REQUEST FOR INFORMATION ON COTS VIRTUAL GLOBE APPLICATIONS
Document Number: USDA-FSA-GIS-2008

A. INTRODUCTION

The U.S. Department of Agriculture (USDA), Farm Service Agency (FSA) is investigating the use of alternative methods of delivering, disseminating, and integrating large geospatial datasets to FSA and other users. The Government is requesting information on commercial-off-the-shelf (COTS) software systems and/or commercial web mapping interface services that offer a potential alternative to FSA's current delivery and data management system. The objective of this RFI is to investigate more effective and efficient ways to integrate geographic information system (GIS) applications with FSA business data. This RFI also provides a record and evidence of proper market research. This RFI was prepared for USDA Farm Service Agency, 1400 Independence Ave SW, Washington DC, 20008.

B. BACKGROUND

The FSA is responsible for administering USDA farm programs including crop commodity price support, disaster relief, and assistance for conservation practices. FSA administers farm programs in part by digitizing and maintaining agricultural field boundaries, or common land units (CLU) from digital orthoimagery acquired from the National Agriculture Imagery Program (NAIP). CLU boundaries consist of fence lines, roads, waterways, and other cultural features, which form the interface between agricultural vegetative cover and non crop vegetative cover on the surface. Another key aspect of farm program administration is to verify that agricultural practices are in accordance with USDA program parameters. FSA has performed this verification by using NAIP imagery which is acquired during peak agricultural growing seasons on an annual basis. The aerial imagery, along with existing program parameters, is viewed in a GIS application at county based USDA Service Centers to show crops and agricultural practices. CLU boundaries are displayed to assist with identification of farm parcels and acreages. The use of NAIP imagery has been successful in providing FSA current orthoimagery for maintaining CLU boundaries and performing farm program administration. It has also provided participating government agencies with current, accurate orthoimagery for their GIS programs.

CURRENT STATE OF OPERATIONS. Approximately 2,350 service center offices exist throughout the country representing mission critical locations for storing and managing geospatial data. Updates for all of the dynamic geospatial data types are performed at the service centers. In addition to the standard geospatial data types and sources, service centers also store and use supplemental data that are provided to them by state and local governments and private sector sources. In the current environment, each service center has a state IT staff that maintains, updates, and secures the infrastructure. The amount and availability of information from one service center to the next is inaccessible to any user above the service center level. In the current environment,

cataloging and publishing metadata on service center data holdings would add to the already overstretched staff resources at the local and state levels.

All Service Centers have a Hewlett-Packard(R) ProLiant(TM) ML370 File Server with SQL/SDE applications and an IBM(R) AS/400 server. The CLU data layer(s) reside on the ProLiant server and is accessed by the CLU Maintenance Tool, which is a customized application based on the ArcGIS(TM) software from ESRI(R), that runs on the client workstations. Clients can only access data on the local server and cannot edit data outside the administrative area. State and national employees cannot access the data without being at the physical site for any user friendly editing experience. The current architecture has the GIS data and business data located at the same physical location, but there is no integration with the business tabular data, which resides on the AS/400 except at the Land Use (LU) pilot sites which is ~240 sites around the country. The AS/400s are targeted for phase out due to functional obsolescence and as applications are deployed to migrate business applications to a centralized, web environment. The ProLiant ML370s have outlasted their warranty and ITS does not wish to extend their support for applications on this hardware under these circumstances. As a result, a replacement is needed to house the GIS data in the ~2,350 offices nationwide.

In the current environment, FSA national headquarters is limited in direct access to the local service centers' databases. Database administrators at Kansas City have the ability to access data on an ad hoc basis and the scope of their work is very limited once access is gained. However, the absence of a central repository precludes users from viewing and analyzing data for the entire country, states, or multi-county regions. Because the majority of geospatial activities are carried out at service centers, access to the distributed service center databases would have to be established to evaluate accuracy and completeness of any geospatial task. The current environment requires additional resources and personnel dedicated to the operations and maintenance of the ProLiant ML370 servers located at the service centers. The current process also hinders the ability of users at national headquarters and state offices to access information processed at the service center level.

FUTURE STATE OF OPERATIONS CONCEPT. The future environment will consist of a centralized, fully integrated architecture potentially to be hosted at the National IT Center (NITC) and the Aerial Photography Field Office (APFO) web farms located in Kansas City and Salt Lake City, respectfully. GIS applications hosted in a centralized architecture will improve communication between national headquarters, state offices, and the service centers. It is envisioned that an integrated architecture will allow end users to access data from a central location, thus reducing the redundant and time consuming tasks of requesting information from a specific service center. Additionally, the USDA Office of the Chief Financial Officer (OCFO) has requested that consideration be given to removing the hardware (ProLiant and AS/400) from all service centers and consolidating the equipment into six data centers. A centralized environment will greatly reduce the risks associated with the physical security of the IT infrastructure. Centralizing FSA's GIS requirements also meets the intent of Congressional committee discussions and language in the 2008 Farm Bill.

In a centralized environment, work stations in service centers will use thin clients to connect to central web or terminal server applications. Internet browsers and/or Citrix Systems(R) terminal server software will enable connections to centrally hosted applications and data servers. The centralized/integrated architecture will host the majority of GIS business applications and data on the dedicated central servers.

C. REQUEST FOR INFORMATION

The Government is soliciting responses from industry addressing an enterprise approach to delivering custom GIS data information to FSA and other users. The GIS data shall be integrated with farm program business data ensuring cost effective and efficient program delivery to internal and external customers. The COTS packages and/or services should enable expedited compliance with Congressional mandates and other information requests, and leverage USDA's investment in geospatial data and computing technologies. Please address all questions and requirements and include feedback on all related topics, including application implementation costs, licensing costs, schedules, and risks. In addition, please feel free to provide other recommendations or suggestions on related subjects or issues.

At a minimum, please respond to the questions in the following sections:

1) APPLICATION ARCHITECTURE: USDA is looking for a lightweight client based GIS analysis tool that will provide a robust application to enable USDA personnel the ability to interact with their customers. A Virtual Globe (VG) or geographic exploration system (GES) client, enabling 3-D globe visualization is envisioned as a preferred solution. Describe the client side architecture and graphical user interface that would be implemented via your product. Describe the server side architecture of your application discussing server footprints, network bandwidth requirements, and processing capacities required to support a solution that delivers raster and vector datasets to the 2300+ USDA locations across the nation. Does your system architecture adhere to design principles of service-orientation architecture (SOA)? Is the application IPv6 compliant? Is the product an open source product or proprietary?

2) DATASET INTEGRATION: In order to be a productive tool, the ability to integrate tabular, vector and raster datasets is required. Please describe your applications ability to fuse tabular, vector, and raster data from both a web services based access model as well as via direct connections to remotely located spatial and non spatial databases across the USDA WAN. What common geospatial data formats and common data interchange protocols does your application support for integrating data and web services?

Base imagery for the VG environment is also an important aspect of the overall solution. Describe the methods by which imagery would be made available to the client application. What processing is required to integrate a national scale, 1 meter resolution or greater, imagery dataset into your application for base mapping purposes? What is the

time involved to integrate, on a yearly basis, more current imagery as it becomes available? Are there specific formats or standards that an existing imagery dataset must meet prior to being integrated with your product? Is there the ability to integrate high resolution elevation data (e.g. derived from IFSAR/LIDAR) into the deployed solution? Does the ability to integrate with existing USDA WMS based imagery services exist, or would the imagery data need be hosted within a proprietary architecture?

3) SECURITY: Certain USDA datasets contain sensitive data protected under U.S. privacy laws. Please describe the supported authentication processes available within your product, and discuss the ability of your product to integrate into an existing department wide authentication mechanism such as USDA's eAuthentication system. Does the software support role-based authorization? Does the ability to have different users access different datasets or different components of the same dataset (attribute and geospatial) exist?

4) BASIC GIS CAPABILITY: Basic GIS functions and analysis tools are necessary to support USDA's requirements. The need to support complex GIS editing tasks is not a requirement for the purposes of this RFI. Please describe your applications client GIS capability. Does it allow for querying and navigation to areas of interest, such as cities or counties? Is full gazetteer functionality supported? Does the product allow for the identification of features? Can feature attributes be accessed, viewed, queried, and used as selection criteria? Can vector features be used within basic geospatial tasks such as intersections and buffer creation? Can non-spatial (tabular) data be queried through the geospatial interface? Is panning and swiveling of the globe supported? Can the user create "place marks" to annotate and bookmark areas of interested with stored text, pictures, or other information? Is there the ability to clip and extract areas of interest with metadata, projection, and/or georeferencing information intact? What other basic GIS capabilities exist? Describe both the client side and server side geoprocessing and geocoding capabilities that would be available within an implemented solution with your products.

5) SPATIAL REFERENCE SYSTEM SUPPORT: USDA typically works in NAD83/UTM projection, but requires other projections such as State Plane and WGS84. Describe the ability of your product to merge geospatial data from different spatial reference systems and the ability render maps and globes in different reference systems? Does the ability exist to determine a base reference system based on parameters identified on a "per user" or "user group" basis? Are there limits to the precision of data that can be used across these various reference systems? Is high precision vector (less than 1 mm precision) data supported?

6) COLLABORATION: USDA users need to share spatial data among co-workers. Does your application support collaboration such as sharing geospatial markers between users? Is peer to peer file sharing and minor workflow integration supported? Is there additional networking components or hardware components required to support this data sharing and workflow integration? What are the Area of Interest (AOI), map template,

and print functionalities? Do they support cartographic map layout features such as legends, title blocks, scale bars, north arrows, tic marks, etc.?

7) EXTENDIBILITY: USDA may need to extend the application capability or create custom tools for office personnel. Can the base functionality of the product be extended via custom GIS tasks or other software components? Can web based services providing canned GIS/geoprocessing tasks be incorporated into the toolset? Is an object oriented software development kit (SDK) provided as part of the application architecture? What customizable reporting capabilities are available? What developer support is available? What printing functionality is available? Is high resolution, cartographic quality printing supported?

8) SCALABILITY: USDA has expectations of integrating these new technologies with the public's demand for GIS data and remote access to FSA programs. Describe the ability of your application to support a tiered architecture, enabling access by both USDA office personnel (enterprise tier) and access by the general public, or authorized users, via a lower tiered application. Is a common interface and client application available across the enterprise tier and the public tier? Is there licensing or other application costs associated with the client software required by the public? Describe the GIS functionality that would be available in a public deployed version of the application versus the application that would operate within the USDA enterprise. Does your product allow for a public version of the application to interact or integrate with data and transaction workflows that have been created or updated by USDA personnel with the enterprise tiered version of the application and how would user authentication occur in this scenario?

9) CLIENT HARDWARE/SOFTWARE REQUIREMENTS: The typical USDA user operates a Microsoft(R) Windows(R) XP based computer. Please describe the minimum workstation requirements for the client component of your application including supported operating systems, CPU and RAM requirements, graphics card requirements, hard disk space usage, and screen resolution specifics. What is the minimum network bandwidth required to the client workstation for your application to operate effectively? From a client perspective, is the application cross-platform compatible, that is, can the application be deployed in an integrated fashion across different workstation types and operating systems? For the various operating systems supported, list any additional software components in addition to the base client GES or VG software that is required to be installed, such as web browser software, plugins, applets, and application framework oriented software.

D. INSTRUCTIONS TO RESPONDENTS

Responses to this RFI are due no later than 4:30 P.M. (Mountain Time) on February 29, 2008. Two copies of your response may be mailed to Contracting Officer, Mr. Geoffrey Gabbott at 2222 West 2300 South, Salt Lake City, UT 84119, or one copy faxed to (801) 956-3640 to the attention of Mr. Geoffrey Gabbott, or submitted electronically to apfo.contracts@slc.usda.gov. The electronic copy of your responses must be in an

Adobe Systems(R) PDF (Portable Document Format) format and readable by the Adobe Acrobat Reader(TM). Any proprietary data that is included in the response must be marked appropriately at the paragraph level (page level is acceptable for full page table, graphs, etc). Any response marked proprietary at the document level will not be considered.

F. CONTACT INFORMATION

Clarifications or questions regarding this RFI must be submitted in writing to ted.payne@wdc.usda.gov or faxed to (202) 690-2374 to the attention of Mr. Ted Payne. All clarifications or questions must reference this RFI.

NOTE: This RFI is being issued solely for information and planning purposes and does not constitute an Invitation for Bids (IFB), a Request for Proposals (RFP), a Request for Quotations (RFQ) or an indication that the Government will contract for any of the items and/or services contained in this notice. All information received in response to this notice that is marked Proprietary will be handled accordingly. Responses to this notice will not be returned. In submitting a response, you are solely responsible and accountable for all of the expenses associated with your response. The following provision is applicable to this notice and is hereby incorporated by reference: FAR 52.215-3 Request for Information or Solicitation for Planning Purposes (Oct 1997). The full text of this clause is available at: http://www.acquisition.gov/far/index.html.