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Florida Orthophotography Business Plan

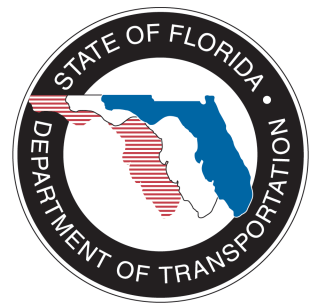


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EXECUTIVE SUMMARY

PURPOSE AND BACKGROUND

The Florida Orthophotography Business Plan defines the framework that will lead to the creation, maintenance, and distribution of a standardized terrestrial orthophotography basemap for Florida that meets the needs of local, State, and federal stakeholders. The plan recommends a course of action necessary to support periodic Statewide imagery acquisition, facilitate the adoption of technical standards, and formalize data distribution.

The plan focuses on the activities and investment necessary to support a Statewide terrestrial orthophotography basemap that meets minimum requirements for the majority of public and private users. This minimum requirement—12 inch pixel, true color, leaf off imagery—has been shown to meet the majority of public and private needs. Often users will require higher resolution orthophotography and a variety of additional value added geospatial products. The plan recommends these value added products be available as additional cost deliverables for any orthophotography project undertaken. The organization needing the enhanced products would bear the burden of paying the incremental additional costs for those products.

An **orthophoto** is an aerial photograph that has been planimetrically corrected to remove distortion caused by camera optics, camera tilt, and differences in elevation. Orthophotographs have the positive attributes of a photograph such as detail and timely coverage, and the positive attributes of a map including uniform scale and true geometry.

Source: United States Geological Survey,
US Department of Interior, USGS Fact Sheet
May 2001

<http://erg.usgs.gov/isb/pubs/factsheets/fs05701.html>

Benefits from a coordinated statewide program of orthophotography to the State of Florida will include improved consistency of orthophotography products, standardized formats for storage and distribution, elimination of duplicative data collection projects, and broader distribution to support the State and National Spatial

Data Infrastructure. Funded in part by the US Geological Survey through a Cooperative Agreement Program grant, this Plan represents the culmination of an open and transparent business planning process where more than 300 interested parties contributed input.

PROJECT APPROACH

To provide the most open process possible, the development of this Business Plan emphasized outreach to users and providers of aerial imagery. The development of this plan was directed by a volunteer project steering committee representative of key stakeholder groups including several departments of Florida state government, water management districts, federal government, and county government.

Outreach to interested parties included direct contact with mapping related professional associations and e-mail to over 700 individuals that have been involved in Geographic Information System (GIS) efforts in the past.

Information gathered from stakeholders through participation in an on-line survey, four regional workshops, and a web based workshop served as the foundation for this Business Plan.

FINDINGS

Driven by Florida Statute 195.022, which required up to date orthophotography to support tax mapping, and a broad open records law, orthophotography is available and up to date for the entire State. However, there are a number of areas where the orthophotography program

Statewide Orthophotography Program Benefits for Florida:

- Improved taxpayer satisfaction through better customer service and more efficient permitting processes
- Efficiency driven reductions in operational costs for state agencies
- Minimized cost impacts of statutory mandates for image acquisition and use
- Improved opportunities to access federal and private funding to support orthophotography projects

within Florida can be improved to maximize overall efficiency and effectiveness.

Based on information provided by imagery users within Florida the following has been determined:

- Orthophotography is fundamental to support the business operations of many State agencies and water management districts. Many county business functions would not be possible without aerial imagery. There are over 30 Florida Statutes and 50 Administrative regulations that address the need for mapping or require imagery to be available. Activities requiring current and accurate orthophotography basemaps include emergency response, facilities management, natural resource

management, long range planning, and property tax appraisal.

- Voluntary cooperation between organizations funding orthophotography projects has been somewhat successful and is on-going. State agencies, Water Management

Project Goals

Collaboration: Sustain a structure to coordinate orthophotography projects Statewide to maximize the return on the investment and ensure no duplication of efforts

Data Discovery and Dissemination: Make current and historical aerial imagery available in public domain to users from a single authoritative source

Standards: Support continued development, adoption, and use of orthophotography standards

Sustainability of Funding: Structure a mechanism that assures on-going funding of orthophotography acquisition, processing, and distribution

Districts, and Federal agencies have had excellent success and continue to reap benefits from interagency collaboration.

- Distribution of current and historic aerial imagery needs to be

An ongoing annual investment of \$2.9 million will support a Statewide Orthophotography Program for Florida that will yield \$31.1 million in annual benefits.

centralized. Florida lacks a single resource where all of the orthophotography for the State can be accessed.

- A duplication of efforts leads to inefficient use of resources. This is particularly true for orthophotography quality control, contracting, and hosting of data for on-line distribution.
- Opportunities for cost savings through “economies of scale” are lost through uncoordinated project activities such as collection, processing, and imagery distribution activities. Orthophotography has been acquired and processed by no fewer than 11 private firms over the last 3 years and is often available for distribution on multiple web portals. Adjacent counties occasionally select different mapping firms for projects to be acquired during the same season where selection of a single firm through a joint contract would yield cost savings to taxpayers.
- Federal and Public-Private Partnership opportunities are not maximized because there is no formal coordinated Statewide mapping. This results in increased costs to Florida taxpayers.
- Communication among organizations procuring orthophotography could be

improved. Improved communication will increase opportunities for collaboration.

- Aerial imagery available on the Internet for viewing (Google, Bing, etc.) is not sufficient to meet the business needs of state government.
- The aerial imagery user community has a wide variety of needs for image resolution, timing, digital formats, and imagery derived mapping products. A coordinated Statewide program must be undertaken with a contracting vehicle that allows partners to get the wide variety of products they require as optional add-ons to the orthophotography project.

Stakeholder survey responses identified as much as \$8 million per year that is spent on orthophotography acquisition, processing, and distribution. Funding sufficient to support an ongoing coordinated Statewide cycle of orthophotography acquisition, processing and distribution meeting the needs of a majority of users in Florida will require investing \$2.86 million annually. A coordinated on-going program funded at this level will refresh 1/3 of the State (approximately 22,000 square miles) annually on a continuous cycle so imagery less than 3 years old will always be available for anywhere in Florida. This funding will also enable all current and historic data to be available in the public domain for users to access without charge.

Options for structuring aggressive public/private partnerships or licensing data from providers rather than purchasing orthoimagery for use in the public domain

may reduce the annual investment necessary to support a Statewide program.

The benefits to Florida from a coordinated Statewide orthophotography program will exceed \$31 million per year. This figure is based on a conservative projection of benefits collected from user feedback. Benefits accrue in variety of areas but the largest are in increased staff productivity, enhanced revenue collection, and more efficient management of field services.

ACTIONS TO IMPROVE FLORIDA'S AERIAL IMAGERY PROGRAM

Based on the project findings the following actions will improve Florida's Orthophotography Program, make government activities more effective and efficient, and provide these critical data to the private sector:

- **Empower a Geographic Information Council (GIC)** to formally approve minimum standards for Florida's orthophotography [As recommended by Florida's Strategic Plan for Geographic Information Systems Coordination (April 2008)].
- **Establish a Technical Advisory Committee (TAC) on Aerial Imagery** to provide technical and policy guidance to the GIC.
- **Formally establish and fully fund a Florida Aerial Imagery Data Warehouse** to make available all orthophotography to potential users.
- **Develop product standards and inspection procedures** and implement them in an "Imagery Center of

Excellence” at the Department of Transportation. This Center would be assigned with being the technical lead in all aerial imagery activities in State government and with research emerging technologies. The Center will provide recommendations to the TAC and GIC on emerging technologies and evolving standards.

- **Improve communication** on imagery issues with users throughout Florida through the TAC on Aerial Imagery and through activities undertaken under the Imagery Center of Excellence.
- **Establish sustainable funding** for orthophotography production in Florida of ***\$2.9 million per year*** through the legislative appropriation process. Leverage this funding through innovative Federal and public/private partnerships.

PROJECT GOALS

The development of this Business Plan is focused on four fundamental goals:

- *Collaboration:* Sustain a structure to coordinate orthophotography projects Statewide to maximize return on the investment and prevent duplication of efforts
- *Data Discovery and Dissemination:* Make current and historical aerial imagery available in public domain to users from a single authoritative source
- *Standards:* Support adoption of aerial imagery standards
- *Sustainability of Funding:* Structure a mechanism that ensures on-going funding of aerial imagery acquisition, processing, and distribution

COLLABORATION

Building a sustainable structure to coordinate statewide imagery acquisition will maximize the return on investment and ensure no duplication of efforts. Collaboration between organizations and private firms to fund and sustain a Statewide program of orthophotography acquisition, processing, and distribution will be critical if the efforts are to be successful and yield the maximum benefit to Floridians.

In orthophotography related projects, potential duplication of effort can occur at any stage. The most obvious of these is the costly collection and processing of imagery over the same geographic area, a single county for example, during the same year and season. Due to improved communication between organizations, this rarely occurs today, but it has been a problem in the past.

However, there are other areas of duplication. One is quality control/quality assurance (QA/QC), where the skills, software, and hardware necessary for

Collaboration is working together to achieve a goal. It is a recursive process where two or more people or organizations work together to realize shared goals. Collaboration is more than the intersection of common goals seen in cooperative ventures, but a deep, collective, determination to reach an identical objective by sharing knowledge, learning and building consensus

Source: Schuman (Editor). [*Creating a Culture of Collaboration*](#).

performing these tasks are implemented in multiple organizations. This duplication results in inconsistently applied quality standards from organization to organization and makes merging the resulting orthophotography from adjoining projects for analysis difficult.

Duplication is also found in the distribution of the imagery to users. Imagery that is acquired and processed by the Florida Department of Transportation or by private firms under contract to the Florida Department of Revenue or the water management districts is distributed through a recognized State web portal. Projects conducted by counties or other government units are often available only through direct contact with that organization. This duplication of distribution mechanisms makes it hard for users to locate the imagery they require and often to ascertain if the imagery they are receiving is the most up to date available. There is no authoritative source for all imagery, current and historic, for Florida.

Successful collaboration requires leadership and an understanding of common goals and objectives. Working collaboratively all organizations requiring orthophotography can obtain greater resources and achieve a superior imagery product for their business needs.

Data dissemination consists of distributing or transmitting data to users. Various release media are possible; for example: electronic format including the internet, CD-ROM, paper publications, files available to authorized users or for public use; fax response to a special request, public speeches, press releases.

Source: Statistics Canada, "Statistics Canada Quality Guidelines", 3rd edition, October 1998

DATA DISCOVERY AND DISSEMINATION

The value of any data is maximized through its use by wide variety of users. Once acquired, data has immense and often unforeseen benefits to users outside of the organization that initially collects the information. Orthophotography is no different than any other spatial data and should be built on a "collect once and use many times" model.

To make this possible, it is important to provide all potential users of the data a simple and easy to understand method to discover the availability of imagery and then access what they require. Currently this is not available in Florida. There are multiple sources of the same orthophotography data and potential users must go on an extensive hunt through individual county and State level data warehouses to find what they need.

Data dissemination should be easy and cost free. Historical imagery that is available

should be clearly identified and the archival information readily available.

STANDARDS

A collaborative and sustainable Statewide program of aerial imagery acquisition, processing, and dissemination must be built on a foundation of standards. Compliance with standards guarantees users of the data that it is fit for their business use.

Implicit in the process of establishing standards is that there is a body given the authority to establish them. By extension there should exist a body charged with conducting an authoritative review to ascertain compliance with the standard.

There is a collaboratively developed minimum standard for orthophotography in Florida that is the product of extensive efforts by the Water Management Districts, the Florida Department of Transportation, Florida Department of Revenue, the US Geological Survey and others. The details of this standard are reviewed in Appendix B, "Review of Aerial Imagery Technical Specifications." This standard remains identified as a "draft" standard since no official body exists to sanction it.

An approved standard may enable Florida to better leverage federal grants. Federal agencies are more likely to provide funding if they are assured that the end product of those grants will meet their needs.

A standard is necessary for quality control/quality assurance to extend the technical specifications for orthophotography as already defined. Further, a collaborative effort should be

A **STANDARD** is an authoritative principle or rule that usually implies a model or pattern for guidance, by comparison with which the quantity, excellence, correctness, etc., of other things may be determined.

Source: <http://dictionary.reference.com>

undertaken to determine if standards are necessary for oblique and other forms of aerial imagery products that are emerging in the marketplace.

SUSTAINABLE FUNDING

A robust orthophotography program must have sustainable funding. The program should support the collection, processing, and distribution of orthophotography for 1/3 of Florida annually. This program should continue to operate at that level on an ongoing basis so that orthophotography for any location in Florida is no older than three years at any time.

This cycle would be in keeping with the requirements of Florida Statute 192.002 which requires that orthophotography to be updated every three years in order to maintain an equitable property tax assessment process.

Frequently Statewide geospatial programs such as orthophotography programs are funded through a dedicated revenue source rather than through the State general budgeting and appropriations process.

Innovative methods for funding ongoing geospatial imagery programs have included funding Statewide geospatial programs from E911 communications surcharges. As E911 systems transition to NG911 the link to mapping and geographic information systems is expanded greatly. Orthophotography is a critical component of base mapping and this mapping is critical to NG911 implementation so there is a rational relationship between the two programs. Additionally, the 911 system is typically connected to county emergency services that rely on orthophotography in times of disaster or to respond to emergency situations. The Commonwealth of Virginia has funded Statewide data acquisition programs, including an on-going orthophoto program for several years using this funding source. In 2010 Florida's E911 trust fund collected \$123 million and the State's E911 Board disbursed \$122 million to help maintain, upgrade, and support operational E911 systems. Statewide E911 Mapping is a long term initiative supported by the Board to develop GIS database Statewide. This strategic board initiative may be expanded to include the orthophotography critical to supporting these GIS data.

Another innovative method for funding Statewide mapping programs has been to assess a fee on any property transfer. Wisconsin, Vermont, Oregon, and Montana have supported vibrant Statewide programs using this type of fee. Typically the collected fees are administered by a State board to support mapping programs across the State. Frequently funds are shared with counties to support property ownership and tax record maintenance. Those programs typically

Sustainable: a system that maintains its own viability by using techniques that allow for continual reuse; able to be maintained or kept going.

Source: <http://dictionary.reference.com>

include orthophotography. This fee has generated an average of \$5 million per year in Wisconsin since it was instituted in 1991.

Currently in Florida, orthophotography is funded through a combination of State appropriations to the Florida Departments of Revenue and Transportation, Federal grants, and a requirement for counties with a population over 25,000 to fully fund their orthophotography acquisition and processing at least once every 3 years. This combination of general fund appropriation and shifting of costs to the counties does not represent a sustainable situation since there is no guarantee of continuing funding from either source. Additionally, since many counties are currently funding orthophotography projects independent of a Statewide system they have little incentive to cooperate in the development of a Statewide program.

The Technical Advisory Committee for Imagery, proposed by this plan, should work with the Geographic Information Council to develop sound alternative sustainable funding mechanisms for orthophotography that will afford the program the continuity required for funding sufficient to support the program in perpetuity.

PROJECT METHODOLOGY

This Business Plan focuses on the actions that will be necessary to create, maintain, and distribute standardized terrestrial orthophotography for all Florida stakeholders. The project approach was designed to maximize opportunities for users of aerial imagery to provide information about their requirements.

A project steering committee consisting of representatives of 9 organizations provided oversight and direction to the project consulting team, Planning Communities and GeoPlanning Services. Representatives from State, local, and federal government organizations actively participated in project steering committee.

Table 1: Business Plan Steering Committee

Name and Organization	
Kevin Brown	SJRWMD
Richard Butgereit	FDEM
Jared Causseaux	FDOT
Steve Dicks	SWFWMD
Joe North	FDEP
Kathleen O'Keefe	FWC
Charles Russell	FDOR
Brett Wood	FDOT
Louis Driber	USGS
Lee Hartsfield	Tallahassee- Leon County

Users of aerial imagery were given multiple opportunities to provide input to the consulting team. These opportunities include participation in on-line surveys, regional workshops, and in-depth interviews. Extensive outreach to potential users of aerial imagery included e-mail to over 700 individuals with project announcements including details on workshops and the on-line survey.

Table 2: Key Outreach Activities

Participation Method	Number
Workshops	162
On-line Survey	274
Interviews	20
Project e-mail list	731

All published documents for the project were made available to stakeholders for review and comment and posted on the project web site (www.fdotortho.com).

PROJECT OUTREACH

An extensive outreach program was implemented to inform aerial imagery users in Florida of the multiple opportunities to participate in the Business Plan development. Over 730 individuals were

contacted by e-mail to inform them of the opportunity to get involved in the project. An on-line survey was conducted to get specific information on aerial imagery requirements, business drivers, and benefits from having imagery available.

Following the close of the survey period, a series of regional workshops were held to provide stakeholders an opportunity to interact with project consultants to provide further information. Additionally 20 in depth interviews with key stakeholders were conducted. These individuals were identified by the project steering committee as being representative of key stakeholder groups and the interviews were structured to collect information representative of the broader constituent group.

Appendix A is a summary of comments from all outreach participant including workshops, the on-line survey, and interviews.

Figure 1: Locations and dates of outreach



PROJECT DOCUMENTS

To support this Business Plan a variety of documents were developed and are presented as appendices of the plan. These documents are described in Table 3 below.

Each of these documents builds the foundation for the Business Plan. They detail the current status of aerial imagery programs in Florida and make recommendations for changes to existing standards, and document the level of dependency on imagery to support many State activities.

Table 3: Plan Documents

Appendix	Title	Description
A	Summary of Comments from Outreach Participants	A summary of all information gathered during the regional workshops, on-line survey, and in-depth interviews.
B	Review of Aerial Imagery Technical Specifications	Florida's draft orthophotography specification is reviewed and compared to USGS's specification. Recommendations for changes to the FL specification are documented.
C	Review of Statutes and Codes	Florida's Statutes and Administrative Codes that relate to orthophotography are listed with pertinent language from the statute or code identified.
D	Statewide Aerial Imagery Investment and Benefits	Benefits that are likely to be generated through a coordinated Statewide orthophotography program are compared to the investment necessary to sustain the program

OVERVIEW OF CURRENT ORTHOPHOTOGRAPHY PROGRAMS

AVAILABLE ORTHOPHOTOGRAPHY CHARACTERISTICS

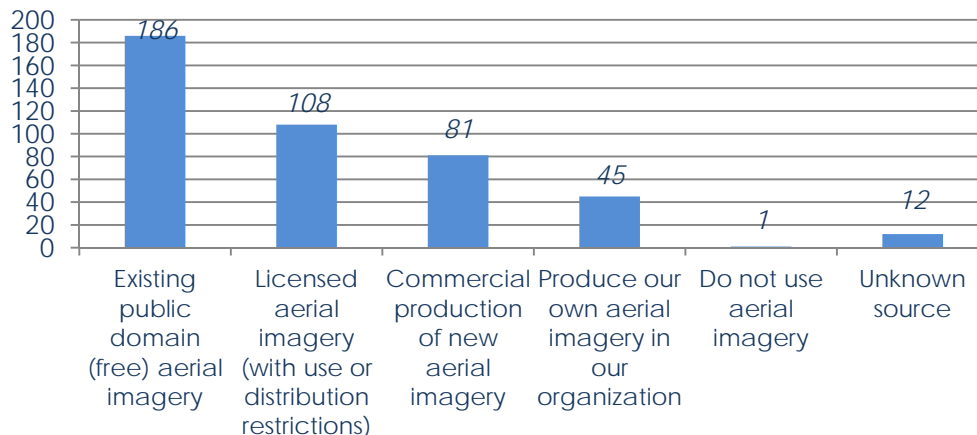
The production of orthophotography in Florida is principally funded by public entities. Users of the imagery enjoy access to these data as a result of Florida's open records laws.

Generally the imagery available meets Federal government mapping standards and has sufficient pixel size to meet intended needs. The following section provides a summary of orthophotography characteristics including source, age, and resolution.

Orthophotography Source

Many of the users of Florida orthophotography receive it from State, regional, local, and federal data producers outside of their organization. Frequently the orthophotography is in the public domain and available to them without significant cost or use restriction, as shown in Figure 2. However, a significant number of users (108) responded to the survey that the imagery they use is produced by a private firm that licenses the use of their data. *Note that in the survey multiple responses were permitted to this question.* These numbers may reflect using aerial orthophotography from public domain sources while also using imagery from another source that *may* have restrictions on use.

Figure 2. Survey Results-Aerial Imagery Sources



ORTHOPHOTOGRAPHY AGE

The majority of respondents to the on-line survey reported that their organization's orthophotography was less than three years old. The most common response was "one to two years" (143) with "less than one year old" being the next most common response (78). This highlights the active collection

program driven by Statue 192.002. Some respondents reported that the approximate age varied by county and that their organization uses a range of current and historic data. Figure 3 shows the approximate age ranges of orthophotography data and the number of corresponding responses.

Figure 3. Survey results- Age of orthophotography

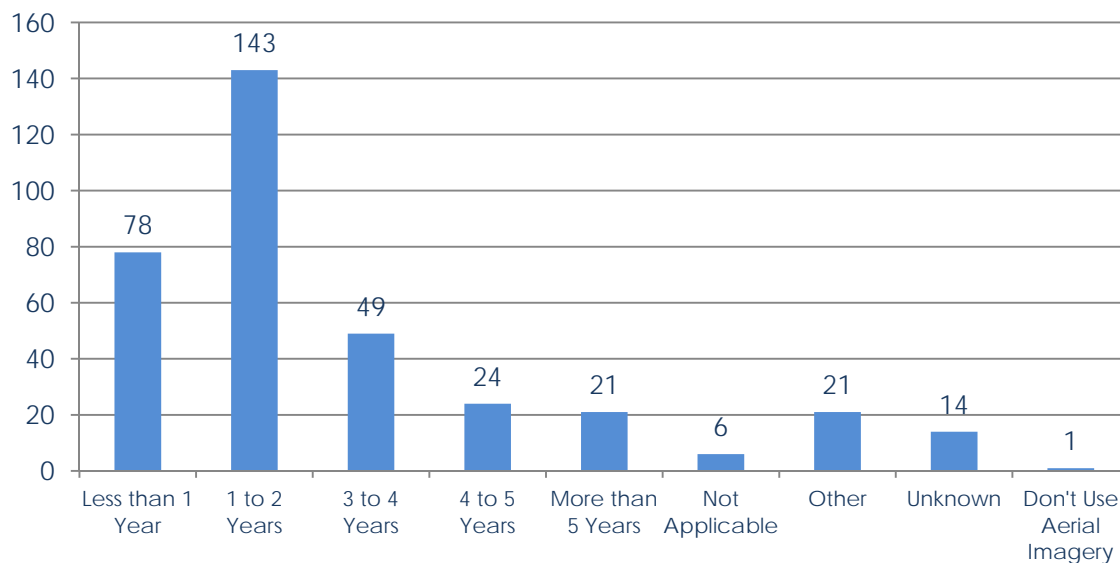


Table 4. Survey results- Orthophotography Resolution and Characteristics

Resolution	Number of Respondents								
	Natural Color	False Color Infrared	Black & White	Leaf-On	Leaf-Off	Aerial: Film	Aerial: Digital	Satellite	Oblique
~3" pixel	23	6	5	3	6	3	14	4	5
~6" pixel	62	20	14	6	17	6	26	0	21
~12" pixel	95	37	21	10	33	7	41	5	14
~18" pixel	6	1	6	3	3	1	4	3	3
~24" pixel	8	5	7	3	4	0	2	2	0
~36" pixel	24	23	9	9	6	2	7	6	0
~72" pixel	1	2	2	0	0	1	0	2	0
>72" pixel	2	2	0	0	0	0	1	8	0
Other/unknown	65	73	71	70	69	78	84	78	74



Figure 4: (From left to right) Natural Color, False Color Infrared, and Black and White

ORTHOPHOTOGRAPHY RESOLUTION/TYPE

Respondents to the survey were asked to describe the characteristics of the orthophotography they use. For each imagery type (e.g. Natural Color, False Color Infrared, Black and White), the majority of respondents selected “unknown/other” for the resolution. This suggests that for many users of aerial imagery specific technical details are not critically important or they are unaware of those details.

The highest reported characteristics were Natural Color at ~12” pixel (95 responses) and Natural Color at ~6” pixels (62 responses). Table 4 shows the total responses for each type and resolution.

The Department of Revenue (DOR) minimum requirement for 12” pixel resolution seems to be driving communities to accept that as their standard. This 12” resolution was identified as being insufficient to meet business needs including change detection supporting property tax appraisal, environmental monitoring, and emergency response. The number of organizations with approximately 3” pixel resolution supports this point.

There remain very few users of imagery from a film source, which is consistent with national trends away from film to digital aerial sensors.

ORTHOPHOTOGRAPHY ACCURACY

The majority of respondents (61 percent) reported that the imagery currently available to them meets National Map Accuracy Standards for horizontal spatial accuracy, while 37 percent did not know whether their imagery meets the standards. Two percent reported that the imagery currently available to them does not meet National Map Accuracy Standards for horizontal spatial accuracy.

IMAGERY DERIVED PRODUCTS

Orthophotography is the foundation for mapping data that serves as the basis for geographic information systems. Orthoimagery is closely tied to and supports other base mapping products such as LIDAR (Light Detection and Ranging) and planimetric maps. Planimetric maps show horizontal positions of features on the Earth’s surface including natural and cultural physical features. LIDAR is used to create topographic maps and other three dimensional representations of features on the surface. The development of those datasets are greatly supplemented by having orthophotography available to validate break lines and other physical features.

Without up-to-date orthophotography it is not possible to have up to data mapping of features such a road centerlines, structures, water features, utilities, and vegetation.

Accurate and up to date maps are critical since the information they convey is often used to make decisions.

INTERNET MAP VIEWERS

A significant impediment to securing the funding necessary to acquire aerial imagery has been a lack of understanding that imagery currently available on Google Earth, Bing Maps, or similar on-line mapping services is not sufficient to meet the needs of government. Participants indicated that they encounter resistance from elected officials and organizational leadership making budget decisions that believe that imagery available for viewing on public web sites should meet the needs of their organization.

Imagery that is available for viewing on web sites (Google, Bing, and other sources aerial photography.) does not meet the needs of government entities for a number of reasons:

- There is no control over specifications or scheduling so the timing of imagery collection is not linked to any particular business needs.
- The date of acquisition is often not available so they cannot be used for certification of tax rolls or to support decisions or detect changes since when the imagery is acquired can be of critical importance to those processes.
- Spatial accuracy of the imagery cannot be validated so measurements cannot be authoritatively derived.



Figures 5 & 6: Illustration of quality differences between imagery obtained from Google Maps (above) and orthophotography obtained by a government-sponsored orthophotography program (below).

- Quality control procedures are not documented or are too vague to be of value.
- Ability to use and distribute imagery outside of a single web site is restricted so the utility of the imagery is limited.
- A clear chain of custody is impossible to establish so using the imagery to support code enforcement actions

based on activities seen in the imagery may not be possible.

- There is no metadata available.

ORTHOPHOTOGRAPHY PRODUCTION AND DISTRIBUTION

There are two slightly different avenues used to make orthophotography available to users. The first of these is funded by State agencies (usually either the Department of Revenue or Department of Transportation). The second is funded by local interests, generally counties. Under the locally funded process the quality control/quality assurance validation are done at the local level and frequently the resulting imagery products are not made available as part of the State or National Map distribution networks. Under the State funded process the capabilities of the Federal government are leveraged through USGS providing QA/QC and the resulting product that has been found to meet State and federal standards ultimately is available as part of the National Map and through easily accessible web portals.

The variable processes for the orthophotography are outlined in Figure 7. As noted in Figure 7, final quality control and quality assurance (QA/QC) reviews for projects funded with State money is accomplished through collaboration with Federal agency partners, generally the USGS. The USGS provides these services as part of their contribution to production of FL orthophotography at no charge to Florida and approved imagery becomes part of the National Map dataset. Projects funded at the county level often have QA/QC

Action: Develop and ratify a quality control/quality assurance standard methodology for orthophotography and implement that methodology in an “Imagery Center of Excellence” at the Department of Transportation.

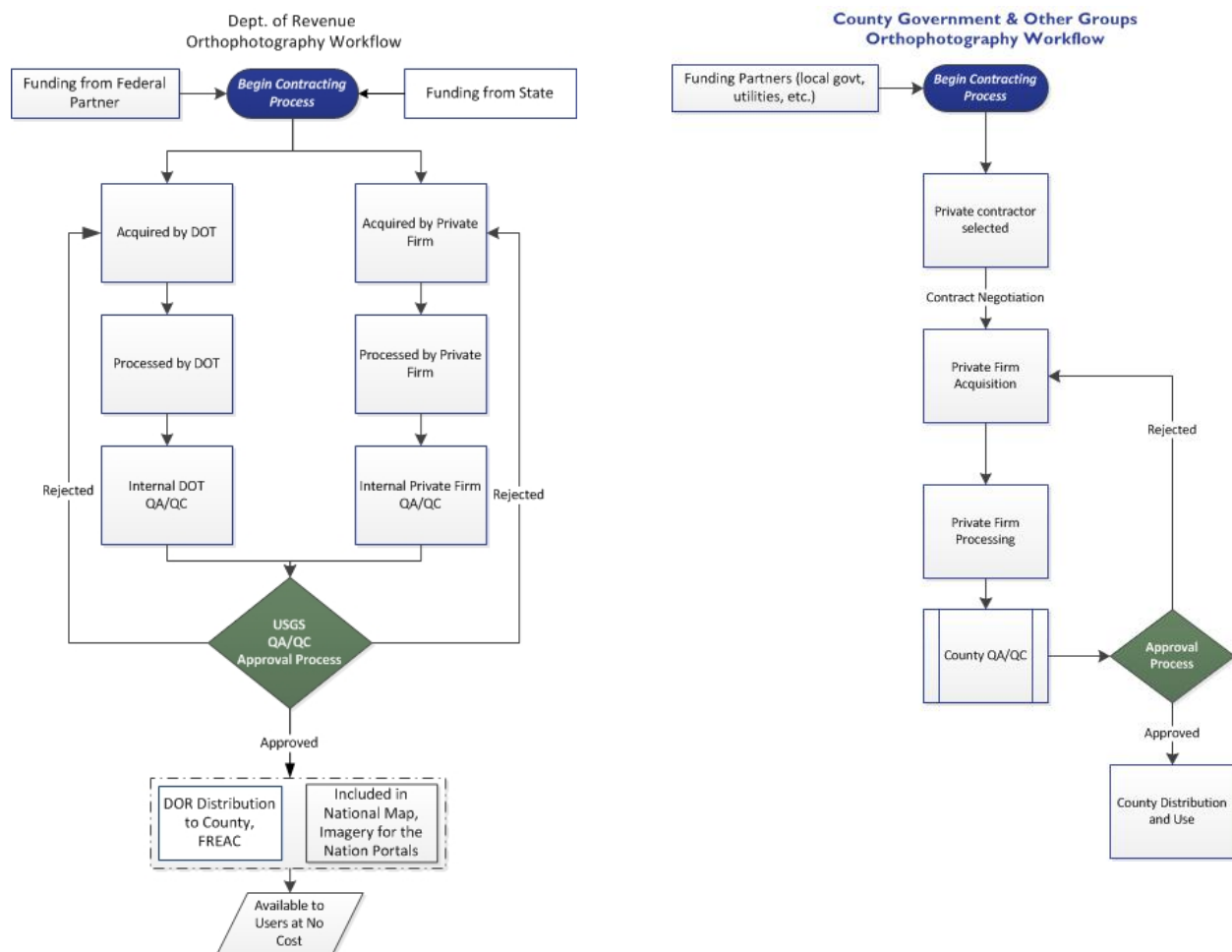
duties performed by the organization that contracted for the work. Further, these projects are often available only through direct contact to the county or other government units that funded the orthophotography. While there are several examples of counties that have been active participants in state and federal programs, including making data available to USGS for the national map, this is not always the case.

One common concern of orthophotography projects funded by the State has been the length of time between acquisition and processing to making the data available to users. Much of this delay is due to the extensive quality assurance/quality control (QA/QC) process these data undergo before being released. In response to this delay a two tier QA/QC process is recommended with an initial process being managed and executed by the Department of Transportation and a “final” evaluation completed by USGS. Once the data have cleared the QA/QC at the Department of Transportation they will be provided to local partners and the general public as “provisional” data with metadata notation that they are still undergoing final evaluation and approval.

The Department of Transportation is the appropriate organization for these activities since they have in-house expertise on image acquisition, image processing, global positioning systems (GPS), and surveying. The Department also has a statewide area of interest with field survey contracts and staff in all regions of the State.

The TAC for Imagery should develop a standard methodology for orthophotography QA/QC and it should be implemented in an “Imagery Center of Excellence” at the Department of Transportation.

Figure 7 Variable Orthophotography Workflows

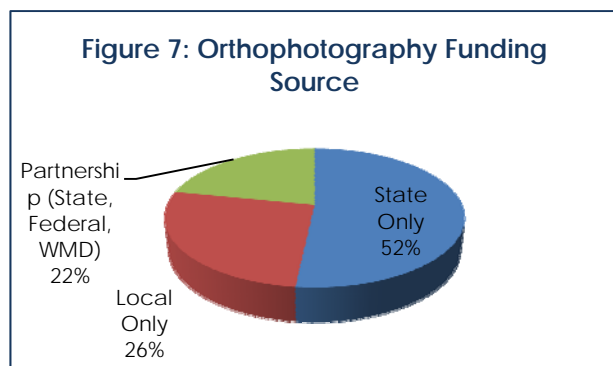


ORTHOPHOTOGRAPHY PROJECT FUNDING

Florida orthophotography is funded largely through two primary means. The first is funded by State agencies or water management districts, often in partnership with the Federal government. The second is funded almost exclusively by county or city government.

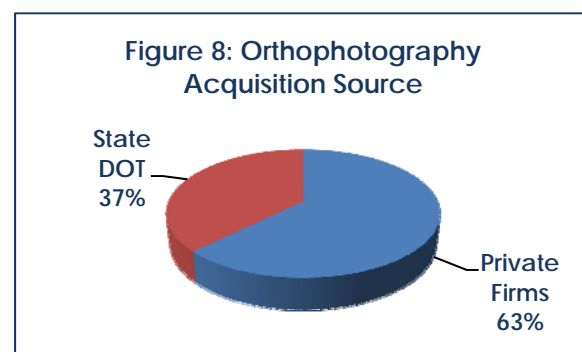
The Departments of Revenue and Transportation historically have funded acquisition and processing of a significant portion of the orthophotography that is available. However, many counties procure orthophotography and base mapping imagery independent of State requirements or contracts. The State is the sole funding source for acquisition and processing of 52 percent of the orthophotography currently available. Local governments have funded 26 percent of the orthophotography available. The remaining 22 percent has been funded through partnerships between the Federal Government and the State or Water Management Districts.

The majority of the orthophotography available in Florida, 63 percent, has been acquired and processed by private firms under contract to government. This imagery,



Action: Maximize the impact of taxpayer dollars through innovative partnerships with the Federal government and private firms.

although created by private firms, become public domain information under the statutes of Florida since they are created with taxpayer dollars and are made available to anyone interested in using them either free or for a minimal charge.



Projects undertaken with Federal partnership funds have accounted for 22 percent of the total imagery available. No project where orthophotography acquisition and processing have been accomplished over the last three years have feature a public-private partnership although several older successful examples were identified. The structure of the ongoing Florida aerial imagery program must reach out to potential private partners to assist in project funding. Potential private partners include utilities, large timber and agricultural land owners, and Internet mapping services such as Google or Bing. A conservative estimate for the value of partnerships to direct funding of orthophotography projects is 11 percent.

FEDERAL ORTHOPHOTOGRAPHY PROGRAMS

Federal partnerships have provided funds to the State of Florida to support orthophotography projects. These funds are administered through the US Geological Survey (USGS) and through the US Department of Agriculture (USDA). These programs have been extremely valuable to meeting both state and federal mapping needs.

In addition to providing a direct cost share contribution to the Florida Department of Revenue, the USGS has provided quality control and quality assurance (QA/QC) services to the state for orthophotography. They are willing to perform QA/QC services on any imagery that will be available for free distribution through national map programs.

The US Department of Agriculture Farm Service Agency (USDA FSA) manages the National Agriculture Imagery Program (NAIP). The NAIP orthophotography is either natural color or “four-band” near infrared imagery. It is collected on a three year update cycle at a one meter ground sample distance during the leaf-on crop growing season.

The NAIP imagery is made available statewide in Florida and is used in circumstances where seamless wide area coverage is necessary and one-meter resolution is acceptable.

The NAIP program does not meet the needs of many state and local government users because of the USDA business need driven

Action: Empower a State Geographic Information Council (GIC), aided by an Aerial Imagery Technical Advisory Committee (TAC), to adopt orthophotography minimum standards.

requirement for leaf-on acquisition and the 1 meter resolution.

MINIMUM STANDARDS FOR ORTHOPHOTOGRAPHY

There is no formally adopted minimum standard for orthophotography in Florida primarily because there is no entity formally charged with GIS coordination and standards approval. However, there is a *de facto* standard for orthophotography that was developed by a volunteer interest group that included representation from a variety of stakeholder groups. Appendix B of this document compares the Florida *de facto* standard to the standard currently being used by the USGS and makes some recommendations for technical changes to the Florida requirements. Recall that meeting the minimum USGS standard is important since Federal Partnerships are involved in 22.8 percent of orthophotography projects that have been recently completed in Florida.

The Geographic Information Council (GIC) recommended by the Florida GIS Coordination Strategic Plan, April 2008 (http://www.floridadisaster.org/gis/capgrant/Documents/FL_Strategic_Plan_GIS_Coordination.pdf) is needed, should be created, and should formally adopt minimum standards for orthophotography. While this

standard would be largely voluntary it would provide a strong basis for moving forward and could be required for those projects receiving State funds.

A Technical Advisory Committee for Aerial Imagery (TAC) is needed and should be established under the formal GIS coordination entity to provide on-going support of standards and Statewide priority setting for these types of projects. This TAC should have representation from a broad spectrum of aerial imagery users including members from State government, county government, local government, water management districts, federal government, and the private sector. It is important that in addition to representing a variety of organizational types that members represent a variety of business functions to make certain that recommendations reflect the wide variety of uses in the State.

As technologies change and demands from stakeholders evolve this TAC will provide the expertise necessary to evaluate these changes and recommend priorities.

The TAC will also serve as the cornerstone for improving communication among groups funding and using aerial imagery.

DATA DISCOVERY AND DISSEMINATION

There are currently multiple on-line locations where orthophotography can be accessed. These include the Land Boundary Information System (LABINS: <http://data.labins.org>) and the Department of Transportation's Air Photo Look Up System (APLUS: <http://www2.dot.State.fl.us/surveyingandma>

Action: Formally establish custodianship for a Florida Aerial Imagery Warehouse and fund the technical and human resources required to sustain its operation.

[pping/aplus.internet/Map.aspx](http://aplus.internet/Map.aspx)). There are also a number of county specific sites where up to date imagery is available. What Florida lacks is a single on-line source of current and historical aerial imagery. A single entity within the State should be identified to serve as the custodian of an aerial imagery data warehouse. This warehouse will offer access to imagery for downloading digital files, through web services, and on electronic media.

A fully functioning and effective data warehouse will remove the need from agencies to devote multiple terabytes of storage to these files. It will also relieve the burden of any local governments and emergency management groups to maintain duplicate backup systems for these data. In cases where a local copy is required for system performance or post-disaster use, only a single copy would need to be maintained since the data warehouse would serve as an off-site backup for these data.

COORDINATED PROGRAM BENEFITS

Orthophotography offers many benefits including improved decision making, improved efficiency of operation, and enhanced services and products as discussed in detail below. A coordinated Statewide approach to orthophotography production and distribution can ensure that taxpayer investments offer the highest return possible.

A coordinated program of Orthophotography for Florida will yield in excess of \$31.1 million in benefits to State residents and businesses.

In general, the types of value most often realized by having up to date orthophotography available can be characterized in the following manner:

Operational and Efficiency Gains—

Expected gains in current personnel efficiency and productivity allowing work to be accomplished in less time and with less expense. These benefits can include reduced efforts for completing tasks, reduction in expenditures for infrastructure or assets, elimination of redundancies of processes, better decision-making, or more efficient use of resources.

Customer Benefits—Benefits realized by providing better services or products directly to the taxpayer and/or customer. This class of benefits can be found in government as well as in private firms using aerial imagery. These benefits can include faster delivery of services, more convenient access to information, and a better experience receiving products or services. More efficient and effective interaction with taxpayers saving them time and money is a clear example of this type of benefit.

Cost Savings and Cost Avoidance—

Reduction in current monetary expenses such as contract costs and direct expenses. Lowering or completely avoiding increased costs that would be incurred without the use of imagery when new programs, regulatory requirements or other new demands are placed on existing organizations.

Revenue Enhancement—Use of imagery and derived data in applications and business processes that result in increased revenue collection from existing or new sources.

As a result of these benefits, organizations can better meet their varied missions for economic stimulation, environmental management, public safety, public

education, and increased revenue or profit, among many others.

During the outreach portion of this project survey respondents were asked to identify specific benefits from having up to date orthophotography available. The survey revealed that over 90 percent of all respondents had demonstrated benefits from improved decision making, improved timeliness of data and services, improve mission performance, and improved staff productivities or labor cost savings. More detailed information on the benefits from orthophotography can be found in Appendix A and Appendix D.

PROGRAM SPECIFIC EXAMPLES OF BENEFITS FROM ORTHOPHOTOGRAPHY

The benefits of a cooperative and coordinated approach to maintaining current orthophotography are many. A few key areas that represent clear opportunities for making a real difference in saving money, saving lives, and supporting economic development in Florida include:

Property Tax Assessment – Tax assessors currently rely on field evaluations to determine if additions to property have been accurately recorded for taxation. In some instances, additions are not viewable or accessible to the field evaluators, increasing the potential of missing unrecorded additions. Orthophotography allows for these assessors to view additions on properties without field visits, saving time spent in the field and increasing the probability of finding unrecorded additions to tax property owners more equitably.

Emergency Management, Response, and Recovery—Florida faces significant risks from hurricane induced coastal storm surge and flooding. Orthophotography and derived data when applied to evacuation route planning, flood mitigation and coastal zone management allows Florida to improve public safety, save lives, and avoid costs associated with disaster recovery. In the absence of diligent and concerted efforts to advance the availability of high quality geospatial data to apply to these problems, preventive measures to address emergency situations may not be fully addressed.



Public Safety/Homeland Security – The operations of law enforcement often require collaboration and communication across jurisdictional boundaries and between government organizations. Aerial imagery increases public safety, including improved 911 services, and emergency response management integration. Orthophotography is also used to support tactical surveillance and for planning for police tactical and homeland security units.

Economic Development— Activities that boost the economic opportunities for Floridians benefit from orthophotography

availability. Traditional site selection for industry and commerce is made more efficient and effective through the use of these data. Extractive industries and agriculture use orthophotography to improve the efficiencies of operations, and better manage timber and citrus groves.

BENEFITS SPECIFIC TO COORDINATED EFFORTS

There are a number of tangible benefits from improving coordination; these benefits are those where a specific dollar amount of savings or other benefit can be identified.

Activities as simple as improved coordination in the timing of orthophotography acquisition flights offer the potential for significant savings through cooperative funding and cost avoidance. For example, aligning collection scheduled between the Department of Revenue, Department of Transportation, county governments, and the water management districts offers the potential for saving in excess of \$1 million per year. The St Johns River Water Management District reports that since the data collection of the counties is not synchronized across the district they are often required to fund a flight during some years for the counties not collected by other organizations to make sure that they have a single seamless comparable data set for their entire jurisdiction.

Improved coordination with potential Federal and private sector partners may also result in an enhanced ability to avoid direct costs to taxpayers by leveraging increased partnership contributions.

Additional cost avoidance opportunities are found through recommendations for the Department of Transportation to establish an Imagery Center of Excellence. The mission of this Center will be to provide QA/QC services to entities funding aerial mapping projects in Florida, technical support in procurement for all entities and support for data discovery and dissemination activities.

TANGIBLE BENEFITS FROM ORTHOPHOTOGRAPHY AVAILABILITY

Clearly there are many benefits that support the development of a Statewide orthophotography program. Anecdotal evidence and survey responses point out many of the difficult to measure benefits: improved decision making, improve timeliness of data and services, and improved public satisfaction to name a few. While these are all important justifications for investing in a program, it is appropriate to explore the tangible benefits (those that can be measured in dollars) that the residents of Florida can expect from investing in orthophotography.

Respondents to the on-line survey of aerial imagery users undertaken during the development of this plan, identified \$12.45 million per year in tangible benefits from orthophotography. More information is provided in Appendix D, "Florida Statewide Aerial Imagery Program Investments and Potential Benefits." When reported benefits are projected beyond the survey sample to the entire State, the benefits from orthophotography could exceed \$31.1 million. The projected total benefits are a conservative estimate that does not take

into account benefits accruing to the private sector.

The greatest reported benefits were from staff productivity and labor cost savings that showed a reported \$1.96 million per year. The benefits from reduced costs through joint funding of orthophotography projects were reported at \$1.82 million per year clearly demonstrating that although there is not a formal coordination effort in place organizations are working together to maximize the benefits to their organizations.

Other tangible benefit categories that were reported by survey respondents to exceed \$1 million per year were: more effective management/allocation of field services (\$1.43 million); savings in capital project design (\$1.29 million); revenue increases from improved collection of taxes, fees, fines, and insurance claims (\$1.22 million); and, reduction in duplication and redundancy (\$1.2 million).

ORGANIZATIONAL REQUIREMENTS

This section details the requirements to effectively implement the actions necessary to create the framework supporting a sustainable statewide orthophotography program.

COLLABORATIVE GOVERNANCE

A collaborative governance structure is necessary to support sustainable orthophotography production. This governance structure must be transparent to the stakeholder community and fully engage the user community in activities to the extent possible.

The *Florida Strategic Plan for Statewide GIS Coordination* (April 2008) recommended creation of the GIC. The Council should be created either by executive order or legislative action. The GIC will coordinate activities and will function to facilitate the orthophotography process and perform a host of other activities with a positive return to Florida's taxpayers.

Once the GIC is established, the TAC for Imagery must be created with representation from all key orthophotography user groups. Representatives from State agencies, local governments, county governments, water management districts, federal agencies,

private sector users (utilities, agriculture, timber, etc.), and tribal governments should be appointed to the TAC.

The TAC will be assigned the task of reviewing the minimum standards for orthophotography and providing a recommended standard to the GIC for approval. Other assignments will include responsibility of developing standards and procedures for quality control/quality assurance evaluation of all orthophotography. These quality reviews will ensure that all imagery is in full compliance with standards and as a result can be used for the maximum benefit of the taxpayer.

It will be the duty of the TAC to make annual recommendations for orthophotography priorities to the GIC. These priorities will be structured to maximize the return on investment to the State taxpayers.

A plan for sustainable and dedicated funding will be another focus of the TAC. The committee will develop an analysis of funding alternatives for presentation to the GIC. The Council will then make a determination which strategy may be appropriate to support program funding.

A final duty of the TAC is an ongoing review of the State of the art orthophotography production technologies to make sure that standards that are in place are not rendered obsolete as technologies evolve.

The collaborative governance structure will require support from the agency assigned responsibility for the GIC. Support will include providing staff to support the administrative needs of the GIC and all appropriate TACs and funding outreach efforts to get the program established. Web pages, newsletters, and other outreach methods will be necessary and will require investment of staff time and money.

ORTHOPHOTOGRAPHY DATA DATA WAREHOUSE

The host agency for an aerial imagery data warehouse should be identified by the TAC and ratified by the GIC. Determination of who is appropriate to serve this role will require an evaluation of the organization's commitment to the long term support. Among the items that will need to be evaluated include in-house technical support available for high end and high volume web services, ability to provide secure computing facilities, redundancy in all critical systems, and sufficient bandwidth.

Once a host agency is identified, a formal analysis of the technology requirements for the data warehouse must be conducted. This study will be necessary to fully understand the massive and ever increasing data storage requirements, bandwidth needs, and other technologies required for the optimization of web services.

Funding will be required during the startup phase of the data warehouse to support the purchase of hardware and software and to complete the detailed implementation study. Ongoing funds will be necessary to sustain the operation of the warehouse. A full-time equivalent employee (FTE) will be required during the start-up phase of the project and approximately .5 a FTE for systems maintenance after the first year of the program.

Annual funding will be necessary to support on-going operations for hardware, software, and Internet connectivity.

IMAGERY CENTER OF EXCELLENCE

The existing mapping functions at the Florida Department of Transportation (FDOT) include the acquisition and processing of orthophotography using in-house resources. In addition to this orthophotography expertise, FDOT also has extensive experience in high precision field surveying using Global Positioning Systems (GPS). As mapping technologies become ever more sophisticated and relationships between traditional surveying, aerial imagery, LIDAR, and GPS become more tightly linked State government will need to develop expertise in these spatial technologies to ensure that they are appropriately leveraged to the maximum benefit of Florida.

FDOT is the natural agency to develop and maintain this expertise. The Department has an explicit legislative mandate (F.S. 334.24) to develop topographic maps. A topographic map is a detailed and accurate graphic representation of cultural (man-made) and natural features on the ground. This topographic mapping

mandate supports FDOT's role in developing and maintaining this expertise.

The mission and duties of the current FDOT mapping and surveying section will need to be modified to acknowledge the need for developing these specific levels of expertise and providing services to other State agencies. This recommendation does not imply that FDOT should be the only source of orthophotography or other geographic data for the State. It is an acknowledgement that mapping sciences are important to many of the business functions of the State. Further it is recognition that within the government system it is wise to have expertise in these critical technologies to evaluate performance of contractors. It is also driven by the need for efficiency so this expertise does not have to be developed and maintained in multiple organizations.

This Center will become the focus of services related to orthophotography in Florida, including implementation of the quality control methodology for imagery, sharing of information related to new and emerging mapping technologies, and issuing master contract vehicles for orthophotography that all government entities can use to purchase necessary geospatial data.

COMMUNICATION

Fundamental to making the statewide orthophotography program successful will be on-going and regular communication among the organizations funding orthophotography programs and the users of the resulting imagery products.

This communication will be greatly aided by the GIC and the TAC, which will be established. However, it will be necessary to have an individual or institution charged with making sure that formal communications continue. The imagery center for excellence will need to devote staff time and budget resources to supporting an open process of communication.

PROGRAM INVESTMENT

A statewide orthophotography program will require regular and on-going investment. There are demonstrated benefits on an annual basis for such a program that far exceed the annual costs. However, it is important that the minimum investment in the program be made every year or the credibility of the program and its ability to deliver the necessary orthophotography to partners will be jeopardized. The efficiencies and benefits accrue in large part from partners having faith their needs will be met. This will prevent duplication of efforts and wasted resources.

There are four primary activities necessary to support an ongoing orthophotography program: imagery acquisition and processing, quality assurance/quality control (QA/QC), distribution, and program management.

In the first year of the program additional investment will be required for QA/QC and distribution to support the start-up of these two critical activities. The QA/QC start-up will require development of a standard methodology for the process that may need to be supported with the procurement or development of additional software. Hardware expenses may be anticipated for both QA/QC activities and distribution. Initiation of the distribution activities will have additional start-up costs associated with careful study of the system needs and user requirements to make sure that the implemented system has adequate performance and expandability to meet anticipated needs.

ANNUAL INVESTMENT DETAILS

In the first year of the program an estimated \$130 per square mile collected will be necessary. In subsequent years \$120 per square mile will be sufficient to support the program since the initial investments in hardware, software, tool development, and standards will have been completed. Table 5 provided details on the breakdown of the annual investment requirements.

Table 5: Orthophotography Acquisition Program Costs

Activity	Year 1		Subsequent Years	
	Per Square Mile	Total	Per Square Mile	Total
Orthophotography Acquisition and Processing	\$95	\$2,090,000	\$95	\$2,090,000
Quality Assurance/Quality Control	\$10	\$ 220,000	\$ 5	\$ 110,000
Distribution	\$15	\$ 330,000	\$10	\$ 220,000
Program Management/Support	\$10	\$ 220,000	\$10	\$ 220,000
Totals	\$130	\$2,860,000	\$120	\$2,640,000

SOURCES OF INVESTMENT

Under the current system of acquisition and processing, QA/QC, distribution, and program management is funded through a variety of mechanisms. State appropriations to the Departments of Revenue, Transportation, and Environmental Protection support a significant portion of the costs. Water management districts historically have carried a large percentage of the orthophotography program costs but this is changing as modifications to district funding have altered their ability to fund these activities. Federal partnerships also support activities for acquisition and processing, QA/QC, and distribution. For counties over 25,000 in population the total costs of these projects are carried by county government.

The best estimate of which institution is currently carrying the costs of orthophotography is based on who funded the most recent project by the area of the county. Approximately 63 percent of the most recently available orthophotography has been funded by the State, 26 percent by county governments or other public entities, and 11 percent by federal or other partners. Table 5 identifies potential funding partners and the level of contribution necessary to support the statewide initiative.

The partnership funding that has been leveraged over the last several years is almost exclusively from Federal sources managed through the US Geological Survey (USGS). The funding that USGS has generally made available for direct support of mapping programs is included in this estimate. What is not included in USGS funding is support through the QA/QC of data from Florida following its capture and processing.

The funding from Federal and private organizations has the potential to be increased through the implementation of a formal and coordinated program. Private entities, most notably utility providers and large property owners, have benefits from the availability of orthophotography for any years without the requirements to contribute to its collection or distribution. Project outreach to those groups indicated some willingness to support a statewide program if there were a formal effort made to request that support. It is possible that in future years the contribution from private firms and the Federal government will increase to help off-set direct State funds that will be necessary.

Table 6. Potential Sources of Funding for Statewide Orthophotography Program

Sources of Funding	Year 1	Subsequent Years
State Investment (63%)	\$ 1,801,800	\$ 1,663,200
Local Investment (26%)	\$ 743,600	\$ 686,400
Leveraged Federal or Private (11%)	\$ 314,600	\$ 290,400
Total	\$ 2,860,000	\$ 2,640,000

IMPLEMENTATION

The following table identifies many of the critical steps that will be required to implement a Statewide orthophotography program. These steps, along with a proposed implementation schedule will require investment of significant time and resources over the initial 12 to 18 months. After that time the essential implementation activities will have been completed and the program will enter a maintenance structure where routine activities are undertaken annually. After the administrative requirements have been completed the benefits to the taxpayer will begin to accrue.

Table 7. Implementation Activity Highlights

Activity	Priority	Primary Responsibility	Success Criteria
ESTABLISH GEOGRAPHIC INFORMATION COUNCIL			
Create enabling legislation or executive order	Very High	FDOT, Florida Department of Revenue, Division of Emergency Management, other key stakeholders.	Enabling documents, which will create the Geographic Information Council (GIC), have been developed and accepted by the organization capable of moving it forward.
Establish Council via Executive Order or Legislation	Very High	Governor or Legislature	The GIC is created through official action of some type (legislation, Executive Order, Agency Decision).
Appoint Members	Very High	Governor, Legislature, Agencies	Members are appointed to the GIC in compliance with the enabling documents.
Ratify GIC Charter and Operating Documents	Very High	GIC, staff	The charter and operational procedures for the GIC are developed and ratified.
Identify Imagery Technical Advisory Committee	Very High	GIC	A Technical Advisory Committee (TAC) for Imagery is created with members representing diverse users across Florida.
Approve Orthophotography Minimum Standards	High	GIC	The TAC approved minimum standards are validated and accepted in a formal action by the GIC.
Approve QA/QC Methodology and Standards	High	GIC	The TAC approved methodology and standards for QA/QC are validated and accepted in a formal action by the GIC.
Approve Clearinghouse Recommendation	High	GIC	The TAC recommendation for assignment of data warehouse stewardship functions is validated and accepted in a formal action by the GIC.
Approve Mapping Priorities	High Annual	GIC	The TAC annual recommendations for mapping priorities are reviewed and approved by the GIS.
TECHNICAL ADVISORY COMMITTEE FOR IMAGERY			
Organize Committee	Very High	GIS/TAC	The TAC is organized, meetings schedules, members participating, and agendas advanced.
Formalize Minimum Orthophotography Standards	Very High	TAC/DOT	The TAC revises and formally recommends to the GIC for approval a minimum standard for orthophotography.
Establish QA/QC Methodology & Standard for Orthophotography	High	TAC/DOT	The TAC develops and forwards to the GIC for approval a QA/QC methodology and standard for orthophotography.
Analyze and recommend Clearinghouse host agency	High	TAC/DOT	The TAC considers options for assignment of stewardship responsibilities for the Statewide Imagery Data Warehouse

Activity	Priority	Primary Responsibility	Success Criteria
			and formally recommends to the GIC an implementation lead agency.
Develop Orthophotography contract specifications (buy-up options)	Very High	TAC/DOT	Contract specifications for orthophotography procurement are developed by the TAC with careful consideration of standards and optional “buy-up” products. These specifications are provided to FDOT or FDOR for securing vendor(s) for the Statewide mapping program.
Establish Annual Mapping Priorities	High Annual	TAC	Recommendations for annual orthophotography priorities are provided to the GIC for formal approval.
DATA WAREHOUSE ACTIVITIES			
Establish clearinghouse	High	Host agency	The host agency has agreed to provide these services and support the data warehouse operation.
Conduct study on hardware, software, web services	High	Host agency/consultant	A complete study of the technology requirements for an orthophotography data warehouse has been established
Procure hardware and software	High	Host agency	Upon completion of requirements study the hardware and software necessary to support the data warehouse is purchased and installed.
Develop web services. Promote and maintain them	High On-going	Host agency/consultant	Based on identified user needs, web services are development and put into operation.
Develop and maintain metadata inventory of historic and current imagery	Very High	Host agency/DOT	The on-line directory of historic, current, and planned imagery is available for users to query via the data warehouse.
Conduct outreach to partners	High On-going	DOT	An active outreach process is institutionalized as part of the annual work plans for the Data Warehouse and the Imagery Center of Excellence.
Accept data from partners	High On-going	Host agency	Imagery data not originally part of the State or federally funded operations is submitted to the warehouse and made available to users.
IMAGERY CENTER OF EXCELLENCE			
DOT Management Acceptance of Center of Excellence concept	Very High	DOT/TAC	The TAC working with FDOT staff will develop and present to FDOT management a proposal for the creation of the Center of Excellence.
Establish Center Mission/Vision	High	FDOT	FDOT management agrees to establish the Center and accepts a specific mission and vision Statement crafted jointly between FDOT and the TAC.
Assign staff responsibilities	Very High	FDOT	Existing staff duties are modified to acknowledge new roles in the Center. If modification of responsibilities or restructuring of positions is necessary this has been completed.
Plan structure and workflow	High	FDOT	Establish a strategic plan for the Center and identify specific functions, responsibilities, and workflows. Acknowledge participation of TAC and GIC in activities and clarify the relationship between the Center and those organizations.
Issue mapping RFP	High	FDOT	Develop and issue an RFP for a multi-year mapping program based on recommendations from the TAC. This RFP will include the specifications for value added ‘buy-up’ options for participants.
Select vendor(s) for contract	High	FDOT/TAC	Award the contract to vendor(s) that clear demonstrates the ability to best meet the needs of the State in an efficient manner. Selection to be based upon current procurement code under the CCNA with a selection committee drawn from FDOT and the TAC..
Implement QA/QC Process	High	FDOT	Based on the QA/QC methodology and standard endorsed by the TAC and the GIC, implement the process on all newly acquired orthophotography for Florida without regard to the source of that imagery.
Build and sustain partnerships	On-going	FDOT	Building partnerships with public and private stakeholders will be essential to the long-term sustainability of the program. These must be built with public partners (most notably State agencies, county governments, federal agencies, and tribal entities) and private sector firms.

Activity	Priority	Primary Responsibility	Success Criteria
Outreach to stakeholder community	Ongoing	FDOT/TAC	Continued outreach to the stakeholder community must be an on-going responsibility of the staff of the Center. This outreach will be important to sustained partnerships and to building an efficient orthophotography program for the State.

The program anticipates a three year continuous update cycle for imagery. With this cycle the most recent orthophotography will never be more than three years old for any county in the state. The phasing proposed for the identified implementation activities mirror the three year timeframe and is shown on the following pages.

Table 8. Implementation Activity Timing.

Note: dark blue are active tasks, light blue are on-going activities.

	Year 1 (by month)													Year 2 (by month)													Year 3 (by month)													
Task	1	2	3	4	5	6	7	8	9	10	11	12		1	2	3	4	5	6	7	8	9	10	11	12		1	2	3	4	5	6	7	8	9	10	11	12		
Establish Geographic Information Council																																								
Create enabling legislation or executive order	█	█																																						
Establish Council via Executive Order or Legislation			█																																					
Appoint Members				█	█																																			
Ratify GIC Charter and Operating Documents					█																																			
Identify Imagery Technical Advisory Committee					█																																			
Approve Orthophotography Minimum Standards						█									█	█	█																							
Approve QA/QC Methodology and Standards							█																																	
Approve Data Warehouse Recommendation								█																																
Approve Mapping Priorities										█	█																											█		
Technical Advisory Committee for Imagery																																								
Organize Committee			█	█																																				
Formalize Minimum Orthophotography Standards					█	█																																		
Establish QA/QC Methodology and Standard for Orthophotography					█	█																																		
Analyze and recommend Data Warehouse host agency							█	█																																
Develop Orthophotography contract specifications (buy-up options)					█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█		
Establish Annual Mapping Priorities								█														█													█					
Data Warehouse Activities																																								
Establish data warehouse								█	█																															
Conduct study on hardware,									█	█																														

	Year 1 (by month)													Year 2 (by month)													Year 3 (by month)														
Task	1	2	3	4	5	6	7	8	9	10	11	12		1	2	3	4	5	6	7	8	9	10	11	12		1	2	3	4	5	6	7	8	9	10	11	12			
software, web services																																									
Procure hardware and software																																									
Develop web services. Promote and maintain them																																									
Develop and maintain metadata inventory of historic and current imagery																																									
Conduct outreach to partners																																									
Accept data from partners																																									
Imagery Center of Excellence																																									
DOT Management Acceptance																																									
Establish Center Mission/Vision																																									
Assign staff responsibilities																																									
Plan structure and workflow																																									
Issue mapping RFP																																									
Select vendor(s) for contract																																									
Implement QA/QC Process																																									
Build and sustain partnerships																																									

