United States Department of Agriculture
Unified Geospatial Environment
Pre-Select Business Case
September 2008

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1.0 Introduction

This document will serve as the foundation for development of the Alternatives Analysis and the full Unified Geospatial Environment Business Case. The Pre-Select Business Case is comprised of the following sections:

- Preliminary OMB Exhibit 300
- Mission Needs Statement
- Concept Management Plan
- Preliminary Cost Benefits Analysis

This Pre-Select Business case and findings were developed based on the following documentation:

- Agency subject matter expert interviews
- Geospatial Segment Architecture "As-Is" Report
- Agency geospatial-related documents
- Agency geospatial-related budget submissions
- Geospatial research information sourced from third parties
- USDA Capital Planning Guidance documentation

A full Alternatives Analysis for the Unified Geospatial Environment has not yet been completed, however, it is anticipated that the Geospatial Alternatives Analysis will be completed no later than December 31, 2008. A To-Be solution architecture will be completed based on the findings of the Alternatives Analysis. In order to provide a basis for comparison, preliminary alternatives for this document were derived from applicable agency documents, and enterprise-wide 10-year Life Cycle Costs were estimated using available documentation and FY2008 costs where possible.

2.0 Preliminary OMB Exhibit 300

Exhibit 300 FY2010	
Unified Geospatial Environment	
Part I: Summary Information And Justification (All Capital Assets) **Description: In Part I, complete Sections A, B, C, and D for all capital assets (IT and non-IT). Complete Sections E and F for IT capital assets.**	
I.A. Overview (All Capital Assets) **Description: The following series of questions are to be completed for all investments.**	
I.A.1. Date of Submission:	09/30/2008
I.A.2. Agency:	Department of Agriculture
I.A.3. Bureau:	All
I.A.4. Name of this Capital Asset: Description: (Up to 250 characters)	Unified Geospatial Investment
I.A.5. Unique Project (Investment) Identifier: Description: For IT investment only, see section 53. For all other, use agency ID system.	
I.A.6. What kind of investment will this be in FY2010? Description: Please NOTE: Investments moving to O&M in FY2010, with Planning/Acquisition activities prior to FY2010 should not select O&M. These investments should indicate their current status.	
I.A.7. What was the first budget year this investment was submitted to OMB?	
I.A.8. Provide a brief summary and justification for this investment, including a brief description of how this closes in part or in whole an identified agency performance gap: Description: (Up to 2500 characters)	

This initiative will bring increased transparency to USDA's geospatial infrastructure by providing better decision-making and more effective governance of geospatial investments; enable more cost-effective and efficient procurement of geospatial products and services, and by enhancing the Department's ability to adapt rapidly to advances in geospatial technology.

The key to improved geospatial performance and accountability is to manage the specific operational and developmental requirements of USDA's diverse agencies within a USDA-wide baseline of technology, services, and data assets. Management of the business and technical resources at the enterprise level will provide the coordination necessary to guide the evolution of data and services from the current baseline to the target state. As new investments become necessary, the geospatial governance group (with input from stakeholders) will validate and prioritize them in order to develop a coordinated investment strategy. The proposed geospatial segment will provide a vehicle through which USDA can identity, review, and prioritize requirements for geospatial assets.

As the information technology discipline matured, it became evident that there was a need for greater accountability and transparency for IT investments. Accordingly, the USDA has applied lessons from the broader IT community, both the private and public sectors, to manage the Department's IT resource more effectively and efficiently. The unified geospatial segment architecture will bring increased transparency to USDA's geospatial infrastructure, thereby enabling more efficient use of those resources.

The formation of the USDA Unified Geospatial Segment Architecture is mandated by various legislative and executive branch initiative and publications. These include

- OMB Circular A-16 (Coordination of Geographic Information and Related Spatial Data Activities);
- Executive Order 12906 (Coordinating Geographic Data Acquisition and Access: The National Spatial Data Infrastructure;
- The Presidential Initiatives for the Geospatial One-Stop and Geospatial Line of Business;
- OMB Circular A-11 (Preparation, Submission, Execution of the Budget)
- USDA OCIO Guidelines for Enterprise Data Centers and Critical Systems; and
- Farm, Nutrition, and Bioenergy Act of 2007, HR 2419, section 1619.

The USDA Unified Geospatial Segment Architecture must be able to support the mission needs of many different agencies. For example, the Farm Services Agency (FSA) must provide expanded customer self-service via the Internet and deploy eGovernment solutions that allow agricultural producers to transact electronic business “anytime anywhere”, with the capability to integrate geospatial assets and data processing. This includes the integration of locally collected GPS data, as well as the storage and delivery of hundreds of terabytes of NAIP imagery.

I.A.9. Did the Agency’s Executive/Investment Committee approve this request?	Pending Completion of the Alternatives Analysis
I.A.9.a. If "yes," what was the date of this approval?	
I.A.10. Did the Project Manager review this Exhibit?	
I.A.11. Contact information of Program/Project Manager?	
I.A.11.a. Name: Description: (Up to 250 characters)	TBD
I.A.11.b. Phone Number: Description: (Up to 250 characters)	TBD
I.A.11.c. E-mail: Description: (Up to 250 characters)	TBD
I.A.11.d. What is the current FAC-P/PM (for civilian agencies) or DAWIA (for defense agencies) certification level of the program/project manager?	TBD
I.A.11.e. When was the Program/Project Manager Assigned?	TBD
I.A.11.f. What date did the Program/Project Manager receive the FACP/PM certification? If the certification has not been issued, what is the anticipated date for certification?	TBD
I.A.12. Has the agency developed and/or promoted cost effective, energy-efficient and environmentally sustainable techniques or practices for this project?	Pending Completion of the Alternatives Analysis
I.A.12.a. Will this investment include electronic assets (including computers)?	Yes
I.A.12.b. Is this investment for new construction or major retrofit of a Federal building or facility? (answer applicable to non-IT assets only)	No
I.A.12.b.1. If "yes," is an ESPC or UESC being used to help fund this investment?	
I.A.12.b.2. If "yes," will this investment meet sustainable design principles?	
I.A.12.b.3. If "yes," is it designed to be 30% more energy efficient than relevant code?	
I.A.13. Does this investment directly support any of the PMA initiatives?	No
I.A.13.a. If "yes," select all that apply:	
I.A.13.b. Briefly and specifically describe for each selected how this asset directly supports the identified initiative(s)? (e.g. If E-Gov is selected, is it an approved shared service provider or the managing partner?) Description: (Up to 500 characters)	
I.A.14. Does this investment support a program assessed using the Program Assessment Rating Tool (PART)? Description: (For more information about the PART, visit www.whitehouse.gov/omb/part.)	No
I.A.14.a. If "yes," does this investment address a weakness found	

during a PART review?	
I.A.14.b. If "yes," what is the name of the PARTed program?	
I.A.14.c. If "yes," what rating did the PART receive?	
I.A.15. Is this investment for information technology?	Yes
I.A.16 What is the level of the IT Project? (per CIO Council PM Guidance) Description: Level 1 - Projects with low-to-moderate complexity and risk. Example: Bureau-level project such as a stand-alone information system that has low- to-moderate complexity and risk. Level 2 - Projects with high complexity and/or risk which are critical to the mission of the organization. Examples: Projects that are part of a portfolio of projects/systems that impact each other and/or impact mission activities. Department-wide projects that impact cross-organizational missions, such as an agency-wide system integration that includes large scale Enterprise Resource Planning (e.g., the DoD Business Mgmt Modernization Program). Level 3 - Projects that have high complexity, and/or risk, and have government-wide impact. Examples: Government-wide initiative (E-GOV, President's Management Agenda). High interest projects with Congress, GAO, OMB, or the general public. Cross-cutting initiative (Homeland Security).	Level 2
I.A.17. In addition to the answer in 1.A.11.d, what project management qualifications does the Project Manager have? (per CIO Council PM Guidance)	Pending Completion of the Alternatives Analysis
I.A.18. Is this investment or any project(s) within this investment identified as "high risk" on the Q4-FY 2008 agency high risk report? (per OMB Memorandum M-05-23)	No
I.A.19. Is this a financial management system?	No
I.A.19.a. If "yes," does this investment address a FFMIA compliance area?	
I.A.19.a.1. If "yes," which compliance area: Description: (Up to 250 characters)	
I.A.19.a.2. If "no," what does it address? Description: (Up to 500 characters)	
I.A.19.b. If "yes," please identify the system name(s) and system acronym(s) as reported in the most recent financial systems inventory update required by Circular A-11 section 52 Description: (Up to 2500 characters)	
I.A.20. What is the percentage breakout for the total FY2010 funding request for the following? Description: (This should total 100%)	
I.A.20.a. Hardware	TBD
I.A.20.b. Software	TBD
I.A.20.c. Services	TBD
I.A.20.d. Other	TBD
I.A.21. If this project produces information dissemination products for the public, are these products published to the Internet in conformance with OMB Memorandum 05-04 and included in your agency inventory, schedules and priorities?	Yes
I.A.22. Contact information of individual responsible for privacy related questions:	
I.A.22.a. Name: Description: (Up to 250 characters)	TBD
I.A.22.b. Phone Number: Description: (Up to 250 characters)	TBD
I.A.22.c. Title: Description: (Up to 250 characters)	TBD
I.A.22.d. E-mail: Description: (Up to 250 characters)	TBD

I.A.23. Are the records produced by this investment appropriately scheduled with the National Archives and Records Administration's approval?	TBD
I.A.24. Does this investment directly support one of the GAO High Risk Areas?	No

I.B. Summary of Spending (All Capital Assets)

I.B.1 Summary of Spending Table
Description: Provide the total estimated life-cycle cost for this investment by completing the following table. All amounts represent budget authority in millions, and are rounded to three decimal places. Federal personnel costs should be included only in the row designated "Government FTE Cost," and should be excluded from the amounts shown for "Planning," "Full Acquisition," and "Operation/Maintenance." The "TOTAL" estimated annual cost of the investment is the sum of costs for "Planning," "Full Acquisition," and "Operation/Maintenance." For Federal buildings and facilities, life-cycle costs should include long-term energy, environmental, decommissioning, and/or restoration costs. The costs associated with the entire life-cycle of the investment should be included in this report.

Note: For the multi-agency investments, this table should include all funding (both managing partner and partner agencies). Government FTE Costs should not be included as part of the TOTAL represented.

I.B.1.a. Summary of Spending for Project Phases

	PY-1 and earlier	PY 2008	CY 2009	BY2010	BY + 1 2011	BY + 2 2012	BY + 3 2013	BY + 3 2014	Total
Planning	0	0	0	0	0	0	0	0	0
Acquisition	91.329	10.885	11.413	0	0	0	0	0	0
Subtotal Planning and Acquisition	91.329	10.885	11.413	0	0	0	0	0	0
Operations and Maintenance	112.01	19.779	25.385	0	0	0	0	0	0
TOTAL	203.339	30.664	36.798	0	0	0	0	0	0
Government FTE Costs	29.417	2.829	2.922	0	0	0	0	0	0

Predecisional Budget Information Redacted

I.B.1.b. Summary of Spending for Project Phases (Government FTE Costs Only)

	PY-1 and earlier	CY 2008	CY 2009	BY2010	BY + 1 2011	BY + 2 2012	BY + 3 2013	BY + 3 2014	Total
Number of FTE represented by cost	89.7	82.9	24	0	0	0	0	0	0

Predecisional Budget Information Redacted

I.B.2. Will this project require the agency to hire additional FTE's?	No
I.B.2.a. If "yes," How many and in what year? Description: (Up to 500 characters)	

I.B.3. If the summary of spending has changed from the FY2009 President's budget request, briefly explain those changes:
Description: (Up to 2500 characters)

I.C. Acquisition/Contract Strategy (All Capital Assets)

I.C.1 Complete the table for all (including all non-Federal) contracts and/or task orders currently in place or planned for this

investment. Total Value should include all option years for each contract. Contracts and/or task orders completed do not need to be included.
Description: Alternative Financing Options Abbreviations: ESPC - Energy savings performance contract; UESC - Utility energy efficiency service contract; EUL - Enhanced use lease contract; N/A - no alternative financing used.
Character Limitations: Contract or Task Order Number - 250 Characters; Type of Contract/Task Order - 250 Characters; Name of CO - 250 Characters; CO Contact Information - 250 Characters)

Contract or Task Order Number	Type of Contract/Task Order	Has the contract been awarded?	If so what is the date of the award? If not, what is the planned award date?	Start date of Contract/Task Order	End date of Contract/Task Order	Total Value of Contract/Task Order ($M)	Is this an Interagency Acquisition?	Is it performance based?	Competitively awarded?	What, if any, alternative financing option is being used?	Is EVM in the contract?	Does the contract include the required security & privacy clauses?	Name of CO	CO Contact information (phone/email)	Contracting Officer Certification Level (Level 1, 2, 3, N/A)	If N/A, has the agency determined the CO assigned has the competencies and skills necessary to support this acquisition? (Y/N)

I.C.2. If earned value is not required or will not be a contract requirement for any of the contracts or task orders above, explain why: Description: (Up to 2500 characters)	
I.C.3. Do the contracts ensure Section 508 compliance?	Yes
I.C.3.a. Explain why not or how this is being done? Description: (Up to 500 characters)	Any hardware or software procurements associated with this investment will use government wide contracts that include Section 508 compliance.
I.C.4. Is there an acquisition plan which reflects the requirements of FAR Subpart 7.1 and has been approved in accordance with agency requirements?	Yes
I.C.4.a. If "yes," what is the date?	
I.C.4.a.1. Is it current?	
I.C.4.b. If "no," will an acquisition plan be developed?	
I.C.4.b.1. If "no," briefly explain why: Description: (Up to 500 characters)	

I.D. Performance Information (All Capital Assets)

I.D.1. Performance Information Table

Description: In order to successfully address this area of the exhibit 300, performance goals must be provided for the agency and be linked to the annual performance plan. The investment must discuss the agency's mission and strategic goals, and performance measures (indicators) must be provided. These goals need to map to the gap in the agency's strategic goals and objectives this investment is designed to fill. They are the internal and external performance benefits this investment is expected to deliver to the agency (e.g., improve efficiency by 60 percent, increase citizen participation by 300 percent a year to achieve an overall citizen participation rate of 75 percent by FY 2xxx, etc.). The goals must be clearly measurable investment outcomes, and if applicable, investment outputs. They do not include the completion date of the module, milestones, or investment, or general goals, such as, significant, better, improved that do not have a quantitative measure.

Agencies must use the following table to report performance goals and measures for the major investment and use the Federal Enterprise Architecture (FEA) Performance Reference Model (PRM). Map all Measurement Indicators to the corresponding "Measurement Area" and "Measurement Grouping" identified in the PRM. There should be at least one Measurement Indicator for each of the four different Measurement Areas (for each fiscal year). The PRM is available at www.egov.gov. The table can be extended to include performance measures for years beyond the next President's Budget.

Fiscal Year	Strategic Goal(s) Supported	Measurement Area	Measurement Grouping	Measurement Indicator	Baseline	Target	Actual Results
2010	Goal 2: Enhance the Competitiveness and Sustainability of Rural and Farm Economies. Objective 2.2: Increase the Efficiency of Domestic Agricultural Production and Marketing Systems.	Mission & Business Results	Agricultural Innovation and Services	% of acreage and crop information that is available “anywhere anytime”	95%	100%	Will report in 2010
2010	Goal 2: Enhance the Competitiveness and Sustainability of Rural and Farm Economies. Objective 2.2: Increase the Efficiency of Domestic Agricultural	Customer Results	Customer Benefit	% of end users that report they are satisfied with the application or system.	77%	78%	Will report in 2010

	Production and Marketing Systems.						
2010	Goal 2: Enhance the Competitiveness and Sustainability of Rural and Farm Economies. Objective 2.2: Increase the Efficiency of Domestic Agricultural Production and Marketing Systems.	Processes & Activities	Compliance	% of projects conforming to Agency System Development Lifecycle Processes	98%	100%	Will report in 2010
2010	Goal 2: Enhance the Competitiveness and Sustainability of Rural and Farm Economies. Objective 2.2: Increase the Efficiency of Domestic Agricultural Production and Marketing Systems.	Technology	Information and Data	% of offices where GIS acreage reports are available	95%	100%	Will report in 2010
2010	Goal 6: Protect and Enhance the Nation's Natural Resource Base and Environment. Objective 6.2: Enhance Soil Quality to Maintain Productive Working Cropland	Mission and Results	Conservation, Marine and Land Management	Acres of Digital Soil Surveys made available ,number	14,000,000 Acres	Increase to 14,750,000 Acres	Will report in 2010
2010	Goal 6: Protect and Enhance the Nation's Natural Resource Base and Environment. Objective 6.2: Enhance Soil Quality to Maintain Productive Working Cropland	Customer Results	Customer Benefit	% of end users that report they are satisfied with the application or system.	77%	80%	Will report in 2010
2010	Goal 6: Protect and Enhance the Nation's Natural Resource Base and Environment. Objective 6.2: Enhance Soil Quality to Maintain Productive Working Cropland	Processes and Activities	Management and Innovation	Hours spent on data collection per sample segment	0.99 hours	0,98 hours	Will report in 2010
2010	Goal 6: Protect and Enhance the Nation's Natural Resource Base and Environment. Objective 6.2:	Technology	Information and Data	Acres mapped or updated per million dollars	492,280 acres	Increase to 510,740 acres	Will report in 2010

	Enhance Soil Quality to Maintain Productive Working Cropland.						
2010	Goal 6: Protect and Enhance the Nation's Natural Resource Base and Environment. Objective 6.3: Protect Forests and Grasslands.	Mission and Business Results	Conservation, Marine and Land Management	Increased use of NRM for planning/monitoring Related to risks and spread of invasive species	Will run query each October to establish baseline	25% increase above baseline	Will report in 2010
2010	Goal 6: Protect and Enhance the Nation's Natural Resource Base and Environment. Objective 6.3: Protect Forests and Grasslands.	Customer Results	Customer Benefit	% of end users that report they are satisfied with the application or system.	77%	80%	Will report in 2010
2010	Goal 6: Protect and Enhance the Nation's Natural Resource Base and Environment. Objective 6.3: Protect Forests and Grasslands.	Processes and Activities	Financial Management	Cost to deliver geospatial information	20% reduction from 2005 baseline	25% reduction from 2005 baseline	Will report in 2010
2010	Goal 6: Protect and Enhance the Nation's Natural Resource Base and Environment. Objective 6.3: Protect Forests and Grasslands.	Technology	Information and Data	Number of Forests with all NRIS data moved from Forest Servers to the Data Center	87	120	Will report in 2010

I.E. Security and Privacy (IT Capital Assets only)

Description: (Up to 2500 characters)

I.E.1. Have the IT security costs for the system(s) been identified and integrated into the overall costs of the investment?	Pending Completion of the Alternatives Analysis
I.E.1.a. If "yes," provide the "Percentage IT Security" for the budget year:	Pending Completion of the Alternatives Analysis
I.E.2. Is identifying and assessing security and privacy risks a part of the overall risk management effort for each system supporting or part of this investment?	Pending Completion of the Alternatives Analysis
I.E.3. Systems in Planning and Undergoing Enhancement(s), Development, and/or Modernization - Security Table(s):	Pending Completion of the Alternatives Analysis
I.E.4. Operational Systems - Security Table:	

Name of System	Agency/ or Contractor Operated System?	NIST FIPS 199 Risk Impact level (High, Moderate, Low)	Has C&A been Completed, using NIST 800-37? (Y/N)	Date Completed: C&A	What standards were used for the Security Controls tests? (FIPS 200/NIST 800-53, Other, N/A)	Date Completed: Security Control Testing	Date the contingency plan tested

I.E.5. Have any weaknesses, not yet remediated, related to any of the systems part of or supporting this investment been identified by the agency or IG?	Pending Completion of the Alternatives Analysis
I.E.5.a. If "yes," have those weaknesses been incorporated into the agency's plan of action and milestone process?	
I.E.6. Indicate whether an increase in IT security funding is requested to remediate IT security weaknesses?	Pending Completion of the Alternatives Analysis
I.E.6.a. If "yes," specify the amount, provide a general description of the weakness, and explain how the funding request will remediate the weakness. Description: (Up to 2500 characters)	
I.E.7. How are contractor security procedures monitored, verified, and validated by the agency for the contractor systems above? Description: (Up to 2500 characters)	Pending Completion of the Alternatives Analysis

I.E.8. Planning & Operational Systems - Privacy Table:
Description: Details for Text Options:
Column (d): If yes to (c), provide the link(s) to the publicly posted PIA(s) with which this system is associated. If no to (c), provide an explanation why the PIA has not been publicly posted or why the PIA has not been conducted.

Column (f): If yes to (e), provide the link(s) to where the current and up to date SORN(s) is published in the federal register. If no to (e), provide an explanation why the SORN has not been published or why there isn't a current and up to date SORN.

Note: Working links must be provided to specific documents not general privacy websites. Non-working links will be considered as a blank field.

(a) Name of System	(b) Is this a new system? (Y/N)	(c) Is there at least one Privacy Impact Assessment (PIA) that covers this system? (Y/N)	(d) Internet Link or Explanation	(e) Is a System of Records Notice (SORN) required for this system? (Y/N)	(f) Internet Link or Explanation
End User Computing	TBD	TBD	TBD	TBD	TBD
Telecommunications	TBD	TBD	TBD	TBD	TBD
ITS Hosting (Web Farm)	TBD	TBD	TBD	TBD	TBD
Enterprise Local Area Network	TBD	TBD	TBD	TBD	TBD
Headquarters Metropolitan Area Network	TBD	TBD	TBD	TBD	TBD

I.F. Enterprise Architecture (EA) (IT Capital Assets only)

Description: In order to successfully address this area of the capital asset plan and business case, the investment must be included in the agency's EA and Capital Planning and Investment Control (CPIC) process and mapped to and supporting the FEA. The business case must demonstrate the relationship between the investment and the business, performance, data, services, application, and technology layers of the agency's EA.

I.F.1. Is this investment included in your agency's target enterprise architecture?	Yes
I.F.1.a. If "no," please explain why? Description: (Up to 2500 characters)	
I.F.2. Is this investment included in the agency's EA Transition Strategy?	Yes
I.F.2.a. If "yes," provide the investment name as identified in the Transition Strategy provided in the agency's most recent annual EA Assessment. Description: (Up to 500 characters)	USDA Unified Geospatial Investment
I.F.2.b. If "no," please explain why? Description: (Up to 2500 characters)	
I.F.3. Is this investment identified in a completed and approved segment architecture?	Yes
I.F.3.a. If "yes," provide the six digit code corresponding to the agency segment architecture. The segment architecture codes are maintained by the agency Chief Architect. For detailed guidance regarding segment architecture codes, please refer to http://www.egov.gov. Description: (In the format "XXX-000")	203-000

I.F.4. Service Component Reference Model (SRM) Table

Description: Identify the service components funded by this major IT investment (e.g., knowledge management, content management, customer relationship management, etc.). Provide this information in the format of the following table. For detailed guidance regarding components, please refer to http://www.egov.gov.

a. Use existing SRM Components or identify as "NEW". A "NEW" component is one not already identified as a service component in the FEA SRM.
b. A reused component is one being funded by another investment, but being used by this investment. Rather than answer yes or no, identify the reused service component funded by the other investment and identify the other investment using the Unique Project Identifier (UPI) code from the OMB Ex 300 or Ex 53 submission.
c. 'Internal' reuse is within an agency. For example, one agency within a department is reusing a service component provided by another agency within the same department. 'External' reuse is one agency within a department reusing a service component provided by another agency in another department. A good example of this is an E-Gov initiative service being reused by multiple organizations across the federal government.
d. Please provide the percentage of the BY requested funding amount used for each service component listed in the table. If external, provide the percentage of the BY requested funding amount transferred to another agency to pay for the service. The percentages in this column can, but are not required to, add up to 100%.

Agency Component Name	Agency Component Description	FEA SRM Service Type	FEA SRM Component (a)	Service Component Reused - Component Name (b)	Service Component Reused - UPI (b)	Internal or External Reuse? (c)	BY Funding Percentage (d)
USDA Data and Digital Asset Services	Geospatial Applications	Knowledge Management	Information Sharing	Information Sharing	005-49—10-51-01-0084-00-404-142	No reuse	
USDA Data and Digital Asset Services	Reporting Components of Geospatial Applications such as the Land Use Report	Reporting	Ad Hoc	Ad Hoc	005-49-01-51-01-0084-00-404-142	No reuse	

USDA Data and Digital Asset Services	Disaster Analysis, Program Eligibility and other Program Performance Analysis	Business Intelligence	Decision Support and Planning	Decision Support and Planning	005-49-01-51-01-0084-00-404-142	No reuse	
USDA Data and Digital Asset Services	Customer Access Applications	Development and Integration	Data Integration	Data Integration	005-49-01-51-01-0084-00-404-142	Yes	
USDA Data and Digital Asset Services	Service Center Certification of CLU Data	Development and Integration	Data Integration	Data Integration	005-49-01-51-01-0084-00-404-142	No reuse	
USDA Data and Digital Asset Services	Geospatial Data Warehouse and Geospatial One-Stop	Data Management	Data Warehouse	Data Warehouse	005-49-01-51-01-0084-00-404-142	Yes	
USDA Data and Digital Asset Services	Assignment of FSA Program Codes to Geospatial Data	Knowledge Management	Information Mapping/Taxonomy	Information Mapping/Taxonomy	005-49-01-51-01-0084-00-404-142	No reuse	
USDA Data and Digital Asset Services	Integration of GIS Applications with Existing System 36	Development and Integration	Legacy Integration	Legacy Integration	005-49-01-51-01-0084-00-404-142	No reuse	
USDA Data and Digital Asset Services	Integration of Geospatial and Tabular Business Records	Development and Integration	Data Integration	Data Integration	005-49-01-51-01-0084-00-404-142	No reuse	
USDA Data and Digital Asset Services	Development of Custom GIS Applications to Support FSA Business Functions	Development and Integration	Data Integration	Data Integration	005-49-01-51-01-0084-00-404-142	No reuse	
USDA Data and Digital Asset Services	FSA's Modernization Effort	Management of Processes	Business Rule Management	Business Rule Management	005-49-01-51-01-0084-00-404-142	No reuse	
USDA Data and Digital Asset Services	Generic Query Capability supports all GIS business applications	Reporting	Standardized/ Canned	Standardized/ Canned	005-49-01-51-01-0084-00-404-142	No reuse	
USDA Data and Digital Asset Services	Eligibility Determinations based on land	Business Intelligence	Demand Forecasting	Demand Forecasting	005-49-01-51-01-0084-00-404-142	No reuse	
NRIS Data Capture	Transactional Oracle Databases for resource data, Oracle data entry forms, field data recorder programming, legacy data migration	Knowledge Management	Knowledge Capture	Knowledge Capture		No reuse	
FSNRA Geospatial Interface (GI) Mapping Capability	FSNRA Geospatial Interface	Visualization	Mapping/Geospatial /Elevation/GPS	Mapping/Geospatial /Elevation/GPS	005-96-01-11-01-1030-00	Internal	
NRIS Reporting Tools, COTS ArcGIS and	Use of NRIS for Natural Resource	Reporting	Ad Hoc	Ad Hoc		No reuse	

Oracle	decision-making, implementation activities, monitoring, upward reporting						
NRIS Reporting Tools, COTS ArcGIS and Oracle	Use of NRIS for Natural Resource decision-making, implementation activities, monitoring, upward reporting	Reporting	Standardized/ Canned	Standardized/ Canned		No reuse	
NRIS Data Exchange Tool	Supports migration of legacy and field data recorder data	Data Management	Data Exchange	Data Exchange		No reuse	
FSNRA Published Data Mart	A persistent replicate of the FSNRA data optimized to meet end user requirements. Will feed geospatial one-stop.	Data Management	Data Mart	Data Mart	005-96-01-11-01-0130-00	Internal	
Geospatial Navigation Services	Provides a backdrop and navigational layers for multiple applications	Data Management	Data Exchange	Data Exchange	005-53-01-11-1000-00-117-057	No reuse	
Natural Resources Data Gateway Services	Provides mechanism for distributing standard datasets from the Geospatial Data Warehouse and Data Marts	Data Management	Data Exchange	Data Exchange	005-53-01-11-1000-00-117-057	Yes	
Natural Resource Data Web Services Framework	A framework for establishing data warehouses for natural resource data	Data Management	Data Exchange	Data Exchange	005-53-01-11-1000-00-117-057	Yes	
Natural Resource Data Marting	A framework for establishing data marts for natural resource data	Data Management	Data Exchange	Data Exchange	005-53-01-11-1000-00-117-057	No reuse	

I.F.5. Technical Reference Model (TRM) Table

Description: To demonstrate how this major IT investment aligns with the FEA Technical Reference Model (TRM), please list the Service Areas, Categories, Standards, and Service Specifications supporting this IT investment.

a. Service Components identified in the previous question should be entered in this column. Please enter multiple rows for FEA SRM Components supported by multiple TRM Service Specifications.
b. In the Service Specification field, agencies should provide information on the specified technical standard or vendor product mapped to the FEA TRM Service Standard, including model or version numbers, as appropriate.

FEA SRM Component (a)	FEA TRM Service Area	FEA TRM Service Category	FEA TRM Service Standard	Service Specification (b) (i.e., vendor and product name)
Resource Planning and Allocation	Service Access and Delivery	Service Requirements	Legislative/Compliance	TBD
Software Development	Service Platform and Infrastructure	Support Platforms	Platform Dependent	TBD
Software Development	Service Platform and Infrastructure	Database/Storage	Database	TBD
Software Development	Service Platform and Infrastructure	Software Engineering	Integrated Development Environment	TBD
Data Integration	Component Framework	Business Logic	Platform Independent	TBD
Information Sharing	Service Access and Delivery	Intranet	Intranet	
Information Sharing	Service Access and Delivery	Service Transport	Service Transport	TBD
Information Sharing	Service Platform and Infrastructure	Support Platforms	Platform Dependent	TBD
Information Sharing	Service Platform and Infrastructure	Database/Storage	Database	
Information Sharing	Service Platform and Infrastructure	Hardware/Infrastructure	Servers/Computers	TBD
Information Sharing	Component Framework	Security	Database	TBD
Information Sharing	Component Framework	Business Logic	Platform Dependent	TBD
Information Sharing	Component Framework	Business Logic	Platform Independent	TBD
Information Sharing	Component Framework	Data Management	Database Connectivity	TBD
Knowledge Capture	Service Access and Delivery	Delivery Channels	Intranet	TBD
Knowledge Capture	Service Access and Delivery	Service Transport	Service Transport	TBD
Knowledge Capture	Service Platform and Infrastructure	Support Platforms	Platform Dependent	TBD
Knowledge Capture	Service Platform and Infrastructure	Database/Storage	Database	TBD
Knowledge Capture	Service Platform and Infrastructure	Hardware/Infrastructure	Servers/Computers	TBD
Knowledge Capture	Component Framework	Security	Database	TBD
Knowledge Capture	Component Framework	Business Logic	Platform Dependent	TBD
Knowledge Capture	Component Framework	Business Logic	Platform Independent	TBD
Knowledge Capture	Component Framework	Data Management	Database Connectivity	TBD
Mapping/Geospatial/Elevation/ GPS	Service Access and Delivery	Delivery Channels	Intranet	TBD
Mapping/Geospatial/Elevation/ GPS	Service Access and Delivery	Service Transport	Service Transport	TBD
Mapping/Geospatial/Elevation/ GPS	Service Platform and Infrastructure	Support Platforms	Platform Independent	TBD
Mapping/Geospatial/Elevation/	Service Platform and Infrastructure	Database/Storage	Database	TBD

GPS				
Mapping/Geospatial/Elevation/ GPS	Service Platform and Infrastructure	Hardware/Infrastructure	Servers/Computers	TBD
Mapping/Geospatial/Elevation/ GPS	Component Framework	Security	Database	TBD
Mapping/Geospatial/Elevation/ GPS	Component Framework	Business Logic	Platform Dependent	TBD
Mapping/Geospatial/Elevation/ GPS	Component Framework	Business Logic	Platform Independent	TBD
Mapping/Geospatial/Elevation/ GPS	Component Framework	Data Management	Database Connectivity	TBD
Mapping/Geospatial/Elevation/ GPS	Component Framework	Data Management	Reporting and Analysis	TBD
Standardized/Canned	Service Access and Delivery	Delivery Channels	Intranet	TBD
Standardized/Canned	Service Access and Delivery	Service Transport	Service Transport	TBD
Standardized/Canned	Service Platform and Infrastructure	Support Platforms	Platform Independent	TBD
Standardized/Canned	Service Platform and Infrastructure	Database/Storage	Database	TBD
Standardized/Canned	Service Platform and Infrastructure	Hardware/Infrastructure	Servers/Computers	TBD
Standardized/Canned	Component Framework	Security	Database	TBD
Standardized/Canned	Component Framework	Business Logic	Platform Dependent	TBD
Standardized/Canned	Component Framework	Business Logic	Platform Independent	TBD
Standardized/Canned	Component Framework	Data Management	Database Connectivity	TBD
Standardized/Canned	Component Framework	Data Management	Reporting and Analysis	TBD
Data Exchange	Service Access and Delivery	Delivery Channels	Intranet	TBD
Data Exchange	Service Access and Delivery	Service Transport	Service Transport	TBD
Data Exchange	Service Platform and Infrastructure	Support Platforms	Platform Independent	TBD
Data Exchange	Service Platform and Infrastructure	Database/Storage	Database	TBD
Data Exchange	Service Platform and Infrastructure	Hardware/Infrastructure	Servers/Computers	TBD
Data Exchange	Component Framework	Security	Database	TBD
Data Exchange	Component Framework	Business Logic	Platform Dependent	TBD
Data Exchange	Component Framework	Business Logic	Platform Independent	TBD
Data Exchange	Component Framework	Data Management	Database Connectivity	TBD
Data Exchange	Service Interface and Integration	Interoperability	Data Transformation	TBD
Data Mart	Service Access and Delivery	Delivery Channels	Intranet	TBD
Data Mart	Service Platform and Infrastructure	Database/Storage	Database	TBD

Data Mart	Service Platform and Infrastructure	Delivery Servers	Application Servers	TBD
Data Mart	Service Interface and Integration	Interoperability	Data Transformation	TBD
Data Mart	Service Platform and Infrastructure	Hardware/Infrastructure	Servers/Computers	TBD
Data Exchange	Service Access and Delivery	Access Channels	Test Management	TBD
Data Exchange	Service Platform and Infrastructure	Support Platforms	Platform Dependent	TBD
Data Exchange	Service Platform and Infrastructure	Delivery Servers	Application Servers	TBD
Data Exchange	Service Platform and Infrastructure	Delivery Servers	Web Servers	TBD
Data Exchange	Component Framework	Data Interchange	Data Exchange	TBD
Data Warehouse	Service Platform and Infrastructure	Database/Storage	Database	TBD
Data Warehouse	Service Platform and Infrastructure	Database/Storage	Storage	TBD
Data Warehouse	Service Platform and Infrastructure	Interoperability	Data Transformation	TBD
Data Mart	Service Platform and Infrastructure	Database/Storage	Database	TBD
Data Mart	Service Platform and Infrastructure	Database/Storage	Storage	TBD
Data Mart	Service Interface and Integration	Interoperability	Data Transformation	TBD

I.F.6. Will the application leverage existing components and/or applications across the Government (e.g. USA.gov, Pay.gov, etc.)?	Pending Completion of the Alternatives Analysis
I.F.6.a. If "yes," please describe. Description: (Up to 2500 characters)	

Part II: Planning, Acquisition And Performance Information

Description: Part II should be completed only for investments identified as "Planning" or "Full Acquisition," or "Mixed Life Cycle" investments in response to Question 6, Part I, Section A above.

II.A. Alternatives Analysis (All Capital Assets)

Description: In selecting the best capital asset, you should identify and consider at least three viable alternatives, in addition to the current baseline, i.e., the status quo. Use OMB Circular A-94 for all investments and the Clinger Cohen Act of 1996 for IT investments to determine the criteria you should use in your Benefit/Cost Analysis.

II.A.1. Did you conduct an alternatives analysis for this investment?	No
II.A.1.a. If "yes," provide the date the analysis was completed?	
II.A.1.b. If "no," what is the anticipated date this analysis will be completed?	12/31/2008
II.A.1.c. If no analysis is planned, please briefly explain why:	

Description: (Up to 500 characters)	
II.A.2. Alternatives Analysis Results: Description: Use the results of your alternatives analysis to complete the following table:	Pending Completion of the Alternatives Analysis
II.A.3. Which alternative was selected by the Agency's Executive/Investment Committee and why was it chosen? Description: (Up to 2500 characters)	Pending Completion of the Alternatives Analysis
II.A.3.a. What year will the investment breakeven? (Specifically, when the budgeted costs savings exceed the cumulative costs.)	Pending Completion of the Alternatives Analysis
II.A.4. What specific qualitative benefits will be realized? Description: (Up to 2500 characters)	Pending Completion of the Alternatives Analysis
II.A.5. Federal Quantitative Benefits ($millions) Description: What specific quantitative benefits will be realized (using current dollars)? Use the results of your alternatives analysis to complete the following table:	Pending Completion of the Alternatives Analysis
II.A.6. Will the selected alternative replace a legacy system in-part or in-whole?	Pending Completion of the Alternatives Analysis
II.A.6.a. If "yes," are the migration costs associated with the migration to the selected alternative included in this investment, the legacy investment, or in a separate migration investment?	
II.A.6.b. List of Legacy Investment or Systems Description: If II.A.6.a is answered "yes," please provide the following information:	Pending Completion of the Alternatives Analysis
II.B. Risk Management (All Capital Assets) **Description: You should have performed a risk assessment during the early planning and initial concept phase of this investment's life-cycle, developed a risk-adjusted life-cycle cost estimate and a plan to eliminate, mitigate, or manage risk, and be actively managing risk throughout the investment's life-cycle.**	
II.B.1. Does the investment have a Risk Management Plan?	No
II.B.1.a. If "yes," what is the date of the plan?	
II.B.1.b. Has the Risk Management Plan been significantly changed since last year's submission to OMB?	Pending Completion of the Alternatives Analysis
II.B.1.c. If "yes," describe any significant changes: Description: (Up to 2500 characters)	
II.B.2. If there currently is no plan, will a plan be developed?	Yes
II.B.2.a. If "yes," what is the planned completion date?	2/28/2009
II.B.2.b. If "no," what is the strategy for managing the risks? Description: (Up to 2500 characters)	
II.B.3. Briefly describe how investment risks are reflected in the life cycle cost estimate and investment schedule: Description: (Up to 2500 characters)	Pending Completion of the Alternatives Analysis
II.C. Cost and Schedule Performance (All Capital Assets)	

Description: EVM is required only on DME portions of investments. For mixed lifecycle investments, O&M milestones should still be included in the table (Comparison of Initial Baseline and Current Approved Baseline). This table should accurately reflect the milestones in the initial baseline, as well as milestones in the current baseline.	
II.C.1. Does the earned value management system meet the criteria in ANSI/EIA Standard - 748?	Pending Completion of the Alternatives Analysis
II.C.2. Is the CV% or SV% greater than + or - 10%? Description: (CV% = CV/EV x 100; SV% = SV/PV x 100)	Pending Completion of the Alternatives Analysis
II.C.2.a. If "yes", was it the CV or SV or both?	Pending Completion of the Alternatives Analysis
II.C.2.b. If "yes," explain the causes of the variance: Description: (Up to 2500 characters)	Pending Completion of the Alternatives Analysis
II.C.2.c. If "yes," describe the corrective actions: Description: (Up to 2500 characters)	Pending Completion of the Alternatives Analysis
II.C.3. Has the investment re-baselined during the past fiscal year?	Pending Completion of the Alternatives Analysis
II.C.3.a. If "yes," when was it approved by the agency head?	
II.C.4. Comparison of Initial Baseline and Current Approved Baseline Description: Complete the following table to compare actual performance against the current performance baseline and to the initial performance baseline. In the Current Baseline section, for all milestones listed, you should provide both the baseline and actual completion dates (e.g., "03/23/2003"/"04/28/2004") and the baseline and actual total costs (in $ Millions). In the event that a milestone is not found in both the initial and current baseline, leave the associated cells blank. Note that the 'Description of Milestone' and 'Percent Complete' fields are required. Indicate '0' for any milestone no longer active.	Pending Completion of the Alternatives Analysis

IV.C. Cost and Schedule Performance (All Capital Assets)

Description: You should also periodically be measuring the performance of operational assets against the baseline established during the planning or full acquisition phase (i.e., operational analysis), and be properly operating and maintaining the asset to maximize its useful life. Operational analysis may identify the need to redesign or modify an asset by identifying previously undetected faults in design, construction, or installation/integration, highlighting whether actual operation and maintenance costs vary significantly from budgeted costs, or documenting that the asset is failing to meet program requirements.

EVM is required only on DME portions of investments. For mixed lifecycle investments, O&M milestones should still be included in the table (Comparison of Initial Baseline and Current Approved Baseline). This table should accurately reflect the milestones in the initial baseline, as well as milestones in the current baseline.

Answer the following questions about the status of this investment. Include information on all appropriate capital assets supporting this investment except for assets in which the performance information is reported in a separate exhibit 300.

IV.C.1. Are you using EVM to manage this investment? Description: Select n/a for investments with ONLY O&M.	Pending Completion of the Alternatives Analysis
IV.C.1.a. If "yes," does the earned value management system meet the criteria in ANSI/EIA Standard - 748?	
IV.C.1.b. If "no," explain plans to implement EVM: Description: (Up to 2500 characters)	
IV.C.1.c. If "n/a," please provide date operational analysis was conducted and brief summary of the results: Description: (Up to 2500 characters)	
IV.C.2. Is the CV% or SV% greater than + or - 10%? Description: NOT applicable for capital assets with ONLY O&M. (CV%= CV/EV x 100; SV%= SV/PV x 100)	

IV.C.2.a. If "yes," was it the CV or SV or both?	
IV.C.2.b. If "yes," explain the causes of the variance:	
IV.C.2.c. If "yes," describe the corrective actions:	
IV.C.3. Has the investment re-baselined during the past fiscal year? Description: Applicable to ALL capital assets	Pending Completion of the Alternatives Analysis
IV.C.3.a. If "yes," when was it approved by the agency head?	
IV.C.4. Comparison of Initial Baseline and Current Approved Baseline Description: Complete the following table to compare actual performance against the current performance baseline and to the initial performance baseline. In the Current Baseline section, for all milestones listed, you should provide both the baseline and actual completion dates (e.g., "03/23/2003"/"04/28/2004") and the baseline and actual total costs (in $ Millions). In the event that a milestone is not found in both the initial and current baseline, leave the associated cells blank. Note that the 'Description of Milestone' and 'Percent Complete' fields are required. Indicate '0' for any milestone no longer active.	Pending Completion of the Alternatives Analysis

3.0 Mission Needs Statement

3.1 Administrative Information

A. MNS Title:	**Unified Geospatial Environment**
B. MNS Number:	
C. Originator:	**Stephen Lowe**
D. Originator's Organization:	**USDA OCIO**
E. Originator's Phone Number:	**202-690-2118**
F. Sponsoring Line of Business:	
G. Sponsor's Focal Point:	**USDA OCIO**
H. Sponsor's Focal Point Phone Number:	
I. Submission Date:	**09/30/2008**
J. Revision Number:	**1**
K. Revision Date:	**9/18/2008**
Signature	

3.2 Impact on USDA Mission Areas

Increasingly, USDA is using geospatial science and data to support its efforts to lead a rapidly evolving food and agriculture system. The geospatial segment architecture will ensure the alignment of mission and technology in critical areas such as improving housing, utilities and infrastructure in rural America, reducing the prevalence of food borne hazards, and managing and protecting America's public and private lands.

While National Resource and Conservation Service (NRCS), Farm Service Administration (FSA), Economic Resource Service (ERS), and Forest Service (FS) have created web services to share data, they are limited from doing so by policies,

network configurations, and security concerns. More needs to be done to share their lessons learned as well as technical solutions. Increasing awareness of the value of spatial data increases the need to manage spatial data resources wisely.

The key to improved geospatial performance and accountability is to manage the specific operational and developmental requirements of USDA's diverse agencies within a USDA-wide baseline of technology, services, and data assets. Management of the business and technical geospatial resources at the enterprise level will provide the coordination necessary to guide the evolution of geospatial data and services from the current baseline to the target state. As new investment requirements are levied on the baseline, a geospatial governance group will validate and prioritize them with the USDA consumers to develop a coordinated investment strategy. The proposed unified geospatial segment will provide a vehicle through which USDA can identify, review, and prioritize requirements for geospatial assets in a planned manner.

3.3 Needed Capability

As the information technology discipline matured, it became evident that there was a need for greater accountability and transparency for IT investments. Accordingly, the USDA has applied lessons from the broader IT community, both the private and public sectors, to manage the Department's IT resource more effectively and efficiently. The unified geospatial segment architecture will bring increased transparency to USDA's geospatial infrastructure, thereby enabling more efficient use of those resources.

The formation of the USDA Unified Geospatial Segment Architecture is mandated by various legislative and executive branch initiative and publications. These include:

- OMB Circular A-16 (Coordination of Geographic Information and Related Spatial Data Activities);
- Executive Order 12906 (Coordinating Geographic Data Acquisition and Access: The National Spatial Data Infrastructure;
- The Presidential Initiatives for the Geospatial One-Stop and Geospatial Line of Business;
- OMB Circular A-11 (Preparation, Submission, Execution of the Budget)
- USDA OCIO Guidelines for Enterprise Data Centers and Critical Systems; and
- Farm, Nutrition, and Bioenergy Act of 2007, HR 2419, section 1619.

The USDA Unified Geospatial Environment must be able to support the mission needs of many different agencies. For example, the Farm Services Agency (FSA) must provide expanded customer self-service via the Internet and deploy eGovernment solutions that allow agricultural producers to transact electronic business "anytime anywhere", with the capability to integrate geospatial assets and data processing. This includes the integration of locally collected GPS data, as well as the storage and delivery of hundreds of terabytes of NAIP imagery.

The Foreign Agricultural Service (FAS) is the largest civilian purchaser of satellite imagery. As a result, FAS works to share as much of this data as possible with other federal agencies. Optimally, this data would be distributed via web services; however, the existing FAS infrastructure lacks the bandwidth, storage capacity, and interoperability to utilize this distribution method.

The Natural Resources Conservation Service (NRCS) has similar requirements for customer self-service and mobile service delivery. In addition, NRCS is co-located with FSA in 2,343 service centers, which necessitates the use of compatible operating environments.

The Forest Service (FS) uses geospatial technology in almost every aspect of its operations. The widely distributed nature of FS presents a challenge in data distribution, as employees are often in remote areas where network access is unreliable or nonexistent. This environment can have a negative impact on data quality, as data standards may be ignored in order to get data entered.

3.4 Current and Planned Capability

3.4.1 Current Capability

Faced with obsolete computing technology and increasing program delivery demands, FSA is using every computer resource available. Desktop computers and application servers are the primary modes of delivery for geospatial-enabled business applications, although there are some centralized web services in use. However, the existing web infrastructure cannot easily accommodate the vast amounts of data necessary to update imagery databases. These updates must be burned onto CDs or DVDs and mailed to the service centers.

FAS is faced with a very similar situation. Most FAS activity is structured around global climate and crop information obtained daily through imagery collection. The timely dissemination of this data to service centers and analysts is critical to the FAS mission. Despite the urgent need for rapid distribution of this data, the inadequacy of its existing infrastructure forces FAS to delay distribution by hours or days.

Due to bandwidth limitations and interoperability issues, FAS staff must currently write geospatial data to CDs, DVDs, and hard drives via FedEx. Due to security and bandwidth restrictions in the FAS networks, analysts often have to use their home computers to download data. This process is counter-intuitive, time-consuming, and presents a security risk.

Geospatial data is used throughout NRCS, but is used most extensively in soil surveys. NRCS's Natural Resources Inventory and Soil Survey databases help scientists and policy makers track natural resource conditions and trends. NRCS considers the maintenance and update of these databases to be among its highest priorities. Given the priority of these tasks, efficient data sharing is of paramount importance, however, NRCS faces many challenges in this area. Currently, data sharing is done via FTP, CD/DVD, or external hard drive.

3.4.2 Capability Shortfall

Even though it is utilizing every available resource, the FSA is challenged to meet its program delivery goals. The decentralized Service Center environment is functionally obsolete and is in danger of failure. The age and obsolescence of the existing architecture makes it impossible to comply with USDA directives to implement "thin-client" computers and to store data in secure, centralized Enterprise Data Centers. In order to all of these architectural, policy and program needs, FSA must move towards a robust and centralized geospatial solution.

NRCS faces many of the above-mentioned challenges. Expanded and enhanced web services are necessary to share more effectively and efficiently share data with internal and external partners; however, infrastructure and firewall issues make data sharing cumbersome.

Due to the wide geographic distribution of the FS, it is greatly impacted by network issues. FS employees are often in areas that have limited or no network access, which makes updating databases cumbersome. Data sharing is also limited by network and firewall issues.

According to FS personnel, all data used in FS decision making must be tied to a point on the ground in order to be effective. Naturally, accurate and easily accessed geospatial data is essential for FS, as it would not be able carry out its mission without high-quality geospatial data. FS must able to share data with other agencies; however, it frequently encounters obstacles for data sharing. For example, FS had to suspend a project with the Bureau of Land Management due to firewall access issues.

3.4.3 Planned Capability

FSA wishes to move to a fully integrated, enterprise-wide, centralized geospatial architecture. The future environment will promotes interaction between service centers and their customers by leveraging technology to enhance services and communications. A centralized, integrated architecture will provide GIS access to Common Land Unit (CLU) information, imagery and other common customer data to help determine program eligibility and compliance, and will reduce service center workload and costs. It will also improve the maintenance, revision, and organization of information. The future architecture satisfies the need to deliver information via the Web and will develop new processes that will eliminate most of the redundant tasks currently part of service center operations.

A centralized GIS would rely completely on Web-based hosting services for ortho-imagery in FSA business applications. Additionally, consolidation of the hardware in a centralized environment will greatly reduce total cost of ownership and risks associated with its physical security.

The FAS requires major infrastructure upgrades in order to optimize the collection, distribution, and use of GIS data.

NRCS wishes to develop mobile systems with a high degree of GIS capability. Ideally, users could collect geospatial data and upload it to a national database (such as the National Elevation system) using wireless broadband access.

FS wishes to enhance network capability through the provision of wireless broadband or satellite. It also requires infrastructure upgrades in order to improve interoperatibility with internal and external partners. FS also wishes to make GIS software available to all employees, tailored to their specific needs (wild land firefighting, road maintenance, etc).

3.5 Barriers

3.5.1 Federal

- Appropriations are not available across the federal government to create, maintain, and update base-map data.
- Core common services and SmartBuy contracts for data are not yet available.
- Funding geospatial programs is not viewed as a priority.

3.5.2 USDA

- Information on network, hardware, and software specifications is not centrally available for cross-agency comparison.
- Infrastructure to support enterprise-level geospatial processing 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 for some geospatial users.

3.5.3 Technological

- Service centers and field offices lack the network and telecommunications capacity necessary for geospatial data sharing.
- Lack of appropriate tools for mobile users (ruggedized laptops and GPS).

3.6 Impact of Not Approving the Mission Need

Many agencies need to replace their geospatial infrastructure and applications in order to maintain their ability to fulfill their missions. For example, FSA no longer has the infrastructure in place to produce hard-copy maps for manual service delivery, as its workforce been reduced and is no longer able to perform required geospatial duties, such as acreage measurement. Continuity of operations, which is already a challenge for existing geospatial application, would be difficult to assure.

The approval and implementation of a Unified Geospatial Segment Architecture is necessary in order to make the USDA compliant with the following mandates:

- OMB Circular A-16 (Coordination of Geographic Information and Related Spatial Data Activities);
- Executive Order 12906 (Coordinating Geographic Data Acquisition and Access: The National Spatial Data Infrastructure;
- The Presidential Initiatives for the Geospatial One-Stop and Geospatial Line of Business;
- OMB Circular A-11 (Preparation, Submission, Execution of the Budget)

- USDA OCIO Guidelines for Enterprise Data Centers and Critical Systems; and
- 2007 Farm Bill

3.7 Benefits

The approval and implementation of the Unified Geospatial Segment Architecture will convey many benefits, some of which are identified below:

- Improves the ability to integrate with mission critical business operations and reduces the costs and risks associated with testing and software deployment;
- Supports President's Management Agenda e-Government mandates;
- Supports improved physical security through hosting applications at central or regionally located servers;
- Supports eGovernment solutions that allow agricultural producers to transact electronic, geo-enabled business at "anytime" (i.e., 24/7) from "anywhere";
- Streamlines information sharing between divisions, outside agencies and other stakeholders;
- Improves accuracy and data integrity through centralized data management and System Administration;
- Supports all applicable federal information processing and geographic information standards, particularly those determined by the Federal Geographic Data Committee as supporting the National Spatial Data Infrastructure (NSDI);
- Improves management of USDA infrastructure.

3.8 Contracting

TBD

3.9 Criticality

In order for several USDA agencies to maintain or improve service delivery, it is necessary to approve this project. Additionally, the approval of this project will ensure that the USDA is in compliance with legislative and executive branch directives.

3.10 Long Range Resource Planning Estimate

TBD

4.0 Concept Management Plan

The concept management plan provides the opportunity for further examination of the proposed solutions. The alignment of alternatives against key criteria and measurement areas are

4.1 General Business Objectives

- Make improvements in USDA geospatial infrastructure and data sharing practices in order to effectively carry out its mission
- Manage the business and technical geospatial resources at the enterprise level to provide the coordination necessary to guide the evolution of geospatial data and services from the current baseline to the target state.
- Develop a USDA Unified Geospatial approach that will effectively support the business and operational needs of all of USDA's agencies.
- Implement management of the specific operational and developmental requirements of USDA's diverse agencies within a USDA-wide baseline of technology, services, and data assets.

4.2 'Raines Rules' Assessment

The geospatial segment architecture initiative must be measured against the eight 'Raines Rules' to assess its viability to move forward into a full business case. The eight questions the rules address can be found in the USDA CPIC guide for FY2010 in section 2.2.3 (pages 16-17). Each question is individually addressed below:

1. **Does the investment in major capital asset support core/priority mission functions that need to be performed by the federal government?**

   The investment in USDA geospatial technology supports a core mission of USDA and its agencies, and is directly tied to USDA's mission, services to citizens, governments, businesses, and other nations. Geospatial technology supports all of USDA's conservation, farming, animal and plant health, rural development, property management, and homeland security elements. The USDA geospatial segment architecture ensures that USDA participates in the Federal Government's Geospatial Line of Business.

2. **Does it have to be undertaken by the requesting agency because no alternative private sector or government source can more efficiently support the function?**

   The geospatial program at USDA is wide-ranging and covers many different programs and systems. It must be undertaken by USDA to ensure the continued support of all mission areas requiring geospatial data.

3. **Does the investment support work processes that have been simplified or otherwise redesigned to reduce costs, improve effectiveness, and make maximum use of commercial-off-the-shelf (COTS) technology?**

The investment will support a streamlined system that maximizes efficiency and cost-effectiveness while maintaining USDA's current level of data availability and quality. Maximum use of COTS software will be considered when making all investment decisions.

4. **Does this initiative demonstrate a projected return on investment that is clearly equal to or better than alternative uses of available resources?**

   It is anticipated that the alternative chosen will provide a return on investment superior to those of other alternatives considered. The full alternatives analysis, scheduled to be completed by December 31, 2008, will detail the projected return on investment for the investment. Alternative uses of currently available resources will be considered in the process.

5. **Is this initiative consistent with Federal, agency, and bureau segment architectures which: integrate agency work processes and information flows with technology to achieve the agency's strategic goals…and specify standards that enable information exchange and resource sharing, while retaining flexibility in the choice of suppliers and the design of local work processes?**

   This initiative is a direct result of the development of the USDA Geospatial Segment Architecture, and is consistent with OMB and USDA segment architecture guidelines. This initiative will make use of every opportunity to promote and enhance information exchange and resource sharing, while remaining aware of the unique needs of each USDA agency.

6. **Does this initiative reduce risk by: avoiding or isolating custom-designed components…; using fully tested pilots, simulations, and prototypes…; establishing clear measures and accountability for project progress; and securing substantial involvement and buy-in…from program officials who will use the system?**

   It is anticipated that this initiative will make use of COTS technology to the greatest extent possible. Additionally, the selected solution will be thoroughly tested and signed off on by program officials prior to release. The process for securing involvement and buy-in from program officials is already underway, as the project team has held the first of a series of interviews with agency stakeholders.

   The full risk analysis of this investment will be completed during the alternatives analysis. Further risk reduction will be assessed at that point.

7. **Will this initiative be implemented in phased, successive chunk as narrow in scope and brief in duration as practicable, each of which solves a specific part of an overall mission problem and delivers a measurable net benefit independent of future chunks?**

   The implementation of this investment will be determined once the alternative is chosen and developed into a full to-be architecture. The target date for this to be completed is February 28, 2009.

8. **Will this initiative employ an acquisition strategy that appropriately allocates risk between the government and the contractor, effectively use competition, tie contract payments to accomplishments, and take maximum advantage of commercial technology?**

   The acquisition strategy is to be determined after the full to-be architecture is established.

4.3 Performance Measures

High level performance measures which support the Performance Reference Model are being developed for the geospatial segment architecture initiative. The target date for establishing these performance measures is September 30, 2008.

4.4 Key Selection Criteria

Key selection criteria to evaluate concept alternatives will be developed following the establishment of high-level performance measures and business objectives.

4.5 Alignment with Department Standards

The chosen alternative that is developed into a solution will be made compatible with department EA, security & privacy, eGovernment, and other relevant standards. This alignment will take place as part of the process of developing the final to-be segment architecture by February 28, 2009.

4.6 Alternatives to be Analyzed

The full alternatives analysis is to be completed by December 31, 2008. However, the specific alternatives that will be analyzed have not been finalized. It is anticipated that the following alternatives will be included:

- Maintain the status quo
- Switch to a centralized operating picture
- Development of a distributed operating model
- Development of a decentralized operating model

4.7 Preliminary Concept Management Plan

A preliminary concept planning and management plan addressing Select Phase preparation, alternatives analysis approach, and business design/reengineering will be developed with the establishment of performance goals.

5.0 Preliminary Cost Benefit Analysis

5.1 Introduction

The United States Department of Agriculture (USDA) uses Geographical Information Systems (GIS) applications in support of many of its functions and tasks. The Unified Geospatial Cost Benefit Analysis (CBA) is conducted to determine the financial feasibility of the solution alternatives versus the current state. The CBA enables the estimation of real costs and benefits for solution alternatives under consideration. The CBA document will be presented in the following format:

- Review of current environment and background, future environment and scope
- Cost benefit methodology
- Architecture and business processes of current environment and each alternative
- Analysis of baseline and alternatives comparison based on life cycle costs, qualitative costs, business requirements and risk analysis.
- Presentation of the preferred alternative

5.1.1 Purpose

The purpose of this document is to present results of the CBA for the USDA geospatial program. The CBA will assist USDA in making program decisions as well as budget estimations for future planning.

This document provides the baseline information intended to support decision making and helps ensure that resources are effectively allocated to support mission requirements for the USDA GIS program. This CBA will demonstrate that at least three alternatives were considered for the GIS program architecture, and that the chosen alternative is the most efficient within the context of budgetary and political considerations. All estimates developed in this review will be submitted for USDA GIS team review in accordance with USDA Capital Planning Investment and Control (CPIC) guidelines and OMB Circular A-94 guidance. OMB Circular A-76 requires "a full description of the standards, performance measures, costs, and adjustments made will be developed by the Agency and made available upon request." This CBA complies with OMB A-76.

5.1.2 Current Environment and Background

USDA's major contribution to geospatial data and services has benefited the nation for decades. Traditionally, aerial photography and mapping has helped USDA agencies achieve their missions, including oil conservation, fighting wild land fires, and promoting better farming practices. Today, geospatial technology supports all of USDA's conservation, farming, animal and plant health, rural development, property management, and homeland security elements of the strategic plan. By participating in internal and external geospatial coordination efforts, USDA aligns its geospatial strategy and investments with the rest of the Federal government primarily through the Federal Geographic Data Committee (FGDC) and the Geospatial LoB. In general, USDA's geospatial investments support many different business functions across a broad range of investments.

USDA currently operates a total of 54 geospatial systems across 15 agencies. This number includes 14 commercial off the shelf software (COTS) systems. These systems are largely operated by individual agencies to meet their specific operating and business needs. Agencies face challenges in operating these individual systems and in sharing data with each other as well as non-USDA organizations.

The key to improved geospatial performance and accountability is to manage the specific operational and developmental requirements of USDA's diverse agencies within a USDA-wide baseline of technology, services, and data assets. Coordination of the business and technical geospatial resources at the enterprise level will provide the coordination necessary to guide the evolution of geospatial data and services from the current baseline to the target state.

5.1.3 Future Environment

In the future, USDA will migrate to a unified geospatial environment that will provide better access to geospatial data between national headquarters, state offices, service centers, and field users. Additionally, enhanced ability to share and transfer data among these users, as well as other government agencies and public users will be a feature of the future environment. Consolidation of the hardware in a centralized environment will reduce the costs of operation and maintenance, as well as reduce risks associated with physical security. These improvements will contribute to an upgrade in USDA's effectiveness in meeting its goals while reducing many costs and duplicative efforts.

The development of a unified geospatial approach is critical to USDA's continued success in meeting its goals and business functions. A common operating picture that will allow agencies and staff offices to collect and share geospatial data with each other as well as with individuals and organizations outside USDA is a core component of the future environment.

5.1.4 Scope

The scope of this effort consists of completing a CBA, modeled after the guidelines in OMB Circular A-94 and the USDA guidelines. This CBA adheres to USDA Office of the Chief Information Officer (OCIO) guidelines and will use an approved cost element structure that accounts for specific attributes of the USDA GIS program.

5.2 Cost Benefit Methodology

The methodology used for this Cost Benefit Analysis follows OMB and USDA CPIC guidelines. This section will provide a detailed description of the process used to complete the analysis as well as reach a recommended alternative.

5.2.1 Determination of Alternatives

For this CBA, the baseline environment and three alternatives will be analyzed:

- Baseline: Maintain the current environment
- Alternative 1: Switch to a centralized operating environment for geospatial technology
- Alternative 2: Develop a distributed operating model
- Alternative 3: Develop a decentralized operating model

5.2.2 Cost Benefit Analysis Design

A current state and future state methodological approach will be used in this CBA. The "current state" reflects the status quo or baseline costs. The "future state" represents costs estimates for each of the proposed alternatives. The costs of maintaining the current geospatial environment were derived from the Geospatial Funding Profile Analysis that was conducted for the Unified Geospatial Segment Architecture. The costs associated with switching to a centralized operating environment, developing a distributed operating model or developing a decentralized operating model were be derived using information from various USDA agencies.

5.2.3 Main Assumptions

Listed below are the overall assumptions used in this CBA:

Assumptions

- All numbers and alternatives are preliminary estimates pending completion of the alternatives analysis.
- The baseline costs are derived from the FY2008 cost profile shown in the USDA Unified Geospatial "As –Is", as displayed in the table below:

Sum of FY 2008 Budget		
Agency	**Total Cost**	**% of USDA Total**
APHIS	$957,532	1.08%
ARS	$129,000	0.15%
DA	$959,000	1.08%
ERS	$238,066	0.27%
FAS	$5,972,374	6.75%
FS	$50,397,003	56.97%
FSA	$17,010,071	19.23%
FSIS	$195,226	0.22%
NASS	$1,245,250	1.41%
NRCS	$8,021,731	9.07%
OCE	$2,398	0.00%
OCIO	$2,448,246	2.77%
OIG	$0	0.00%
RD	$203,800	0.23%
RMA	$684,884	0.77%
Grand Total	$88,464,581	100.00%

- The base year for all estimates is FY2008.
- Transition to a centralized of operating environment or distributing operating model will occur between FY2010 and FY2014.
- The Farm Service Agency (FSA) Geographic Information Systems Program Cost Benefits Analysis provides the basis for alternative 1.
- The FSA used the costs associated with a terminal server environment to estimate the cost for a centralized operating environment.

- The Natural Resources Conservation Service (NRCS) Natural Resources Inventory, Information, and Assessment (NRIAA) Analysis of Alternatives provides the basis for alternatives 2 and 3.
- Where applicable, FY 2008 costs were increased by 3% annually.

5.2.4 Data Collection

The data collection effort for this CBA consisted of two main sources: internal and external supporting documents and interviews with agency stakeholders. Taken together, these sources provided quantitative and qualitative data necessary to identify costs and benefits.

System and cost information was derived from a variety of sources, including the USDA Geospatial Segment Architecture "As-Is", the Farm Service Agency (FSA) Geographic Systems Program Business case and the Natural Resources and Conservation Service (NRCS) Inventory, Information, and Assessment Business Case.

Interviews were conducted with geospatial stakeholders from the following agencies:

- Farm Services Agency
- Foreign Agricultural Service
- Natural Resources and Conservation Service
- Forest Service
- National Agricultural Statistics Service
- Animal and Plant Health Inspection Services

5.2.5 Evaluation Criteria

This section will provide a high-level view of the baseline and three alternatives. This analysis evaluates each alternative's ability to meet agency and business requirements. These evaluation criteria are:

- Life cycle costs: Cost effectiveness of each alternative.
- Qualitative benefits: Benefits which can not be assigned a numeric value, but can be related to improvements in customer service, improved decision making and enhanced productivity.
- Business requirements: Ability of each alternative to meet expected user requirements.
- Risk: Ability of the alternative to meet overall investment objectives in regard to cost, schedule, and technology.

5.3 Concept of Current and Future Operations

This section compares the current architecture and processes in the current and proposed environments.

5.3.1 Architecture and Business Processes: Current Environment

Sharing geospatial information at USDA is still limited by a reliance on desktop software utilization with locally stored data. This results in multiple copies of data, little master data, and little guidance about data standardization. Spatial data exists in multiple locations in different kinds of systems or databases. Spatial data

governance policies are confined to a few agencies and their data and services are often not sharable. Some agencies struggle to create and manage massive amounts of data and other agencies have no information about how to spatially enable their small amount of valuable data.

While agencies such as the Economic Research Agency (ERS), FS, NRCS, and FSA may have the ability to create web services for data sharing, but their efforts are limited by network configurations, security concerns, resources, and policies governing permissions and access. In addition, increasing awareness of the uses of spatial data increases the need to manage spatial data and related technologies. Many smaller agencies would also benefit from geospatial data sharing and enhanced geospatial capabilities.

Faced with obsolete computing technology and increasing program delivery demands, FSA is using every computer resource available. Desktop computers and application servers are the primary modes of delivery for geospatial-enabled business applications at local service centers. Given limitations on bandwidth and related telecommunications infrastructure, FSA is not yet able to support updates to its base imagery via web services and must rely on mailing CDs and DVDs to the service centers. Currently, a centralized version of the mission-critical Common Land Unit (CLU) data layer does not exist.

The Foreign Agricultural Service (FAS) is faced with a very similar situation. Most FAS activity is structured around global climate and crop information obtained daily through imagery collection. The timely dissemination of this data to service centers and analysts is critical to the FAS mission. Despite the urgent need for rapid distribution of this data, the inadequacy of its existing infrastructure forces FAS to delay distribution by hours or days.

Due to bandwidth limitations and interoperability issues, FAS staff must currently write geospatial data to CDs, DVDs, and hard drives for delivery via FedEx. Due to security and bandwidth restrictions in the FAS networks, analysts often have to use their home computers to download data. This process is counter-intuitive, time-consuming, and presents a security risk.

Geospatial data is used throughout NRCS, but is used most extensively in soil surveys. NRCS's Natural Resources Inventory and Soil Survey databases help scientists and policy makers track natural resource conditions and trends. NRCS considers the maintenance and update of these databases to be among its highest priorities. Given the priority of these tasks, efficient data sharing is of paramount importance, however, NRCS faces many challenges in this area. Currently, data sharing is done via FTP, CD/DVD, or external hard drive.

5.3.2 Architecture and Business Processes: Future Environment

The future environment will consist of either a centralized architecture, hosted at USDA's Enterprise Data Centers, distributed operating picture based in several centers across USDA facilities, or a decentralized environment in which agencies will continue to host their own data, but data standards and requirements will be implemented. Switching to an enterprise wide geospatial solution will allow agencies to focus on business services across all missions and agencies rather than focusing on individual tasks and systems. It will also provide greater ability to share data

and information across USDA offices and agencies. This streamlining will also allow greater collaboration between USDA and other government agencies, state and local governments and public users. The implementation of an enterprise solution requires the leveraging of existing systems and hardware, the existence of tools for future operations, and a centralized planning process. Establishing a common operating picture with enterprise level data management standards is a central element of any future architecture.

The transfer to an enterprise system will be done incrementally and make as much use of existing systems as possible, to minimize costs as well as any disruption in day-to-day operations.

USDA will be transitioning its critical information technology, including all geospatial systems, to Enterprise Data Centers (EDC). This transfer requires agencies to reduce the total number of agency data centers into a smaller number of physical centers; collate small and mid-tier computing platforms in larger data centers; and modernize remaining data centers in order to improve the delivery of services. USDA has selected four locations for consolidation of applications and hardware infrastructure. They are:

- National Information Technology Center (EDC – Kansas City)
- Primary Data Center (EDC – Denver)
- Goodfellow Enterprise Data Center (EDC – St. Louis)
- GWCC Enterprise Data Center (EDC – Beltsville)

Each data center has specific requirements that must be met in order to house critical applications, and each one will be reviewed annually to verify that they are managed within requirements set by the Department.

A permanent moratorium on any investment in new or existing data centers without an approved waiver from the Chief Financial Officer (CFO) and Chief Information Office (CIO), is in effect for all USDA agencies. The EDC requirement will impact all of the proposed alternatives, including maintaining the baseline. Analysis of each alternative will be conducted with the EDC requirement as a factor.

5.3.3 Alternative 1: Centralized Hosting and Management

The future environment will consist of a centralized, fully integrated architecture to be hosted at USDA Enterprise Data Centers. GIS applications hosted in a centralized architecture will improve communication between national headquarters, state and local offices, and the service centers. Web services will be utilized where possible to provide for the greatest availability and portability of data.

This alternative will adopt an enterprise architecture in which the GIS program is hosted and managed in a centralized environment, with strong Departmental controls and governance. Local clients in service centers or remote locations will use available communications bandwidth to connect to central web or terminal server applications. Internet browsers and/or Citrix terminal server software will enable connections to centrally hosted applications on data servers. The centralized architecture will host GIS business applications and data on central servers.

A centralized architecture will not require file servers at service centers or state offices. In order to fully implement a centralized approach, additional web servers, GIS application servers and GIS application database servers will be required.

5.3.4 Alternative 2: Distributed Architecture

This alternative focuses on centralizing data in USDA Enterprise Data Centers. Under this scenario, each Agency would be responsible for managing and maintaining their own data and creating services according to well-defined standards. This alternative focuses on creating a Service Oriented Architecture (SOA) for USDA geospatial data resources. Data that is currently dispersed among multiple geographic locations will be consolidated to these central locations. Data shared by multiple agencies would be managed centrally by a designated Agency Data Steward.

Web services will be used to provide access to data at field offices and service centers. This architecture will not require any local data hosting or servers. In order to fully implement a centralized approach, additional web servers, GIS application servers, and GIS application database servers will be required.

Alternative 2 is differentiated from Alternative 1 by the degree to which the architecture is managed and controlled by the Department. Under Alternative 2, Agencies would be able to choose the software (.NET or Java, CRM or SAP), databases (SQL Service or Oracle), and delivery (Citrix or Web) that best meets their business requirements. However, strong coordination between agencies would still be necessary in order to maximize data sharing, promote reuse, and eliminate redundancy.

5.3.5 Alternative 3: Decentralized Architecture

This alternative keeps data fully decentralized, and USDA agencies that currently produce and maintain data would continue to do so. Agencies would maintain responsibility for distribution of data to their end users. Overall data standards would be set by an enterprise data team at a higher level. Centralized data centers could be used on a case-by-case basis to distribute individual sets as needed. Essentially, this alternative is the status quo, with more robust business rules and other enhancements to coordination between agencies.

5.4 Comparison of Current and Future Environment

In the current environment, data is often confined to an individual system or user. Sharing data with other users can require physically transferring CDs, DVDs or portable hard drives. Users are limited by the capabilities of some PCs and security settings that prohibit the kinds of data transfers sometimes needed by geospatial users. Data sets are hosted by individual agencies on a case-by-case basis, with cooperation among agencies and outside entities occurring when it is possible.

The future environment will be centered on a common operating picture, in which agencies are able to freely share data. Department wide data standards and enterprise level data management will standardize data sets for greater sharing ability and access to data across USDA agencies and outside partners. Each of the

alternatives involves data stewardship and standards management, along with infrastructure improvements to allow greater operating capability.

5.5 Comparison of Baseline and Alternatives

After conducting a comparison of the business processes and architecture, this section will present a more detailed comparison of the baseline and the alternatives.

A full-blown alternative analysis for the Unified Geospatial Segment Architecture has not been completed; however, various USDA agencies have developed analyses that can be used to partially estimate the cost of enterprise-wide systems. However, these analyses cannot directly be compared due to inconsistencies in life cycle durations and life cycle cost categories, and in some cases lack of specificity about hardware and software requirements.

This section will further explain the differences between the baseline and the alternatives by discussing the following areas

- Life Cycle Costs: A full life cycle cost comparison for the current state and for each competing alternative.
- Qualitative Benefits: A comparison of the non-quantifiable benefits identified through the data collection process.
- Business Requirements: A comparison of the business requirements met under the current state and the competing alternatives.
- Risk Analysis: A measure of relative risk for each of the alternatives categorized within investment cost, schedule, and technical constraints.

5.5.1 Analysis of Each Alternative

This section presents an analysis of the baseline and each proposed alternative,

5.5.2 Baseline

Predecisional Budget Information Redacted

5.5.3 Alternative 1: Centralized Architecture

Under this alternative, all USDA geospatial functions and data would be centrally managed and integrated. This centralized architecture presents benefits through improvements in maintenance, revision and organization of data in a centralized location. This alternative addresses the need for users to share data through web services and will develop new processes that will eliminate most, if not all, redundant data sharing practices currently in use throughout USDA. End level users will continue to have access to data using familiar desktop computer software, while enjoying greater ability to access and share data with other users and customers. A centralized architecture will promote data integrity and transparency by allowing data to be shared and vetted by multiple sources rather than relying on individual users to verify all data integrity.

The most significant risk of a centralized architecture lies in the availability of data and reliability of the system. This alternative involves a single point of failure, and any disruption in the centralized system will reverberate throughout USDA until the system can be restored. In order for USDA to carry out its tasks, geospatial data

must be available at all times. Centralized maintenance of agency–specific business data also presents significant risk. Geospatial data is a mission-critical asset for many USDA agencies, and therefore, it is crucial to maintain data integrity and quality.

Conversion to a centralized environment would require a significant investment in hardware. While the exact costs for developing an enterprise-wide centralized environment are not yet available, the FSA Geospatial CBA estimates the 10-Year Life Cycle Costs associated with the development and maintenance of its centralized geospatial environment as follows:

Cost Category	Amount
Support Services-Data Acquisition	$288 M
Equipment	$56 M
Support Services-Other	$50 M
Intra-Governmental Services	$16 M
Personnel	$8 M
Software	$8 M
Total	**$426 M**

Using the figures provided in the Geospatial Segment Architecture "As-Is" document and the following assumptions, it is possible to estimate the 10-year life cycle cost of an enterprise-wide centralized geospatial environment:

- The enterprise- wide costs for Support Services-Data Acquisition, Software and Intragovernmental Services will be identical to those cited in the FSA GIS CBA.
- All other costs will be estimated according to the proportion of the total geospatial costs shown in the main assumptions. This table shows that FSA accounted for 19 % of USDA's FY 2008 Geospatial. Therefore, the costs shown above for Equipment, Support Services-Other, and Personnel are assumed to be 19% of the enterprise-wide 10-year life cycle costs for a centralized geospatial environment.

Given these assumptions, the estimated enterprise-wide 10-year life cycle costs for a centralized geospatial environment are:

Cost Category	Amount

Support Services-Data Acquisition	$288 M
Equipment	$295 M
Support Services-Other	$263 M
Intra-Governmental Services	$16 M
Personnel	$ 4M
Software	$8 M
Total	**$874 M**

5.5.4 Alternative 2: Distributed Architecture

A distributed architecture has many of the benefits of a centralized architecture. Increased ability to share data through web services and elimination of redundant services are benefits of this alternative. Additionally, this alternative presents greater disaster recovery capability and increases data availability. By having centralized data sets in two or more locations, there are multiple points of failure and the risk of a catastrophic failure are significantly reduced.

The most significant risk of this alternative is the added layer of complexity involved with running multiple data centers. Each data center will require operational and managerial support, and has its own possibility of failure or disaster.

The alternative analysis submitted by the National Resources Conservation Service (NRCS) provides a five-year estimate of the Life Cycle Costs associated with a distributed architecture. However, in order to compare this proposal to the FSA centralized architecture proposal, it was necessary to extend the Life Cycle Costs for five additional years. This projection was made using the following assumptions from the NRCS alternatives analysis:

- All hardware costs will incurred in the first year of the Life Cycle.
- Software license costs remain equal throughout the Life Cycle.
- Network and telecommunications costs remain equal throughout the Life Cycle.
- Support Services DME costs remain constant after the fourth year of the Life Cycle.
- Support Services Maintenance costs remain constant after the fourth year of the Life Cycle.
- NRCS Direct Costs remain equal throughout the Life Cycle.

Given these assumptions, the estimated 10 Year Life Cycle Costs of the NRCS distributed architecture proposal are:

Cost Category	Amount
Support Services	$15.5M
Equipment	$2.5M
Personnel	$11.3M
Software	$1M
Total	**$30.3M**

Further research is required to determine what the costs would be for an enterprise-wide distributed model. It is reasonable to assume that some hardware acquisition would be necessary, but that there could be some reuse of newer and more powerful servers.

5.5.5 Alternative 3: Decentralized Architecture

A decentralized architecture will keep data in the hands of its producers and most frequent users. Data management and quality standards will be applied to make the data sets more universal and easily shared, but the storage and management of the data will remain in the hands of agencies. This will minimize the impact of a migration and allow data owners to remain in control of their own data, within the quality standards.

The most significant risk of this alternative is a continuation of current practices, in which data cannot be easily shared and is not accessible to all users at all times. If agencies continue to own and manage their own data, it is possible that they will not fully implement data quality standards. The alternative analysis submitted by the National Resources Conservation Service (NRCS) provides a five-year estimate of the Life Cycle Costs associated with a decentralized architecture. However, in order to compare this proposal to the FSA centralized architecture proposal, it was necessary to extend the Life Cycle Costs for five additional years. This projection was made using the following assumptions from the NRCS alternatives analysis:

- All hardware costs will incurred in the first year of the Life Cycle.
- Software license costs remain equal throughout the Life Cycle.
- Network and telecommunications costs remain equal throughout the Life Cycle.
- Support Services DME costs remain constant after the fourth year of the Life Cycle.
- Support Services Maintenance costs remain constant after the fourth year of the Life Cycle.
- NRCS Direct Costs remain equal throughout the Life Cycle.

The National Resources Conservation Service (NRCS) estimates the 10 Year Life Cycle Costs of its decentralized architecture to be:

Cost Category	Amount
Support Services	$32.5M
Equipment	16.2M
Personnel	$8M
Software	$2.3M
Total	**$59M**

Further research is required to determine what the costs would be for an enterprise-wide decentralized model. It is reasonable to assume that some hardware acquisition would be necessary, but that there could be some reuse of newer and more powerful servers. Moreover, the decentralized model closely resembles the USDA's current geospatial environment and practices, and therefore, it is reasonable to assume that the cost distribution would be similar to that shown below:

Sum of FY 2008 Budget		
Agency	**Total Cost**	**% of USDA Total**
APHIS	$957,532	1.08%
ARS	$129,000	0.15%
DA	$959,000	1.08%
ERS	$238,066	0.27%
FAS	$5,972,374	6.75%
FS	$50,397,003	56.97%
FSA	$17,010,071	19.23%
FSIS	$195,226	0.22%
NASS	$1,245,250	1.41%
NRCS	$8,021,731	9.07%
OCE	$2,398	0.00%
OCIO	$2,448,246	2.77%
OIG	$0	0.00%
RD	$203,800	0.23%
RMA	$684,884	0.77%
Grand Total	$88,464,581	100.00%

5.5.6 Comparison of Alternatives

This section presents the comparison of each alternative in terms of life cycle cost, qualitative benefits, business requirements, and risk assessment.

5.5.7 Life Cycle Cost Comparison

Life cycle cost can be identified as the overall estimated total for a particular program alternative over a specified time period, including direct and indirect initial costs plus any periodic or continuing operations and maintenance costs. A base-year estimate will be used to compute life cycle costs.

The five major cost elements identified in the life cycle cost comparison will be Equipment, Software, Support Services, Personnel, and Intra-Governmental Services.

The cost estimation at this stage will not include any qualitative benefits or risk factors. Therefore, the cost comparison here will only be the preliminary CBA result. All costs will be adjusted for qualitative benefits and risk assessment affecting the baseline and each alternative.

5.5.8 Comparison of Qualitative Benefits

In order to represent the complete picture of each alternative, the non-quantifiable benefits will be identified. These qualitative benefits are divided in two categories:

- User Value: Benefits experienced by end users of geospatial imagery (public users, academia, organizations, etc.)
- Government Operational Value: Benefits realized as a result of improvements achieved by creating an integrated and accessible IT environment.

This comparison will include the current state, consolidated operating environment and distributed operating model. Some benefits are realized in both alternatives. The benefits represent those which can be related to improvements in quality of service, improved decision making, and enhanced interoperability among USDA agencies.

Table 4-1: GIS Program Non-Quantifiable Benefits

Classification of Benefit	Current State	Alternative 1: Consolidated Environment	Alternative 2: Distributed Environment	Alternative 3: Decentralized Environment
User Value	**TBD**	**TBD**	**TBD**	**TBD**
Government Operational Value	**TBD**	**TBD**	**TBD**	**TBD**

5.5.9 Comparison of Business Requirements

Business requirements are identified through the USDA Strategic Plan FY2005-2010 and cross checked against the Performance Reference Model (PRM). The PRM is a standard framework to measure the performance of major IT investments and their contribution to program performance, per OMB guidance. Based on the PRM, the business requirements that the GIS program seeks to achieve and the results it seeks to obtain can be classified into the following categories:

- Mission and Business Results: This measurement area captures the outcomes that agencies seek to achieve. These outcomes are usually developed during the agency budget and strategic planning process.
- Customer Results: This measurement area captures how well an agency or specific process within an agency is serving its customers.
- Processes and Activities: This measurement area captures the outputs that are the direct result of the process that an IT initiative supports.
- Technology: This measurement area captures key elements of performance that relate directly to the IT initiative.

During the initial assessment of the business requirements, it is important to identify the overall program goals to determine which requirements take precedence for comparison purposes. The requirements presented in the following table represent rational outcomes based on the selected alternatives and current state as identified in the study. Rating the business requirements according to the PRM will:

- Produce enhanced performance information to improve strategic and daily decision making.
- Improve the alignment and better articulate the contribution of inputs to outputs and outcomes.
- Identify performance improvement opportunities that span traditional organizational structures and boundaries.

A comparison of the requirements by each alternative will be presented in Table 4-2. The business requirements are rated on a scale of 1-5 as defined below:

1. Does not meet this requirement.
2. Slightly meets this requirement.
3. Partially meets this requirement.
4. Fully meets this requirement.
5. Exceeds this requirement.

When the business requirements are established and the scores can be calculated, this table will present a summary of each Alternative's total score in meeting the business requirements criterion.

Table 4-2: Comparison of Business Requirements

Business Requirements	Baseline	Alternative 1: Centralized Operating Environment	Alternative 2: Distributed Operating Environment	Alternative 3: Decentralized Environment

Mission and Business Results				
Enhance the Competitiveness and Sustainability of Rural and Farm Economies	**TBD**	**TBD**	**TBD**	**TBD**
Increase the Efficiency of Domestic Agricultural Production and Marketing Systems	**TBD**	**TBD**	**TBD**	**TBD**
Enhance the Production and Safety of the Nation's Agriculture and Food Supply	**TBD**	**TBD**	**TBD**	**TBD**
Reduce the Number and Severity of Agricultural Pest and Disease Outbreaks	**TBD**	**TBD**	**TBD**	**TBD**
Protect and Enhance the Nation's Natural Resource Base and Environment	**TBD**	**TBD**	**TBD**	**TBD**
Protect Watershed Health to Ensure Clean and Abundant Water	**TBD**	**TBD**	**TBD**	**TBD**
Enhance Soil Quality to Maintain Productive Working Cropland	**TBD**	**TBD**	**TBD**	**TBD**
Protect Forests and Grasslands	**TBD**	**TBD**	**TBD**	**TBD**
Customer Results				
Enhance the Competitiveness and Sustainability of Rural and Farm Economies	**TBD**	**TBD**	**TBD**	**TBD**
Increase the Efficiency of Domestic Agricultural Production and Marketing Systems	**TBD**	**TBD**	**TBD**	**TBD**
Enhance the Production and Safety of the Nation's Agriculture and Food Supply	**TBD**	**TBD**	**TBD**	**TBD**

Reduce the Number and Severity of Agricultural Pest and Disease Outbreaks	**TBD**	**TBD**	**TBD**	**TBD**
Protect and Enhance the Nation's Natural Resource Base and Environment	**TBD**	**TBD**	**TBD**	**TBD**
Protect Watershed Health to Ensure Clean and Abundant Water	**TBD**	**TBD**	**TBD**	**TBD**
Enhance Soil Quality to Maintain Productive Working Cropland	**TBD**	**TBD**	**TBD**	**TBD**
Protect Forests and Grasslands	**TBD**	**TBD**	**TBD**	**TBD**
Processes and Activities				
Enhance the Competitiveness and Sustainability of Rural and Farm Economies	**TBD**	**TBD**	**TBD**	**TBD**
Increase the Efficiency of Domestic Agricultural Production and Marketing Systems	**TBD**	**TBD**	**TBD**	**TBD**
Enhance the Production and Safety of the Nation's Agriculture and Food Supply	**TBD**	**TBD**	**TBD**	**TBD**
Reduce the Number and Severity of Agricultural Pest and Disease Outbreaks	**TBD**	**TBD**	**TBD**	**TBD**
Protect and Enhance the Nation's Natural Resource Base and Environment	**TBD**	**TBD**	**TBD**	**TBD**
Protect Watershed Health to Ensure Clean and Abundant Water	**TBD**	**TBD**	**TBD**	**TBD**
Enhance Soil Quality to Maintain Productive Working Cropland	**TBD**	**TBD**	**TBD**	**TBD**

Protect Forests and Grasslands	**TBD**	**TBD**	**TBD**	**TBD**
Technology				
Enhance the Competitiveness and Sustainability of Rural and Farm Economies	**TBD**	**TBD**	**TBD**	**TBD**
Increase the Efficiency of Domestic Agricultural Production and Marketing Systems	**TBD**	**TBD**	**TBD**	**TBD**
Enhance the Production and Safety of the Nation's Agriculture and Food Supply	**TBD**	**TBD**	**TBD**	**TBD**
Reduce the Number and Severity of Agricultural Pest and Disease Outbreaks	**TBD**	**TBD**	**TBD**	**TBD**
Protect and Enhance the Nation's Natural Resource Base and Environment	**TBD**	**TBD**	**TBD**	**TBD**
Protect Watershed Health to Ensure Clean and Abundant Water	**TBD**	**TBD**	**TBD**	**TBD**
Enhance Soil Quality to Maintain Productive Working Cropland	**TBD**	**TBD**	**TBD**	**TBD**
Protect Forests and Grasslands	**TBD**	**TBD**	**TBD**	**TBD**
AVERAGE TOTALS:				

5.5.10 Comparison of Risks

Risk analysis is a technique to identify and assess factors that may jeopardize the success of a project or achieving a goal. This technique also helps define preventive measures to reduce the probability of these factors from occurring and identify countermeasures to successfully deal with these constraints when they develop to avert possible negative effects. Document research, Subject Matter Expert

Interviews and surveys assisted in identifying risk factors, rationale and overall scores.

According to CPIC guidelines, risk identification consists of determining and documenting risks that will likely have an impact on the investment. The identification and associated analysis is a continuing process that should be done periodically throughout the investment life cycle. Both internal and external risks should be identified.

The identified risks for each selected alternative have been organized into the following categories:

- Financial Risk – Risks associated with changes in life cycle investment costs, which directly relate to the complexity and duration of the investment.
- Technical Risk – Risks associated with the inability to accurately predict the technology underlying the investment over its life cycle.
- Operational Risk – Risks associated with direct or indirect losses resulting from inadequate or failed internal processes, people, and systems or from external events.
- Legal and Contractual Risk – Risks associated with USDA's explicit relationships with vendors, contractors, and external GIS users.
- Organizational Risk – Risks associated with the business processes, and the key stakeholders' views of the investment.

Each of the five risk categories consists of four associated components:

- Probability of failing to achieve the desired outcome
- Impact of failing to achieve that outcome
- Percentage of overall costs
- Calculated risk factor

The percentage of overall costs is the perceived weight placed on each risk category, totaling 100%, and it remains constant throughout the risk analysis for each alternative. The risk factor is calculated by using the following formula:

(Probability) x (Impact) x (% of Overall Costs) = Risk Factor

The scores from each category are added up to arrive at a total score for each selected alternative. To determine a numerical value for probability and impact, a scoring system is assigned to these two components according to the following criteria outlined in tables 4-3 and 4-4.

Table 4-3: Probability Scoring Key

Probability – Ranking Scale	
1	Remote: 10% Chance
2	Unlikely: 25% Chance
3	Likely: 50% Chance

4	Highly Likely: 75% Chance
5	Near Certainty: 90% Chance

Table 4-4: Impact Scoring Key

Impact – Ranking Scale		
	Impact	Outcome
1	Negligible	Minimal or no outcome
2	Marginal	Minor outcome shortfall, overall outcome below goal but within acceptable limits
3	Moderate	Moderate outcome shortfall, overall outcome below goal and possibly below accepted limits
4	Critical	Overall outcome below acceptable limits
5	Catastrophic	Overall outcome unacceptable

The following tables provide the template that will be used to detail the risk score factor and rationale for each alternative. When all the information is obtained and put in the tables, a clear numerical risk factor score for each alternative will be presented. Analysis of each alternative's risk score will be presented, followed by an overall risk analysis.

Table 4-5: Baseline Risk

Risk	Rationale	Probability	Impact	% Overall Costs	Risk Factor
Financial	TBD	TBD	TBD	TBD	TBD
Technical	TBD	TBD	TBD	TBD	TBD
Operational	TBD	TBD	TBD	TBD	TBD
Legal & Contractual	TBD	TBD	TBD	TBD	TBD

Organizational	TBD	TBD	TBD	TBD	TBD
Total Score	TBD	TBD	TBD	TBD	TBD

This section will present the baseline risk factors analysis.

Table 4-6: Alternative 1 Risk

Risk	Rationale	Probability	Impact	% Overall Costs	Risk Factor
Financial	TBD	TBD	TBD	TBD	TBD
Technical	TBD	TBD	TBD	TBD	TBD
Operational	TBD	TBD	TBD	TBD	TBD
Legal & Contractual	TBD	TBD	TBD	TBD	TBD
Organizational	TBD	TBD	TBD	TBD	TBD
Total Score	TBD	TBD	TBD	TBD	TBD

This section will present the Alternative 1 risk factors analysis.

Table 4-7: Alternative 2 Risk

Risk	Rationale	Probability	Impact	% Overall Costs	Risk Factor
Financial	TBD	TBD	TBD	TBD	TBD
Technical	TBD	TBD	TBD	TBD	TBD
Operational	TBD	TBD	TBD	TBD	TBD
Legal & Contractual	TBD	TBD	TBD	TBD	TBD
Organizational	TBD	TBD	TBD	TBD	TBD

Total Score	TBD	TBD	TBD	TBD	TBD

This section will present Alternative 2 risk factors analysis.

Table 4-8: Alternative 3 Risk

Risk	Rationale	Probability	Impact	% Overall Costs	Risk Factor
Financial	TBD	TBD	TBD	TBD	TBD
Technical	TBD	TBD	TBD	TBD	TBD
Operational	TBD	TBD	TBD	TBD	TBD
Legal & Contractual	TBD	TBD	TBD	TBD	TBD
Organizational	TBD	TBD	TBD	TBD	TBD
Total Score	TBD	TBD	TBD	TBD	TBD

This section will present Alternative 3 risk factors analysis.

A comparison of the baseline and three alternatives will show which alternative presents the lowest risk factor, with a comparison of the composite scores for each alternative.

5.5.11 Risk Adjusted Costs

Adjusting the life cycle cost estimates for risk aids in comparing alternatives with different potential risk levels and helps ensure that returns from investments with higher risk potential are fully understood. Investments with high technical risk may be selected if the investment is deemed a strategic or operational necessity. Other investments may be selected simply because they have low risk and require few resources.

Conducting a risk assessment and controlling risk is a continuing process throughout the investment life cycle. Having identified the risk factor for the baseline and each of the three alternatives, they are then applied to each alternative's discounted life cycle cost estimate.

5.6 Findings

This section will explain how the actionable information from the previous sections supports selection of the recommended alternative. The findings will be used to show

how investment in the recommended alternative provides the ideal mix of meeting business requirements, exhibiting acceptable risk and reducing yearly operating expenses.

5.6.1 Functional Comparison of Alternatives

This section will present the ability of the baseline and each alternative to meet the selection criteria. Scoring will be determined through calculating values within each area-specific section of the CBA and then holding a final review and validation meeting with the program sponsors. Each functional area will be viewed independently of the others to achieve the greatest objectivity in determining the final scoring for each alternative.

The scoring will be based on a four point scale:

1. Lowest Value
2. Marginal Value
3. Good Value
4. Best Value

Table 5-1 will be used to present a concise summary picture of all the factors analyzed in the above sections. The total score for each alternative will be presented in this table.

Table 5-1: Functional Comparison of Alternatives

Criteria	Baseline		Alternative 1		Alternative 2		Alternative 3	
	Score	**Rationale**	**Score**	**Rationale**	**Score**	**Rationale**	**Score**	**Rationale**
Life Cycle Costs	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Qualitative Benefits	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Business Requirements	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Risk	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Total Score	TBD		TBD		TBD		TBD	

The functional comparison of benefits in Table 5-1 will present a straightforward comparison of each criterion.

5.6.2 Recommended Alternative

This section will present the alternative that is recommended based on the results of the alternatives analysis and the CBA. It will address each of the criteria and describe how the recommended alternative meets the requirements of the criteria.

5.7 Appendices

5.7.1 Appendix A: Referenced and Related Documentation

The following documents were used in the preparation of this CBA:

- Building a Business Case for Shared Geospatial Data and Services – U.S. Federal Geographic Data Committee, September 2006
- Data Center Consolidation: Benefits, Best Practices, Avoidance, and TCO Considerations, June 2008
- Enterprise Data Centers and Critical Systems Memo, January 2008
- Geographic Information Systems Program Cost Benefit Analysis – USDA Farm Service Agency, September 2007
- Natural Resources Inventory, Information, and Assessment Analysis of Alternatives – USDA Natural Resources Conservation Service – July 2008
- OMB Circular A-11
- OMB Circular A-76
- OMB Circular A-94
- USDA Enterprise Architecture Geospatial Segment Architecture Report, March 2008
- USDA Information Technology Capital Planning and Investment Control Guide for the Fiscal Year 2010 Budget, April 2008

5.7.2 Appendix B: Acronyms

Below is a list of acronyms used throughout this CBA:

Acronym	Definition
CBA	Cost Benefits Analysis
COTS	Commercial Off The Shelf
CFO	Chief Financial Officer
CIO	Chief Information Officer
CPIC	Capital Planning and Investment Control
EDC	Enterprise Data Center

ERS	Economic Research Service
FAS	Foreign Agricultural Service
FGDC	Federal Geographic Data Committee
FS	Forest Service
FSA	Farm Services Agency
FTP	File Transfer Protocol
FY	Fiscal Year
GIS	Geographic Information System
GPS	Global Positioning System
NITC	National Information Technology Center
NRIAA	Natural Resources Inventory, Information and Assessment
NRCS	Natural Resources Conservation Service
OMB	Office of Management and Budget
USDA	United States Department of Agriculture
USGS	United States Geologic Survey