



**U.S. Department of Agriculture  
Information and Technology  
Management  
Office of the Chief Information  
Officer**

# **Review of Unified Geospatial Segment Architecture & Pre-Select Business Case**

**July 31, 2008**

**Updated for USDA Imagery Meeting**

**By Jim Heald, FSA/ITSD Geospatial  
Center**

**December 2008**



# Summary and Background Information

- **Summary of USDA Geospatial Activities**
  - ★ Geospatial data is a major component of USDA Business, it is used on a daily basis for mission critical operations by many agencies.
  - ★ USDA spent \$88 million on Geospatial Line of Business in FY2008
    - This is probably underestimated
  - ★ USDA currently operates 54 Geospatial Systems across 15 Agencies
    - Probably more
- **Geospatial Segment Architecture Initiative**
  - ★ Necessitated by the Guidelines for Enterprise Data Centers and Critical Systems published by the USDA OCIO in January 2008.



## As-Is Geospatial Segment Architecture

- **DRAFT As-Is Segment Architecture completed for all USDA GIS activities in January 2008.**
- **Complete inventory of all systems, cross reference related data to FEA Reference models, funding profile.**
  - ★ **Not really complete**
- **Intended to provide a complete picture of USDA geospatial activities and provide data for development of a to-be architecture.**



## To-Be Segment Architecture and Next Steps

---

- **Pre-Select Business Case was developed by August 31.**
- **Complete Alternatives Analysis due by December 31, 2008 to develop a full solution for to-be architecture.**
- **Develop final to-be architecture and supporting business case by March 31, 2009.**



## Vision for the Future

- **Vision for fully integrated GIS systems across USDA with data shared and accessible to all agencies and external partners**
- **Department-Level Geospatial management and coordination**
  - ★ **By whom? OCIO has no Geospatial staff or expertise**
  - ★ **Agencies fear an ITS-like solution for GIS**
- **Increased ability to effectively manage and store geospatial data**
- **Improved data sharing capabilities and processes**
- **Increased portability and dependability for field GIS users and analysts**



## Why is This Mission Critical?

- **Ensure USDA compliance with OMB mandates and alignment with FEA Geospatial requirements**
- **Ensure Program delivery system supports data integrity, reliability, and consistency across USDA and for all related stakeholders (USDA Program Managers, USDA field and service center staff, other Federal employees, citizens)**
- **Provide real-time, on-demand querying capabilities and access to reports, maps, imagery, and data for users and stakeholders.**



## Benefits

- **Improved ability to integrate GIS operations with mission critical business operations and reduced risks and costs associated with testing and deployment**
- **Provides ability for users to obtain and analyze GIS data layers and imagery from a single location**
- **Streamlines information sharing between agencies, outside partners, and other stakeholders**
- **Improves accuracy and data integrity through centralized data management and system administration.**



# Challenges

## USDA

- **Information on network, hardware, and software specifications is not centrally available for cross-agency comparison.**
- **Infrastructure to support enterprise-level geospatial data is not currently available.**
- **Existing policies for desktop configuration, permissions and access do not recognize the unique requirements necessary to develop and share geospatial data.**
- **Lack of department-level support and management for geospatial initiatives and development.**

## Technological

- **Service centers and field offices lack the network and telecommunications capacity necessary for geospatial data sharing.**
- **Users of geospatial data often have desktop computers that are not optimally configured for geospatial tasks.**
- **Agencies (particularly FAS, NRCS, and FSA) do not have adequate storage capacity.**



**U.S. Department of Agriculture  
Information and Technology  
Management  
Office of the Chief Information  
Officer**

# **Geospatial Segment Architecture Alternatives for Consideration**

**October 21, 2008**

**updated for USDA Imagery Meeting by  
Jim Heald, FSA**



## Current Environment

- ★ **USDA invests over \$88 million geospatial activities. These systems, partially or wholly, use geospatial data and functions to fulfill USDA's many missions.**
- ★ **However, geospatial activities at USDA have grown from the bottom up resulting in:**
  - Compartmentalization within agencies
  - Data storage in disparate systems and locations
  - Numerous gatekeepers and IT environments
  - Data may not be timely, uniform, or available
  - Little awareness of national scale across agencies or applications
    - **Clearly they've never been to one of these meetings**
  - Absence of a Common Operating Picture



## Alternatives Analysis (Jim's Summary)

- **100,000 foot level analysis**
- **Lots Missing**
  - ★ Agencies didn't tell OCIO everything
  - ★ Agencies don't know everything/haven't figured it all out
  - ★ OCIO and Contractors don't really know GIS and Remote Sensing
- **Three Alternatives**
  1. Status Quo
  2. Fully Unified GIS Operating Environment and Architecture
  3. Fully Unified GIS – 99.99% Outsourced
- **Study is designed to select Alternative 2**

# Alternative 1

## Maintain Status Quo

Area of Focus	Alternative 1	Area of Focus	Alternative 1
Enterprise Software	ELA for ESRI software	Enterprise Data Centers (EDC)	Four newly designated EDCs
Terminal Server access to Software	Planned by FSA and NRCS	Hosting	USDA hosting at various locations ESRI hosting for ClearView
Imagery	NAIP FAS Imagery Archive Assorted other formats and locations	Commercial Application Usage	Interest in using commercial sources for limited use and simple applications
Master Data Sets	Tele Atlas (few agencies) Common Land Unit (CLU )-limited access Forest Service data not easily available Base map data sets scattered across agencies and applications	Common Operating Picture	None, data for emergency preparation scattered and not integrated, ClearView is an prototype. None available for uniform analysis or background of program data
USDA Webservices	Some developed but not widely utilized or shared across USDA	Integration of Program Data	Some integration but often there are legal, technology or expertise obstacles to this
Other federal webservices	Some developed but not widely utilized or shared across agencies		

# Alternative 2

## Unified Geospatial Environment



Area of Focus	Alternative 2	Area of Focus	Alternative 2
Enterprise Software	ELA for ESRI software	USDA Webservices	Implement webservices of master data sets and imagery for sharing and consumption from other agencies.
Terminal Server access to Software	Implement terminal server access, as feasible, for all USDA agencies	Other federal webservices	Integrate webservices and data exchange with other federal agencies for other master data sets of common interest
Imagery	Consolidate hosting of imagery with appropriate system and security requirements for any USDA produced or acquired imagery. Plan for any USDA responsibilities for Imagery for the Nation.	Hosting	Integrate EDCs to provide foundational geospatial data with business applications
Master Data Sets	Create a single hosting location for <i>master standardized data sets</i> , including imagery data, produced by or licensed by USDA.  Continue to produce data as necessary and incorporate data acquired through interagency efforts	Enterprise Data Centers	Determine the roles, responsibilities, and infrastructure needs to support geospatial and business applications
		Commercial Application Usage	Analyze the utility of using commercial vendors and the result of the GSA Smart Buy and ArcGIS On Line
		Common Operating Picture	Establish a <i>common operating picture</i> of geospatial data with interoperable environments
		Integration of Program Data	Make USDA foundational geospatial data services available to business applications with program data



## Alternative 3 Outsource Production of Geospatial Data

Area of Focus	Alternative 3	Area of Focus	Alternative 3
Enterprise Software	ELA for ESRI software	Other federal webservices	Consume webservices and data exchange with other federal, State, and local agencies for other master data sets of common interest
Terminal Server access to Software	Implement terminal server access, as feasible, for all USDA agencies	Hosting	Plan for primarily commercial hosting of data distribution and applications
Imagery	Rely on commercial sources of imagery	Enterprise Data Centers	Lease commercial data centers
Master Data Sets	Outsource production, hosting and distribution of all geospatial data, as consistent with information security requirements  Require contractors meet FGDC and USDA geodata standards, data management lifecycle, metadata, and business requirements	Commercial Application Usage	Use commercial mapping application vendors for USDA business applications e.g. Google Earth, MS Virtual Earth, etc
		Common Operating Picture	Adopt and Implement Common Operating Picture emergency applications from other federal agencies
USDA Webservices	Integrate webservices from commercial sources	Integration of Program Data	Limit integration of program data due to constraints on using outside sources



## Some Problems and Issues – Jim’s Opinions

- **No real assessment of Agency Needs**
  - ★ “Vision” is an optimized status quo
    - Does not account for Raw, Stereo Imagery (for example)
    - Does not account for any needs that haven’t been articulated to OCIO
  - ★ Agencies have had limited involvement and access
- **Not clear WHAT is being outsourced or unified**
- **Currently, we already outsource much of our data production**
  - ★ Imagery is a prime example
  - ★ NRCS: Can Soils be outsourced? Does it make sense?
  - ★ FSA: CLU Maintenance can not be outsourced
  - ★ Who builds a Wetlands Layer from what source material?
- **We also already outsource much of our SW development and support**
- **Outsourcing Hosting is separable from other outsourcing goals**
- **In a SOA world, Integrated Applications can be based on external data sources**
- **Why would we depend on Google or MS VE for our Business Applications?**
  - ★ Fundamental lack of understanding of WHAT we do