Final Report

HIGICC Business Plan for Imagery, Metadata, and GIS Data Portal

Prepared for:

HIGICC

Hawai'i Geographic Information Coordinating Council

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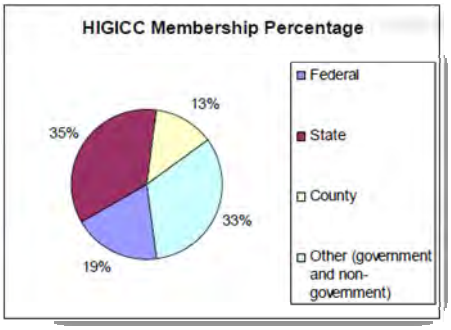
EXECUTIVE SUMMARY

The purpose of the *Hawaii Geographic Information Coordinating Council's* (HIGICC) Business Plan for Imagery, Metadata, and GIS Data Portal (referred to as Business Plan) is to support the successful implementation of the programmatic goals identified in the HIGICC 2009 Strategic Plan. The goals are: *1) define a mechanism for periodic statewide imagery acquisition, 2) facilitate the adoption of a set of metadata standards,* and *3) investigate options for an online spatial data discovery and dissemination application.* The Business Plan describes how the goals and objectives will be achieved along with necessary justification.

The HIGICC is a 501(c)(3) not-for-profit organization registered in Hawaii in 1999. HIGICC is run by volunteers from Hawaii's geospatial community to provide coordination of GIS activities among a wide range of GIS users in order to avoid duplication of effort, promote data sharing, and advocate for data standards throughout the state. HIGICC consists of over 60 active individual members and 15 organizational members.



The Data Inventory and Assessment Committee (DIAC) was created as a result of HIGICC business planning efforts in 2009. Its specific mission is to support HIGICC programmatic goals of facilitating data acquisition and development of data standards by taking a leadership role in coordinating possible data acquisition efforts, establishing and promoting data standards, and facilitating data distribution.[1]

The committee chose to focus on imagery[2], one of the Federal Geographic Data Committee (FGDC) framework data layers for several reasons: 1) it is the largest and most expensive to acquire, 2) it has a significant number of data requirements, 3) it provides the foundation on which all other data is built, 4) it requires the dissemination of large datasets, and 5) the USGS Liaison recommended starting with imagery to support ongoing efforts to update imagery across the State. By outlining requirements and issues for this thematic layer, the DIAC creates a framework that can be used to update the majority of all other Statewide Spatial Data Infrastructure (SSDI) layers, including the necessary collaborative partnerships required to insure success.

This Business Plan is based in part on the work done by the DIAC, which included an imagery inventory, imagery stakeholder survey, and an imagery stakeholder workshop. The workshop brought together over 40 stakeholders from both the public and private sectors to: 1) discuss the findings of an imagery

[1] HIGICC Business Plan to Codify the Operational Structure of the Council v2, Sept 2009, pgs: 19-22. http://higicc.camp8.org/resources/Documents/HIGICC-BusinessPlan-Adopted-20090910a.pdf

[2] For the purposes of this Business Plan, imagery includes digital orthophotography, satellite imagery, and oblique imagery. Digital terrain models and elevation contours were left out of this initial process, but could be easily added at a later date.

needs assessment survey that canvassed users for information on their current imagery use, data requirements, annual expenditures on imagery, frequency of imagery use; and 2) elicit stakeholder feedback on the analysis of the survey results.

The workshop helped to build support for investigating a collaborative imagery acquisition partnership representing the majority of imagery needs of a wide variety of users in the State of Hawaii. It raised awareness of key issues surrounding the need for a minimum set of uniform metadata standards, and it demonstrated support for finding a robust solution to data discovery and dissemination. A majority of attendees agreed that the current ad hoc method of exchanging DVDs or external hard drives was no longer viable. The overall consensus was that by working together, all parties would save money by eliminating duplication of effort, increasing economies of scale, and reducing the time it takes individuals to rapidly find data.

Proposed Outcomes

Planning and management requires up-to-date imagery, which is updated on a regular basis and easy to find and use, to support informed decision-making.

Government agencies, educational institutions, non profits and commercial companies acquire digital imagery for a wide variety of planning, business, and environmental purposes. Imagery supports core GIS and mapping activities such as feature extraction, data update, change detection, and realistic 3-D models that enhance communication among decision makers and the public. Imagery is being used to develop public policy in a variety of areas such as land use planning, economic development, public works, natural resource management, homeland security, and emergency response.

The State of Hawaii currently has no regularly recurring statewide aerial imagery program. Like Utah, Hawaii has created several statewide imagery datasets through public/private partnerships (e.g., Spot Image purchase, Ikonos Consortium). However, each of these projects has been undertaken under a unique set of circumstances and funding. In contrast, many states are implementing flyovers on a regular schedule with annual budgets.

The ***first proposed outcome*** of the DIAC Imagery Stakeholder Workshop is the formation of a collaborative partnership combining both public and private partners, led by the HIGICC, to facilitate the acquisition of state-wide imagery on a periodic basis. Such a partnership will increase the bargaining and buying power of the whole, and for individual partners leverage their limited funds to make available more imagery than would otherwise be possible.

The needs assessment also revealed that each HIGICC partner organization has different goals and therefore different needs in imagery type, resolution, etc. Therefore the HIGICC should identify ways to facilitate communication and/or the coordination between interested parties for special imagery acquisition projects, which may benefit several partners working in one particular area (like the Resource Mapping Hawaii project that flew the entire Koolau Watershed or the Pictometry acquisition efforts of the City and County of Honolulu, Kauai County, and Maui County). Niche remote sensing

projects can be just as important to planning, natural resource management, emergency response, etc., as statewide orthophoto projects.

The ***second proposed outcome*** is for the DIAC to create a working group that would identify a minimum set of metadata standards, identify barriers to adoption of the standards, and provide several methods to overcome those barriers so that the majority of GIS data developers in the State of Hawaii implement metadata standards.

The ***third proposed outcome*** is for the HIGICC to investigate GIS data portal technical approaches and organizational structure that would be best suited to support spatial data discovery and distribution. The pixel and spectral resolution of imagery is expanding exponentially, and a robust method for both data discovery and dissemination should be included early on in an imagery acquisition effort.

The Cost of Doing Nothing

If the GIS community of Hawaii does nothing, valuable time and money will continue to be wasted buying datasets at a higher cost because they did not have the benefit of higher economies of scale, identifying authoritative datasets because of a lack of metadata, and searching for datasets because there is no central GIS portal to assist them with searches. There are also the computer usage and labor costs associated with the burning and exchanging hundreds of DVDs or copying data to external hard drives. Harder to quantify, but even more costly are the consequences of using out-of-date data, or the wrong data for planning, economic development, or emergency response projects.

Benefits

The majority of workshop participants agreed that by working together on all three proposed outcomes above, stakeholders would save money by eliminating duplication of effort, increasing economies of scale, and reducing the time it takes individuals to find existing data appropriate to their need.

Timeline (preliminary)

At this early stage there are a number of decisions to be made before actual timelines and costs can be solidified. Using previous costs and schedules for work completion based on similar projects, it is possible to build a preliminary timeline and rough estimates.[3]

Imagery Funding and Acquisition	2 to 3 years
Metadata Standards Development and Implementation	1 to 2 years
GIS Data Portal Development and Implementation	3 months to 1.5 years

Cost (rough order of magnitude)

Imagery Acquisition Funding	$2M to $5M

[3] These estimates should be updated with vendor quotes that are based on well defined user requirements.

Metadata Standards Development and Implementation	$50K to $150K
GIS Data Portal Development and Implementation (over 5 yrs)	$10K to $2M

1 PROGRAM GOALS

The Business Plan's programmatic goals are listed below. The goals relate directly to the programmatic goals outlined in the HIGICC 2009 Strategic Plan. For each goal, there are a set of success factors or supporting objectives that support the implementation of each goal.[4] *In addition, some of the program goals have discrete options that vary in complexity, requirements, and cost. These are addressed throughout the Business Plan.*

Programmatic Goal 1: Define a mechanism and coordinate periodic statewide imagery acquisition.

There are three potential options when it comes to statewide imagery acquisition. It may be desirable to combine various options or portions of options to meet this particular goal.

Option 1: Enhance communication among partners and the community to facilitate collaborative imagery acquisition efforts over smaller areas.

The HIGICC has already held two formal data discovery workshops, and would plan to continue its active role in communicating all imagery acquisition efforts in the State to the community. This could involve creating a web-based forum, discussion group, RSS and/or GeoRSS feeds, online map interface, and newer forms of social networking that would support the reporting of imagery needs and efforts by any organization, allowing the community to communicate with each other regarding need. This would allow those with similar interests to meet and explore imagery acquisition solutions together as needed. The result would likely be the formation of ad hoc partnerships for localized data collection efforts, but not a coordinated statewide effort.

Programmatic Goal 1, Option 1	
Objective 1:	HIGICC would become responsible for communication of all imagery acquisition efforts in the state.
Objective 2:	Investigate methods of facilitating communication and community engagement (e.g., listserv, RSS feeds).
Objective 3:	Build web-based tools (e.g. RSS feeds, alerts, online forums) to facilitate communication and community engagement.
Objective 4:	Create a list of technical specifications to assist interested parties.
Objective 5:	Create a list of best practices to insure successful data acquisition projects.
Objective 6:	Create sample Memorandum of Understanding (MOU) for organizations that wish to partner.
Objective 7:	Create an online mapping interface showing existing imagery area of coverage, imagery type, resolution, etc.
Objective 8:	Create an online mapping interface showing areas of interest and points of contact for those interested in collaborative purchases.

[4] This HIGICC Business Plan follows the NSDI 50 States Initiative Business Plan Guidelines revised May 2009. http://www.fgdc.gov/policyandplanning/newspbp/BusinessPlanGuidelines_v2_052809_FinalVersion.pdf

Option 2: Explore acquiring statewide imagery through an existing Federal program leveraging existing efficiencies and lowering or eliminating costs to local participants.

The HIGICC would facilitate the exploration of becoming a National Agriculture Imagery Program (NAIP) state[5] and investigate the ramifications of the current Hawaii efforts of the National Digital Orthophoto Program[6], which is in charge of providing Technical Specifications, Contracting, and Data Distribution for the "Imagery for the Nation" (IFTN) initiative. IFTN was first proposed by National States Geographic Information Council (NSGIC), the parent organization of the HIGICC. Since the IFTN's inception, the USGS and the USDA have been actively soliciting input for the technical specifications plans for orthoimagery for the Hawaii/Pacific Basin.

Programmatic Goal 1, Option 2	
Objective 1:	Create a sub-group with a strong project manager to begin exploring existing Federal programs.
Objective 2:	Identify agencies and organizations willing to champion and support a request to congress to include Hawaii as a NAIP state.
Objective 3:	Investigate NAIP state participation requirements[7] and options.
Objective 4:	Continue advocacy for IFTN program.
Objective 5:	Investigate existing areas of interest covered by these programs.
Objective 6:	Investigate technical specifications and frequency of image acquisition.
Objective 7:	Investigate proposed schedules for imagery acquisition under these programs.
Objective 8:	Gather information on sources of funding and funding requirements.

Option 3: Create a new imagery consortium and pursue the purchase of imagery in a collaborative partnership of public and private sectors.

The HIGICC would facilitate the creation of an imagery consortium and pursue the acquisition of a statewide imagery dataset that meets the majority of user needs and is free of licensing restrictions.

Programmatic Goal 1, Option 3	
Objective 1:	Identify a strong lead agency and designate an experienced project manager (not necessarily from the lead agency).
Objective 2:	Identify organizations willing to form a consortium to participate in collaborative imagery acquisition efforts. Combine federal, state, and local government along with educational institutions, non profits, and the commercial sector.
Objective 3:	Explore bringing the military services into the consortium effort.
Objective 4:	Identify champions within key partner organizations who will back the consortium during difficult times.
Objective 5:	Evaluate available technologic options and approaches for imagery acquisition.
Objective 6:	Identify and pursue program funding source(s) and encumber funds.
Objective 7:	Define a scope of work with well defined requirements with detailed quality standards.

[5] NAIP acquires aerial imagery during the agricultural growing seasons in the continental U.S. A primary goal of the NAIP program is to make digital orthophotography available to governmental agencies and the public within a year of acquisition.

[6] http://www.ndop.gov/

[7] http://www.fsa.usda.gov/FSA/apfoapp?area=home&subject=prog&topic=nai

Programmatic Goal 1, Option 3	
Objective 8:	Request program cost estimates from qualified solution/data providers based on a scope of work (include the detailed quality standards in the contract language).
Objective 9:	Procure services according to scope of work (include the detailed quality standards in the contract language).
Objective 10:	Project Management: Manage project schedule while making adjustments as needed to maintain quality and stay on budget; Create a communication plan which includes frequent communication to stakeholders; Require a quality assurance and quality control plan be a part of the contract, managed by someone experienced in imagery acquisition and orthophoto development projects; Set aside a portion of the budget as a project contingency reserve budget.
Objective 14:	Determine the imagery refresh frequency rate required to meet most stakeholder needs (e.g., every year, every 2 years). Note: This objective could be included in the Scope of Work (SOW), if the objective is to have vendors offer long term services.
Objective 15:	Manage project schedule while making adjustments as needed to maintain quality and stay on budget.

Programmatic Goal 2: Facilitate the adoption of spatial metadata standards in the State of Hawaii.

A goal of the HIGICC strategic plan is to facilitate the adoption of metadata standards in the State of Hawaii which will increase the functionality, value, and discoverability of Hawaii's datasets among stakeholders.

Programmatic Goal 2	
Objective 1:	DIAC to create a working group that would identify a minimum set of metadata standards.
Objective 2:	DIAC to identify barriers to adoption.
Objective 3:	DIAC to provide several methods to overcome those barriers.
Objective 4:	DIAC to identify sources of funding for this program.
Objective 5:	DIAC to create a scope of work, schedule and costs to implement a metadata adoption program.

Programmatic Goal 3: Explore methods for spatial data discovery and dissemination.

One of the goals of the HIGICC strategic plan is to investigate GIS data portal technical approaches and organizational structures that would best suit spatial data discovery and distribution.

Option 1: Basic GIS Data Portal

This option would have a minimum of development requirements mostly using HTML with links to other agency sites that host the data providing FTP download.

Option 2: Intermediate GIS Data Portal

This option would have an intermediate number of scope requirements. In addition to those in Option 1, it would also have online web map capability with geographic and keyword searches along with static ftp download.

Option 3: Advanced GIS Data Portal

This option would have an advanced number of scope requirements. In addition to those in Option 2, it would include a more sophisticated online web map with geographic, thematic, and keyword search capabilities; thumb nail and KML quick view capability; and clip, zip and ship capability in various coordinate systems and various formats. It would also have links to other agency websites as appropriate.

Programmatic Goal 3, Options 1: Basic, 2: Intermediate, or 3: Advanced	
Objective 1:	Identify GIS data portal requirements.
Objective 2:	Identify hosting and management requirements.
Objective 3:	Identify potential hosting alternatives.
Objective 4:	Identify and evaluate technical approaches.
Objective 5:	Create detailed scope of work.
Objective 6:	Request estimates from vendors.
Objective 7:	Secure funding for multiyear operation of the website.
Objective 8:	Create data sharing MOU with each participating partner.
Objective 9:	Purchase required hardware and software; or arrange for lease of same.
Objective 10:	Procure services according to scope of work (include the detailed quality standards in the contract language).
Objective 11:	Project Management: Manage project schedule while making adjustments as needed to maintain quality and stay on budget; Create a communication plan which includes frequent communication with stakeholders; Require a quality assurance and quality control plan be a part of the contract, managed by someone experienced in web development projects; Set aside a portion of the budget as a project contingency reserve budget.
Objective 12:	Develop GIS Data Portal; web interface look and feel, functionality, system architecture, data schema, etc.
Objective 13:	Launch and test GIS Data Portal.
Objective 14:	Finalize GIS Data Portal.
Objective 15:	Manage the operation of the GIS Data Portal for 5 years.

2 BENEFITS AND JUSTIFICATION

This section provides the justification for each programmatic goal and option, including financial and non-financial benefits.

Programmatic Goal 1: Define a mechanism and coordinate periodic statewide imagery acquisition.

Organizations benefit from digital imagery collaboration in a variety of ways. Having multiple participants share in digital imagery acquisition will result in a savings of time and money, while improving the overall quality of the final imagery product beyond what any single organization could afford. An additional benefit is having a uniform dataset across each island, which makes analyses, feature extraction, change detection, and other job functions easier.

Option 1: Enhance communication among partners and the community to facilitate collaborative imagery acquisition efforts over smaller areas.

Facilitating the coordination and acquisition of common datasets through enhanced communication will allow interested parties to become aware of common needs. Ad hoc partnerships can then develop around those needs allowing the interested parties to avoid duplication of effort, and gain a price advantage from vendors by pooling both their resources and needs. Funding agencies also are more likely to fund efforts that involve multiple partners and leveraged resources. In addition, partners benefit from a group synergy that may include the technical expertise of GIS and contract specialists from the partner organizations who can help in developing the Request for Proposal (RFP), evaluating vendor proposals and negotiating contracts. Enhancing communication among partners and the community to facilitate collaborative imagery acquisition efforts also provides a mechanism to support smaller imagery acquisition projects that have special requirements to support specific user needs (e.g., hyper spectral analysis of vegetation types to identify the location of Australian tree fern).

Option 2: Explore acquiring statewide imagery through an existing Federal program leveraging existing efficiencies and lowering or eliminating costs to local participants.

By participating with a Federal program it is possible for the State to realize significant cost sharing advantages. In addition, some of these programs support 3-year acquisition cycles. Since these are Federal and State partnership programs, a good deal of the project management costs are covered.

Some of the additional benefits that can be realized by participating in a partnership with the USDA Farm Service Agency (FSA) for acquiring NAIP imagery are[8]:

- Cost share partnerships can help ensure full state coverage.
- Cost share partners receive all NAIP deliverables as they become available through the inspection process.
- Cost share partners can “buy up” to enhance deliverables (e.g., from three band, 1m to four band, 50cm imagery) through the NAIP contract.

[8] http://www.fsa.usda.gov/Internet/FSA_File/instruct_naippartn_collabpdf.pdf

- Cost share partners may establish secondary contracts with NAIP contractors for derivative products.

Lessons learned by the State of Texas[9], may be useful to Hawaii:

- State cost share minimums can vary widely depending on the amount of agricultural land.
- State benefits from strong contribution ability (1/3).
- Need a single strong State entity leader.
- Need a strong FSA state office and state mapping center relationship.
- Strong value in having a history of successful data collaborations across state agencies.
- A contract vehicle that is clear and expeditious; sole sourcing or others.
- Essential that State partners and funding are in place prior to NAIP award because there can be a very short time frame between NAIP award and the flying season.

Option 3: Create an imagery consortium and pursue the purchase of imagery in a collaborative partnership of public and private sectors.

The benefits of participating in an imagery acquisition consortium are:

- All parties gain a price advantage from vendors by pooling resources and increasing economies of scale.
- Individual investments are leveraged to gain access broader geographical coverage and/or better imagery than they would have been able to acquire alone.
- Partners benefit from the technical expertise of GIS and contract specialists from larger organizations who take the lead in developing the RFP, evaluating vendor proposals and negotiating a final contract.
- Partners gain ability to spread the costs of imagery acquisition over two fiscal years through MOU's with a larger lead agency, which is likely to be handling the contract with the project vendor.
- Duplication of effort including contracting, invoicing, and management are eliminated or greatly reduced.

Programmatic Goal 2: Facilitate the adoption of spatial metadata standards.

There are many benefits of metadata, including those summarized by the Wyoming Geographic Service Center (WyGISC) that apply to Hawaii:[10]

- Protects the investment in data:
    - Mitigates the effect of staff turnover and individual memory loss.
    - Sets the stage for data re-use and update.
    - Provides documentation of data sources and quality.
- Helps the user understand the data:
    - Provides consistency in terminology.
    - Focuses on key elements of data.
    - Helps user determine the data's fitness for use.

[9] http://www.slideshare.net/NSGIC/naip-and-tnris

[10] http://www.uwyo.edu/wygisc/metadata/why.html#wagic (note: cut and paste this url into the web browser)

    - Facilitates data transfer and interpretation by new users.
- Enables data discovery:
    - Provides information to data catalogs and clearinghouses.
    - Provides flexibility in searching to support interdisciplinary usage.
- Limits Liability: can prevent data from being inappropriately used or provides protection if data is inappropriately used.
- Can prevent embarrassing or expensive disasters such as designing an intersection that unintentionally encroaches on private property or a utility easement, or a highway that passes through a protected wetland, etc.
- Provides evidence of prudent data stewardship: an organization that takes the time to create and maintain quality metadata will also mostly likely take the time to develop good quality, clean data.
- Reduces workload associated with questions about data: users don't have to keep asking data producers questions regarding the data.
- Cuts overall costs: allows automation of tools which ease overall burden and cost of data population and maintenance.

Benefits Exceed Associated Costs

Costs of generating metadata are typically short term and quantifiable. The most cost-effective method is to generate metadata as an integrated step of data creation. Implementation costs vary with complexity, level of detail, and age of the data set. The benefits associated with having and using metadata are identifiable, immediate, and *increase over time*. The biggest impediments to the creation of metadata are lack of knowledge, simple tools and guidelines.

The State of Washington Geographic Information Council compiled some examples of cost savings that help justify the creation of a metadata adoption effort for Hawaii. [11]

- Internally - saves 4 hrs research 10 times a year = (4*10*$50) = $2,000 (time it takes to look up or contact someone for information about a dataset).
- External Questions - refer 30 inquires/year (1hr/inquiry) = (30*1*$50) = $1,500 (time it takes to answer calls from people who want to use the data or find out more about it).
- Enable future reuse/enhancement - $5,000 to $25,000.
- Limit Liability - lawyer & court costs (TBD).

By implementing a statewide metadata adoption program the HIGICC can potentially increase the cost savings listed above by 40 times, if 40 organizations joined the program.

Programmatic Goal 3: Explore methods for spatial data discovery and dissemination.

The workshop resulted in overwhelming support for a GIS portal of some kind[12]. A GIS portal is a web-based system for discovery, access, viewing, and downloading of geospatial data. GIS portals are typically a collaborative effort, made stronger by member participation and private/public partnerships.

[11] http://wagic.wa.gov/aboutgic.htm

The primary reasons for investigating appropriate technologies, methods, and organizational structure for spatial data storage, discovery, and distribution are:

- The amount of imagery data is overwhelming given the exponential increase in file size due to higher pixel and spectral resolution available today.
- The burden on organizations and staff to burn multiple copies of data on CDs, DVDs, and external hard drives is no longer practical.
- There is no reliable way to find out what data is available.
- Current ad hoc methods of data discovery rely on who you know.

A GIS portal will provide time and money savings for those searching for datasets by assisting with searches, providing for rapid discovery of relevant data and supporting efficient delivery of data.

The benefits of a coordinated GIS data collection, metadata development, discovery, and dissemination effort are stated clearly in a U.S. Department of Commerce, National Institute of Standards and Technology report[13]:

- **40%** of engineering time is spent locating and validating information.
- Data entered once and used by all reduces delivery time by up to **50%**.
- Poor communications between systems wastes up to **30%** of project costs.
- Operations & Maintenance will save up to **14%** in project costs.

3 REQUIREMENTS AND COSTS

To achieve effective program implementation it is necessary to assess the condition of the existing infrastructure as well as the requirements to achieve effective program implementation. There is a causal relationship between requirements and costs, thus they are linked together in this section. Part of the assessment process includes looking at an organization's track record of handling past projects.

Strong Track Record of Success

There is a long tradition in Hawaii of the GIS community defining common interests, creating MOU's, and vendor contract mechanisms to buy data in partnership. This stems back to 1996 with the first imagery consortium when 26 organizations banded together to purchase statewide 10m panchromatic and 20m multispectral SPOT imagery. The GIS community successfully took advantage of the economies of scale to successfully cost share and negotiate a statewide licensing agreement to acquire digital imagery.

[12] See Appendix 9 - GIS Data Portal Requirements Questionnaire Results; Question 4, Page 117. And Appendix 5 –GIS Data Portal Portion of the Workshop: Goals, Methods, and Results; Question 4, Page 54.

[13] NIST GCR 04-867 Cost Analysis of Inadequate Interoperability in the U.S. Capital Facilities Industry; U.S. Department of Commerce, National Institute of Standards and Technology; 2004. http://www.bfrl.nist.gov/oae/publications/gcrs/04867.pdf

In 2002, the newly formed HIGICC successfully lead the second statewide imagery acquisition effort entitled the Hawaii Ikonos Consortium. The process involved a series of informal interviews across federal, state, local and private users to gather technical requirements (e.g., imagery type, resolution, datum, coordinate system). The Hawaii Natural Heritage Program (HINHP), the lead organization in 2002, successfully negotiated the cost for an unlimited multi-organization licensing agreement. This resulted in the successful acquisition and distribution of 1m natural color satellite imagery covering the entire state of Hawaii. An accomplishment once completed in the 70's by a single agency was now done by a community of public and private users with a common need.

These two successful efforts clearly defined a lead organization, a strong project manager, a number of champions (both individuals and organizations), a legal structure, defined technical requirements, and a custom-ordered product from a specialized vendor. *The successful imagery acquisition plan for the future will build on the past successes and include a plan to provide continued financial support and guidance through successive updates on a yearly or biannual basis, as well as a robust method of data dissemination.*

3.1 Organizational Approach

Programmatic Goal 1: Define a mechanism and coordinate periodic statewide imagery acquisition.

Every group that decides to work together to purchase imagery or data over large areas must have a clearly defined organizational structure and legal foundation on which to handle large financial transactions. There are two types that could work for Hawaii:

1. Lead agency with secondary participants. In this case a lead agency contracts directly with the vendor and completes the project. This could happen in two ways:
    a. Lead agency acts as sole agent and collects money from the participants.
    b. Lead agency negotiates a prototype contract and encourages participants to purchase from the same vendor.
2. A non-profit corporation is established for the purpose of contracting with vendors and hiring project managers.

Each type has advantages and disadvantages. The advantage of having a large agency lead the effort is that they can often pledge large amounts of money upfront while products are being developed and support the project with existing staff. The downside is that public agencies are constrained by contracting and purchasing rules and can make no allowance for performance/penalty-based contracting. They may also be reluctant to support staff on the project over the long term, which would impact overall project management.

A non-profit corporation would be more flexible when it comes to contracting rules but may not have the resources to commit staff over the long haul of an imagery acquisition project that could last two or more years. In either case, the consortium would have to insure there is sufficient funding for a project manager and necessary support staff.

The best option for Hawaii is to use the HIGICC as the lead organization that determines the requirements, negotiates the costs, and then acts as the sole agent with the vendor. HIGICC would then write contracts between it and each participant, and handle all transactions (e.g., quote, contract, delivery, and invoicing).

Another alternative would involve choosing a large federal agency like the USGS and using their contract management services. Although fees would likely be higher, the burden on the consortium and/or participating organizations would be minimized.

A hybrid solution would be to have the HIGICC coordinate the clarification of requirements and the identification of partnerships and allow a lead Federal or State agency to handle the administration of the contract, and evaluation, approval, and distribution of deliverables.

The HIGICC will have to weigh the above considerations carefully and chose an approach that best meets the overall needs for imagery acquisition.

Programmatic Goal 2: Facilitate the adoption of spatial metadata standards.

The organizational structure of the HIGICC is currently well equipped to successfully administer the spatial metadata standards adoption goal.

The HIGICC Board will act as the approving body while the various committees act as technical advisors. The Board President will act as the overall HIGICC project manager with final approval on interim deliverables and be the primary liaison with funding agencies. The Board will approve final deliverables.

The Board President and/or project team lead appointed by the Board will be responsible for all communication with the consultant, which will include clarification of requirements, delivery schedule, and compliance with the scope of work.

The appropriate HIGICC committee will communicate directly with the consultant on technical issues as needed, reporting progress to the Board President.

The Board Treasurer will handle all billing and invoicing.

Programmatic Goal 3: Explore methods for spatial data discovery and dissemination.

The organizational structure of the HIGICC is currently well equipped to successfully administer the exploration and development of a GIS data portal.

The HIGICC Board will act as the approving body while the various committees act as technical advisors. The Board President will act as the overall HIGICC project manager with final approval on interim deliverables and be the primary liaison with funding agencies. The Board will approve final deliverables.

The Board President and/or management team will be responsible for all communication with the consultant, which will include clarification of requirements, delivery schedule, and compliance with the scope of work.

The appropriate HIGICC committee will communicate directly with the consultant on technical issues as needed, reporting progress to the Board President.

The Board Treasurer will handle all billing and invoicing.

3.2 Suitability Assessment of Existing Infrastructure

This section assesses the existing infrastructure for suitability.

Programmatic Goal 1: Define a mechanism and coordinate periodic statewide imagery acquisition.

Not applicable.

Programmatic Goal 2: Facilitate the adoption of spatial metadata standards.

Not applicable.

Programmatic Goal 3: Explore methods for spatial data discovery and dissemination.

Option 1: Basic GIS Data Portal.

The HIGICC's current website is running on Wild Apricot online membership software for small associations, non-profits, clubs and subscription websites. It is capable of handling simple links to other HIGICC partner websites that contain spatial data available for download or web maps. It also has premium services that could be purchased to provide additional functionality.

Option 2: Intermediate GIS Data Portal.

Neither the IT infrastructure nor personnel that are currently within various State agencies have the resources to support the system administration of a GIS Data Portal.

Research will have to be conducted on the infrastructure, resources, and capabilities of existing local portals run by the University of Hawaii's Experimental Program to Stimulate Competitive Research (EPSCOR) program, Pacific Basin Information Node (PBIN), Manoa Magis, the School of Ocean and Earth Science and Technology (SOEST), and possible others, before a suitability assessment can be made.

Research should also be done on commercial outsourcing options such as online content management and web hosting services that use a "cloud" computing model and a variety of robust data search and delivery methods. The infrastructure, resources, and capabilities of these types of services should be examined before a suitability assessment can be made.

More information is needed on existing hardware, software, networking, storage, backup, retrieval, disaster recovery, and available IT personnel capable of administering such a system for all possible public or private sector options.

Option 3: Advanced GIS Data Portal.

Neither the IT infrastructure nor personnel that are currently within various State agencies have the resources to support the system administration of a GIS data portal.

Research will have to be conducted on the infrastructure, resources, and capabilities of existing local portals run by EPSOCR, Pacific Basin Information Node (PBIN), Manoa Magis, SOEST, and possible others, before a suitability assessment can be made.

Research should also be done on commercial outsourcing options such as online content management and web hosting services that use a "cloud" computing model and a variety of robust data search and delivery methods. The infrastructure, resources, and capabilities of these types of services should be examined before a suitability assessment can be made.

More information is needed on existing hardware, software, networking, storage, backup, retrieval, disaster recovery, and available IT personnel capable of administering such a system for all possible public or private sector options.

3.3 Data Requirements

This section focuses on specific data gaps and data specifications required to meet application requirements, which can include data warehousing schemes with Extraction, Transformation, and Loading (ETL) procedures, metadata, MOU's, and data sharing agreements.

Programmatic Goal 1: Define a mechanism and coordinate periodic statewide imagery acquisition.

Option 1: Enhance communication among partners and the community to facilitate collaborative imagery acquisition efforts over smaller areas.

This option would build on the HIGICC's current Wild Apricot online implementation that provides the infrastructure necessary to house information, run forums, provide RSS feeds, etc. Identified data gaps that would support various ad hoc imagery collaboratives might include the following:

- Technical specifications to assist interested parties.
- Best practices to insure successful data acquisition projects.
- Sample MOU's for organizations that wish to partner.
- Online mapping interface showing existing imagery area of coverage, imagery type, resolution, etc.
- Online mapping interface showing areas of interest and points of contact for those interested in collaborative purchases.

Option 2: Explore acquiring statewide imagery through an existing Federal program leveraging existing efficiencies and lowering or eliminating costs to local participants.

MOU's or other types of cost and data sharing agreements will have to be put in place between partners to support this programmatic goal option.[14]

Imagery data specifications of the Federal imagery programs such as NAIP and IFTN must be gathered along with "up lift" costs, etc. Data specifications and data format types and data delivery methods will vary depending on program type and negotiations with vendors.

[14] See Appendix 8: Memorandum of Understanding Examples

Option 3: Create a new imagery consortium and pursue the purchase of imagery in a collaborative partnership of public and private sectors.

MOU's or other types of cost and data sharing agreements will have to be drafted, agreed upon by partner legal teams, and ready to go to support this programmatic goal option. Other data preparation includes having a draft SOW with solid imagery requirements, draft contract with quality assurance and control requirements, imagery acquisition best practices, and a communication plan.

Programmatic Goal 2: Facilitate the adoption of spatial metadata standards.

A minimum set of metadata standardization will be identified during the implementation of this task. Currently, there are several HIGICC partners with good metadata standards that could be enlisted to help establish a minimum set of standards. Online and instructor led metadata training courses are also available. All need to be investigated to see if they could be of use and or modified for use in Hawaii.

Programmatic Goal 3: Explore methods for spatial data discovery and dissemination.

Option 1: Basic GIS Data Portal.

This option builds off the existing HIGICC Wild Apricot website that would have simple links to other websites. There would likely not be any data requirements, MOU's, or metadata standards required, as links are provided to websites "as is" with no endorsement. It might be advisable to only link to sites that maintain their spatial data with the basic set of metadata standards defined under Programmatic Goal 2.

Option 2: Intermediate GIS Data Portal.

MOU's and data sharing agreements will have to be put in place between partners to support this programmatic goal. Basic metadata records must be completed for all data before submitting it for incorporation into the GIS portal. Standard operating procedures and processes will have to be created for both the back office (e.g., data handling) and front office (e.g., website data browsing, query, and download).

Option 3: Advanced GIS Data Portal.

Similar to Option 2: Intermediate GIS Data Portal but with the addition of data indexing and warehousing schemes for ETL procedures will have to be created to support data automation and clip, zip, and ship capabilities.

3.4 Technology Requirements

This section outlines the technology requirements of each goal which may include infrastructure, system architecture, storage, security, and the leveraging of legacy systems, as appropriate.

Programmatic Goal 1: Define a mechanism and coordinate periodic statewide imagery acquisition.

Option 1: Enhance communication among partners and the community to facilitate collaborative imagery acquisition efforts over smaller areas.
At a minimum, leverages existing HIGICC web site infrastructure for communication and outreach tasks. This option could involve creating web-based forums, discussion groups, RSS and/or GeoRSS feeds, online map interface, and utilizing newer forms of social networking that would support the reporting of imagery needs and efforts by any organization, allowing the community to communicate with each other regarding *specific imagery* needs.

HIGICC's current Wild Apricot online software already provides many of the things listed above including:

- Secure remote access to staff, volunteers, or members at different levels of access.
- Setup of members-only blog to facilitate ad hoc group efforts.
- RSS feeds so members can keep up to date on certain topics of interest.
- Web pages accessible only to specific members that could allow potential ad hoc imagery groups to form and communicate better – a.k.a. Intranet.
- Document storage (e.g. industry research, best practices, sample MOU's, sample contract language) through uploading PDF documents, Microsoft Word files, Excel spreadsheets, etc.

Wild Apricot does not have GeoRSS feed or online mapping capability, which would have to be done elsewhere if chosen as a required option. Some of the above options are "Premium" options that may require an increase in the monthly fee. The HIGICC web site will need some user interface improvements to accommodate added functionality.

Option 2: Explore acquiring statewide imagery through an existing Federal program leveraging existing efficiencies and lowering or eliminating costs to local participants.
Communication and outreach tasks will leverage the existing HIGICC web site infrastructure. Data dissemination of newly acquired imagery will utilize the technology requirements listed under Programmatic Goal 3.

Option 3: Create an imagery consortium and pursue the purchase of imagery in a collaborative partnership of public and private sectors.
Communication and outreach tasks will leverage the existing HIGICC web site infrastructure. Data dissemination of newly acquired imagery will utilize the technology requirements listed under Programmatic Goal 3.

Programmatic Goal 2: Facilitate the adoption of spatial metadata standards.

This goal will leverage the communication and outreach capability of the existing HIGICC web site infrastructure to distribute metadata standards, tools, instructions, and implementation guidance as well as user case examples showing the return on investment (ROI) so that partners can seek training funds from within their own organizations. Calendaring capability and email announcements will inform people of where and when training will occur.

Programmatic Goal 3: Explore methods for spatial data discovery and dissemination.

Technology requirements for this programmatic goal will vary with each option.

Option 1: Basic GIS Data Portal.

This option includes creating new functionality that piggybacks on the existing HIGICC website that uses Wild Apricot hosting services. Alternatively, the site could easily be moved to another web hosting company via a regular web hosting package arrangement and use their servers and software and bandwidth, etc.

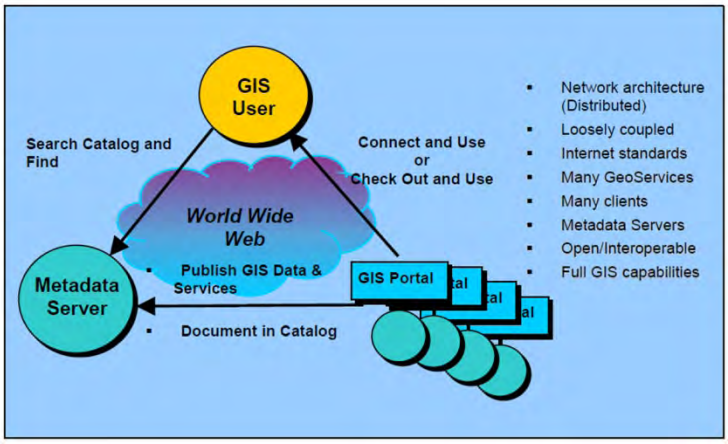
Option 2: Intermediate GIS Data Portal and Option 3: Advanced GIS Data Portal.

Requirements must be identified first and then a number of approaches should be researched and the solution that best meets the needs of the project chosen. It is important to note that the data will come from different owners with different data security and user requirements. Agreements will have to be made between parties and users on proper use. Decisions will also have to be made on whether all the data is uploaded and housed locally with the HIGICC as the authority holding the data or whether another method is used. These decisions will affect the technical requirements surrounding system architecture. Below is a generic list of common GIS data portal technical requirements.

GIS Data Portal Technical Requirements

Web components

- Web Application
- Data Content Service
- Metadata Harvester



Hardware—Specifications for underlying hardware will necessarily be tied to the existing architecture of the hosting organization and the intended level of use. Hardware specifications will vary based on data storage, speed, and functionality requirements.

Software—Underlying software required to support a GIS Data Portal must be configured with reference to the host-specific architecture. These might include:

- Operating System
- ESRI Arc Server Software or Other
- DBMS
- Servlet Engine
- Java

3.5 Resource Requirements

This section identifies people and facilities needed to support program goals.

Programmatic Goal 1: Define a mechanism and coordinate periodic statewide imagery acquisition.

A strong project manager must be identified. The project manager needs to have a variety of skills ranging from marketing the project to potential participants to insuring the collection of funds. He or she needs to be well-versed in the organizational, technical, legal and financial aspects of the project or obtain help from other parties who have such skills.

Usually, the project is based on the common geographic interest of a core set of participants. The project manager will be more effective if he or she has strong local knowledge of both the physical and political geography of the proposed project area.

A third party consultant with deep knowledge in photogrammetric projects may be required to either act as the project manager or be responsible for quality assurance and quality control (QA/QC) functions.

The facilities to support this goal will be a combination of lead agency, HIGICC board or committee partners, and selected contractor and their sub contractors.

Programmatic Goal 2: Facilitate the adoption of spatial metadata standards.

A project manager must be identified as well as a committee and possibly a contractor to help achieve this goal.

The facilities to support this goal will be a combination of existing facilities of the HIGICC board or committee partners, and the selected contractor.

Programmatic Goal 3: Explore methods for spatial data discovery and dissemination.

A project manager must be identified as well as a committee and a contractor to help achieve this goal.

The facilities to support this goal will be a combination of lead agency, HIGICC board or committee partners, hosting organization or commercial vendor, and selected contractor and their sub contractors (if any).

3.6 Required Standards

The RFP process should require vendor proposals to provide a detailed description of how each component – such as digital aerial acquisition, photogrammetric compilation, and measurement requirements – will be addressed and the vendor's respective prior experience.

Programmatic Goal 1: Define a mechanism and coordinate periodic statewide imagery acquisition.

Aerial Photography Standards.

All imagery shall be collected to conform to the American Society for Photogrammetry and Remote Sensing (ASPRS) Draft Aerial Photography Standard (1995).

- http://www.asprs.org/resources/standards/photography.htm

These standards include the amount of forward and side lap, tip, tilt, and crab, etc. Language on the following should be included: avoidance of collecting any images obscured by haze, smoke, vog, etc.; amount of cloud cover, shadow, etc.; and solar altitude, time of day, and how to deal with bi-directional reflectance variances that occur over large areas covered with basalt, or water.

Ground Control. There must be adequate ground control to meet the accuracy requirements of the selected scale of mapping. The ASPRS and FGDC websites give detailed specifications and requirements for this task.

Aerial Triangulation. Aerial triangulation shall be performed to support mapping for deliverables required for the selected scale and resolution. The ASPRS and FGDC websites give detailed specifications and requirements for this task.

Orthophotography. This specification includes the scanning of the aerial photographs, creation of the surface data, rectification of the digital imagery and the format and delivery of the final product. The ASPRS and FGDC websites give detailed specifications and requirements for this task.

Digital Elevation Model. The digital elevation model must at minimum meet the accuracy standards sufficient to produce the digital orthophotography at the selected scale. If collected by standard photogrammetric means or by LiDAR the data should meet those standards. The ASPRS and FGDC websites give detailed specifications and requirements for this task.

Accuracy Standards. All digital imagery should conform to the industry accuracy and quality standards established by the FGDC and ASPRS:

- Standard FGDC -STD-007.3-1998, Geospatial Positioning Accuracy Standard Part 3: National Standard for Spatial Data Accuracy, http://www.fgdc.gov/standards/projects
- Orthophotography Standard, FGDC -STD-008-1999 - Content Standard for Digital Orthoimagery, http://www.fgdc.gov/standards/projects/FGDC-standards-projects/orthoimagery/orth_299.pdf

Programmatic Goal 2: Facilitate the adoption of spatial metadata standards.

The Content Standard for Digital Geospatial Metadata (CSDGM), Vers. 2 (FGDC-STD-001-1998) is the current Federal metadata standard. The FGDC originally adopted the CSDGM in 1994 and revised it in 1998. According to Executive Order 12096, all Federal agencies are ordered to use this standard to document geospatial data created as of January 1995. The standard is often referred to as the 'FGDC Metadata Standard' and has been implemented beyond the federal level with State and local governments adopting the metadata standard.

- Content Standard for Digital Geospatial Metadata (CSDGM), Vers. 2 (FGDC-STD-001-1998) http://www.fgdc.gov/metadata/geospatial-metadata-standards#csdgm

Programmatic Goal 3: Explore methods for spatial data discovery and dissemination.

Below are a number of spatial data standards that should be considered when building a GIS data portal.

Open Geospatial Consortium Standards and Specifications are technical documents that detail interfaces or encodings. Software developers use these documents to build support for the interfaces or encodings into their products and services. These specifications are the main "products" of the Open Geospatial Consortium (OGC) and have been developed by the membership to address specific interoperability challenges. Ideally, when specifications are implemented by two different software engineers working independently, the resulting components plug and play, that is they work together without further debugging. These include the OGC Web Map Service (WMS).

- http://www.opengeospatial.org/standards
- http://schemas.opengis.net/wms/

National Spatial Data Infrastructure. Executive Order 12906 calls for the establishment of the National Spatial Data Infrastructure defined as the technologies, policies, and people necessary to promote sharing of geospatial data throughout all levels of government, the private and non-profit sectors, and the academic community.

- http://www.fgdc.gov/nsdi/nsdi.html

FGDC Registry and Geospatial One Stop (GOS) Resources. This system manages and provides searchable access to a list of Z39.50 metadata servers located around the world. These standards are located here:

- http://registry.gsdi.org/index.php.

Content Standard for Digital Geospatial Metadata. This standard provides a common set of terminology and definitions for the documentation of digital geospatial data.

- Content Standard for Digital Geospatial Metadata (version 2.0), FGDC-STD-001-1998

Spatial Data Transfer Standard (SDTS). This standard promotes and facilitates the transfer of digital spatial data between dissimilar computer systems, while preserving information meaning and minimizing the need for information external to the transfer.

- http://www.fgdc.gov/standards/standards_publications/index_html

International Organization for Standards (ISO). ISO 19115:2003 defines the schema required for describing geographic information and services. It provides information about the identification, extent, quality, spatial and temporal schema, spatial reference, and distribution of digital geographic data.

- http://www.iso.org/iso/catalogue_detail.htm?csnumber=26020

U.S. Department of Justice Americans with Disabilities Act, Electronic and Information Technology Accessibility Standards (Section 508). This site assists developers with standards required to meet the needs of those who may have various disabilities.

- http://www.access-board.gov/sec508/standards.htm

3.7 Costs

This section provides the detail about **how much** funding is needed, whereas the "Budget Plan" (Section 4.3) determines how funds will be secured and spent.

The costs are based on previous experience delivering similar projects and represent a rough order of magnitude estimate covering a wide range of possible requirements.

Programmatic Goal 1: Define a mechanism and coordinate periodic statewide imagery acquisition.

Option 1: Enhance communication among partners and the community to facilitate collaborative imagery acquisition efforts over smaller areas.
$50K to $100K

Option 2: Explore acquiring imagery through an existing Federal program.
$400 to $500K

Option 3: Create an imagery consortium and pursue the purchase of imagery in a collaborative partnership of public and private sectors.
$2M to $5M

Programmatic Goal 2: Facilitate the adoption of spatial metadata standards.

$50K to $150K

Programmatic Goal 3: Explore methods for spatial data discovery and dissemination.

GIS Data Portal Development and Implementation (period covering 5 yrs) $10K to $2M

The spread in costs represents the vast range of functionality that must be decided by the Council. This includes functions such as:

- Security and sharing control.
- Automation of approval processes or workflow within and across organizations.
- Use of 3rd party software or hosted applications.
- Customized user interface.
- Search functions.
- Data selection and download customization.

Option 1: Basic GIS Data Portal.
$10K to $50K

Option 2: Intermediate GIS Data Portal.
$100K to $500K

Option 3: Advanced GIS Data Portal.
$500K to $2M

3.8 Risks

It is important to identify possible risks, their impact, and methods to avoid them up front. At the same time, opportunities can arise that should be taken advantage of. Including a change management plan that identifies possible risks and opportunities and proactively addresses both risk and opportunity minimizes risk. For each project, 10% of the project cost will be set aside as contingency money should delays happen due to unforeseen events. Additional qualified vendors will be identified as "backup" should the selected vendor not be able to complete the work.

Project management risks will be avoided by identifying a project manager or management team that possesses:

- Commensurate experience for the size of the project.
- Diverse knowledge across a range of technical fields.
- Ability to write contracts, handle complex financial arrangements, and deal with a variety of personalities and political challenges.

Programmatic Goal 1: Define a mechanism and coordinate periodic statewide imagery acquisition.

In addition to the above, a strong lead agency, solid collaborative agreements with participants and a very strong contract with the mapping vendor will be in place to help mitigate most risks to the project.

To mitigate risk, a strong communication plan will be in place to educate consortium participants and set expectations. Multi-agency, multi-organization consortiums have many users with varying levels of understanding regarding the complexity inherent in acquiring, processing and delivering imagery products. Bill Zeman and Paul Van Zuyle state it this way, "If either the vendor or the customers do not understand the expectations and variables related to a given project, the project manager will more

than likely be caught between the demands of the purchasers and the apparent failure of the vendor. Thus, the project manager must educate the intended recipients of the products, have a strong working relationship with the vendor and be backed by concrete financial incentives."[15] The importance of setting and managing expectations of all parties is not to be underestimated.

Programmatic Goal 2: Facilitate the adoption of spatial metadata standards.

Primary risks covered above in Section 3.8 Risks, Paragraph 1.

Specific risks associated with metadata standard adoption:

- HIGICC partners cannot come to an agreement on the number of standards to adopt.
- Unanticipated costs arise due to travel mishaps.
- HIGICC partners fail to adopt the metadata standards.

Programmatic Goal 3: Explore methods for spatial data discovery and dissemination.

Primary risks covered above in Section 3.8 Risks, Paragraph 1.

Specific risks are similar for all three Options (Basic, Intermediate, Advanced), with the amount of risk commensurate with the costs for each option. These include unanticipated costs and delays typical to software development projects (i.e., software bugs, vendor management issues, new software versions or advances come out before work is complete, etc.). Other risks might include delays in reaching consensus among members, slow adoption across member organizations, and data security disparities. And possible funding difficulties associated with a multiyear, multi-member project.

4 IMPLEMENTATION

This section of the Business Plan explores all viable options and documents a recommended set of specific steps, schedules, budgets, and activities required to accomplish each of the programmatic goals.

4.1 Implementation Details

The implementation team for each programmatic goal is specified in this section:

Programmatic Goal 1: Define a mechanism and coordinate periodic statewide imagery acquisition.

- HIGICC Board of Directors
- HIGICC Board President
- DIAC Committee
- Project manager: TBD
- Contract administrative Support: TBD
- Lead Agency: TBD
- Additional Champion agencies

[15] California Imagery Business Plan and Best Practices Project: A Review of Regional Multi-Jurisdictional Collaborations, April 2008. http://www.cgia.org/CA_Imagery_Business_Plan_&_Best_Practices_Final_Report.pdf

Programmatic Goal 2: Facilitate the adoption of spatial metadata standards.

- HIGICC Board of Directors
- HIGICC Board President
- DIAC Committee
- Project manager: TBD
- Contract administrative Support
- Contractor: TBD

Programmatic Goal 3: Explore methods for spatial data discovery and dissemination.

- HIGICC Board of Directors
- HIGICC Board President
- DIAC Committee
- Project manager: TBD
- Contract administrative Support: TBD
- Contractor: TBD
- Hosting organization or commercial vendor: TBD

4.2 Phasing and Milestones

This section shows the timeline with phases and milestones for implementing each programmatic goal. This will help to guide action and serve as a baseline for monitoring progress.

Programmatic Goal 1: Define a mechanism and coordinate periodic statewide imagery acquisition.

Imagery collection is very dependent on weather conditions, which in turn can delay planned schedules. Hawaii has a high degree of cloud cover, and in some places, clouds can persist for months over target areas. The HIGICC should keep this in mind when negotiating a vendor's schedule, plan data collection for the most optimum times, and remain flexible. The difficulties of collecting aerial imagery in Hawaii should be communicated to the various partners and stakeholders to set reasonable expectations. The vendor will have to be opportunistic and fly when and wherever there is cloud free weather. An absolute schedule will be hard to set, given the dependence on weather. Generally the winter months of December, January, and February have the clearest skies. Leeward sides of the islands will likely be collected first, while windward and mauka (mountain) areas might take longer. The imagery acquisition project can also be done by breaking up the effort into phases or island by island with each island having its own clearly defined project plan.

Generally, all imagery acquisition efforts for all program goal options have a similar progression of tasks, milestones, and deliverables.

Approximate timeline of 2 to 3 years.

Task Description	Schedule	Milestones
Task 1: Kick Off Meeting.	14 days from NTP	Deliverable
Task 2: Plan flight lines and proposed control point layout.	14 days from NTP	Deliverable
Task 3: Perform photo control surveys.	30 days from NTP	Milestone

Task Description	Schedule	Milestones
Task 4: Acquire aerial photography.	90 days from completion of Task 3	Milestone
Task 5: Perform aerial triangulation.	90 days from completion of Task 4	
Task 6: Create digital terrain models.	90 days from completion of Task 4	
Task 7: Produce orthophotos.	90 days from completion of Task 6	Milestone
Task 8: Perform quality control.	30 days from completion of Task 7	
Task 9: Cut to specified tile sizes.	30 days from completion of Task 8	
Task 10: Create FGDC compliant metadata.	14 days from completion of Task 9	
Task 11: Deliver final orthophotos in specified format.	14 days from completion of Task 10	Deliverable

Costs for each step will vary depending on area of coverage, terrain and impact of shadows, and whether the area is on the windward or leeward side of an island, the logistics required for mobilizing people to neighbor islands, and the distance required to fly the plane to neighbor islands. Costs and schedule should be solicited from qualified vendors.

Programmatic Goal 2: Facilitate the adoption of spatial metadata standards.

The proposed approach is divided into two phases; the first phase involves defining the solutions and approach, while the second phase involves implementation. Implementation will involve visits to multiple islands to hold meetings, training, etc. This will involve logistics planning, travel, expenses, and a good deal of coordination.

Approximate timeline of 1 to 2 years.

Task Description	Schedule	Milestones
Phase 1		
Task 1: DIAC would hold Kick Off meeting with client to clarify scope items, roles and responsibilities, timeline, and communication plan.	14 days from NTP	Deliverable
Task 2: DIAC to create a working group that would be responsible for identifying a minimum set of metadata standards.	7 days from completion of Task 1	
Task 3: Working group to identify minimum set of metadata standards.	30 days from completion of Task 2	
Task 4: DIAC to hold workshop or other method to vet minimum standards.	30 days from completion of Task 3	Deliverable
Task 5: Working group to identify barriers to adoption.	30 days from completion of Task 3	

Task Description	Schedule	Milestones
Task 6: Working group to provide specific solutions for each barrier.	30 days from completion of Task 5	
Task 7: Working group to create a scope of work, schedule and costs to implement metadata adoption program.	30 days from completion of Task 6	Deliverable
Task 8: DIAC to identify sources of funding for this program and submit a complete report.	30 days from completion of Task 6	Deliverable
Phase 2		
DIAC would implement the metadata adoption program.		
Schedule and specific milestones are dependent on the various solutions determined in Phase 1.		

Programmatic Goal 3: Explore methods for spatial data discovery and dissemination.

Approximate timeline of 3 months to 1.5 years.

Task Description	Schedule	Milestones
Task 1: DIAC would hold Kick Off meeting with client to clarify scope items, roles and responsibilities, timeline, and communication plan.	14 days from NTP	Deliverable
Task 2: Clarify GIS data portal requirements; Identify core users and administrators.	60 days from completion of Task 1	Deliverable
Task 3: Identify hosting and management requirements.	60 days from completion of Task 2	
Task 4: Identify potential hosting alternatives.	30 days from completion of Task 3	
Task 5: Evaluate best available technical approaches and pick one.	30 days from completion of Task 3	Milestone
Task 6: Create detailed scope of work and request estimates from vendors.	60 days from completion of Task 5	Deliverable
Task 7: Evaluate estimates from vendors.	30 days from completion of Task 6	
Task 8: Secure funding.	30 days from completion of Task 6	
Task 9: Create data sharing MOU's with participating partners.	90 days from NTP	Milestone
Task 10: Purchase required hardware and software, or arrange for leases; work out contracts, etc.	60 days from completion of Task 5	
Task 11: Procure services according to scope of work (include the detailed quality standards in the contract language).	30 days from completion of Task 7	
Task 12: Develop GIS Data Portal; web interface look and feel, functionality, system architecture, data schema, etc.	120 days from completion of Task 11	
Task 13: Launch and test GIS Data Portal.	30 days from completion of Task 12	
Task 14: Train core users and administrators on use of GIS Data Portal.	30 days from completion of Task 13	

Task Description	Schedule	Milestones
Task 15: Create manual (either hardcopy and/or online) of all procedures for the operations and maintenance of the web portal.	30 days from completion of Task 14	Deliverable
Task 16: Finalize GIS Data Portal.	30 days from completion of Task 15	Deliverable
Task 17: Ongoing training, tweaking, and maintenance of GIS Data Portal.	Ongoing: for 5 years of project	

4.3 Budget Plan

This section outlines how funds will be secured and spent.

Programmatic Goal 1: Define a mechanism and coordinate periodic statewide imagery acquisition.

The budget variations are numerous depending on which option is selected. The organizing body will be the HIGICC but the specifics on contract administration are dependent on whether or not the HIGICC or a yet-to-be identified lead agency is selected. In all options there are cost sharing opportunities that both lower and spread the overall costs. Any contractors will be paid incrementally based on a number of discrete deliverables.

Option 1: Enhance communication among partners and the community to facilitate collaborative imagery acquisition efforts over smaller areas.

Funds will be secured through grant applications to support communication strategies. These could come in the form of a CAP grant.

Individual imagery acquisition efforts that arise are on their own to seek funds through a variety of methods of their choosing.

Option 2: Explore acquiring imagery through an existing Federal program.

Funds will be secured through a combination of cost sharing strategies, which include Federal and State minimum “buy in” amounts to join the program, matches, in-kind contributions, and shared “buy up” costs that are equally distributed among partners.

Option 3: Create an imagery consortium and pursue the purchase of imagery in a collaborative partnership of public and private sectors.

Total amount of the project will first be defined based on project requirements and a final vendor negotiated cost. The HIGICC will decide the cost per partner based on equal share or ability to pay. Funds will then be secured from each participating organization. There may be an opportunity for matching Federal or State funds through various programs.

Programmatic Goal 2: Facilitate the adoption of spatial metadata standards.

The HIGICC will be the organizational body and contracting agent. The likely source of funding would be a CAP grant. The HIGICC would define the working group, write up a scope of work, and hire a

contractor who would perform the tasks and write up the report. The contractor will be paid incrementally, based on the deliverables of Task 4, 7, and 8 (identified in Section 4.2 Phasing and Milestones). There will be some in-kind contribution and cost sharing involved, as appropriate.

Programmatic Goal 3: Explore methods for spatial data discovery and dissemination.

Specific management of the budget is similar for all three options (Basic, Intermediate, and Advanced). The overall organizational structure is as follows:

The HIGICC will be the organizational body that would administer any contract. The likely source of funding would be another CAP grant but it could come from a consortium of partners. There will be the opportunity of some in-kind contribution and cost sharing, as appropriate. Existing infrastructure of a host organization (if any) may also help offset costs. The HIGICC would define the working group, write up the scope of work, and hire a contractor who would perform the tasks and in this case, provide a workable GIS data portal with a possible option to run it for the first five years.

The cost for each option (Basic, Intermediate, and Advanced) would vary based on number of requirements and who the hosting organization might be. The contractor will be paid incrementally based on a number of discrete deliverables.

4.4 Marketing Outreach

The HIGICC Outreach Committee will perform the necessary marketing and outreach for all programmatic goals through press releases, articles, whitepapers, workshops, conferences, and webcasts. The target audience will be HIGICC members, the GIS community at large, researchers, and those not as familiar with GIS such as planners, architects, engineering firms, and other decision makers.

The HIGICC and or HIGICC members will organize special sessions and/or present at the biannual GIS Map Conference, ESRI Hawaii User Group meetings, and other specialized conferences (e.g. Asia Pacific Disaster Conference), on project status, rational, and benefits using appropriate user case studies.

The HIGICC Outreach Committee will develop a marketing plan appropriate to the needs of each programmatic goal and support the implementation of the plan.

5 Measuring Success and Feedback for Recalibration

This section will include criteria for performance measurement.

Programmatic Goal 1: Define a mechanism and coordinate periodic statewide imagery acquisition.

Option 1: Enhance communication among partners and the community to facilitate collaborative imagery acquisition efforts over smaller areas.

Measures of success include:

- If the project is on-time and on budget.

- If people sign up for specific RSS feeds regarding a (yet to be established) imagery data acquisition working group.
- If a blog regarding imagery acquisition efforts increases its readership and postings.
- If the site is actively used by others to help build imagery partnerships for specific areas of interest.
- If the site leads to a successful imagery acquisition effort for a specific area.

Option 2: Explore acquiring imagery through an existing Federal program.
Measures of success include:

- If the project is on-time and on budget.
- If a letter of support for becoming a NAIP state is created with over 60 signatories.
- If the HIGICC is successful in acquiring Federal approval to become a NAIP state.
- If the partners interested in NAIP data create a mutually agreed upon requirements document that supports the majority of users imagery data needs.
- If the partners negotiate an "up buy" contract that is supported by the majority of users and the NAIP vendor.
- If HIGICC partners are kept informed of the projects status at all times.
- If an imagery update frequency is established and funded to meet user needs.

Option 3: Create an imagery consortium and pursue the purchase of imagery in a collaborative partnership of public and private sectors.
Measures of success include:

- If a strong lead agency and dedicated project manager are identified.
- If the HIGICC identifies a strong majority of users willing to support a consortium.
- If the HIGICC identifies key champions and partner organizations who back the consortium in difficult times.
- If the partners negotiate an "up buy" contract that is supported by the majority of users and the NAIP vendor.
- If the HIGICC pursues and encumbers funds in support of imagery acquisition.
- If the HIGICC defines an SOW with well defined requirements with detailed quality standards.
- If the HIGICC requests and then receives three responsive cost estimates from viable contractors that address the requirements.
- If the HIGICC procures services according to the scope that are delivered on time and on budget.
- If HIGICC consortium partners are kept informed of the projects status at all times.
- If an imagery update frequency is established and funded to meet user needs.

Programmatic Goal 2: Facilitate the adoption of spatial metadata standards.
Measures of success include:

- If the project is on-time and on budget.
- If the number of users producing metadata increases.
- If the number of users uploading data with minimum metadata standards increases.

- If metadata tools are created, distributed, and utilized at the outset of the data creation process.
- If the users getting trained in metadata implementation actually adopt the practice of creating metadata.

Programmatic Goal 3: Explore methods for spatial data discovery and dissemination.

Measures of success for any of the three options (Basic, Intermediate, Advanced) include:

- If time and costs for data searching, storing and sharing decrease
- If the project is approved to continue (and grow) beyond the 5-year plan.
- If certain adoption measurements are met: i.e., <x> users, <x> uploads, etc.
- If the project is on-time and on budget.
- If time searching for data decreases and data sharing and end user productivity increases.

Appendices

Appendix 1 – Imagery Stakeholder Survey Results

Appendix 2 – Imagery Stakeholder Workshop Agenda (June 30, 2010)

Appendix 3 – Imagery Stakeholder Workshop Attendee List

Appendix 4 – Imagery Survey and Imagery Workshop Goals, Methods, and Results

Appendix 5 – GIS Data Portal Portion of the Workshop: Goals, Methods, and Results

Appendix 6 – GIS Data Portal Requirements Questionnaire

Appendix 7 – Imagery Stakeholder Workshop (combined notes)

Appendix 8 – Imagery Stakeholder Workshop PowerPoint

Appendix 9 – GIS Data Portal Requirements Questionnaire Results

Appendix 10 – Memorandum of Understanding Examples

Appendix 11 – Glossary

Appendix 1 - Imagery Stakeholder Survey Results

Imagery Stakeholder (Inventory) Survey Results

Q1. What is the name of the organization you work for?

Answer Options	Response Count
	36
answered question	36
skipped question	2

Q2. Organization Affiliation

Answer Options	Response Percent	Response Count
Federal	30.6%	11
State	19.4%	7
County	5.6%	2
Private	50.0%	18
Academic	2.8%	1
Military	2.8%	1
Other (please specify)	2.8%	1
	answered question	36
	skipped question	2

Q3. What is your position?

Answer Options	Response Count
	36
answered question	36
skipped question	2

Q4. Please provide the following contact information:

Answer Options	Response Percent	Response Count
First Name	100.0%	35
Last Name	97.1%	34
Address	88.6%	31
Address 2	40.0%	14
City	91.4%	32
State	91.4%	32
Zip/ Postal Code	91.4%	32
Phone Number	88.6%	31
Email Address	91.4%	32
	answered question	35
	skipped question	3

Q5. Do you use satellite or aerial imagery products of any type to perform your job?

Answer Options	Response Percent	Response Count
Yes	100.0%	36
No	0.0%	0
	answered question	36
	skipped question	2

Q6. What types of job functions do you use imagery for? (check all that apply)

Answer Options	Response Percent	Response Count
Digitization	72.2%	26
Natural Resource Mapping	63.9%	23
Cadastral Mapping	36.1%	13
Disaster Analysis	41.7%	15
Image Processing	41.7%	15
Environmental Monitoring	50.0%	18
Change Detection	50.0%	18
Planning	66.7%	24
Site Design	41.7%	15
Other (please specify)	22.2%	8
	answered question	36
	skipped question	2

Q7. What is your geographic area of interest for imagery? (check all that apply)

Answer Options	Response Percent	Response Count
All Islands	69.4%	25
Hawaii County	16.7%	6
Maui County	16.7%	6
County of Honolulu	22.2%	8
Kauai County	19.4%	7
Northwestern Hawaiian Islands	5.6%	2
Hawaiian Archipelago	11.1%	4
Other (please specify)	25.0%	9
	answered question	36
	skipped question	2

Q8. How often do you use the following types of imagery products?

Answer Options	Daily	Weekly	Monthly	Infrequently
1927 US Army Air Corps B&W AirPhotos	0	0	0	15
1965 USDA Aerial Photos	0	0	0	13
1977 USGS B&W Ortho Quads	0	0	1	11
1995 SPOT Satellite Imagery	0	0	0	13
Landsat Satellite Imagery	1	2	4	16

Emerge CIR Digital Air Photos	0	0	1	14
Ikonos 1 Meter PAN Imagery	2	1	5	10
Ikonos 1 Meter Pan Sharpened Color Imagery	4	3	8	7
Ikonos 4 Meter Multi-spectral Imagery	0	1	4	10
WorldView .5 Meter PAN Imagery	1	2	4	4
WorldView .5 Meter PAN Sharpened Color Imagery	1	2	3	4
WorldView 2 Meter Multi-Spectral Imagery	0	1	2	6
Digital Globe PAN Imagery	1	0	5	6
Digital Globe PAN Sharpened Color Imagery	3	0	8	5
Digital Globe Multi-Spectral imagery	1	4	3	6
Digital Globe Digital Ortho Quads	2	4	8	6
NGA (Earthdata) 2003 1 Meter Natural Color Airphotos	1	6	3	4
NGA 2007 1 Meter Natural Color Airphotos	2	5	6	3
NextMap ifSAR ORI B&W Imagery	0	1	3	5
Resource Mapping Hawaii CIR Digital Airphotos	0	1	4	6
NOAA/NOS Coastal Photography 2000	1	2	6	11
Pictometry	2	1	3	3
Virtual Earth (Bing Imagery)	2	7	8	4
Google Earth Imagery	6	11	6	5
Google Street View	2	12	5	8
Air Photos - Oblique	2	2	4	10
LiDAR	1	9	7	6
Project Oriented - Air photos (Small Area Coverage, Miscellaneous)	6	4	3	8
NASA Satellites (ASTER, AQUA.)	1	2	2	5
Comments				
			answered question	34
			skipped question	4

Q9. What do you use imagery for?

Answer Options	Background	Classification	Change Detection	Feature Extraction	Measurements	Reconnaissance	Planning	Other	Response Count
1927 US Army Air Corps B&W AirPhotos	2	1	6	1	1	0	2	2	9
1965 USDA Aerial Photos	0	1	5	1	0	0	1	2	7
1977 USGS B&W Ortho Quads	0	0	4	1	0	0	2	2	7
1995 SPOT Satellite Imagery	1	1	4	1	0	0	1	1	6
Landsat Satellite Imagery	9	3	6	1	0	0	3	0	14
Emerge CIR Digital Air Photos	1	0	3	2	0	0	2	0	6
Ikonos 1 Meter PAN Imagery	5	0	2	4	1	1	3	0	9
Ikonos 1 Meter Pan Sharpened Color Imagery	12	2	4	6	3	1	7	1	16
Ikonos 4 Meter Multi-spectral Imagery	3	2	1	2	0	0	3	1	8
WorldView .5 Meter PAN Imagery	3	1	2	3	2	2	3	1	6
WorldView .5 Meter PAN Sharpened Color Imagery	4	3	2	4	2	2	3	0	7
WorldView 2 Meter Multi-Spectral Imagery	1	2	1	3	0	1	2	0	5
Digital Globe PAN Imagery	3	1	2	3	2	2	3	1	6
Digital Globe PAN Sharpened Color Imagery	8	3	8	5	3	4	5	0	10
Digital Globe Multi-Spectral imagery	2	5	4	3	1	1	2	1	7
Digital Globe Digital Ortho Quads	7	2	5	4	2	3	5	0	9
NGA (Earthdata) 2003 1 Meter Natural Color Airphotos	7	2	5	3	4	3	7	1	10
NGA 2007 1 Meter Natural Color Airphotos	7	2	5	4	4	5	7	1	10
NextMap ifSAR ORI B&W Imagery	1	1	1	2	0	0	2	1	7

Resource Mapping Hawaii CIR Digital Airphotos	3	3	1	1	0	1	2	0	6
NOAA/NOS Coastal Photography 2000	4	1	4	1	2	2	7	0	9
Pictometry	2	2	1	1	3	3	2	2	6
Virtual Earth (Bing Imagery)	11	0	3	1	1	4	5	2	14
Google Earth Imagery	11	0	3	1	1	9	10	2	21
Google Street View	5	1	1	1	2	8	8	2	15
Air Photos - Oblique	0	0	2	0	0	1	2	1	5
LiDAR	8	4	4	7	10	4	10	3	17
Project Oriented - Air photos (Small Area Coverage, Miscellaneous)	8	3	4	5	4	6	11	2	12
NASA Satellites (ASTER, AQUA.)	2	0	1	1	1	0	2	1	4
Comments									5
							answered question		29
							skipped question		9

Q10. What type of imagery would best suit your needs?

Answer Options	Response Percent	Response Count
Natural Color	90.0%	27
CIR	10.0%	3
B&W	13.3%	4
Multispectral	30.0%	9
Hyperspectral	10.0%	3
Other (please specify)	3.3%	1
	answered question	30
	skipped question	8

Q11. What imagery would best meet your needs (pixel resolution)?

Answer Options	Response Percent	Response Count
6 in	46.7%	14
1 ft	23.3%	7
2 ft	3.3%	1
1 m	6.7%	2
2 m	3.3%	1
3 m	3.3%	1
Other (please specify)	13.3%	4
	answered question	30
	skipped question	8

Q12. What are the positional accuracy requirements for your imagery (i.e., how close does that pixel need to be to its actual location on Earth)?

Answer Options	Response Percent	Response Count
Sub foot	22.6%	7
Sub meter	58.1%	18

1 to 5 meters	25.8%	8
5 to 10 meters	3.2%	1
Other (please specify)	9.7%	3
	answered question	31
	skipped question	7

Q13. What are the spectral resolution requirements for your imagery (i.e., number of bands)?

Answer Options	Response Percent	Response Count
Panchromatic (i.e., black and white)	19.4%	6
Digital color (i.e., 3-bands)	77.4%	24
Color infra-red film	12.9%	4
Digital color with near infra-red (i.e., 4 band) Panchromatic-color merge	45.2%	14
Hyper-spectral (i.e., 7 bands or more)	22.6%	7
Other (please specify)	9.7%	3
	answered question	31
	skipped question	7

Q14. How do you receive imagery? (check all that apply)

Answer Options	Response Percent	Response Count
Web Mapping Services or other web based streaming image delivery services	50.0%	15
Download from online data portals	50.0%	15
Portalable storage device transfer	76.7%	23
Other (please specify)	20.0%	6
	answered question	30
	skipped question	8

Q15. How often do you need imagery to be acquired?

Answer Options	Response Percent	Response Count
Every 6 months	13.8%	4
Every year	31.0%	9
Every 2 years	13.8%	4
Every 3 years	20.7%	6
Other (please specify)	31.0%	9
	answered question	29
	skipped question	9

Q16. How much does your organization spend for imagery annually?

Answer Options	Response Percent	Response Count
0-25K	69.6%	16
25-50K	4.3%	1

50-100K	0.0%	0
100-200K	0.0%	0
200K or greater	26.1%	6
Comments		7
	answered question	23
	skipped question	15

Q17. Does your organization participate in a collaborative effort to purchase imagery, such as the Hawaii IKONOS Consortium"?"

Answer Options	Response Percent	Response Count
Yes	38.5%	10
No	61.5%	16
Comments		13
	answered question	26
	skipped question	12

Q18. How often do your receive requests for imagery that is licensed?

Answer Options	Response Percent	Response Count
Never	14.8%	4
Seldom (<5 request/yr)	40.7%	11
Sometimes (5-10 requests/yr)	18.5%	5
Often (>10 requests/yr).	25.9%	7
Other (please specify)	0.0%	0
	answered question	27
	skipped question	11

Q19. Is your organization collecting & using oblique air-photos?

Answer Options	Response Percent	Response Count
Yes	28.6%	8
No	71.4%	20
	answered question	28
	skipped question	10

Q20. What datum is standard for imagery at your organization?

Answer Options	Response Percent	Response Count
Old Hawaiian	0.0%	0
NAD83(original)	43.3%	13
NAD83 (HARN)	40.0%	12
WGS84	53.3%	16

Other (please specify)	10.0%	3
	answered question	30
	skipped question	8

Q21. What projection is standard for imagery at your organization?

Answer Options	Response Percent	Response Count
UTM Zone 4	60.0%	18
UTM Zone 5	30.0%	9
State Plane Feet	33.3%	10
State Plane Meters	20.0%	6
Geographic	23.3%	7
Other (please specify)	23.3%	7
	answered question	30
	skipped question	8

Q22. Do you reproject older imagery to match newer datums?

Answer Options	Response Percent	Response Count
Yes	60.0%	18
No	30.0%	9
Don't know	10.0%	3
	answered question	30
	skipped question	8

Q23. Do you have metadata for the imagery at your organization?

Answer Options	Response Percent	Response Count
Yes - complete	27.6%	8
Yes - partial	69.0%	20
No	3.4%	1
Don't	0.0%	0
	answered question	29
	skipped question	9

Q24. What software does your organization use for image processing? (check all that apply)

Answer Options	Response Percent	Response Count
ERDAS	27.6%	8
ENVI	17.2%	5
PCI-geomatics	3.4%	1
ECognition	10.3%	3
ERmapper	10.3%	3
ESRI	75.9%	22

None (don't do image processing)	17.2%	5
Other (please specify)	20.7%	6
	answered question	29
	skipped question	9

Q25. Does your organization have a scanner?

Answer Options	Response Percent	Response Count
No	10.7%	3
Yes - 8.5 X 11	28.6%	8
Yes - 11 X 17	35.7%	10
Yes - Larger	42.9%	12
	answered question	28
	skipped question	10

Q26. Is your organization performing systematic scanning and indexing of imagery or maps?

Answer Options	Response Percent	Response Count
Yes	28.6%	8
No	71.4%	20
Don't know	0.0%	0
	answered question	28
	skipped question	10

Q27. Does your organization make these scanned files available to outside users/organizations?

Answer Options	Response Percent	Response Count
No	62.5%	15
Yes, freely available	16.7%	4
Yes, for a fee	4.2%	1
Other (please specify)	25.0%	6
	answered question	24
	skipped question	14

Appendix 2 – Imagery Stakeholder Workshop Agenda (June 30, 2010)

10:00am -10:15am	Introduction and Opening
10:15am -10:45am	Present Imagery Survey Findings
10:45am -11:15am	What are some of the uses of Imagery here in Hawaii?
11:15am -11:30pm	Costs, licensing, storage and data sharing
11:30pm - 1:00pm	Working Lunch • Topic 1: Identify key functionality of the best data portals • Topic 2: Discussion of web portal research findings • Topic 3: What functionality would you like to see in an HIGICC portal?
1:00pm - 1:45pm	What role does the HIGICC play with regards to data acquisition & dissemination? What role should we play?
1:45pm - 2:15pm	Let's talk data discovery and Metadata. How is data currently found? What do we need to make data easy to find? How is data disseminated? What are the road blocks? How do we overcome them?
2:15pm - 2:45pm	What would be needed to create an HIGICC data portal? What are we looking at in terms of technology, funding, labor, agreements, licensing, and governance?
2:45pm - 3:30pm	GIS Portal Questionnaire It is your turn to provide us anonymous feedback by commenting, choosing, or ranking the importance of each data requirement. For ranking we use a range of 1 to 5 with 1 being of low importance and 5 being of the highest importance. Circle the number that best fits your thoughts on importance. Ample space is provided for you to be able to provide your own examples for ranking and write comments. We will compile results and lump together comments into similar categories so that no one answer can be attributed to a single person. Thank you for participating in this important workshop.

Appendix 3 – Imagery Stakeholder Workshop Attendee List

First name	Last name	Organization
Stephen	Ambagis	Resource Mapping Hawaii
Gilbert	Bailado	County of Hawaii, Planning Dept.
Matthew	Barbee	University of Hawaii at Manoa - SOEST
Malie	Beach-Smith	Environmental Planning Office
Paul	Berkowitz	USGS-BRD / HCSU employee
Arthur	Buto	DLNR, Land Division
Ronald	Cannarella	DLNR / DOFAW
Chris	Chiesa	Pacific Disaster Center
Don Craig	Clouet	ESRI Honolulu
John	Dawley	Dam Safety Program
Joan	Delos Santos	DBEDT/ Office of Planning
Donna	Delparte	University of Hawaii
Julia	Ehses	NOAA CRED
Sarah	Falzarano	US Army Corps of Engineers
Jean	Fujikawa	O`ahu Invasive Species Committee
Jon	Hodge	C & C Planning and Permitting
Alexa	Jacroux Biggs	Akimeka, LLC
Garrett	Johnson	County of Kauai
Royce	Jones	ESRI Honolulu
Karen	Kemp	
Carol	Kennedy	Maui Electric Company, Ltd
Jamie	Legsay	Maui Electric Co, Lt.d
Jon	Lewis	City and County of Honolulu
Frances	Lichowski	NOAA CRED
Derek	Masaki	USGS
Tristin	Matsuki	US Army Corps of Engineers
Shannon	McElvaney	Pacific GPS – Workshop Facilitator
Bill	Medeiros	County of Maui
Tomoaki	Miura	
Rich	Nezelek	PDC
Karyn	Nolan	Pacific GPS
Lara	Payne	PDC
Justin	Pummell	U.S. Army Corps of Engineers
Kamoa	Quitevis	Office of Hawaiian Affairs
Ron	Salz	GeoCGI
Patricia	Shade	NRCS
Craig	Tasaka	DBEDT
David	Tomita	Hokulele Imaging & Mapping / HIES
Ronnie	Torres	State DoD
Susan	Vogt	GeoCGI
Henry	Wolter	USGS NGPO

Appendix 4 – Imagery Survey and Imagery Workshop Goals, Methods, and Results

The primary goal of the DIAC Stakeholder Workshop was to identify common needs for remotely-sensed data in both the public and private sectors, and to then use this data to draft implementation plans to meet those needs. In order to be truly representative of GIS user needs we conducted a user-needs analysis. This was done by first conducting a survey and then a workshop to elicit additional feedback. The goals and methods for both the survey and workshop are listed below.

Imagery Stakeholder Survey Goals

The main goal of the imagery needs assessment survey was to ascertain the technical imagery requirements, geographic scope, and the annual amount spent on imagery by the majority of imagery users in the State of Hawaii. The second goal of the survey was to identify trends, commonalities, and opportunities for collaborative participation and to build a framework for future acquisition of new imagery and other spatial datasets that would support the majority of GIS users in the state.

Imagery Stakeholder Survey Methodology

The DIAC created a draft set of questions that were sent out to key stakeholders for comment. This resulted in the refinement of questions and the addition of several more key questions that got at the heart of some technical requirements regarding resolution, etc.

The final survey was distributed via Survey Monkey to over 100 imagery users in both the public and private sectors. Ninety one responses were received, a significant sample size. Information was collected on affiliation, imagery products used, job function, geographic area of interest, frequency of use, imagery use, type of imagery needed, pixel resolution, positional accuracy, spectral resolution, frequency required for new imagery, amount spent annually, Ikonos consortium participation, datum, projection, and unit types, oblique ortho use, metadata completeness, software types, and whether their organization is scanning and/or sharing other imagery or historic maps.

Imagery Stakeholder Survey Results

(See Appendix 1)

Imagery Stakeholder Workshop Goals

The workshop brought together over 40 stakeholders from both the public and private sectors to 1) discuss the findings of the imagery needs assessment survey, and 2) elicit feedback and clarify some of the findings.

The overall workshop goals:

Bring together stakeholders from across the state and across sectors to discuss:

- Overall imagery needs.

- The current state of metadata production.
- And the results of an online imagery survey.

The results of the workshop were to be used to develop:

- Strategies and action plans for future acquisition partnering opportunities.
- Standards requirements.
- Data distribution requirements and methods.

The main deliverables:

- An actionable Needs Assessment Report.
- Information to support funding requests that further the HIGICC Imagery Business Plan.

Imagery Stakeholder Workshop Methodology

The workshop utilized a combination of power point presentation techniques using charts, images, and bulleted points to present both the survey findings and analyses. Rules of engagement were well explained up front, stating that we had come together to generate ideas and that no question was a dumb question, and that all ideas or issues would be treated with respect, with tangential, yet important issues, being noted for future follow up. All key survey findings were followed up with additional questions to the audience in an attempt to seek clarification. The facilitator focused on asking key questions, listening, and restating what he had heard while two others took notes on the proceedings. The entire workshop was recorded using Adobe Acrobat and Camtasia.

At the end of the workshop, a workshop evaluation form was passed out, collected, and compiled so the organizers could gauge the effectiveness of the workshop.

Imagery Stakeholder Workshop Results and Discussion

Imagery is being used as a significant part of work on a daily basis with a pan-sharpened color or multi-spectral satellite image at sub-meter resolution being most common. 84% of those surveyed requested natural color ortho quadrangles or digital orthophotos, indicating a high demand.

Of significant notice is that Google Earth, Google Street View, and Bing are playing significant roles in the creation of “mashups” (e.g., integration of ArcGIS data, and other data using kml) to showcase existing geographic information in perspective view, conduct virtual field reconnaissance, and deliver geographic data to clients who do not have or know how to use desktop GIS software. The downside of this is that the imagery used in “mashups” is typically out of date, of low resolution, and unavailable for use in high end desktop GIS software or analyses.

The imagery survey shows that historic imagery from a variety of dates is used for change detection, but infrequently. It is of vital use and importance for both planning and environmental monitoring. Newer

imagery is used much more frequently, on a daily or weekly basis, but mostly as background imagery to put other geographic data into context.

7. What is your geographic area of interest for imagery? (check all that apply)

	Response Percent	Response Count
All Islands	**61.0%**	**50**
Hawaii County	25.6%	21
Maui County	23.2%	19
County of Honolulu	28.0%	23
Kauai County	19.5%	16
Northwestern Hawaiian Islands	7.3%	6
Hawaiian Archipelago	11.0%	9
Other (please specify)	20.7%	17
answered question		**82**
skipped question		**5**

Many private firms and local government agencies are acquiring and or using imagery on a project basis, typically for finite areas over the short term. But many State and Federal government agencies are acquiring and/or using imagery on a statewide or countywide basis, covering large areas for long term planning.

6. What types of job functions do you use imagery for? (check all that apply)

	Response Percent	Response Count
Digitization	63.0%	51
Natural Resource Mapping	63.0%	51
Cadastral Mapping	28.4%	23
Disaster Analysis	34.6%	28
Image Processing	38.3%	31
Environmental Monitoring	49.4%	40
Change Detection	46.9%	38
Planning	**66.7%**	**54**
Site Design	37.0%	30
Other (please specify)	24.7%	20
answered question		**81**
skipped question		**6**

Planning is the number one use of imagery at 66.7%. Others, in descending order are natural resource mapping, environmental monitoring, change detection, site design, disaster analysis, and cadastral mapping, among others.

When asked what their geographic area of interest was…

…the majority of users, some 61% said they needed data for the whole state.

When asked what pixel resolution they wanted, some 60% requested 1ft or better.

11. What imagery would best meet your needs (pixel resolution)?

	Response Percent	Response Count
6 in	37.3%	25
1 ft	20.9%	14
2 ft	6.0%	4
1 m	14.9%	10
2 m	1.5%	1
3 m	6.0%	4
Other (please specify)	13.4%	9
answered question		67
skipped question		20

When asked what this high resolution imagery would be used for the workshop attendees answered:

- Identifying type of trees for inventory.
- Vegetation monitoring.
- Public safety needs – what is on the ground.
- Feature extraction such as utility mapping.

When asked about positional accuracy…

12. What are the positional accuracy requirements for your imagery (i.e., how close does that pixel need to be to its actual location on Earth)?

	Response Percent	Response Count
Sub foot	27.5%	19
Sub meter	**49.3%**	**34**
1 to 5 meters	31.9%	22
5 to 10 meters	1.4%	1
Other (please specify)	8.7%	6
answered question		**69**
skipped question		**18**

…submeter was preferred at 49.3%, but 27.5% preferred subfoot for engineering and infrastructure, while those working in natural resource management were fine with 1-5 meter positional accuracy.

When asked about spectral resolution,

13. What are the spectral resolution requirements for your imagery (i.e., number of bands)?

	Response Percent	Response Count
Panchromatic (i.e., black and white)	14.5%	10
Digital color (i.e., 3-bands)	**71.0%**	**49**
Color infra-red film	8.7%	6
Digital color with near infra-red (i.e., 4 band) Panchromatic-color merge	39.1%	27
Hyper-spectral (i.e., 7 bands or more)	24.6%	17
Other (please specify)	8.7%	6
answered question		**69**
skipped question		**18**

Digital color (3 band) stood out with 71% of the vote. When digital color was combined with near infra-red and hyper-spectral, the vast majority of users preferred some sort of color imagery.

When asked about how imagery data was received, 70% of users reported the use of portable storage devices while 65.7% reported receiving data via online download.

14. How do you receive imagery? (check all that apply)

	Response Percent	Response Count
Web Mapping Services or other web based streaming image delivery services	50.0%	35
Download from online data portals	65.7%	46
Portalable storage device transfer	**70.0%**	**49**
Other (please specify)	15.7%	11
answered question		70
skipped question		17

The reality is that large files may need to be delivered via portable storage, however this can lead to the "sneaker netting" (i.e., the transferring of data from one person to another by copying and passing CDs, DVDs, etc.) of the data from person to person. The "con" is you need to know WHO has the data and HOW to get it. It is not easily discoverable.

A surprising number, some 50% reported using web mapping services or other streaming based source.

When asked how often you would like imagery data updated the majority (69%) stated at least every two years. It was clear that the majority of users some 86.6% could use data refreshed at east every three years.

15. How often do you need imagery to be acquired?

	Response Percent	Response Count
Every 6 months	17.6%	12
Every year	**38.2%**	**26**
Every 2 years	13.2%	9
Every 3 years	17.6%	12
Other (please specify)	26.5%	18
answered question		68
skipped question		19

When asked for clarification:

- The answers were based more on desire than what they thought possible.
- There was a seasonal need – wet and dry or leaf on and leaf off.
- And they were dependent on specific circumstances – more often in areas of high change (urban/ natural disasters/wild land interface)/less often in areas with no change (watershed).

When asked about average annual expenditures on imagery purchases, there was a wide variety of answers.

16. How much does your organization spend for imagery annually?

	Response Percent	Response Count
0-25K	**73.1%**	**38**
25-50K	9.6%	5
50-100K	0.0%	0
100-200K	1.9%	1
200K or greater	15.4%	8
Other (please specify)		16
answered question		52
skipped question		35

73% of respondents reported 0 to $25K a year in imagery annually.

When asked: *Show of hands…how many of you answered $0-25K when $0 was actually the reality?*

The majority had answered the question meaning $0 was spent annually on imagery. However, even if that was the case, then conservatively, the stakeholders were spending approximately $1,825,000 on imagery annually. If you include the military, DOT, and engineering firms, all under represented, then the number could likely jump to approximately $3 million.

When asked if they participated in the Hawaii IKONOS Consortium, 44.4% stated that they did with 55.6% stating that they didn't.

17. Does your organization participate in a collaborative effort to purchase imagery, such as the "Hawaii IKONOS Consortium"?

	Response Percent	Response Count
Yes	44.4%	28
No	55.6%	35
If no, why not?		21
answered question		63
skipped question		24

The state is almost completely flown showing that a participatory collaborative can work. Reasons for not participating included: 1) the cost of the "buy in" price, 2) their organization does not allow the purchase of licensed data that cannot be distributed for free, 3) or they had other imagery needs.

When asked if their organization was using oblique imagery, 30.8% said yes, while 69.2% said no.

19. Is your organization collecting & using oblique air-photos?

	Response Percent	Response Count
Yes	30.8%	20
No	69.2%	45
answered question		65
skipped question		22

When asked for clarification some said there was a large pool of money to support E911 efforts in which Pictometry became the front runner because of its ability to create a 3D representation of reality. This is a good example of the changing face of "GIS", when orthophotos with a high positional accuracy are trumped by orthogonals which have no guaranteed accuracy. The Pictometry imagery is being flown county by county, right now only for Kauai and Oahu with restrictive licensing.

Henry Wolter suggested as an action item that the HIGICC as an organization should try to elevate the usage and data sharing agreement to be more inclusive, and not have to rely on the counties.

When asked about datum, there was a wide and varied response indicating there was still a need for storing and/or delivering data in a variety of datum.

20. What datum is standard for imagery at your organization?

	Response Percent	Response Count
Old Hawaiian	0.0%	0
NAD83(original)	50.7%	35
NAD83 (HARN)	36.2%	25
WGS84	43.5%	30
Other (please specify)	8.7%	6
answered question		69
skipped question		18

The same applies to coordinate systems. There is a large requirement for storing and delivering data in a variety of coordinate systems.

21. What projection is standard for imagery at your organization?

	Response Percent	Response Count
UTM Zone 4	**64.7%**	**44**
UTM Zone 5	25.0%	17
State Plane Feet	25.0%	17
State Plane Meters	10.3%	7
Geographic	17.6%	12
Other (please specify)	19.1%	13
answered question		68
skipped question		19

When asked about costs, licensing, storage, and data sharing the needs were that the imagery or data be in:

- A variety of formats and data types
- Easily discoverable
- Accessible

The barriers to participation or adoption were different for different people but they were identified largely as:

- Cost
- Licensing
- Storage
- Discovery
- Dissemination

Appendix 5 – GIS Data Portal Portion of the Workshop: Goals, Methods, and Results

The second half of the workshop surrounded the issue of data discovery and dissemination. For quite a while Hawaii GIS users have been using ad hoc methods that are based on who you know and "sneaker netting" to pass data from one to another.

Goals

Raise the pertinent issues about data discovery and dissemination and get feedback on a path forward.

Methods

Part of the effort required the examination of existing GIS data portals to document the variety of functionality and identify the top three GIS data portal types. To accomplish this task, a GIS data portal matrix was created.

	A	B	C	D	E	F	G
4		Alaska	Alabama	Arkansas	Colorado	Connecticut	District of Columbia
5	**User Interface**						
6	Easy to use, intuitive	x		x		x	x
7	Fast	NA		x		x	
8	Modern interface (i.e., uses Silverlight, Flex, etc.)			x			
9							
10	**Searchability**						
11	By theme (i.e., transportation, hydrography)	x	x	x	x	x	x
12	By online maps (i.e., lauches map service)			x	x		x
13	By date (i.e, allows user to put in a range of dates to search by)	x	x		x	x	x
14	By metadata (i.e., a subset of metadata fields)	x	x	x	x	x	x
15	By agency - (links to agency site for more info or download)	x			x	x	x
16	By geography (i.e., allows user to graphically drag a box to query intersecting features within the box outline)		x	x	x		
17	By geography (i.e., allows user to select key words for defined areas like cities, counties, watersheds, etc.)			x	x	x	x
18	By key words (i.e., allows user to type in a word to search corresponding layers or attributes within a layer)			x	x		x
19							
20	**Data Sources**						
21	Links to other sites for data	x			x	x	x
22	Links to own agency's data	x					
23							
24	**Host (i.e., who hosts the data)**						
25	State GIS Council						
26	Federal agency						
27	Educational Institution				x	x	
28	Non-profit						
29	Private Sector Commercial						
30	State Agency	x	x	x			
31	Department - Natural Resources	x					
32	Department - Geological Service		x				
33	Department - Geographic Information Office (GIO)			x			
34							
35	**Administration**						
36	Administered by a statewide GIS council made of fed, state, local, academia, and private sector partners	x			x	x	
37	Administered by Alabama Geological Survey		x				
38	Adminsitered by State GIS board supported by multi-agency technology working groups			x			
39							
40	**Metadata**						
41	FGDC standards	x	x	x	x	x	
42	Refers you to metadata tools (FGDC)	x	x		x		

The data gathered was used in the following lunch and afternoon discussion topics:

- Topic 1: Discussion of web portal research findings
- Topic 2: Identify key functionality of the best data portals
- Topic 3: What functionality would you like to see in an HIGICC portal?

Results

Topic 1: Discussion of web portal research findings

- User Interface – user interfaces differ widely from simple html to complex Silverlight and Flex interfaces. The best are easy to use, intuitive, fast, and have a modern interface.
- Searchability – also differs widely using key word, graphical, thematic, geographic, metadata, or agency. Some use online web mapping, some do not.
- Data Sources – some provide links to other agency sites, some only to their own agency's data.
- Host (i.e., who serves the data) – this differs from state to state and ranges from public to private hosting.
- Administration (i.e., who oversees content) – Administration also varies widely but is usually accomplished by a GIS Council or State agency.
- Metadata – a common search criteria, but not always present.
- Data Preview – there are new and improved methods of preview including thumbnails and KML.
- Data Delivery – these range from common FTP to data request via email and CD to the most advanced clip, zip, and ship.
- Communication – many now use Facebook, Twitter, blogs, RSS and GeoRSS, newsletters, and list serves to communicate with their users.

Topic 2: Identify key functionality of the best data portals

A subset of data website was examined to showcase the wide variety of functionality including Alaska, Alabama, Arkansas, Colorado, and Connecticut. See the recorded movie of this discussion which can be found on the HIGICC portal.

One of the best sites was that of Arkansas which created a site called the GeoStor. Some of the highlights include:

- Clearly defined audience as that of the GIS professional.
- Has Twitter and Facebook feeds. Great for communicating with users, following improvements, asking advice, and giving advice.
- Map viewer was professional looking, fast, intuitive, and modern looking (uses Silverlight/Flex).
- Has preloaded base map options such as shaded relief topo maps and aerial imagery.
- Spells out their services well including web services, web feature services, web mapping services, apps, etc.
- Has FTP download capability.
- Download (DL) feature using geographic queries like watershed, city, county, etc., and allows the user to request which coordinate system and units they would like their data in.
- Efficient clip, zip, and ship feature.

- Has blog and a detailed tutorial on how to use the site.
- Their State administrative structure is supports GIS with a State GIO, State GIS Board (used to be Land Information System), State GIS department, and technical advisory committees.
- It was recognized and set up by Governor Huckabee as a vital component to support their economic development activities.
- Built by private contractor with guidance from the State GIS Board and technical advisory committee.

Topic 3: What functionality would you like to see in an HIGICC portal?

The individual results of the GIS data portal requirements questionnaire can be found in Appendix 9. The analysis of each question using statistical averaging of all answers per question is below. Comments are provided for each. Those with the highest scoring are marked with dark green, second highest with medium green, third highest with moss green, fourth highest with yellow, and 4th and 5th with darkening shades of red.

1. Searchability

Against	Neutral	For	Comments
10.00%	3.33%	86.67%	1st place - By theme
13.79%	27.59%	58.62%	5th - By online map - curiously this would be necessary in order to search geographically via a box, which won 2nd place.
13.33%	30.00%	56.67%	6th - By date
10.00%	43.33%	46.67%	Interestingly, people are neutral on metadata.
20.00%	30.00%	50.00%	7th - By agency link to web site
10.00%	6.67%	83.33%	2nd - By geography using box
10.34%	6.90%	82.76%	3rd - By geography using key word
13.79%	10.34%	75.86%	4th - By key word that searchs theme or attributes.

2. Hosting

Against	Neutral	For	Comments
25.93%	18.52%	55.56%	3rd Federal Agency
14.29%	14.29%	71.43%	2nd State Agency
13.79%	6.90%	79.31%	1st Educational Institution
66.67%	22.22%	11.11%	5th Commercial
51.85%	14.81%	33.33%	4th Not for profit

3. Metadata

Yes	No	Maybe	Not Sure	Comments
16	7	4	0	Majority of people would like help with metadata implementation.
4	7	6	4	No agreement on level of metadata attribution they would like to see.

4. What methods would you like to see used for data delivery?

Against	Neutral	For	Comments
17.24%	10.34%	72.41%	2nd place – FTP Download
15.38%	19.23%	65.38%	4th place - HTML hyper link
42.86%	25.00%	32.14%	Searchable map library for downloading of existing pdf maps
75.86%	17.24%	6.90%	People don't want to sneaker net anymore.
11.11%	11.11%	77.78%	1st place - Through searchable online map, select and download data.
22.22%	11.11%	66.67%	3rd place - Zip and ship choosing datum, zone, unit, and format for data delivery.
20.83%	12.50%	66.67%	3rd place - Map services (i.e., live GIS data feeds that allow you to load directly into your desktop map view)…but with caveats regarding speed.

Comments included:

- Services should be the foundation. Shouldn't be a repository, but should provide active links to data at original locations + map services + download.
- Mapping services is the future and we should head towards this, but as an alternative, CD's are always an option.
- I need a hardcopy on my laptop…

5. What is important to you in a GIS portal user interface?

Against	Neutral	For	Comments
10.34%	3.45%	86.21%	2nd place - easy to use
10.34%	0.00%	89.66%	1st place - fast
11.11%	22.22%	66.67%	3rd place - modern interface

6. How should we work together to purchase large datasets used in common?

Against	Neutral	For	Comments
6.67%	0.00%	93.33%	Overwhelming support for working together.

7. How should we go about sharing data?

Against	Neutral	For	Comments
48.28%	27.59%	24.14%	1st place - a repudiation of ad hoc sneaker net method of data sharing.
6.67%	0.00%	93.33%	1st place - a positive statement for a GIS portal for data sharing.

8. How should we go about increasing communication about key data availability and issues surrounding updates, etc.?

Against	Neutral	For	Comments
35.71%	7.14%	57.14%	1st place - high marks for blog.
57.14%	10.71%	32.14%	Facebook - Negative response to social media. Maybe related to age of participants.
60.71%	10.71%	28.57%	Twitter - Negative response to social media. Maybe related to age of participants.
38.46%	11.54%	50.00%	3rd place - positive response to GeoRSS feeds.
39.13%	13.04%	47.83%	3rd place - positive response to RSS feeds.
33.33%	11.11%	55.56%	2nd place - old style list serve still popular.

Appendix 6 – GIS Data Portal Requirements Questionnaire

GIS Data Portal Questionnaire

June 30, 2010

1. **Searchability**

1.1. What would you like to see used for data searches?

1.1.1. By theme (i.e., transportation, hydrography) (Circle one) **1 2 3 4 5**

1.1.2. By online maps (i.e., launch map service) (Circle one) **1 2 3 4 5**

1.1.3. By date (i.e, allows user to input range of dates) (Circle one) **1 2 3 4 5**

1.1.4. By metadata (i.e., a subset of metadata fields) (Circle one) **1 2 3 4 5**

1.1.5. By agency - (i.e., provides links to agency sites) (Circle one) **1 2 3 4 5**

1.1.6. By geography (i.e., allows user to graphically click/drag a box which intersects features within the box's outline) (Circle one) **1 2 3 4 5**

1.1.7. By geography (i.e., allows user to select key words for defined areas like cities, counties, watersheds, etc.) (Circle one) **1 2 3 4 5**

1.1.8. By key words (i.e., allows user to type in a word to search corresponding layers or the attributes within a layer) (Circle one) **1 2 3 4 5**

1.1.9. Other:_____ (Circle one) **1 2 3 4 5**

1.1.10. Other: _____(Circle one) **1 2 3 4 5**

1.1.11. Other:_____(Circle one) **1 2 3 4 5**

1.2. Comments:

2. Hosting

2.1. Who would be the most likely candidate to host such a portal?

2.1.1.Federal agency (Circle one) **1 2 3 4 5**

2.1.2.State agency (Circle one) **1 2 3 4 5**

2.1.3.Educational Institution (Circle one) (Circle one) **1 2 3 4 5**

2.1.4.Commercial company (Circle one) **1 2 3 4 5**

2.1.5.Not-for-profit (Circle one) **1 2 3 4 5**

2.2. *If public, what agency or department would be the most likely candidate?*

_____

2.3. Comments: Why?

3. Metadata

3.1. *Would your agency or department benefit from someone assisting them with metadata development?* (Circle one) ***Yes No Maybe Not Sure***

3.2. *Assuming we all agree to use FGDC metadata standards, what level of metadata attribution would you like to see implemented?* (Circle one) Minimum **1 2 3 4 5** Maximum

3.3. Comments: Explain

4. How methods would you like to see used for data delivery?

4.1. FTP download (Circle one) **1 2 3 4 5**

4.2. HTML hyperlink (Circle one) **1 2 3 4 5**

4.3. Searchable Map library for download of existing pdf maps (Circle one) **1 2 3 4 5**

4.4. Order CDs (Circle one) **1 2 3 4 5**

4.5. Through searchable online map, select and download data (Circle one) **1 2 3 4 5**

4.6. Zip and ship choosing datum, zone, unit, and format for data delivery (Circle one) **1 2 3 4 5**

4.7. Map services (i.e., live GIS data feeds that allow you to load directly into your desktop map view) (Circle one) **1 2 3 4 5**

4.8. Other:_____ (Circle one) **1 2 3 4 5**

4.9. Other_____(Circle one) **1 2 3 4 5**

4.10. Other: _____(Circle one) **1 2 3 4 5**

4.11. Comments:

5. ***What is important to you in a GIS portal user interface?***

5.1. Easy to use, intuitive (Circle one) **1 2 3 4 5**

5.2. Fast /responsive (Circle one) **1 2 3 4 5**

5.3. Modern interface (i.e., uses Silverlight, Flex, etc.) (Circle one) **1 2 3 4 5**

5.4. Other:_____ (Circle one) **1 2 3 4 5**

5.5. Other_____(Circle one) **1 2 3 4 5**

5.6. Comments:

6. How should we work together to purchase large datasets used in common?

6.1. Leverage buying power through collaborative data consortiums (Circle one) **1 2 3 4 5**

6.2. Other: _____ (Circle one) **1 2 3 4 5**

6.3. Other: _____ (Circle one) **1 2 3 4 5**

6.4. Comments:

7. How should we go about sharing data?

7.1. Use ad hoc "sneaker net" methods of coping hard drives or passing CDs or DVDs

(Circle one) **1 2 3 4 5**

7.2. Use a GIS portal capable of making data easily discoverable and downloadable

(Circle one) **1 2 3 4 5**

7.3. Other: _____ __(Circle one) **1 2 3 4 5**

7.4. Other: _____ __(Circle one) **1 2 3 4 5**

7.5. Comments:

8. ***How should we go about increasing communication about key data availability and issues surrounding updates, etc.?***

8.1. Blog (Circle one) **1 2 3 4 5**

8.2. Facebook (Circle one) **1 2 3 4 5**

8.3. Twitter (Circle one) **1 2 3 4 5**

8.4. GeoRSS (Circle one) **1 2 3 4 5**

8.5. RSS (Circle one) **1 2 3 4 5**

8.6. Listserve (i.e., blanket emails) (Circle one) **1 2 3 4 5**

8.7. Other:_____ (Circle one) **1 2 3 4 5**

8.8. Other:_____ (Circle one) **1 2 3 4 5**

8.9. Comments:

Appendix 7 - Imagery Stakeholder Workshop (combined notes)

Morning Session

Imagery (pixel resolution) why less than 1 ft?

- Identifying type of trees for inventory
- Vegetation monitoring
- Public safety needs – what is on the ground
- Change Detection
- Disaster Management
- Comment - The more data you deliver the more storage and delivery requirements

How often do you need imagery acquired?

- More of a desire than a requirement
- Season – wet and dry
- Dependent on specific circumstances – more often in areas of high change (urban/ natural diasters/wildline interface)/less often in areas with no change (watershed)

Organization spending for imagery

- 0 – 25K – signifies mostly zero (free)
- Next time there is a survey zero should be a value
- Military spending not identified
- Range of 1-3 million dollars currently spent in Hawaii by civilians

Hawaii IKONOS

- State is almost done
- Uses the principle of leverage, all or nothing business model
- Economies of scale

Licensed imagery

- Depends on who pays for it
- Could be restricted to one agency
- Raw Imagery can't be shared, but derivative products can be shared
- NGA/Homeland Security Honolulu 1 ft natural color – distributed widely
- Only by great effort to get registered as NAIP state
    - Mainland every 2-3 yrs, east coast sometimes twice a year (leaf off)
    - 1 m and or pay a little extra for higher resolution (uplift)

- No USDA land (forests) as per comm - Ron Cannarella
- **ACTION ITEM - Henry Wolter thinks HIGICC should as a group get congress to register HI as a NAIP state (through Dept of Ag)**

Oblique air photos

- Pictometry – e911 money for emergency response
- 1st full delivery of Kauai – 4", 5 views – 1 ortho in 5 directions (Garrett Johnson)
  - Sharing to be determined – gov't agencies – state, fed, non profits
- ½ meter Maui
  - Maui available to the county, Alexa Biggs at Akimeka has the details for Maui pictometry
- Oahu – 4-6 inch resolution
  - Not being shared limited to county (note – in Ken Schmidt's presentation at the HIGICC meeting he mentioned it was on BING)
  - Oahu and Kauai every 2 yrs for 6 years
  - Oahu already on the second collect
- No guaranteed accuracy
- Called Orthogonals due to lack of positional accuracy
- **ACTION ITEM - Henry Wolter suggests as an organization HIGICC should try to elevate the usage and data sharing, and not have to rely on the counties**

Metadata for imagery at your organization

- Not full metadata, copying and pasting, codes, attributes
- ISO and FGDC basics though not complete due to time limitations
- From PDC - 'Metadata is not a 4 letter word, it is two 4-letter words.'
- 1/3 of the state metadata has been completed by Ron Cannarella the rest is incomplete due to staff restraints.
- Most people using ESRI fgdc format
- Fgdc ISO format too difficult, time consuming

Image processing tool

- ESRI not being used as image processing tool (1 person has Image Analyst) besides reprojecting
- ERDAS used by feds
- No other major use of RS software by attendees

What is being scanned?

- Maps, 9" aerial, as builts, virtual vaults – document storage
- UHM at Hamiliton (Henry Wolter)– USGS, NOAA, FEMA, State is scanning historic maps and photos – you can get jpg online or higher res tif if you bring a hard drive

- UH SOEST Coastal Geology (Matt Barbie) – 1929 historic aerial photography including ortho mosaics – Oahu, Maui, Kauai – coastal ½ meter – available online
- Land Study Bureau – for most of the state except Big Island
- Maui Electric (Carol Kennedy) – maps and drawings (not available)

Scans not available, why?

- Don't have a method for distribution
- Security – sensitive data such as infrastructure

Other Input

- USGS, State and others – Digital Globe
    - Pan .5 m (50 cm) and multi spectral 1.4 m for the whole state, NW Hawaiian Islands, Pacific Basin (US territories – Palau, American Samoa, CNMI), coastal buffer around all islands, up to 60 m depth in clear water
    - Organization can use this as a baseline and upgrade to more bands
    - Benthic Habitat as a key need

Afternoon Session

Topic 1 Key Portal Functionalities

Additional Comments

- Linked In, You Tube
- API – application program interface (developers can work with it)
- Upfront identify what scale you want
- Currently organizations are still operating independently but coordinating, ad hoc system
- Formalize with MOU's
-

What role should HIGICC play

- Methodology for data discovery
- Formalize relationship for data sharing and collaboration
- Lots of data but it is difficult to find it. HIGICC should be more involved in data discovery and dissemination
- Historically HIGICC had the Data Discovery Day meetings
- Currently not sustainable

How do you find data now?

- Email, word of mouth, transfer via hard drives

What inhibits data use?

- Funding
- staff resources
- licensing
- security
- institutional firewalls
- lack of knowledge to new datasets

What metadata should be in place?

- Who, what, when, why, where
- File name, when it was produced/collected (minimum metadata requirements)
- FGDC standards become routine
- Other Comments
    - Biodiversity, invasive species – no central repository
    - Build in the contract language that the deliverable must include FGDC metadata
    - Have templates (boiler plates) with good best practices and good metadata
    - Education – not comfortable with instructions (you tube videos available)

Suggestions for portal

- Quick, easy, indexed interface with key word
- Learning tool – Matt Barbie suggested making it interactive and refining the data set and search, that the experts with the specific schematics assist with structure and what else is available
- Work with librarians and form an alliance/collaboration with university – data and categorization is same as books, just digital
- From Joan Delos Santos – State needs metadata
- Services based (imagery, feature) – new age not just an ftp site

What would be needed to create HIGICC data portal?

- GIS and non GIS users to increase relevance
- HIGICC has lack of staffing, who and how many hours, currently it is volunteers which is not sustainable
- In strategic plan, underserved committees to get access to the data
- Find the funds, painting picture and finding process

Additional Comments

- ADA compliant, American Council for the blind, font sizes, translations
- Metadata – FGDC training needed, web based or live training, local opportunities for training the trainer

- UH Hilo – NSF grant to have Hawaii Geospatial repository (news to HIGICC!), looking for partners, metadata catalogue
- Lidar discovery site – NOAA coastal services center, spatial data with attributes
- ESRI Virtual campus training opportunities
- Future data needs – Remote sensing products - Lidar, Pan chromatic, detailed DEM, canopy height, bare earth –
    - From Craig Clouet – lidar and elevation data in next framework layer, start with imagery and vector data sets
    - How to approach elevation data with climate change

HIGICC Annual Meeting

Post Workshop Session

Ken Schmidt – City & County of Honolulu

- Technology moves faster than they can keep up with
- Regulatory and tax for parcel (POI) is separate than tax PIN – though 85% match
- Historic TMK – only visible to CCH
- Structure (i.e. condos at the same address) Object ID (SOI)
- Fast Maps – thematic
- BING maps – Honolulu Oblique

Bill Medeiros – Maui County

- .5 m IKONOS
- Oblique on BING
- Stories, historic photos and maps online with ArcServer

Garrett Johnson – Kauai County

- ESRI ELA
- Mobile Data Terminals (MDT) for every fire vehicle
- Furloughs and boss at county quit
- Online KOHA – ArcServer one stop shop
- Pictometry available on 140 County computers – full delivery in 2 weeks
- Focusing on issues such as coastal erosion, dfirms - flood/dam break hazards, GIS education

Gilbert Bailado (stand in for Lisa Nahoopii) – Hawaii Island County

- Arc Server
- Parcel updates – other data layers on DVD for use with ArcReader
- Contract with Akimeka to update e-911
- Pictometry recently signed contract – available to county
- dfirms

Appendix 8 – HIGICC Imagery Stakeholder Workshop PowerPoint

HIGICC Data Inventory and Assessment Committee

Imagery Stakeholder Workshop
June 30, 2010

Facilitated by Shannon McElvaney

Agenda

10:00am-10:15am	Introduction and Opening
10:15am -10:45am	Present Imagery Survey Findings
10:45am-11:15am	What are the uses of Imagery here in Hawaii
11:15am-11:30pm	Costs, licensing, storage and sharing
11:30pm - 1:00pm	Working Lunch

Topic 1: Identify key functionality of the best data portals
Topic 2: Discussion of web portal research findings
Topic 3: What functionality would you like to see in an HIGICC portal?

1:00pm - 1:45pm	What role does the HIGICC play with regards to data acquisition & dissemination?
1:45pm - 2:15pm	Let's talk data discovery and Metadata.
2:15pm - 2:45pm	What would be needed to create an HIGICC data portal?
2:45pm – 3:30pm	Come up with 3 scenarios that would scale in cost, technology, and labor requirements required to maintain a data portal for 5 years
3:30pm – 5:00pm	HIGICC Annual Meeting
5:00pm – 8:00pm	HIGICC 10th Anniversary Bash!!!

Introduction and Opening

Introduction and Opening

- CAP Grant
- Workshop Purpose
- Rules of Engagement
- Housekeeping

CAP Grant

Bring together stakeholders from across the state to:

- Formulate a comprehensive business plan
- Establish a common set of standards
- Explore potential funding strategies for acquiring and distributing orthoimagery

CAP Grant

Four-fold approach:

- Conduct an online survey of the community to identify imagery holdings, needs, and acquisition plans.
- Conduct a workshop in Honolulu to assess, discuss and plan for imagery acquisition
- Conduct individual interviews with participants who want additional input or clarification on the business plan.
- Conduct informational briefings for decision makers and those who approve and fund geospatial data acquisitions

Workshop Purpose

Bring together stakeholders from across the state and across sectors to discuss:

- Overall imagery needs
- The current state of metadata production
- Other states' methods of data distribution, and the results of an online imagery survey.

The results of the workshop will be used to develop:

- Strategies and action plans for future acquisition partnering opportunities
- Standards requirements
- Data distribution requirements and methods

Main Deliverable

- Actionable Needs Assessment Report
- Main purpose: to support funding requests that further the HIGICC Business Plan

Rules of Engagement

- Want feedback and ideas
- Want to generate as many ideas as possible
- There are no dumb ideas or issues
- Time may force us to move quickly
- Related issues that require more time than we have today will be noted for follow up (i.e., “parking lot”)
- Any additional ideas can be emailed to PGPS or we can chat until about the end of summer

House Keeping

- Breaks
- Bathrooms
- Phones

Imagery Survey Findings

Imagery Survey Findings

- Imagery survey performed
- Online survey using Survey Monkey
- 91 respondents (survey is closed now)
- Mix of questions covering:
  - Affiliation
  - Data types
  - Data use
  - Coordinate systems, datums, units
  - Resolution (e.g., pixel, spatial, spectral)
  - Etc.

Thanks to all for your time!

Organization Affiliation

2. Organization Affiliation

	Response Percent	Response Count
Federal	28.9%	24
State	20.5%	17
County	9.6%	8
Private	**33.7%**	**28**
Academic	10.8%	9
Military	3.6%	3
Other (please specify)	3.6%	3
answered question		**83**
skipped question		**4**

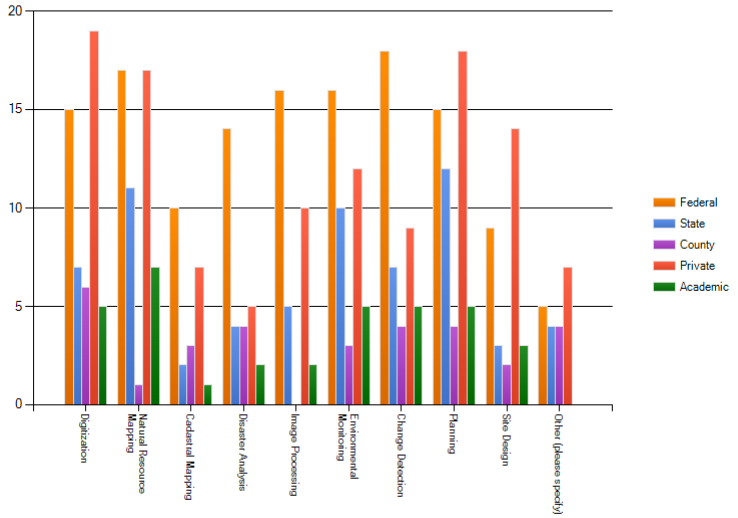
Job Function and Imagery Use

6. What types of job functions do you use imagery for? (check all that apply)

	Response Percent	Response Count
Digitization	63.0%	51
Natural Resource Mapping	63.0%	51
Cadastral Mapping	28.4%	23
Disaster Analysis	34.6%	28
Image Processing	38.3%	31
Environmental Monitoring	49.4%	40
Change Detection	46.9%	38
Planning	**66.7%**	**54**
Site Design	37.0%	30
Other (please specify)	24.7%	20
answered question		**81**
skipped question		**6**

Job Function and Imagery Use by Aff

What types of job functions do you use imagery for? (check all that apply)



Geographic Area of Interest

7. What is your geographic area of interest for imagery? (check all that apply)

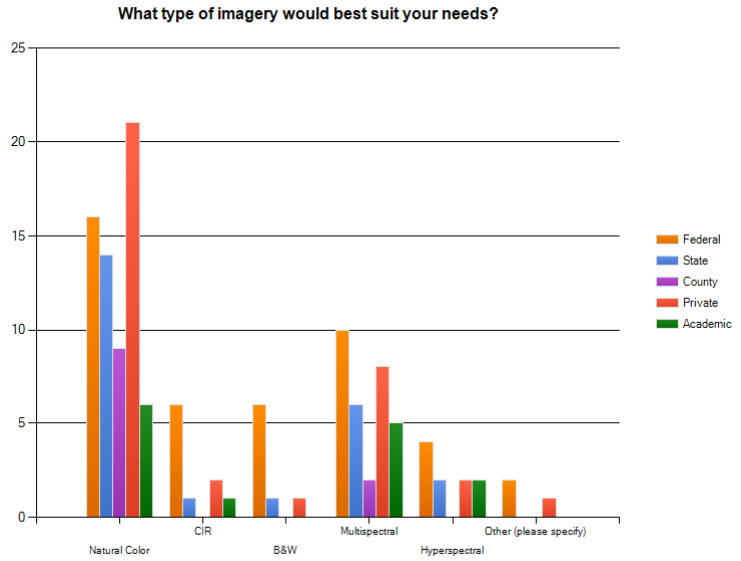
	Response Percent	Response Count
All Islands	**61.0%**	**50**
Hawaii County	25.6%	21
Maui County	23.2%	19
County of Honolulu	28.0%	23
Kauai County	19.5%	16
Northwestern Hawaiian Islands	7.3%	6
Hawaiian Archipelago	11.0%	9
Other (please specify)	20.7%	17
answered question		**82**
skipped question		**5**

Imagery Type to Best Suit Needs

10. What type of imagery would best suit your needs?

	Response Percent	Response Count
Natural Color	**84.3%**	**59**
CIR	12.9%	9
B&W	11.4%	8
Multispectral	40.0%	28
Hyperspectral	15.7%	11
Other (please specify)	4.3%	3
answered question		**70**
skipped question		**17**

Imagery Type to Best Suit Needs by Affiliation

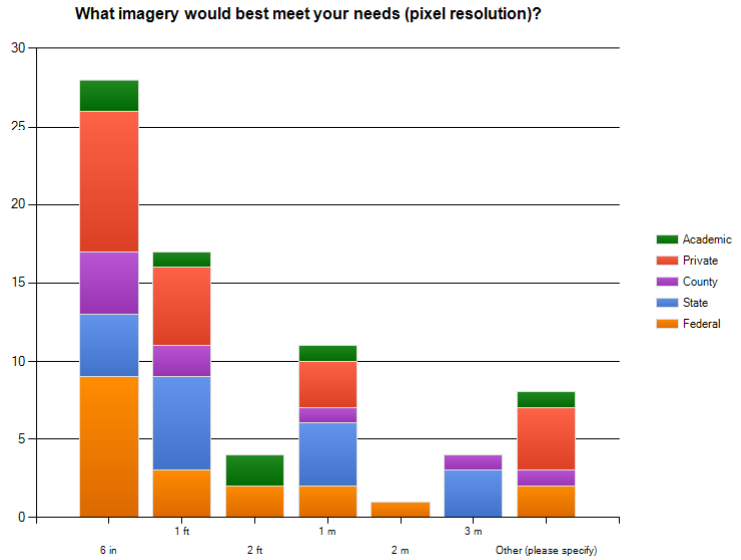


Pixel Resolution

11. What imagery would best meet your needs (pixel resolution)?

	Response Percent	Response Count
6 in	**37.3%**	**25**
1 ft	20.9%	14
2 ft	6.0%	4
1 m	14.9%	10
2 m	1.5%	1
3 m	6.0%	4
Other (please specify)	13.4%	9
	answered question	**67**
	skipped question	**20**

Pixel Resolution by Affiliation



Positional Accuracy

12. What are the positional accuracy requirements for your imagery (i.e., how close does that pixel need to be to its actual location on Earth)?

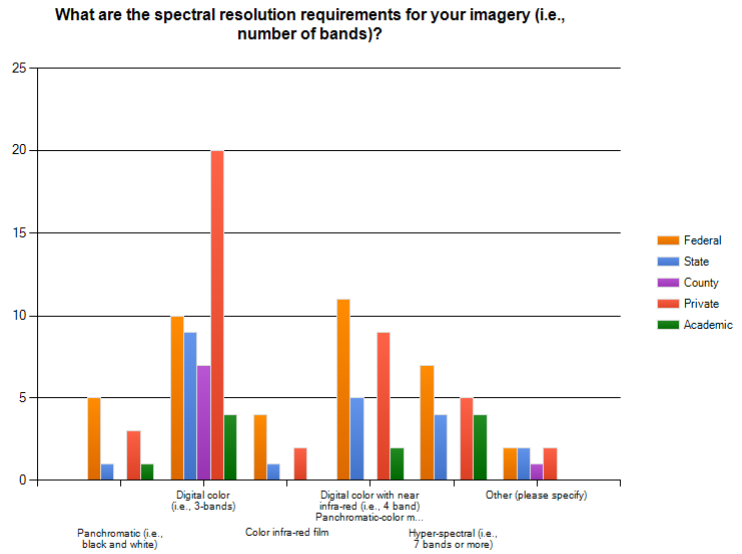
	Response Percent	Response Count
Sub foot	27.5%	19
Sub meter	**49.3%**	**34**
1 to 5 meters	31.9%	22
5 to 10 meters	1.4%	1
Other (please specify)	8.7%	6
	answered question	**69**
	skipped question	**18**

Spectral Resolution Requirements

13. What are the spectral resolution requirements for your imagery (i.e., number of bands)?

	Response Percent	Response Count
Panchromatic (i.e., black and white)	14.5%	10
Digital color (i.e., 3-bands)	**71.0%**	**49**
Color infra-red film	8.7%	6
Digital color with near infra-red (i.e., 4 band) Panchromatic-color merge	39.1%	27
Hyper-spectral (i.e., 7 bands or more)	24.6%	17
Other (please specify)	8.7%	6
	answered question	**69**
	skipped question	**18**

Spectral Resolution Requirements by Aff



Imagery Delivery Mechanism

14. How do you receive imagery? (check all that apply)

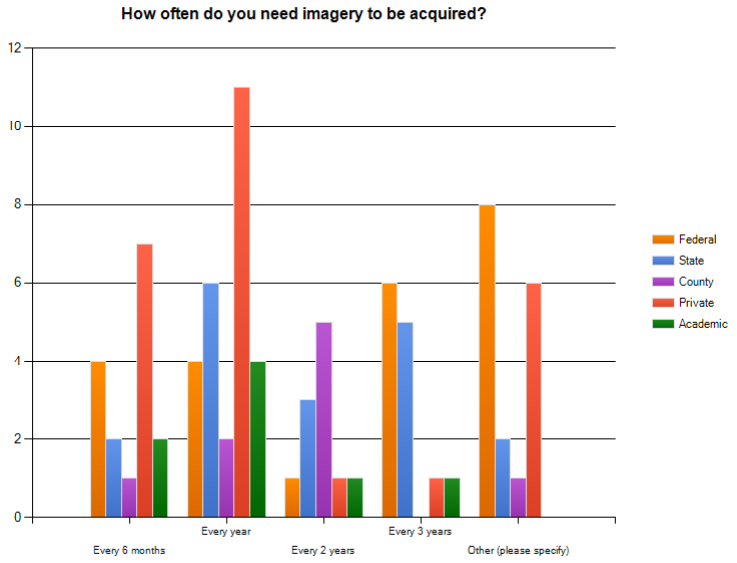
	Response Percent	Response Count
Web Mapping Services or other web based streaming image delivery services	50.0%	35
Download from online data portals	65.7%	46
Portalable storage device transfer	**70.0%**	**49**
Other (please specify)	15.7%	11
answered question		**70**
skipped question		**17**

Imagery Acquisition Frequency

15. How often do you need imagery to be acquired?

	Response Percent	Response Count
Every 6 months	17.6%	12
Every year	**38.2%**	**26**
Every 2 years	13.2%	9
Every 3 years	17.6%	12
Other (please specify)	26.5%	18
answered question		**68**
skipped question		**19**

Imagery Acquisition Frequency



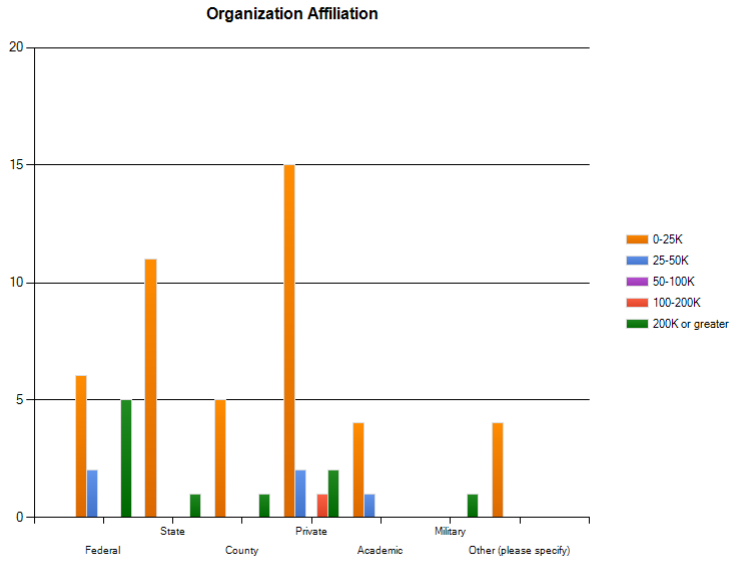
Average Annual Expenditure

16. How much does your organization spend for imagery annually?

		Response Percent	Response Count
$950K	0-25K	73.1%	38
$250K	25-50K	9.6%	5
$0K	50-100K	0.0%	0
$200K	100-200K	1.9%	1
$1600K	200K or greater	15.4%	8
$3000K	Other (please specify)		16
	answered question		52
	skipped question		35

$1,825,000 < $3,000,000 < ?

Average Annual Expenditure by Aff



Imagery Consortium Participation

17. Does your organization participate in a collaborative effort to purchase imagery, such as the "Hawaii IKONOS Consortium"?

	Response Percent	Response Count
Yes	44.4%	28
No	55.6%	35
If no, why not?		21
answered question		63
skipped question		24

Requests for Licensed Imagery

18. How often do your receive requests for imagery that is licensed?

	Response Percent	Response Count
Never	25.8%	16
Seldom (<5 request/yr)	**32.3%**	**20**
Sometimes (5-10 requests/yr)	22.6%	14
Often (>10 requests/yr).	19.4%	12
Other (please specify)	0.0%	0
answered question		62
skipped question		25

Use of Oblique Imagery

19. Is your organization collecting & using oblique air-photos?

	Response Percent	Response Count
Yes	30.8%	20
No	**69.2%**	**45**
answered question		65
skipped question		22

Commonly Used Datums

20. What datum is standard for imagery at your organization?

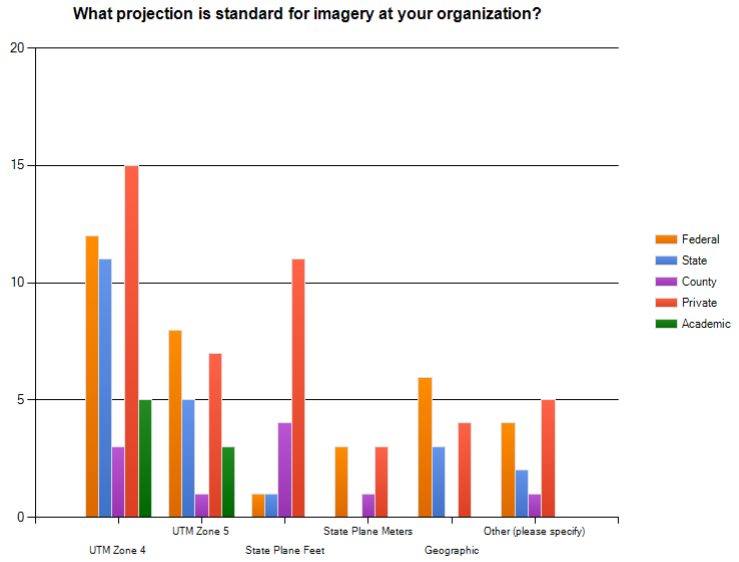
	Response Percent	Response Count
Old Hawaiian	0.0%	0
NAD83(original)	**50.7%**	**35**
NAD83 (HARN)	36.2%	25
WGS84	43.5%	30
Other (please specify)	8.7%	6
answered question		**69**
skipped question		**18**

Most Frequently Used Projection

21. What projection is standard for imagery at your organization?

	Response Percent	Response Count
UTM Zone 4	**64.7%**	**44**
UTM Zone 5	25.0%	17
State Plane Feet	25.0%	17
State Plane Meters	10.3%	7
Geographic	17.6%	12
Other (please specify)	19.1%	13
answered question		**68**
skipped question		**19**

Most Frequently Used Projection by Aff



Imagery Reprojection

22. Do you reproject older imagery to match newer datums?

	Response Percent	Response Count
Yes	56.7%	38
No	31.3%	21
Don't know	11.9%	8
answered question		67
skipped question		20

Imagery Metadata

23. Do you have metadata for the imagery at your organization?

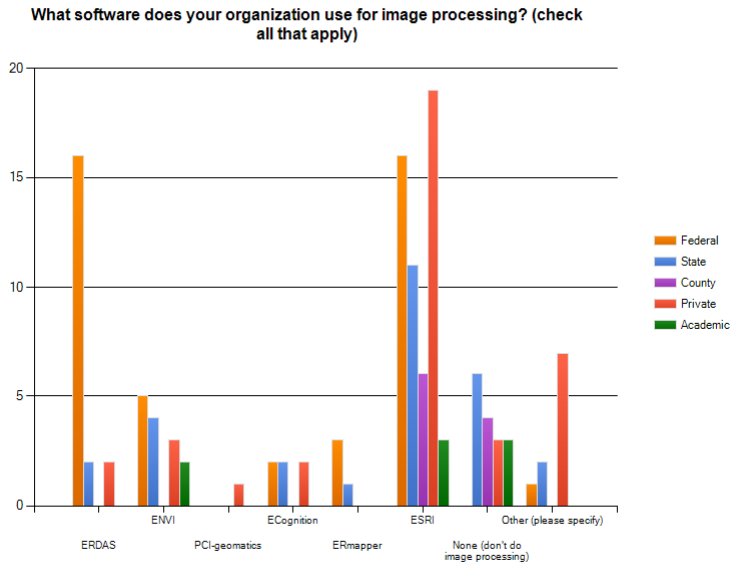
	Response Percent	Response Count
Yes - complete	22.4%	15
Yes - partial	**62.7%**	**42**
No	9.0%	6
Don't	6.0%	4
answered question		**67**
skipped question		**20**

Image Processing Software

24. What software does your organization use for image processing? (check all that apply)

	Response Percent	Response Count
ERDAS	27.9%	19
ENVI	17.6%	12
PCI-geomatics	1.5%	1
ECognition	7.4%	5
ERmapper	5.9%	4
ESRI	**72.1%**	**49**
None (don't do image processing)	22.1%	15
Other (please specify)	14.7%	10
answered question		**68**
skipped question		**19**

Image Processing Software by Aff

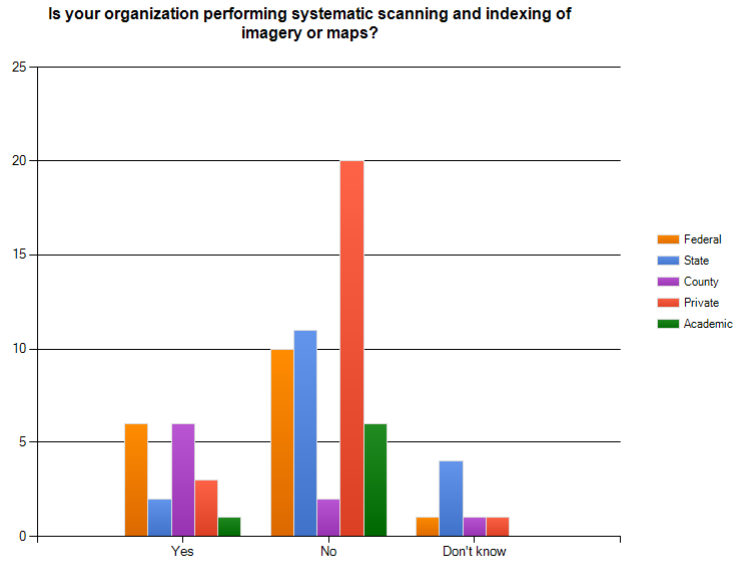


Systematic Scanning and Indexing

26. Is your organization performing systematic scanning and indexing of imagery or maps?

	Response Percent	Response Count
Yes	25.8%	17
No	68.2%	45
Don't know	7.6%	5
answered question		66
skipped question		21

Systematic Scanning and Indexing by Aff



Scanned Imagery or Map Availability

27. Does your organization make these scanned files available to outside users/organizations?

	Response Percent	Response Count
No	**61.8%**	**34**
Yes, freely available	20.0%	11
Yes, for a fee	1.8%	1
Other (please specify)	21.8%	12
answered question		**55**
skipped question		**32**

How Imagery is Being Used Here in Hawai'i

How is Imagery Being Used Here in Hawaii

- Imagery being used as a significant part of one's work on a daily basis
- With a pan-sharpened color or multi-spectral satellite image at sub-meter resolution being most common
- Natural color ortho quadrangles or digital orthophotos are also in high demand and use
- Google Earth, Google Street View, and Bing are playing significant roles for mashup and reconnaissance work
- Older imagery used for change detection, but infrequently
- Newer imagery used much more frequently, on a daily or weekly basis, mostly as a background
- Most folks are developing and/or using imagery on a project basis, typically for finite areas over a short term
- But many in government are developing and/or using imagery on a statewide or countywide basis, covering large areas for long term planning

Imagery Use in Descending Order

- Background
- Change detection
- Feature extraction
- Classification
- Measurements
- Reconnaissance
- With planning being the major job function

Costs, Licensing, Storage, and Data Sharing

Costs, Licensing, Storage, and Data Sharing

Needs

- A variety of formats and data types
- Easily discoverable
- Accessible

Barriers

- Cost
- Licensing
- Storage
- Discovery
- Dissemination

Lunch

Topic 1: Discussion of web portal research findings

Topic 2: Identify key functionality of the best data portals

Topic 3: What functionality would you like to see in an HIGICC portal?

Topic 1: Identify key functionality of the best data portals

Topic 1: Key Portal Functionality

General Definition:

- A GIS Portal is a web-based system whereby everyone can discover, access, view, and download geospatial data from anywhere, anytime free of charge.
- GIS Portals are typically a collaborative effort, made stronger by member participation and private/public partnerships of all kinds.

Topic 1: Key Portal Functionality

	A	B	C	D	E	F	G
4		Alaska	Alabama	Arkansas	Colorado	Connecticut	District of Columbia
5	**User Interface**						
6	Easy to use, intuitive	x		x		x	x
7	Fast	NA		x		x	
8	Modern interface (i.e., uses Silverlight, Flex, etc.)			x			
9							
10	**Searchability**						
11	By theme (i.e., transportation, hydrography)	x	x	x	x	x	x
12	By online maps (i.e., lauches map service)			x	x		x
13	By date (i.e, allows user to put in a range of dates to search by)	x	x		x	x	x
14	By metadata (i.e., a subset of metadata fields)	x	x	x	x	x	x
15	By agency - (links to agency site for more info or download)	x			x	x	x
16	By geography (i.e., allows user to graphically drag a box to query intersecting features within the box outline)		x	x	x		
17	By geography (i.e., allows user to select key words for defined areas like cities, counties, watersheds, etc.)			x	x	x	x
18	By key words (i.e., allows user to type in a word to search corresponding layers or attributes within a layer)			x	x		x
19							
20	**Data Sources**						
21	Links to other sites for data	x			x	x	x
22	Links to own agency's data	x					
23							
24	**Host (i.e., who hosts the data)**						
25	State GIS Council						
26	Federal agency						
27	Educational Institution				x	x	
28	Non-profit						
29	Private Sector Commercial						
30	State Agency	x	x	x			
31	Department - Natural Resources	x					
32	Department - Geological Service		x				
33	Department - Geographic Information Office (GIO)			x			
34							
35	**Administration**						
36	Administered by a statewide GIS council made of fed, state, local, academia, and private sector partners	x			x	x	
37	Administered by Alabama Geological Survey		x				
38	Adminsitered by State GIS board supported by multi-agency technology working groups			x			
39							
40	**Metadata**						
41	FGDC standards	x	x	x	x	x	
42	Refers you to metadata tools (FGDC)	x	x		x		

Topic 1: Key Portal Functionality

- User Interface
- Searchability
- Data Sources
- Host (i.e., who serves the data)
- Administration (i.e., who oversees content)
- Metadata
- Data Preview
- Data Delivery
- Communication

Topic 1: Key Portal Functionality

User Interface:

- Easy to use, intuitive
- Fast
- Modern interface (i.e., uses Silverlight, Flex, etc.)

Topic 1: Key Portal Functionality

Searchability

- By theme (i.e., transportation, hydrography)
- By online maps (i.e., launch map service)
- By date (i.e, allows user to input range of dates)
- By metadata (i.e., a subset of metadata fields)
- By agency - (i.e., provides links to agency sites)
- By geography (i.e., allows user to graphically click/drag a box which intersects features within the box's outline)
- By geography (i.e., allows user to select key words for defined areas like cities, counties, watersheds, etc.)
- By key words (i.e., allows user to type in a word to search corresponding layers or the attributes within a layer)

Topic 1: Key Portal Functionality

Data Preview:

- Google map preview
- Thumbnails
- Metadata

Communication:

- Facebook
- Twitter
- Blog
- RSS
- GeoRSS
- Newsletters
- Listserve

Topic 1: Key Portal Functionality

Data Delivery:

- FTP download
- Searchable Map library for download of existing pdf maps
- Order CDs
- Through online map, select and download
- Zip and ship choosing datum, zone, unit, and format
- Map services (i.e., live GIS data feeds)
- Prepackaged datasets in multiple coordinate systems, datum, units and formats

Topic 1: Key Portal Functionality

Administration:

- Statewide GIS council made of fed, state, local, academia, and private sector partners
- State Agency or Department
- State GIS board supported by multi-agency technology working groups

Metadata:

- FGDC compliant
- Basic subset of over all

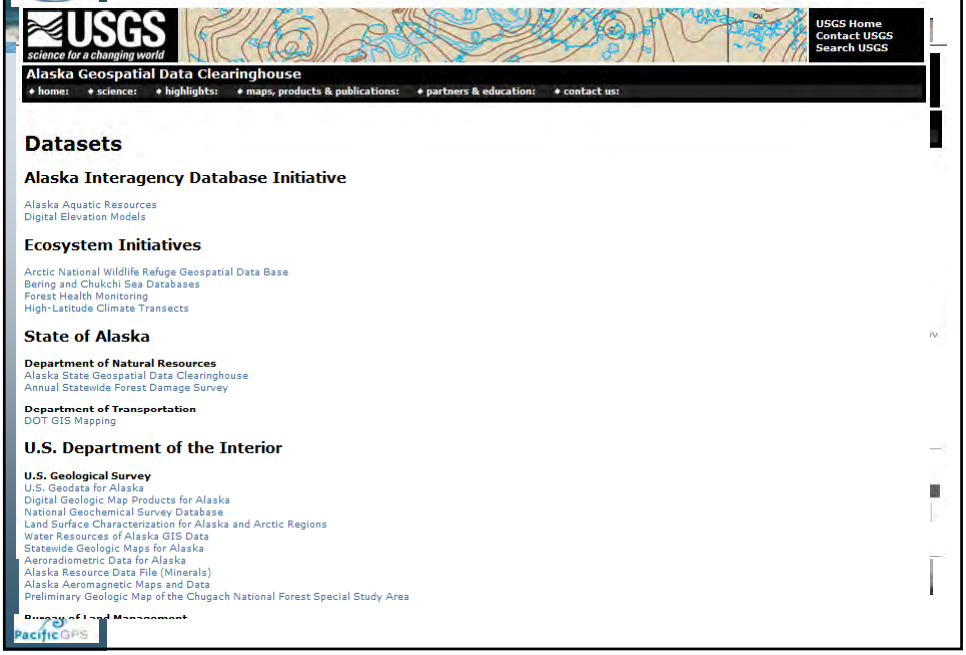
Topic 1: Key Portal Functionality

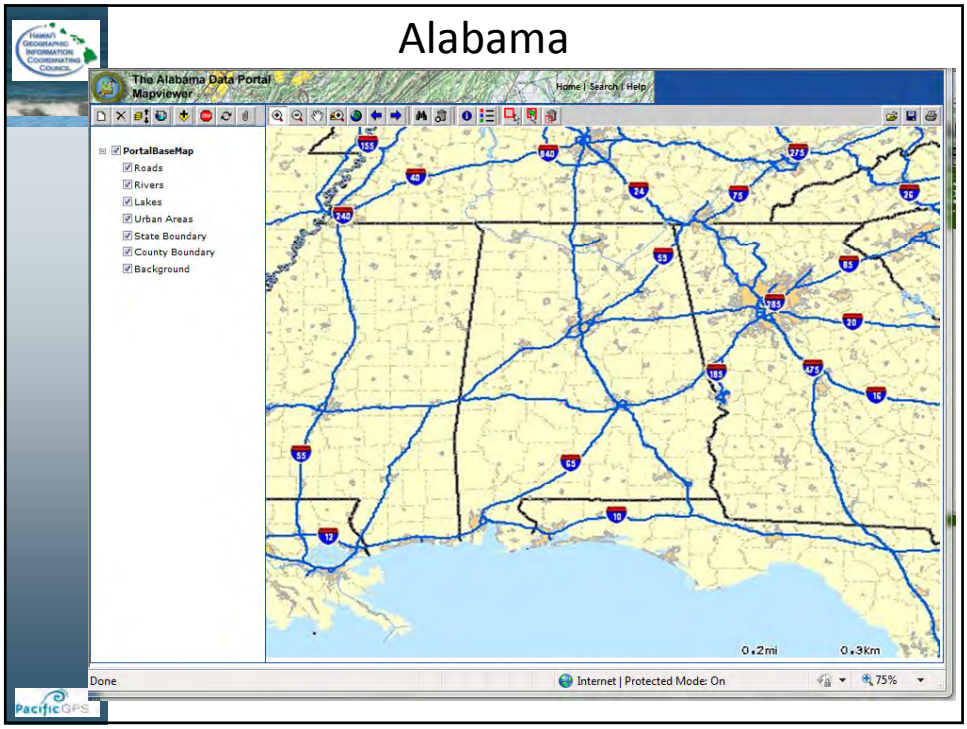
Host (i.e., who hosts the data)

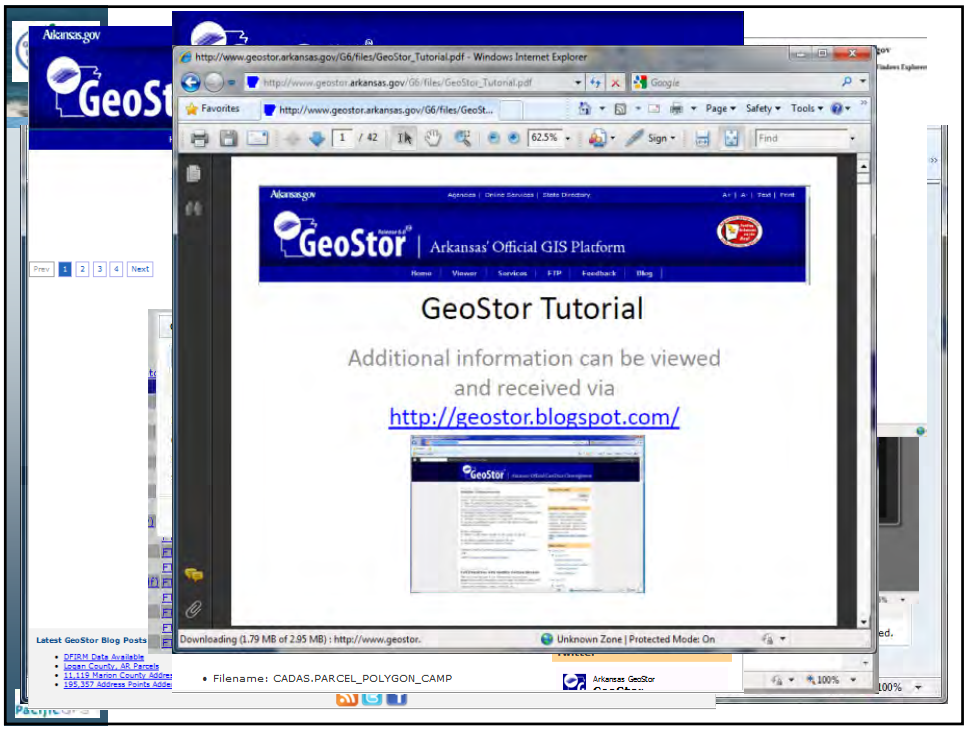
- State GIS Council
- Federal agency
- Educational Institution
- Non-profit
- Private Sector Commercial
- State Agency
  - Department - Natural Resources
  - Department - Geological Service
  - Department - Geographic Information Office (GIO)

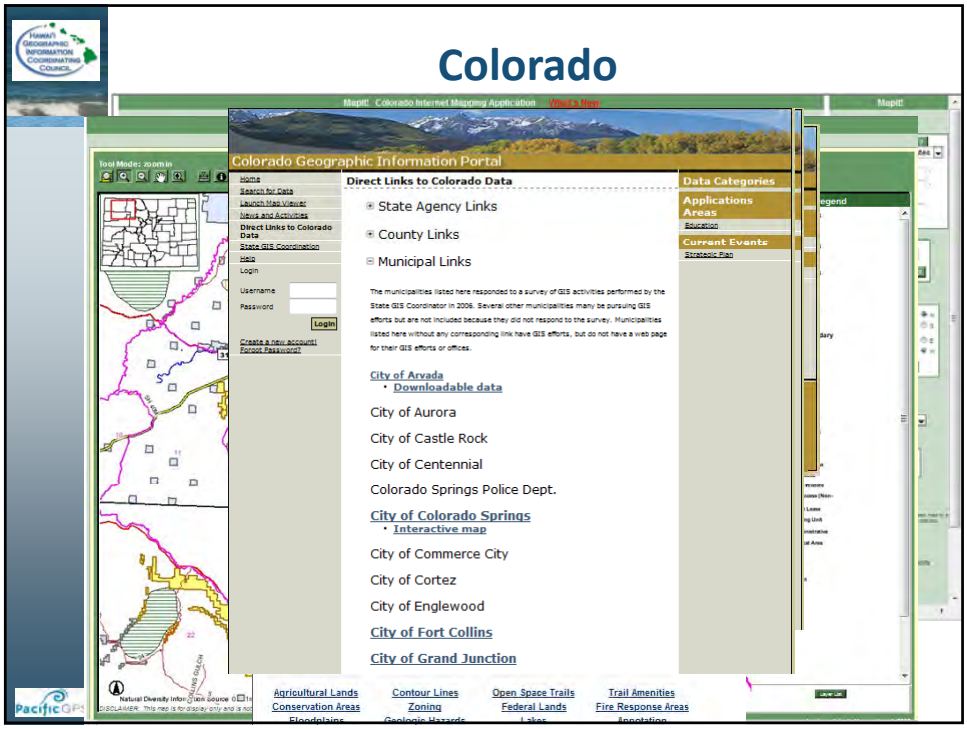
Topic 2:Discussion of web portal research findings

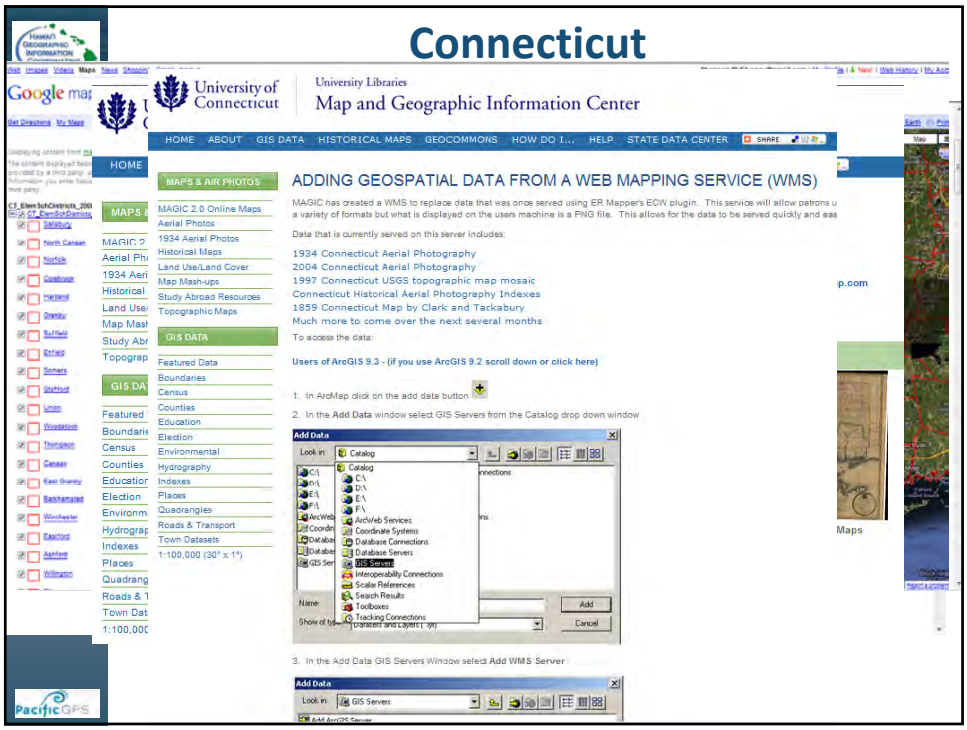
Alaska



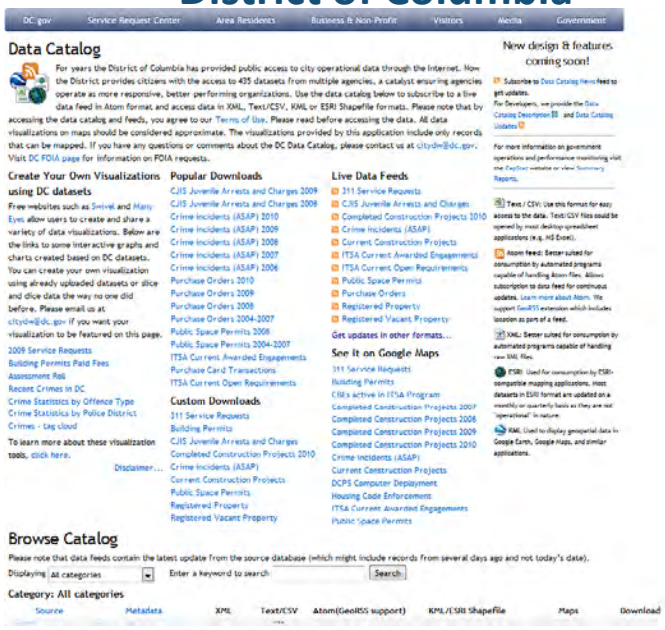

Alabama
The Alabama Data Portal
Mapviewer
Home | Search | Help
PortalBaseMap
Roads
Rivers
Lakes
Urban Areas
State Boundary
County Boundary
Background
0.2mi
0.3km
Done
Internet | Protected Mode: On
75%
PacificGPS


http://www.geostor.arkansas.gov/G6/files/GeoStor_Tutorial.pdf - Windows Internet Explorer
GeoStor | Arkansas' Official GIS Platform
GeoStor Tutorial
Additional information can be viewed
and received via
http://geostor.blogspot.com/
Downloading (1.79 MB of 2.95 MB) : http://www.geostor.
Unknown Zone | Protected Mode: On
Latest GeoStor Blog Posts
Filename: CADAS.PARCEL_POLYGON_CAMP


Colorado
Colorado Geographic Information Portal
Direct Links to Colorado Data
State Agency Links
County Links
Municipal Links
City of Arvada
Downloadable data
City of Aurora
City of Castle Rock
City of Centennial
Colorado Springs Police Dept.
City of Colorado Springs
Interactive map
City of Commerce City
City of Cortez
City of Englewood
City of Fort Collins
City of Grand Junction
Data Categories
Applications Areas
Current Events
Agricultural Lands
Conservation Areas
Contour Lines
Zoning
Open Space Trails
Federal Lands
Trail Amenities
Fire Response Areas


Connecticut
University of Connecticut
University Libraries
Map and Geographic Information Center
HOME ABOUT GIS DATA HISTORICAL MAPS GEOCOMMONS HOW DO I... HELP STATE DATA CENTER
MAPS & AIR PHOTOS
GIS DATA
ADDING GEOSPATIAL DATA FROM A WEB MAPPING SERVICE (WMS)
Add Data
Add
Cancel

District of Columbia



HIGICC's Role in Data Discovery and Dessimination

HIGICC

What

A private non-profit organization of professionals and students from the federal, state, county, education, and private sectors of Hawai'i's GIS community.

Goal

To provide coordination of GIS activities among a wide range of GIS users in order to avoid duplication of effort, promote data sharing, and maintain data standards throughout the state.

Mission

Strive to bring together and continue to build the geographic community into a cohesive, recognized coordinating body that facilitates the use, development, sharing, and management of geographic data and communicates the value of geographic information to citizens and decision-makers.

HIGICC's Role

- **What role does the HIGICC currently play with regards to data discovery & dissemination?**
- **What role should HIGICC play?**
- **Why should HIGICC be involved in data discovery and dissemination?**

Let's Talk Data Discovery and Metadata

Let's talk data discovery

- How do folks currently find existing data?
- What inhibits data use?
- What metadata requirements should be in place?
- What inhibits metadata development?
- What can we do to insure data is easy to find and useful?

What Would be Needed to Create an HIGICC Data Portal?

What would be needed to create an HIGICC data portal?

- Defining the portal requirements
- Defining our audience
- Increasing our relevance
- Defining our administration
- Executive Board, Working Committees
- Hosting – (currently Wild Apricot)
- Funding – (various, by conferences, grants, and membership)

GIS Portal Questionnaire

- For ranking we use a range of 1 to 5 with 1 being of low importance and 5 being of the highest importance.
- Circle the number that best fits your thoughts on importance.
- Ample space is provided for you to be able to provide your own examples for ranking and write comments.
- We will compile results and lump together comments into similar categories so that no one answer can be attributed to a single person.

Appendix 9 – GIS Data Portal Requirements Questionnaire Results

GIS Data Portal Requirements Questionnaire Results

	1	2	3	4	5
	low				high
1. Searchability					
1.1. What would you like to see used for data searches?					
1.1.1. By theme (i.e., transportation, hydrography)	1	2	1	9	17
1.1.2. By online maps (i.e., launch map service)	4	0	8	10	7
Comment: not sure					
1.1.3. By date (i.e, allows user to input range of dates)	0	4	9	9	8
1.1.4. By metadata (i.e., a subset of metadata fields)	1	2	13	7	7
1.1.5. By agency - (i.e., provides links to agency sites)	2	4	9	11	4
1.1.6. By geography (i.e., allows user to graphically click/drag a box which intersects features within the box's outline)	2	1	2	9	16
1.1.7. By geography (i.e., allows user to select key words for defined areas like cities, counties, watersheds, etc.)	3	0	2	7	17
1.1.8. By key words (i.e., allows user to type in a word to search corresponding layers or the attributes within a layer)	3	1	3	6	16
1.1.9. Other: key word / by service (flex, silverlight, etc.) / by data type WFS, WMS, SHP, GDB / Exhaustive Listing			2		1
1.1.10. Other: geographic - nearby					
1.1.11. Other:_____					

1.2. Comments:
MAGIC connection to Google Maps is brilliant!
Combination of all of the above
Really like the interface of the Greenly, CO site.
Metadata is a key way to search for data
Need to allow for posting of MD records for data sets that may not be generally available - i.e. to discover the existence of data and then see if you qualify to access it. Not just public data.
Useful data is in too many different sources….. I find new useful layers every few months.

2. Hosting

2.1. Who would be the most likely candidate to host such a portal?

2.1.1. Federal agency	4	3	5	10	5
2.1.2. State agency	1	3	4	9	11
2.1.3. Educational Institution	3	1	2	9	14
2.1.4. Commercial company	15	3	6	1	2
2.1.5. Not-for-profit	10	4	4	6	3

2.2. *If public, what agency or department would be the most likely candidate?* Follow Connecticut model! / HIGICC /Geographic Information Service / UH / USGS, Office of Planning, ICSD- maybe next Administration / UH - Library or SOEST, FED-USGS or NOAA, State-Comb. of OP and ICSD / DBEDT or UH / USGS, UH / State DBEDT, UH / MAGIS or Statewide GIS Program / GIS / DLNR

2.3. Comments: Why?

Librarians specialized in information retrieval, research, and cataloging material created by al disciplines.
Whoever has funding, should support HIGICC to house
HIGICC Discovery, UH-SOEST & PDC as portal

I really enjoyed learning about the University of Denver & University of Connecticut geospatial data pages. I think with collaboration with the local university here, we can come up with something similar and functional.
Based on available resources, existing infrastructure and expertise (or lack of) and likelihood of getting funds (sustained)
Consistent with agency mission.
NOT private, due to potential conflicts of interest
They already have started down this road
Commercial company will have less red tape to disseminate the data

3. Metadata

	Yes	No	Maybe	Not Sure	
3.1. *Would your agency or department benefit from someone assisting them with metadata development?*	16	7	4	0	
Comment: absolutely! / YES! YES! YES! YES! PLEASE! / We already author a lot of MD. We even help others… / Already have someone					
3.2. *Assuming we all agree to use FGDC metadata standards, what level of metadata attribution would you like to see implemented?*	4	7	6	4	6

3.3. Comments: Explain

Provide incentives for people to add metadata to their data, even if they don't see the immediate value of it.
Definitely must have attribute info!
Should be complete
Perhaps having templates with having prefilled fields as a basis.
The more complex, the more excuses for not creating/distributing.
Not actually sure - but certainly not minimum (too little info) and not max (too cumbersome) - but must include source, date, history, attribute value meanings!!

Full MD standard should be goal. But min CSDGM stnds should be required…
I believe there's a minimum acceptable standard
As an employee in a Federal office, we have to do fully compliant FGDC metadata
All required fields in FGDC + attribute definitions
Need within state Metadata training opportunities.
As long as someone else does it…

4. What methods would you like to see used for data delivery?

4.1. FTP download	5	0	3	9	12
Comment: keep available…not everyone has fast internet					
4.2. HTML hyperlink	3	1	5	12	5
Comment: for 4.1 and 4.2 are we trying to get away from this and head toward web mapping services?					
4.3. Searchable Map library for download of existing pdf maps	5	7	7	5	4
4.4. Order CDs	14	8	5	1	1
Comment: always as an alternative					
4.5. Through searchable online map, select and download data	1	2	3	9	12
4.6. Zip and ship choosing datum, zone, unit, and format for data delivery	3	3	3	5	13
4.7. Map services (i.e., live GIS data feeds that allow you to load directly into your desktop map view)	4	1	3	3	13
Comment: Usually S-L-O-W Comment: I want the data!					
4.8. Other: DVD / WMS					3
4.9. Other: WFS					1
4.10. Other: KML					1

4.11. Comments:

Services should be the foundation. Shouldn't be a repository, but should provide active links to data at original locations + map services + download. Mapping services is the future and we should head towards this, but as an alternative, CD's are always an option.
I need a hardcopy on my laptop…

5. What is important to you in a GIS portal user interface?

5.1. Easy to use, intuitive	3	0	1	10	15
5.2. Fast /responsive	3	0	0	9	17
5.3. Modern interface (i.e., uses Silverlight, Flex, etc.)	2	1	6	12	6
Comment: no! not everyone has up to date flash! Comment for 5.1, 5.2 and 5.3: Must be all of these					
5.4. Other: Legibility for limited sight / content - rich / Has comprehensive amt of data					3
5.5. Other: Scalable icons and mouse over decriptions					1

5.6. Comments:

Keep it simple. Maintain ADA accessibility. ArcPad ≠ Flash

Must provide for different approaches for different user types - e.g. casual mappers using free tools.

Adheres to ADA and council. For the blind recommendations. Separate window navigation so you can always return to the source map/query page.

Flex is Great

Some things to consider: firewalls, security, etc. if the portal is not convenient, it won't be effective.

I just need the data…

6. How should we work together to purchase large datasets used in common?

6.1. Leverage buying power through collaborative data consortiums	2	0	0	8	20
6.2. Other: Coordinate interest and needs / Use my taxes for information not bombs. / Let Henry Buy It. / Training / MOV's with NOAA's coastal geospatial service contract (CGSC) / approach engineering, planning and surveying companies for input into a consortium / E911 - State funded County "owned" and controlled	0	0	1	1	5
6.3. Other: _____					

6.4 Comments:
We should have an initiative to lobby for NAIP coverage.
Yes - communication is key - there are some who work in silos- don't inform as data is being contempl. if at all
E911 should be looked into… Data should be released to public… We have Google earth already…

7. How should we go about sharing data?

7.1. Use ad hoc “sneaker net” methods of coping hard drives or passing CDs or DVDs	7	7	8	5	2
Comment: in the meantime Comment: keep available…not everyone has fast internet					
7.2. Use a GIS portal capable of making data easily discoverable and downloadable	2	0	0	6	22
7.3. Other: Multiple data services - served from data origins / Data Search Engine (e.g. USGS Earth Explorer.) / Need demarkation of large vs small datasets / linked network interface / Use existing sites (e.g. state site, SOEST) / Annual "Data Discovery" workshop / FTP					4
7.4. Other: zip and ship					1
7.5. Comments: Although this takes away from 'networking', a GIS portal is a seamless way of sharing data as it reduces duplication and everyone is speaking the same language. Sneaker not on work but we need better communication to let people know about existing data. We are not in the 'sneaker not' loop and thus the public could be at risk… If data not released who is liable?					

8. How should we go about increasing communication about key data availability and issues surrounding updates, etc.?

Comments: Don't know yet!					
8.1. Blog	4	6	2	5	11
8.2. Facebook	8	8	3	7	2
8.3. Twitter	10	7	3	5	3
Comments: hate it, but Arkansas site uses it way cool.					
8.4. GeoRSS	6	4	3	7	6
8.5. RSS	5	4	3	5	6
8.6. Listserve (i.e., blanket emails)	6	3	3	7	8
8.7. Other: targeted emails / website / specific Hawaii Data iphone App / LinkIn / Formal site with updates					5
8.8. Other:_____					

8.9. Comments:

Should provide data service service for those who can't serve their own data. I personally don't use these sights and are often blocked at my place of business. I like the old fashion email way of communicating key data availability (with an update capability)
Not Sure

Appendix 10 – Memorandum of Understanding Examples

Below are web sites with good examples of MOU's and Memorandum of Agreement's (MOA's) for data and cost sharing:

http://gis.utah.gov/gisac-strategic-planning-archive/1997-data-sharing-memorandum-of-understanding-mou

http://www.nysgis.state.ny.us/coordinationprogram/cooperative/ (Note the diagram on page 21/59)

http://co.calaveras.ca.us/CC/LinkClick.aspx?fileticket=wEAea8aTkZ4%3D&tabid=512

http://www.igic.org/committees/datashare.html

http://www.nysgis.state.ny.us/coordinationprogram/reports/model/index.cfm

http://www.oregon.gov/DAS/EISPD/GEO/docs/gisutility/1339.1.3DataStewardshipDeliv3EFINAL123005.pdf

http://www.oregon.gov/DAS/EISPD/GEO/data/doq/doc/Ortho_MOU_2004.pdf?ga=t

http://www.oregon.gov/DAS/EISPD/GEO/docs/datasharing/DataSharingApproach.pdf

Appendix 11 – Glossary

aerial triangulation - The process of developing a network of horizontal and vertical position from a group of known positions using measurements taken from aerial photographs and mathematical computations.

attribute data - Characteristic or descriptive information about a geographic feature (points, lines, or areas) stored in either tabular format or relational format.

base map - A map containing geographic features, used typically for locational reference and for overlaying specific, discipline data.

CIRGIS - Channel Islands Regional GIS – a 501c (3) non profit. Its purpose is to facilitate the development and maintenance of an ongoing public-private partnership for sharing and expanding the use of standard spatial data to foster informed community decision making, innovative business development, environmental management and education in the Channel Islands region of California.

coordinate system - A system to measure horizontal and vertical distances so that a geographic feature true position can be established in relation to an accepted public reference system such as State Plane or Universal Transverse Mercator (UTM) coordinate systems.

data formats – The specific patterns into which data are systematically arranged for use by a computer or specific software. There are both proprietary data formats and public-domain data formats.

DIAC - Data Inventory and Assessment Committee of the HIGICC.

Geographic Information System (GIS) - An organized collection of hardware, software, data, and personnel designed to input, analyze and display geographically referenced information.

GeoTIFF - A binary digital image format commonly used by GIS software that is characterized by reference information imbedded in the file header as opposed to an external file.

Global Positioning System (GPS) - A satellite-based system for recording positional information and other data about a geographic feature. Ground positions are calculated by using signals from at least 24 GPS satellites orbiting the Earth.

ground control - Physical points on the ground whose positions are known with respect to some horizontal coordinate system and/or vertical datum. When identifiable on both the ground and in an aerial photograph, ground control can be used to establish the true position of the aerial photograph.

HIGICC – Hawaii Geographic Information Coordinating Council – A private non-profit organization of professionals and students from the federal, state, county, education, and private sectors of Hawaii's GIS community. Its mission is to bring together and continue to build the geographic community into a cohesive, recognized coordinating body that facilitates the use, development, sharing, and management of geographic data and communicates the value of geographic information to citizens and decision-makers.

imagery - A graphical representation of an object produced by an optical or electronic device (photograph).

I-Plan - Stands for Implementation Plan, which defines a process for prioritizing data themes that will contribute to building the NSDI, and summarizes sixteen data themes that will be included in the prioritization process. The goal is to devise a plan for the development, distribution, and long-term maintenance of each theme.

orthophoto - Aerial photographs that have been processed to correct for scale variations and image displacement resulting from relief or terrain variations and camera tilt.

planimetric data - Data about features on the Earth surface that are represented only by their correct horizontal position. Distinguished from a topographic map by the omission of relief in a measurable form.

quarter quad - One-quarter area of a four-sided quadrangle that depicts 7.5 minutes of latitude and 7.5 minutes of longitude on a side. Used as a standard surface area mapping unit by the U.S. Geologic Survey.

QA/QC - Quality Assurance / Quality Control of project process and deliverables.

rectification - The process of eliminating photo scale variations and relief displacement. In digital image processing, it also refers to correcting for geometric distortions, radiometric calibrations, and noise removal.

satellite imagery - Imagery that is collected using a space-borne remote system that is in orbit around the Earth.

SSDI - Statewide Spatial Data Infrastructure

surface data - Information about variations in the surface of the Earth that are referenced to a known coordinate system and vertical datum. A required component of the orthophoto rectification process.