalmap.gov/3DEP/**
Purpose of Grant	The 3DEP program was developed to respond to needs for high-quality topographic data and for a wide range of other 3D representations of natural and constructed features. This is a broad agency announcement, as opposed to a grant, and helps applicants set up partnerships with the USGS and other federal agencies to acquire high-quality 3D elevation data. Per the Alaska liaison there is some possibility that grant funding in part could be directed to imagery acquisition as part of an elevation program. The Municipality of Anchorage, Western Alaska Landscape Conservation Cooperative, via U.S. Fish & Wildlife Service, and other areas of Alaska received funding from the 3DEP program to support IfSAR data acquisition.
Submittal Requirements	State and local governments are eligible. Applicants commit to a cost share with pending or guaranteed partners. Applicants may contribute funds toward a USGS data acquisition via the Geospatial Products and Services Contracts or they may request 3DEP funds toward a data acquisition activity where the requesting partner is the acquiring authority. Grant requests receiver higher consideration if the project areas have little to no topography data, existing data is older than 8 years, existing data is not Q2 quality or greater, or significant landscape changes have occurred. Areas 1500 to 5000 square miles are preferred, but this is not a strict requirement.
Cost Share Information	The greater the cost share, the higher the evaluation score for this factor. In 2016, average cost share by recipients was 62% and 38% federal partners. By law, USGS may not pay more than 50% of topographic mapping costs and state and local applicants who request award in the form of a cooperative agreement must contribute 50% or more of the total project costs.
Application Deadline	Initial response date October 10, 2016. After the initial response date, the FY17 Broad Area Announcement (BAA) will remain open. Applicants can continue to submit proposals until September 30, 2017 or until the BAA is cancelled through an amendment or another BAA is issued.
MSB Imagery Program Fit	Primarily this opportunity is focused on LiDAR which is an MSB objective. Time to develop an application varies from weeks to months. See MOA, FNSB, and USFWS examples.

Table 3. Federal EIEN Grant

FY 2017 National Environmental Information Exchange Network (EIEN) Grant Program	
Grantor	EPA
Online Link	**https://www.epa.gov/exchangenetwork/exchange-network-grant-program**
Purpose of Grant	The Exchange Network Grant Program provides funding to states, territories and federally recognized Indian tribes to support the development of the Environmental Information Exchange Network (EIEN). The primary outcome expected from Exchange Network assistance agreements is improved access to, and exchange of, high-quality environmental data from public and private sector sources. Applications should demonstrate support for and results toward EIEN program priorities. These priorities focus on projects that enable applicants to receive reports electronically (e-reporting); share data with EPA, other partners, communities of interest, and the public; and provide value-added services that enable users to analyze and visualize data.
Submittal Requirements	MSB must initiate a cooperative agreement with the State of Alaska as they would be the eligible applicant. Project periods must be equal to or less than three years. Budgets must be less than $300,000 for single applicant applications; or $500,000 for partnership applications.
Cost Share Information	No cost share or match required.
Application Deadline	November 18, 2016 for advance consideration. Applications can still be submitted in Jan-March 2017.
MSB Imagery Program Fit	Environmental mapping initiatives such as the National Hydrography Dataset, National Watershed Boundary, National Wetland Inventory, National Elevation Dataset, Geographic Names Information System and others depend on current and good quality aerial imagery. It is possible that funding could be directed to the MSB for imagery acquisition as part of a project to provide web-enabled access to environmental information.

Table 4. Federal PDM Grant

FEMA - Pre-Disaster Mitigation (PDM) Grant	
Grantor	FEMA
Online Link	**https://www.fema.gov/pre-disaster-mitigation-grant-program**
Purpose of Grant	The Pre-Disaster Mitigation (PDM) Program is designed to assist states, U.S. territories, federally-recognized tribes, and local communities in implementing a pre-disaster natural hazard mitigation program. The goal is to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on federal funding in future disasters. FEMA will prioritize the competitive projects for selection as follows: • Climate Resilient Mitigation Activities, including Aquifer Storage and Recovery, Floodplain and Stream Restoration, and Flood Diversion and Storage; and pre- or post-wildfire mitigation activities or any mitigation action that utilizes green infrastructure approaches. • Non-flood hazard mitigation projects (e.g., seismic, wildfire, landslide and wind) and non-acquisition/elevation/mitigation reconstruction flood mitigation activities (e.g. stormwater and flood control measures). • Acquisition, elevation and mitigation reconstruction projects. • Generators for critical facilities as identified in a FEMA-approved Mitigation Plan.
Submittal Requirements	MSB applies as sub-applicant to the state. Requires applicant to develop and adopt hazard mitigation plans.
Cost Share Information	Up to 75% of funds can be federal, 25% must come from non-federal sources.
Application Deadline	June 15 (annually)
MSB Imagery Program Fit	River erosion and flooding challenges require good quality imagery to help monitor and mitigate. Funding from this program could, in part, be directed to MSB imagery acquisition. Imagery could be used to create or update mitigation plans for flooding (rivers in Alaska are extremely dynamic) and verify if plans are still appropriate. The MSB could also make the case of using aerial imagery for identifying seismic faults and structures that may need seismic retrofits or to plan for mitigation efforts to prevent structures from being destroyed by wildfires.

Table 5. Federal FMA Grant

FEMA--Flood Mitigation Assistance (FMA) Grant	
Grantor	FEMA
Online Link	**https://www.fema.gov/flood-mitigation-assistance-grant-program**
Purpose of Grant	This grant provides funding to states, territories, federally-recognized tribes and local communities for projects and planning that reduce or eliminates long-term risk of flood damage to structures insured under the National Flood Insurance Program (NFIP). FMA funding is available for management costs and sometimes includes imagery and other geospatial data where appropriate. FEMA will select eligible project sub-applications on a competitive basis in order of the agency's priorities for the FY 2016 FMA Grant Program: • 1st priority: Projects that will mitigate flood damage for at least 50% of structures included in the sub-application that meet definition part (b)(ii) of a property: At least two separate NFIP claim payments have been made with the cumulative amount of such claims exceeding the market value of the insured structure. • 2nd priority: Projects that will mitigate flood damage for at least 50% of structures included in the sub-application that meet the definition of an FMA Repetitive Loss (RL) property: Have incurred flood-related damage on two occasions, in which the cost of the repair, on the average, equaled or exceeded 25% of the market value of the structure at the time of each such flood event. • 3rd priority: Projects that will mitigate flood damage for at least 50% of structures included in the sub-application that meet definition part (b)(i) of a Severe Repetitive Loss (SRL) property: four or more separate NFIP claims payments have been made with the amount of each claim exceeding $5,000, and with the cumulative number of claims payments exceeding $20,000. • 4th priority: Projects that meet other ancillary types of damage.
Submittal Requirements	MSB applies as sub-applicant to the state applicant. Requires development and adoption of hazard mitigation plans.
Cost Share Information	Up to 75% of funds can be federal, 25% must come from other entities.
Application Deadline	June 15 (annually)
MSB Imagery Program Fit	The MSB could acquire imagery from this grant by showing that imagery is needed to create, update, or verify mitigation plans related to flooding (rivers in Alaska are extremely dynamic).

5 Funding Generation

Based on the research conducted for this report and the *Report on Successful Recurring Aerial Imagery Programs* (Report 1), there are some funding models that are potentially applicable to the MSB for raising revenue or stimulating revenue for imagery. In this section, options for generating funding were evaluated as follows:

- Establishment of a fee or surcharge specifically to fund geospatial products, including aerial imagery;
- a hybrid approach consisting of a regular fee and partner funding; and
- selling imagery and/or GIS data.

5.1 Fee or Surcharge for a Geospatial Fund

Some local governments establish a regular fee or surcharge, mandated in legislation, that provides funding for geospatial products including imagery acquisition.

Perhaps the best example of this is the Wisconsin Regional Orthoimagery Consortium (WROC). The WROC derives its funding for imagery acquisition from a state mandated property transaction fee of $30. The fee revenue is collected by the State and directed to the Wisconsin Land Information Program (WLIP). A portion of these funds go into a collective imagery fund that WROC uses to fund imagery acquisition and processing.

In 2015, orthoimagery spending constituted 21% of WLIP expenditures (see Figure 1). About one-quarter of the WLIP funding was used for the development and maintenance of county parcel datasets, including survey re-monumentation. Another quarter of the funding was used for computer hardware, software, and website development and hosting. These expenditures provide convenient access to land records through searchable databases, online interactive maps, and various types of mapping applications. The remaining funds supported a diverse range of activities, including the acquisition of LiDAR, as well as the development of address points and street centerlines.

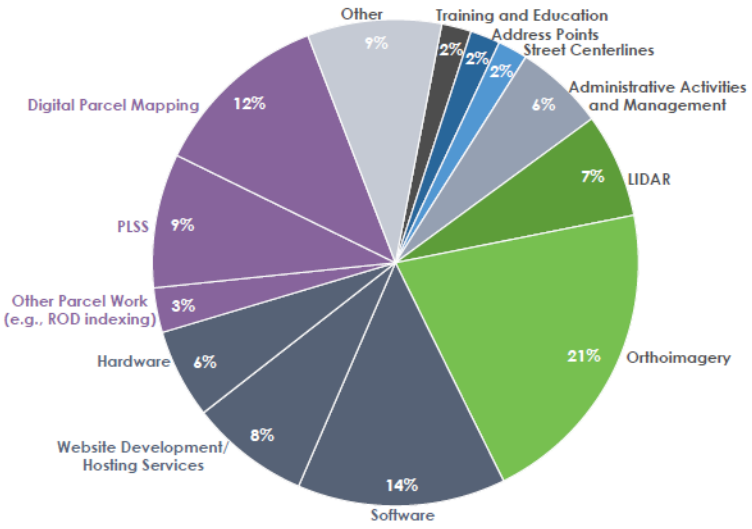

Figure 1. Wisconsin Land Information Program Spending Allocation

For 2018, the WLIP is proposing a new plan called the *Wisconsin Aerial Imagery Blueprint for Moving Imagery Forward*. Beginning in 2018, every county would be eligible for a strategic initiative grant every three years, for an amount that covers the acquisition of a 6" resolution base aerial imagery product (~$1.5 million).

5.2 Selling Geospatial Services to Partners

Spokane Example

Spokane County has a model that could potentially be used by the MSB to pay for geospatial services. Spokane County GIS provides aerial imagery and other data via online services. These services and other GIS support functions are paid for as follows:

- Internal departments, including the Sheriff's Office and Assessor's Office, are charged a standard fee for usage of imagery/data services and other GIS support services.
- Local governments within Spokane County (e.g. City of Spokane and West Valley) also subscribe and pay annual fees for usage of imagery and geospatial support services.
- A contractual agreement is consummated with each of the customers and specifies imagery products and resolutions of the products they will receive.
- Spokane County IT Department provides a stable infrastructure that serves as the platform for imagery and data delivery. It also coordinates closely with the two city IT departments to ensure there is little downtime and that imagery and related data is regularly maintained.
- Note, Spokane County does not offer cartography services as they determined that this type of service includes custom map development which is difficult to price.

Pros of this approach: Spokane County GIS receives an annual funding stream for acquisition of aerial imagery and related data, and to assist in paying for GIS staff.

Cons of this approach: Having a clear and defined scope of services was challenging when the program was first established, and has since been resolved with the use of a contract, with each customer, in which the services and fees are clearly defined.

California Examples

The cities of Anaheim, and Palo Alto fund their GIS operations from a fee attached to utility rates. Current and accurate imagery is used for maintaining the utility infrastructure inventory, which is the main justification for this fee.

Ventura County has implemented an "Internal Service Fund" into which each of the 32 departments/agencies pays for a negotiated level of GIS services. Previously there was no clear method for allocation and distributing funding for imagery acquisition. Now the County Geographic Information Officer meets regularly with departmental managers to assess their satisfaction and need for imagery and data updates, technical support, applications, map production projects, and web-based services. The departmental managers have been willing to pay the GIS department for the perceived value of these services, which now accounts for 80% of the County's GIS operating budget.

5.3 Selling Data

Local governments have considered the advantages and disadvantages of selling geospatial data for many years; see Table 6. Among the imagery programs studied in Report 1, only two of the programs sell data, and in a limited manner.

Spokane County sells imagery mosaics for a nominal fee. In Wisconsin, two counties (out of the entire WROC, which includes more than 40 counties) sell imagery mosaics. Standard pricing has not been established. The remaining programs that were researched do not sell data, but instead make it available in the public domain.

The following Alaska local governments provide geospatial data at no cost: Kenai Peninsula Borough, Fairbanks North Star Borough, City and Borough of Juneau, Ketchikan Gateway Borough, North Slope Borough, City of Valdez, Kodiak Island Borough, and the Municipality of Anchorage.

Federal and state agencies we spoke to in the course of this study typically endorse public domain access to data. Grants from some agencies may require that data funded, even just in part, by grant monies must be public domain.

Table 6. Pros and Cons of Selling Data

Approach	Pros	Cons
Free Public Domain Data	Provides transparency; aka "the public's right to public data". Fosters collaboration and supports Big Data, Open Data, and Crowdsourcing models. Allows for easy access and widespread use of aerial imagery. Acts as a catalyst for the use of imagery in business, industry, government, and private citizens.	Access to aerial imagery may be taken for granted. Finding partners who are willing to help pay, for what has been previously been "free", might prove to be difficult. Loss of a potential revenue stream.
Selling Data	Reinforces to the user that there is a cost associated with the acquisition of imagery. Provides a source of revenue. Shows decision makers that the program is making an effort to pay for itself.	The overhead associated with selling data may offset any revenue. Smaller companies, non-profits, researchers, and the general public may find it difficult to afford the data. Companies that sell imagery may perceive an agency selling data to be in competition with private industry sales.

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Appendix A. Comparison Matrix of Potential Funding Opportunities

Organization	Department or Agency	Need	Acquisition Frequency Preference?	Recurring imagery acquisition interest?	Funding Mechanism; Related Funding Item	Funding Amount	Imagery Type	Recommend Follow-up?	Business Reporting Requirements and Other Information
MSB	Admin - Port	Port facility site design and planning.	Every 2-3 years	YES	Co-funding	TBD	Orthoimagery 6-inch resolution	YES	NO
	Emergency Services	Location of addresses.	Every 2-3 years	YES	Part of 911 Surcharge or similar	TBD	Orthoimagery 6-inch resolution	YES	NO, but critical to activities
		Location of structures, and other similar features.	Every 2-3 years	YES	Co-funding for non-911 type applications	TBD	Orthoimagery 6-inch resolution	YES	NO, but critical to activities
	Public Works	Roads and other asset management.	Every 2-3 years	YES	Co-funding	TBD	Orthoimagery 6-inch resolution	YES	NO, but critical to activities
		Solid waste report on landfill conditions to state agencies.	Every month	YES	Co-funding	TBD	Very high resolution aerial imagery and or LiDAR	YES	YES
	Community Development	Land and resource management	Every 2-3 years	YES	Co-funding	TBD	Varies depending on area	YES	YES
	Capital Projects	Used extensively for project development through project completion	Every 2-3 years	YES	Co-funding	TBD	Varies depending on area	YES	YES
	Finance	Buildings and property appraisal.	Every 2-3 years	YES	Co-funding	TBD	Orthoimagery 6-inch resolution	YES	NO, but critical to activities
External Local	Enstar Natural Gas Company	Identify buildings and structure types. Find where pipelines intersect railroad, roads. Asset management.	Every 2-3 years	YES	Annual budgetary cycle	TBD	Orthoimagery 6-inch resolution	YES	YES
	Matanuska Electrical Association	Asset location and management.	Every 2-3 years	YES	Annual budgetary cycle	TBD	Orthoimagery 6-inch resolution	YES	NO, but critical to activities
	Matanuska Telephone Association	Locate existing facilities and identify placement options for new facilities. Google Earth imagery is used via for locating member locations and dispatch.	Every 2-3 years	YES	Annual budgetary cycle	TBD	Orthoimagery 6-inch resolution	YES	NO, but critical to activities
	Alaska Railroad Corporation	Real-estate management and asset management.	Every 2-3 years	YES	Annual budgetary cycle	TBD	Orthoimagery 6-inch resolution	YES	NO, but critical to activities
	The Nature Conservancy	Critical to strategic objectives including GIS and science-based projects.	Varies, but typically 3 year cycles	YES	Annual budgetary cycle	TBD	Oblique, orthogonal RGB	YES	NO, but critical to activities

Organization	Department or Agency	Need	Acquisition Frequency Preference?	Recurring imagery acquisition interest?	Funding Mechanism; Related Funding Item	Funding Amount	Imagery Type	Recommend Follow-up?	Business Reporting Requirements and Other Information
Federal Agencies	USGS	LiDAR acquisition	Annually in various locations	N/A	Federal Program Acquisition of high resolution elevation data	TBD	N/A	YES	N/A
	EPA	Visualization of environmental data. Improved access to, and exchange of, high-quality environmental data from public and private sector sources.	N/A	N/A	Probably funding as part of larger program.	TBD	N/A	YES	N/A
	FEMA	To support Floodplain and Stream Restoration (FSR), Flood Diversion Storage (FDS); and pre- or post-wildfire mitigation activities or any mitigation action that utilizes green infrastructure approaches.	N/A	N/A	Probably funding as part of larger program.	N/A	N/A	YES; Time Permitting	N/A
		To support local communities for projects and planning that reduces or eliminates long-term risk of flood damage to structures insured under the National Flood Insurance Program (NFIP).	N/A	N/A	Probably funding as part of larger program.	N/A	N/A	YES; Time Permitting	N/A
State of Alaska	AGC	To develop better coordination of imagery needs in Alaska.	N/A	YES	Internal team performing Orthorectification using standard UAS data procedures, sFm methods, image mosaicking; CAD production.	N/A	SDMI (see below)	YES; For Consortium and Networking	N/A
	SDMI	To develop better coordination of imagery needs in Alaska, and provide imagery services to statewide users.	N/A	YES	Internal team performing Orthorectification using standard UAS data procedures, sFm methods, image mosaicking; CAD production.	Likely N/A	SPOT Moderate resolution. Note: refresh planned for 2017 will include upgrade from 2.5m to 1.5m	YES; To leverage their existing acquisition and possible imagery online services in 2017.	N/A