UNITED STATES DEPARTMENT OF AGRICULTURE

UNITED STATES GEOLOGICAL SURVEY

Imagery for the Nation

IFTN

Cost Benefit Analysis

July 2007

Executive Summary

Digital orthoimagery[1] from aerial and satellite imagery is the foundation for most public and private Geographic Information Systems (GIS), and these systems are routinely integrated as critical components of mainstream IT initiatives. Digital orthoimagery is used in hundreds of applications across the nation ranging from E-911 dispatch systems and permit tracking, to the foundation for property mapping and analyzing the health of the nation's agricultural industry. The creation of orthoimagery is founded on sound, well-understood, scientifically based technologies. Private sector firms, experienced in adapting computer-based technologies, produce the vast majority of digital orthoimagery in this country.

Today, orthoimagery is created in a patchwork pattern of inconsistent products that typically do not provide uniform national coverage. Access to these products is often controlled by state and local agencies that seek to recover funds and there are numerous confusing systems that must be navigated to access available imagery. Inadequate funding and non-compliance with national standards are key problems, but inconsistent coordination mechanisms also lead to duplicative efforts and a less than optimal use of limited funds. Many organizations independently manage their own programs without regard for the similar requirements that they share with others. These problems are pervasive and are not unique to any one level of government. Most federal, state and local agencies have limited resources to address these issues on their own and the time commitment required for coordination can be prohibitive. Moreover, the current situation does not lead to consistent, up-to-date, nationwide coverage for the general public.

To alleviate these problems, a nationwide program is being proposed to acquire, process, archive and distribute multi-resolution imagery on set schedules. The proposed Imagery for the Nation (IFTN) concept recommends a collaborative effort between the United States Department of Agriculture (USDA) Farm Service Agency (FSA) and the Department of the Interior (DOI) United States Geological Survey (USGS) to enhance the coverage of their respective imagery programs. This standardized, interagency concept was developed to provide a sustainable and flexible nationwide digital imagery program that will meet the needs of most government agencies by collecting and disseminating standardized multi-resolution products. Effective partnerships will promote significant cost savings by instituting large area contracts that create economies of scale and reduce duplicative efforts. Cost-sharing options are integral to the IFTN concept as well as program enhancements and efficiencies created through the streamlining of business processes to decrease the turnaround time between acquisition and distribution. The imagery produced by this program will be placed in the public domain and be easily discoverable through data gateways such as the Geospatial One Stop (GOS).

The IFTN proposal is consistent with E-Gov goals and initiatives. As defined by the Office of Management and Budget (OMB), the objective of the Geospatial Line of Business (Geo LoB) is to refine the opportunities for optimizing and consolidating federal geospatial-related investments to reduce the cost to government and, at the same time, improve services to end-users. A more coordinated approach for producing and maintaining geospatial data will further reduce redundant expenditures, and promote sustainable participation by federal partners working in collaboration with state and local governments to optimize geospatial related investments.

The IFTN Cost Benefit Analysis (CBA) analyzed multiple alternatives to identify the optimal solution for creating a national program that will meet the needs of federal, state and local governments. A significant

[1] Digital orthoimagery is made from an aerial or satellite images geometrically corrected such that the scale of the resulting image is uniform and equivalent to a map. Unlike an uncorrected photograph or image, an orthoimage can be used to measure true distances and areas because it provides an accurate representation of the Earth's surface.

amount of information was collected for the IFTN CBA through surveys and interviews with Subject Matter Experts (SME). The estimates in this analysis are reflective of the data gathered only from the SME, multiple stakeholders and directly surveyed populations. They have not been extrapolated to represent the total existing population of orthoimagery programs. Therefore, the cost estimates in this analysis are conservative and actual benefits will increase significantly when the cost data is extracted to reflect the entire nation's orthoimagery operations.

The original IFTN concept is Alternative #1. It consists of:

- Nationwide coverage of 1-m resolution imagery that is federally funded
- 1-ft resolution imagery that is federally funded with coverage that is determined by a population model
- 6-in resolution imagery of identified urbanized areas that is acquired through a mandatory 50% cost share program

Due to equity concerns expressed by the Western Governor's Association, the IFTN sponsors formulated three additional alternatives:

- Alternative #2 – Original IFTN Concept with Full Federal Funding for 1-ft Program: IFTN with 1-ft coverage of lower 48 states and Hawaii. Alaska and the Insular Areas will adhere to population model.
- Alternative #3 – Original IFTN Concept with Mandatory 50% Cost Share for 1-ft Program: IFTN with1-ft coverage of lower 48 states and Hawaii, with mandatory cost share. Federal government will provide 50% according to statewide business plan. Alaska and the Insular Areas will adhere to population model.
- Alternative #4 – Original IFTN Concept with Optional 50% Cost Share for 1-ft Program: IFTN with 1-ft coverage of lower 48 states and Hawaii with optional cost share. Federal government will guarantee the availability of 50% funding for coverage according to statewide business plans. Statewide councils can increase funding to increase program coverage. Alaska and the Insular Areas will adhere to population model.

As seen in Table ES-1, the four alternatives were assessed across five areas: Business Processes; Non-Quantifiable Benefits; Costs; Business Requirements; and Risk. Each area was scored on a four-point scale, with one being unacceptable and four being best value. The four alternatives and their total assessment scores are depicted in the following table.

Table ES-1: Functional Comparison of the Alternatives

Criteria	Current State		Alternative 1: Original IFTN Concept		Alternative #2: Original IFTN Concept with Full Federal Funding for 1-ft Program		Alternative #3: Original IFTN Concept with Mandatory 50% Cost Share for 1-ft Program		Alternative #4: Original IFTN Concept with Optional 50% Cost Share for 1-ft Program	
	Score	Rationale	Score	Rationale	Score	Rationale	Score	Rationale	Score	Rationale
Business Processes	2	National needs are not met. There is also a need for product standardization, and public domain imagery.	4	Future state business process implements common orthoimagery services and best practices.	4	Future state business process implements common orthoimagery services and best practices.	4	Future state business process implements common orthoimagery services and best practices.	4	Future state business process implements common orthoimagery services and best practices.
Non-Quantifiable Benefits	2	Individual Programs: • Control the orthoimagery process • Determine their required coverage and schedule • Determine the level of accuracy required • Are free of restrictions from federal government • Have no common standards or protocols • Make their own choices about access to imagery	4	• Access to current and archived imagery in the public domain • Reliability of product and schedule • Continuity of process and funding • Options available to acquire high resolution imagery and buy-up features • Increased interoperability across jurisdictions • Consistent treatment for critical infrastructure	4	• Access to current and archived imagery in the public domain • Reliability of product and schedule • Continuity of process and funding • Options available to acquire high resolution imagery and buy-up features • Increased interoperability across jurisdictions • Consistent treatment for critical infrastructure	4	• Access to current and archived imagery in the public domain • Reliability of product and schedule • Continuity of process and funding • Options available to acquire high resolution imagery and buy-up features • Increased interoperability across jurisdictions • Consistent treatment for critical infrastructure	4	• Access to current and archived imagery in the public domain • Reliability of product and schedule • Continuity of process and funding • Options available to acquire high resolution imagery and buy-up features • Increased interoperability across jurisdictions • Consistent treatment for critical infrastructure
Cost	2	Higher cost due to duplicative efforts, and few large area contracts.	4	ROI of 2.26:1 and NPV of $136M.	1	ROI of -2.96:1 and NPV of -$178M.	1	ROI of -1.60:1 and NPV of -$170M.	3	ROI of 0.37:1 and NPV of $30M.
Business Requirements	1	Varying imagery types and resolutions collected on different schedules. Each organization meets its own mission.	3	Sustainable and flexible digital imagery program that generally meets the needs of tribal, local, state, regional, and federal agencies.	3	Sustainable and flexible digital imagery program that generally meets the needs of tribal, local, state, regional, and federal agencies.	2	Sustainable and flexible digital imagery program that generally meets the needs of tribal, local, state, regional, and federal agencies.	2	Sustainable and flexible digital imagery program that generally meets the needs of tribal, local, state, regional, and federal agencies.

	Current State		Alternative 1: Original IFTN Concept		Alternative #2: Original IFTN Concept with Full Federal Funding for 1-ft Program		Alternative #3: Original IFTN Concept with Mandatory 50% Cost Share for 1-ft Program		Alternative #4: Original IFTN Concept with Optional 50% Cost Share for 1-ft Program	
Risk	1	• Continuous duplication of effort • Limited access to imagery already produced • Inability to maintain partnerships • Patchwork of products	2	• Congress not providing funds due to population model • Customer dissatisfaction with population model • Low adoption rate due to pop. model • Program specific or ad hoc requirements may not be met.	3	• The federal government incurring a larger burden of program costs and responsibilities (Financial, operational, etc.) • Program specific or ad hoc requirements may not be met.	2	• Uncertainty that states can afford 50% mandatory cost share • The state and local governments incurring a larger burden of program costs • Low adoption rate due to mandatory cost share • Program specific or ad hoc requirements may not be met.	4	• Uncertainty of how much states will buy up with optional 50% cost share • The state and Local governments incurring a larger burden of program costs • Program specific or ad hoc requirements may not be met.
Total Score	8		17		15		13		17	

After completing the alternatives analysis, alternatives #1 and #4 obtained the same overall score. Additionally, each of the four alternatives received the same scores in the categories of Business Processes and Non-Quantifiable Benefits; therefore, the remaining categories of Cost, Business Requirements and Risk were further examined to select the recommended alternative.

Table ES-2 shows a summarized comparison of Cost, Business Requirements, and Risk for alternatives #1 and #4.

Table ES-2: Summary of Cost, Business Requirements, and Risk

Alternatives	Discounted Baseline LCCE Costs	Risk Adjusted Alternative LCCE Costs	Return on Investment[1]	Net Present Value[1]	Business Requirements[2]	Risk[3]
Alternative #1: Original IFTN Concept	$1.50B	$1.37B	2.26:1	$136M	4 - Fully Meets Requirements	10.60 HIGHEST
Alternative #4: Original IFTN Concept with Optional Cost Share for 1-ft Program		$1.47B	0.37:1	$31M	3 - Partially Meets Requirements	6.95 LOWEST

[1] The ROI for Alternative #1 is 2.26:1, meaning that for every dollar invested, the program will receive $2.26 in return. The ROI for Alternative #4 is 0.37:1, meaning that for every dollar invested, the program will receive $0.37 in return. While Alternative #4's ROI is less than 1:1, the total investment required still provides potential operational savings over the baseline. The resulting NPV further supports investment in both alternatives #1 and #4 as it provides a positive return relative to the baseline.

[2] Alternative #1 received a higher score because it will require less coordination effort across agencies, and will offer a greater reduction in the number of independent contracts. Alternative #4's score was lower but still achieves the threshold where it will

meet Mission and Business requirements.

3 Alternative #1 presented the highest overall risk, due mostly to the inclusion of the population model. Alternative #4 presented the lowest risk of all those examined. Risks mainly associated with Alternative #4 are due to the uncertainty of the burden on the state and local governments related to program costs and responsibilities, and the inability to predict operating requirements for imagery service providers.

Alternative #4 presents a positive ROI and NPV while providing an equitable program to all federal, state, and local agencies. This is particularly appealing to western states, since most of their less populous areas require higher resolution imagery to support industries such as utility corridors, transportation, energy development, and tourism. In addition, funding for Alternative #4 is more likely to garner the backing of state and local groups and be supported by Congress than Alternative #1. The estimated rate of adoption for Alternative #4 is also expected to be higher than that of Alternative #1 due to the elimination of population requirements which limit the national coverage of 1-ft imagery. Alternative #4 offers the flexibility that will allow statewide coordinating councils (with federal representation) to determine the exact land area of coverage for the 1-ft program.

The Recommended Alternative is #4: Original IFTN Concept with Optional 50% Cost Share for 1-ft Program

In the final analysis, risk must be understood as the real potential of an alternative being unable to execute in a way precluding it from meeting its functional scores and, particularly in an instance of having high financial risk, not meeting its measured financial metrics. Alternative #1 falls into this dilemma as identified through the CBA risk analysis process.

Throughout the study, alternatives #1 and #4 scored very closely in respect to process requirements and financial analysis. In the end, they were separated by a broad gap in risk scoring. Alternative #4 achieved the lowest risk score of all the alternatives where as Alternative #1 scored the highest. Specifically Alternative #1's financial risk received a probability scoring of 3 which makes it likely to occur. When applying the high level of financial risk occurrence to Alternative #1 it becomes less likely to realize the financial metrics displayed in Table ES-2. The probability rating of likely to occur effectively closes the gap in NPV between Alternatives #1 and #4.

Therefore it can be concluded that Alternative #4 is a more viable option to implement IFTN. Ultimately Alternative #4 meets the thresholds of functional and financial measures while maintaining an acceptable level of risk.

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1. Introduction

Advances in technology over the last decade have made it easy for individuals and organizations to acquire and utilize imagery in a number of different ways. Organizations use orthoimagery to analyze, develop, and implement public policy related to: health services, homeland security, transportation, agriculture, surveying and mapping, hazards and wildfire response, energy development, land use, economic development, growth management, and many other business needs. Some applications of orthoimagery include[2]:

- Post-event evaluation and strategic planning for use by first responders who require orthoimagery to lessen loss of life and property, and to improve the response time through proper identification and coordination of activities.
- Precision agriculture or farming which uses tools such as orthoimagery to determine the correct amounts of fertilizer used on each acre of land. As a result, there are increased efficiencies in agriculture practices.
- Streamlining workflows by aligning environmental, demographic, utilities, political boundaries, public health infrastructure, and other data onto georeferenced data. As a result, relationships can be drawn out that serve as preliminary assessment tools that identify trends, and disparities.

As a result, demand has increased dramatically. Government agencies at the Federal, State, and Local levels also have acknowledged the value of imagery and have begun to use it in conjunction with Geographic Information Systems (GIS) technology to streamline workflows, decision processes and to effectively coordinate their efforts. Orthoimagery is the base layer for many other data themes associated with GIS technology. There is a direct correlation between these data themes, GIS technology, and user applications as demonstrated in Figure 1-1 below.

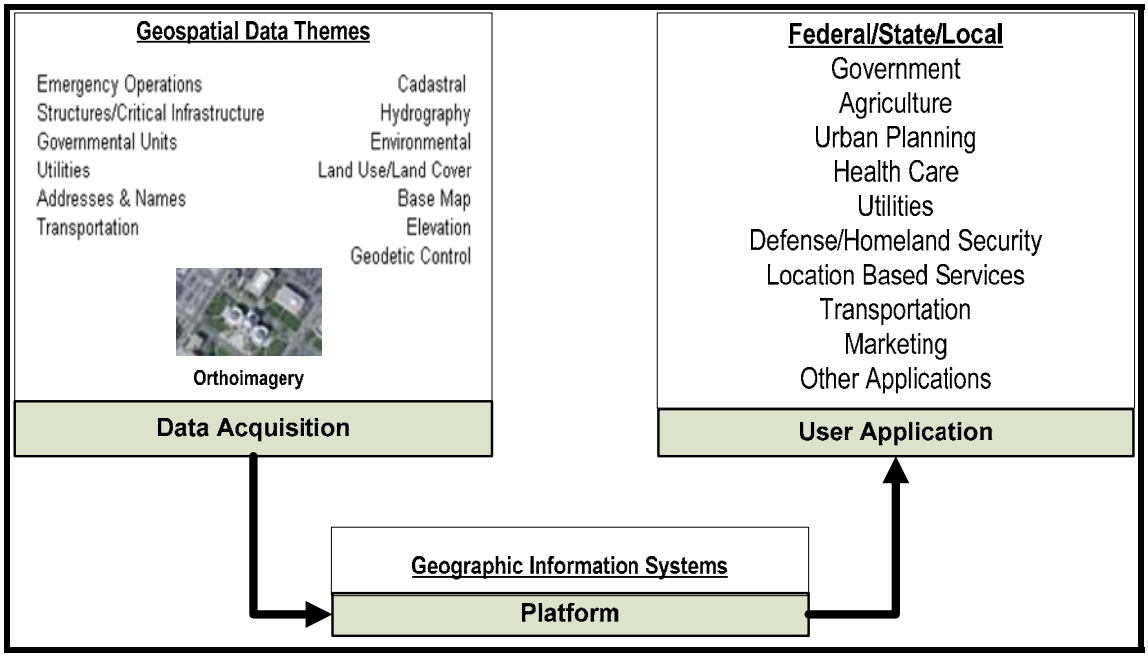

Figure 1-1: Data Themes and Uses

[2] GIS for Homeland Security. ESRI Press. 2005

This trend has made orthoimagery and GIS technology, increasingly important. Orthoimagery removes displacements owing to camera tilt and ground relief from analog or digital images and it then combines the image characteristics of a photograph with the geometric qualities of a map. Aerial and satellite imagery, in the form of digital orthoimagery, have become the foundation for most public and private GIS. Different agencies across the nation have been developing orthoimagery capabilities independently, resulting in higher costs, varying quality, duplicative efforts and a patchwork of varied products. These disparities have prevented government agencies from realizing the full potential of orthoimagery solutions.

1.1 Current Environment and Background

The business requirements for many organizations at the federal, regional, state, local, and tribal levels[3] are not currently being fully met, due to inadequate or inaccessible orthoimagery. Nationally, orthoimagery coverage is limited in accessibility and scalability, and common standards for orthoimagery products are not widely available. Moreover, limited coordination between agencies results in duplicative efforts to acquire imagery and a less than optimal use of limited funding. Instead, each organization independently manages its program, regardless of jurisdictional consideration or sharing similar requirements with any other organization. Coverage is generally not continuous from one county to the next or from one state to the other. Not surprisingly, the current inventory of orthoimagery represents a rough patchwork of images at varying image types (Black and White, True Color, Color Infrared, etc), at varying resolutions, and collected at various seasons including the peak growing seasons of "leaf-on" and the dormant seasons of "leaf-off".

Often times, orthoimagery does not align with related products because they are created and revised separately. As a result, many images do not match across administrative boundaries, and orthoimagery is rarely up to date because of the complexity and cost of revision. As the uses for this technology expand in a rapidly changing landscape, these differences hinder the full potential and application of orthoimagery.

Fortunately, as orthoimagery becomes increasingly valuable and a widely used data theme for GIS work, organizations have created new acquisition strategies. Organizations have established partnering and coordinating councils to align similar orthoimagery requirements across diverse organizations. These partnerships have realized significant cost savings by instituting large area contracts that create economies of scale unavailable to small, individual agencies. These activities are the exception rather than the rule because barriers to entering into partnerships include differing budgeting cycles and other administrative issues. In addition, many partnerships (public/private) produce orthoimagery whose licensing restrictions limit its availability in the public domain.

1.2 Imagery for the Nation (IFTN) Proposal

The *Imagery for the Nation* proposal seeks to address the inefficiencies of orthoimagery acquisition. The IFTN proposal will create a new national aerial imagery program to collect and disseminate standardized multi-resolution products on "set" schedules. Federal, state and local partners will be able to exercise cost sharing options for orthoimagery enhancements that their organizations require. The imagery acquired through the IFTN proposal will be placed in the public domain and archived for historical purposes. This proposal will create a common standard and a "set" schedule to acquire imagery that will:

- Improve the availability and accuracy of standardized, high-quality imagery products
- Provide a reliable business model for orthoimagery production
- Enhance business processes to decrease turnaround time between acquisition and distribution

[3] From here on referred to as federal, state, and local.

- Match data across administrative boundaries
- Lower the complexities and costs to revise and update data

Significantly, the IFTN proposal falls in line with E-Gov initiatives. As defined by the Office of Management and Budget (OMB), the objective of the Geospatial Line of Business (Geo LoB) is to refine the opportunities for optimizing and consolidating federal geospatial-related investments to reduce the cost of government and, at the same time, improve services to citizens. A more coordinated approach for producing, maintaining, and using geospatial data will reduce or eliminate redundant expenditures and promote sustainable participation by Federal partners in a collaborative effort to optimize geospatial related activities and investments. The IFTN proposal will allow users unprecedented access to a highly accurate and current orthoimagery base through a gateway such as the Geospatial One Stop (GOS) Portal.

Figure 1-2 highlights the opportunity that exists when aligning orthoimagery to the Geo LoB and its association with the end-user.

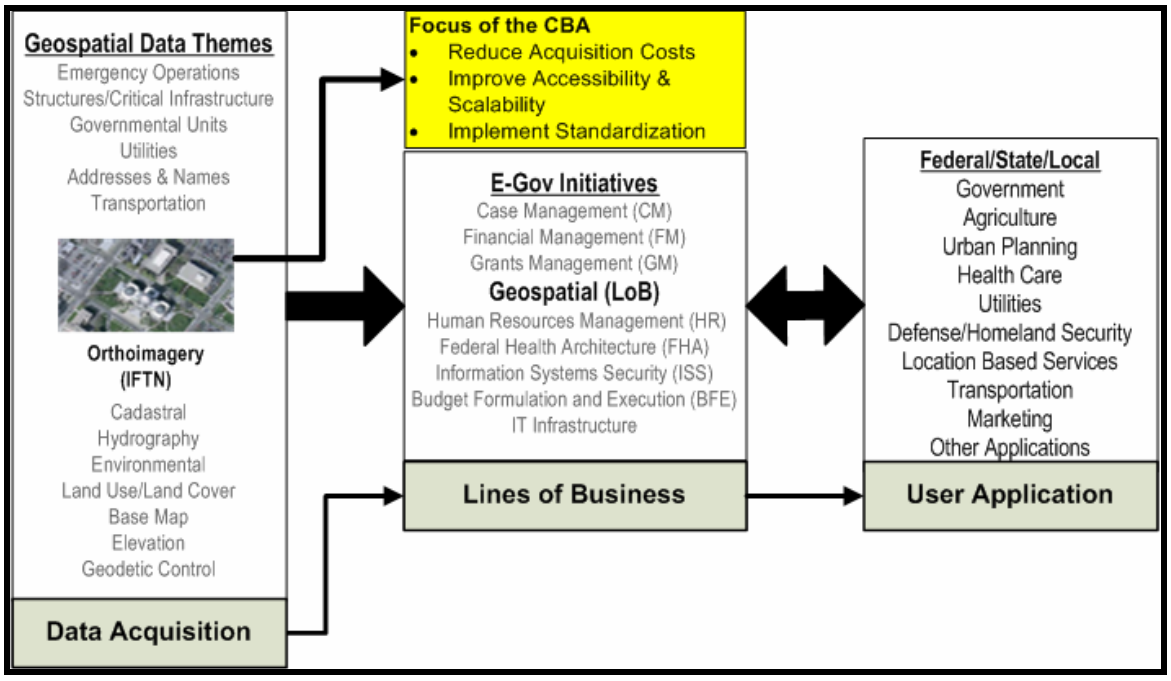

Figure 1-2: Data Themes and the E-Gov Initiatives

1.3 Purpose

The purpose of this document is to present the results of the IFTN CBA to the United States Department of Agriculture (USDA) and United States Department of the Interior (DOI). The CBA will assist the IFTN Sponsors in making program decisions as well as budget estimates and justifications for future planning. The analysis will also demonstrate the need for consistent federal funding and identify lead federal agencies to administer program funding, establish contracting guidelines, and manage the program.

This CBA explains the methodology used to evaluate the four courses of action and demonstrates why the chosen alternative is the most efficient option within the context of budgetary and political considerations. This document provides all estimates developed in this analysis for IFTN Executive Sponsor review in accordance with USDA and USGS Capital Planning Investment and Control (CPIC) guidelines and the OMB Circular A-94 guidance.

1.4 Scope

This effort consists of a complete CBA, modeled after the general principles and elements contained in OMB Circular A-94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs,* and the USDA and USDOI *Information Technology Capital Planning and Investment Control Guide for* FY 2007. This CBA adheres to the USDA and Office of the Chief Information Office (OCIO) guidelines and uses an approved Cost Element Structure (CES) that accounts for specific attributes of the IFTN program. The Life Cycle Cost Estimate (LCCE) will compare the four alternatives in terms of Investment, Operations and Maintenance, and Legacy Phase-Out costs. Consequently, the comparative analysis spans FY07 through FY16. Costs are displayed by cost element and by functional category for ease of program understanding.

2. Summary of Methodology

The methodology used for this CBA follows USDA and USDOI CPIC guidelines as well as government best practices. This section will provide a detailed description of the steps followed to complete the analysis and provide an insightful recommendation having taken into consideration all factors such as business processes, non-quantifiable benefits, costs, business requirements and risks.

2.1 Cost Benefit Analysis Design

OMB defines CBA as the recommended technique for formal economic analysis of government programs or projects. The basis for determining the economic justification of a program is to analyze the discounted monetized value of net benefits over a specified period of time. The stream of future costs and benefits over the specified time period are discounted into a present value, and the discounting reflects the time value of money. The focus of this CBA is on quantifiable and non-quantifiable costs and benefits of the current state, the original IFTN concept, and three alternatives.

A short primer on financial metrics:
Comparisons of numerical values are best presented in relation to some "base" value. In the instance of life cycle costs, the presentation is relative to a selected year; this is known as the base year of the estimate. The IFTN CBA life cycle cost analysis used Fiscal Year (FY) 2007 as its base year. Essentially costs are normalized to the common base year by applying an index representing the value of one dollar in any given year relative to its value in the base year. In the case of normalizing for inflation, one dollar is capable of purchasing less goods and services in FY2009 than in FY2007. To compare an FY2009 dollar to our base year dollar, the FY2009 dollar is *discounted* back by the rate of inflation provided by OMB circular A-94 guidance. This approach is known as presenting findings in *base year* dollar amounts. Alternatively, cost estimates are also displayed as *then year* amounts. A good way of looking at then year dollar amounts is thinking of the sums for each year as the amount the budget will read for that year. The difference between the then year and base year is the discounted amount.

Each approach to displaying costs has specific uses. Presenting costs in base year amounts, as used in this CBA, normalizes the values so any delta from year to year is directly correlated to a programmatic change and not that of inflation. In this way a presentation of costs showing deltas from year to year can be read as influenced by programmatic changes (hours, quantities, etc.) and are neither exaggerated nor hidden by the impact of inflation. Then year summaries are useful to the budget analyst as the amounts represent the actual dollar amount expended in each year of the program. It is important to keep in mind then year and base year dollar amounts represent the same estimate and one can be calculated from the other by applying the inflation index and are essentially equal. The next step in presenting a stream of estimated costs is to determine their Present Value (PV).

PV takes into account the cost of accelerating or the benefit of postponing an expenditure; the inverse can be said of a monetary benefit. Instead of inflation, PV discounting uses the risk free rate of return, usually that of a specific duration U.S. Treasury Bill, to determine the base year PV. This approach attempts to highlight the opportunity cost of not having to make an expenditure until further into the life cycle of a program. Within this CBA, Net Present Value (NPV) is used to compare alternatives. The NPV is the delta of the PV sum of costs subtracted from the PV sum of benefits. This metric provides the reader with a comparison of costs between alternatives with the impact of differing expenditure and benefit timelines imbedded into one summary number specific to each alternative. For example, two alternatives both having a $10K expenditure requirement but with one in FY2010 and the other in FY2015 will present two different NPVs of the $10K. Discounted back to FY2007 using a rate of 2.8% (sourced from OMB guidance), the

FY2015 expenditure will present an NPV of $8K, conversely the FY2010 expenditure presents an NPV of $9.2K. The application of NPV to the LCCE illustrates to the decision maker that by delaying expenditures the cost of the program in terms of PV becomes less. By calculating the NPV (again, PV of benefits less PV of costs) it is then possible to determine a Return on Investment (ROI) of the alternative.

ROI provides a means of quantifying the value of an investment dollar for each alternative. The ROI is simply a ratio of the NPV (PV benefits less PV costs) to the PV of investment dollars. The ratio states for every dollar of investment there is X number of dollars returned. Note that ROI can be misleading in certain instances; one of which occurs within this analysis. If the NPV is less than the PV of investment the ratio will be some fraction of 1 which is stating the alternative provides less than one dollar of return for every dollar invested. The reader needs to keep in mind the underlying bottom line ROI is still a positive number. Public sector initiatives (vice commercial) are not typically income generating and achieving a positive NPV, even if the resulting ROI is less than 1:1, can still show a strong financially viable alternative.

2.2 Cost Element Structure (CES)

The IFTN CBA adheres to the USDA/USDOI guidelines and uses an approved CES that accounts for specific attributes of the IFTN program. The baseline and alternative comparisons throughout the LCCE are presented in terms of a cost element hierarchy. The CES was developed to classify costs into three main categories which can be found below in Table 2-1.

Table 2-1: Cost Element Hierarchy

Cost Categories	Description	Definition
1.0	Non-Recurring Investment Costs Development/Modernization/Enhancement	Includes all future state investment costs accrued during FY07 through the end of FY16, including sunk costs. Per OMB Circular A-94 guidance, sunk costs are not factored into the lifecycle cost analysis and cost-benefit calculations (e.g. ROI, NPV, etc.) since these costs will not be affected by any present or future decision.
2.0	Recurring Investment Costs Steady State	Includes all current and future state operations & maintenance costs, to begin accruing in FY07 and through the lifecycle of this analysis (i.e. 10-year period).
3.0	Legacy System Phase Out (LPO)	Includes all current state program costs related to the phase out of the current system environment based on the implementation plan.

Each CES cost category includes the seven CES elements defined in the USDA CPIC (FY07) and the USDOI CPIC (Dec. '02) Guides: Equipment, Software; Commercial Services; Support Services; Supplies; Personnel; and Intra-Governmental Services. The baseline and the selected alternatives incur costs solely in Equipment, Software, Support Services, and Personnel. A detailed description of all the CES elements can be found in Table 2-2.

Table 2-2: Cost Elements and Definitions

Cost Elements	Definition
Equipment, Leased or Purchased	Servers, High-End Workstations, CCE Workstations, StorageTek L700 Tape Library, Expansion of Existing Server Room used for data archiving and distribution.
Software, Leased or Purchased	Compression Software, Software Licensing, and Software Maintenance.
Commercial Services	Commercially-provided services, such as teleprocessing, local batch processing, on-line processing, Internet access, electronic mail, and voice mail.
Support Services	Commercially-provided services to support equipment, software, or services. Data acquisition and production for federal, state and urban area orthoimagery.
Supplies	Any consumable item designed specifically for use with equipment, software, commercial services, or support services identified above.
Personnel (Compensation and Benefits)	Systems Administrator, Desktop Support, Agency Application Support, Web Master, Application Development, Data Management, Ingestion/Distribution Personnel, Contract Support, QA Personnel, Technical Support.
Intra-Governmental Services	All IT services within agencies, and between executive branch agencies, judicial and legislative branches, and state and local governments.

The cost element structure promotes consistency among data elements in the current and future state cost analyses. These models are available for review in Appendix H.

2.3 Assumptions and Constraints

Listed below are the overall CBA assumptions and constraints that faced the CBA effort.

Assumptions

- The 10-year LCCE will be FY07 through FY16
- The estimate base year is FY2007
- Inflation and discount rates are sourced from current OMB Circular A-94 guidance
- Comparative costs in the main body of the document are in base year dollars except where otherwise noted
- Annual inflation rate of 2.2% will be used for the 10-year LCCE
- Real discount rate of 2.8% will be used for the 10-year LCCE

Common Estimating Approach

- In the Current State, we determined, Equipment, Software, Support Services, and Personnel costs for other sampled programs (federal/state/local) by deriving a total percentage of costs from the USDA and USGS programs and distributed accordingly among the major cost elements listed below:
  - Equipment accounts for 8.1% of the total cost of the sample programs used in the analysis.
  - Software accounts for 0.2% of the total cost of the sample programs used in the analysis.
  - Support Services accounts for 82.4% of the total cost of the sample programs used in the

analysis.
    - Personnel accounts for 9.2% of the total cost of the sample programs used in the analysis.
- In the Future State, USDA and USGS incur investment costs during the implementation of IFTN in the areas of Equipment, Software, Support Services, and Personnel in FY09 – FY12.
- In the concept of operations the current process for the other sampled programs will decrease significantly and will be consolidated at the federal level in the future state. The rate at which federal, state, and local governments will adopt and utilize IFTN in lieu of their own efforts is assumed to be the following:
    - 20% adoption rate estimated for FY09
    - 45% adoption rate estimated for FY10
    - 70% adoption rate estimated for FY11
    - 90% adoption rate estimated for FY12 and after

Constraints

- The estimates in this analysis are reflective of the data gathered only from the Subject Matter Experts (SME) and directly surveyed populations, and have not been extrapolated to represent the total existing orthoimagery population.

2.4 Data Collection

The data collection effort for the IFTN CBA consisted of five main sources: Internal and external supporting documents; SME interviews; a companion IFTN survey to the SME interviews; an IFTN survey conducted by the National States Geographic Information Council (NSGIC) in April 2006; and the NSGIC IFTN Alternatives survey completed in June 2007. Taken together, these five sources provided pertinent quantifiable and non-quantifiable data necessary to identify all costs and benefits across all stakeholder groups.

- Supporting Documents: The IFTN CBA team received information from organizations such as NSGIC, American Society for Photogrammetry and Remote Sensing (ASPRS), National Digital Orthophoto Program (NDOP), Management Association for Private Photogrammetric Surveyors (MAPPS), and Federal Geographic Data Committee (FGDC) in addition to industry white papers, academic papers, referred websites, etc. Documents providing CBA guidance included the USDA and USDOI CPIC Guides as well as the Guide to the Performance Reference Model (PRM). See Appendix A for details on supporting documents.

- SME Interviews: The IFTN Executive Sponsors provided a list of SMEs from Federal, State, and Local governments and representatives from private industry and professional service providers to interview. These interviews captured pertinent qualitative and quantitative data to assess the viability of the IFTN proposal to meet the needs of all stakeholder groups. See Appendix F for details regarding SME interviews.

- IFTN Survey: Responses from the SME interviews helped create a companion IFTN CBA survey. The survey was distributed to all interviewees in addition to other individuals who, if interviewed, would enhance the IFTN data collection effort. The survey results offered insight into the costs associated with Contract Management, Data Production, Quality Assurance/Quality Control, Distribution and Archiving, and additional qualitative data. See Appendix F for details regarding the IFTN survey.

- NSGIC Survey: The IFTN CBA team completed the NSGIC survey in April 2006. It provided an index and point of reference to compare all cost data before incorporating all costs into the CES.

See Appendix F for details regarding the NSGIC survey.

- NSGIC IFTN Alternatives Survey: The NSGIC State survey was completed in June 2007. The survey was distributed to all fifty states and selected insular territories as to assess the feasibility of the proposed alternatives to the IFTN program. The respondents rated the current state of their imagery programs against the four proposed alternative programs. This provided the IFTN CBA team with the ability to assess the IFTN proposal's ability to meet the imagery needs at the state and local levels.

2.5 Concept of Current and Future State Operations

The business processes will remain the same across all the alternatives, therefore, a current state and future state approach was used to examine the concept of operations. Future state business processes will strive to create efficiencies by standardizing the processes and products and eliminating duplicative efforts and program redundancies.

2.6 Comparison of Baseline and Alternatives

This section provides a high-level review of the baseline and the four alternatives. This analysis helped determine each alternative's ability to meet agency and business needs. This high-level analysis rates each of the alternatives against the following key selection criteria:

- Non-Quantifiable Benefits: Benefits which cannot be assigned a numeric value, and can be related to improvements in quality of service, improved decision making, and enhanced products.
- Life Cycle Cost Comparison – Cost effectiveness of each alternative. Determined using several financial metrics.
- Business Requirements – Ability of each alternative to meet expected user requirements.
- Risk – Ability of the alternative to achieve overall investment objectives within defined cost, schedule, and technical constraints.

2.7 Selection of Alternatives

For the purposes of the analysis, the original IFTN concept is Alternative #1. The original IFTN concept consists of an annual 1-m imagery program over all states except Alaska. This program will collect imagery during the growing season in natural color. A companion program will be administered by the USGS. Under this program, Alaska will receive 1-m imagery for the entire state once every five years. This program will also produce 1-ft resolution imagery once every three years for all states east of the Mississippi River and for all counties west of the Mississippi River with population densities greater than 25 people per square mile. In addition, 50% matching funds will be available for partnerships to acquire six-inch imagery over urban areas identified by the U.S. Census Bureau that have populations of at least 50,000 and overall population densities of at least 1,000 people per square mile. This program will typically acquire imagery during winter and spring months (leaf-off) in natural color.

Due to equity concerns expressed by the Western Governor's Association, the IFTN sponsors formulated three additional alternatives:

- Alternative #2 – Original IFTN Concept with Full Federal Funding for 1-ft Program: IFTN with 1-ft coverage of lower 48 states and Hawaii. Alaska and the Insular Areas will adhere to population model.
- Alternative #3 – Original IFTN Concept with Mandatory 50% Cost Share for 1-ft Program: IFTN with1-ft coverage of lower 48 states and Hawaii, with mandatory cost share. Federal government will provide 50% according to statewide business plan. Alaska and the Insular Areas will adhere to

population model.

- Alternative #4 – Original IFTN Concept with Optional 50% Cost Share for 1-ft Program: IFTN with 1-ft coverage of lower 48 states and Hawaii with optional cost share. Federal government will guarantee the availability of 50% funding for coverage according to statewide business plans. Statewide councils can increase funding to increase program coverage. Alaska and the Insular Areas will adhere to population model.

A summarized description of the baseline and the alternatives presented in this analysis can be found in Appendix G.

3. Concept of Current and Future Operations

This section compares the business processes in the current state and the expected business processes in the future state. The current state business processes are characterized by a lack of standardization and are often times determined by funding. The future state will occur at the federal level and offer a more standardized process by effectively utilizing federal funding. The future state will seek to lessen the logistical and financial burden on state and local programs by more consistent funding, more effective program coordination, and consolidation at the federal level.

3.1 Business Processes: Current State

The current business processes include imagery projects formed and managed both independently and through partnership agreements. Orthoimagery products in the current state are more expensive to produce, maintain, archive, and distribute. In the current state, there are no defined lines of communication or business processes. Figure 3-1 below represents the communication flow in the current state. There is no coordinating entity that could align all the needs of the organizations at the respective levels of government, often creating duplicative efforts and eliminating possible cost savings.

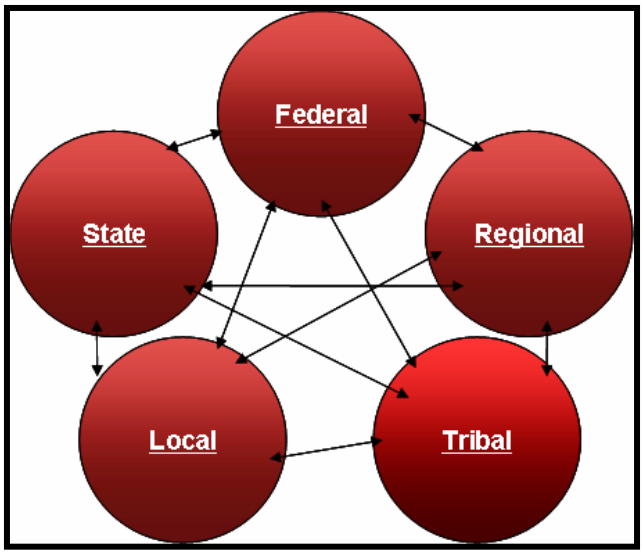

Figure 1-1: Current State Operations

In the current state, there are five general processes required for orthoimagery acquisition and use. Depending on the jurisdiction, they are more or less formally applied during the life cycle. They are:

1. Requirements Assessment
2. Project Management
3. Data acquisition and production
4. Quality Assurance/Quality Control (QA/QC)
5. Archive and Distribution

Figure 3-2 highlights those five general business processes and the major stakeholders for current state orthoimagery programs. Primary stakeholders include the federal, state, and local programs which can be in

the form of partnerships and independent programs (non-partnering); as well as imagery service providers. Due to the varying organizational imagery requirements, different agencies may skip one or more steps in the current business processes. Node boxes with hash marks represent steps with greater variation from program to program. For example, not all local agencies evaluate pre-production samples, so that node box in the Quality Assurance/Quality Control column has hash marks.

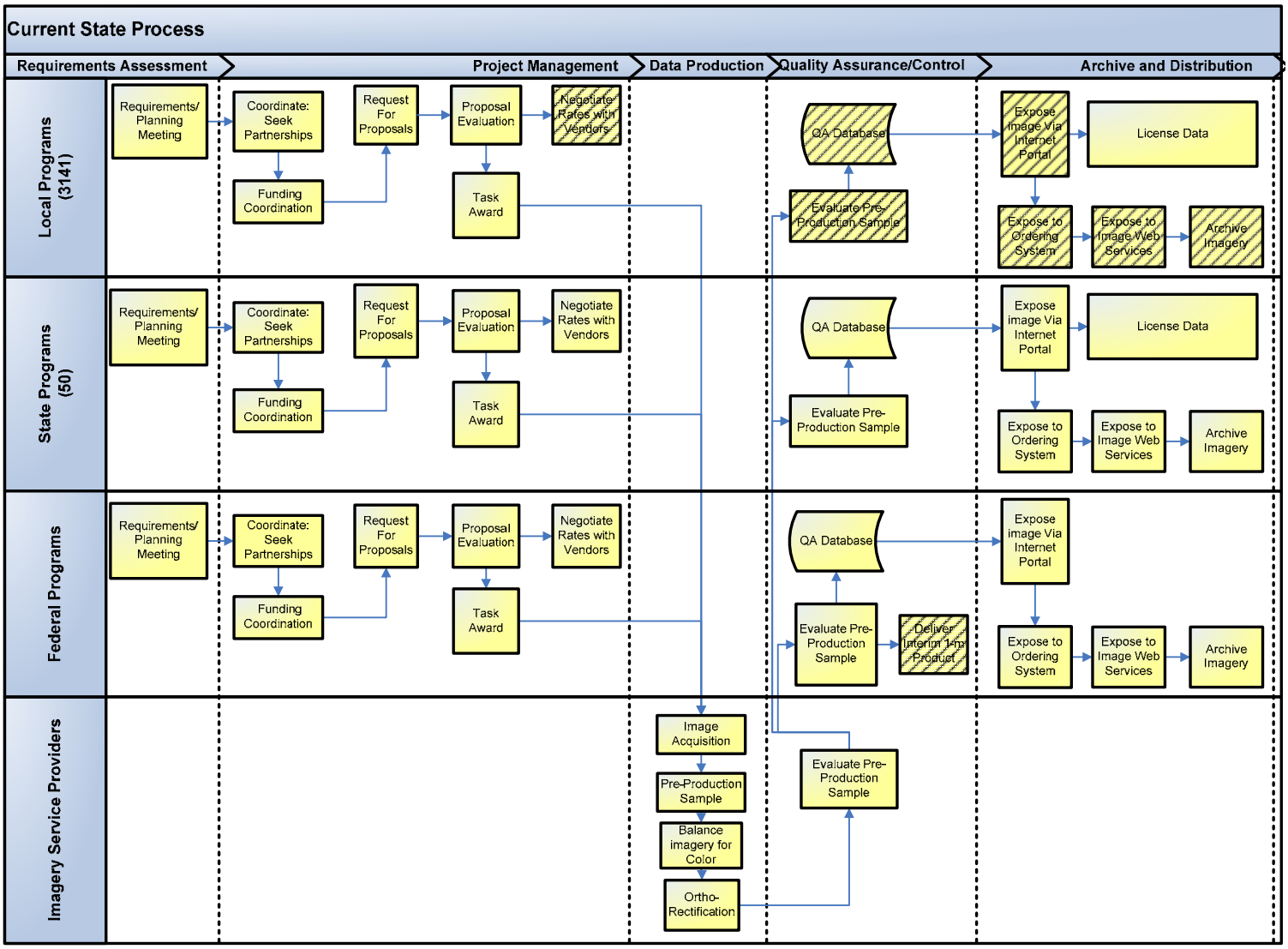

Figure 3-2: Current State Business Processes

The exclusion of many of these processes may be attributed to cost savings. Some organizations place higher values on the QA/QC process and spend significantly more on internal labor or third party contracting to ensure the quality of their product. Other organizations may skip partnering due to the potential for high coordination costs and project delays. They may also be in standing multi-year contracts where only recurring task orders are fulfilled that don't meet the needs of other potential partners. This results in different organizations acquiring the same (or similar) orthoimagery over the same geographic area which is an obvious duplication of effort. There are no assurances in the current state that all steps in the generally recognized best practices for the acquisition of orthoimagery will take place.

3.1.1 Summary of Steps

The steps explained in this section are general in nature and due to the lack of standard processes are not cross walked to the steps in Figure 3-2.

Step 1: Requirements Assessment

Requirements/Planning Meeting

Agencies determine their upcoming needs and uses for orthoimagery either independently or in collaboration with other organizations. This planning addresses issues such as funding, flight year, season, contracting requirements, technical components (e.g., ground resolution, accuracy, image type, etc.), product delivery timelines, storage requirements, and distribution policy. Agency funding and any other specific acquisition goals are discussed. At this time, advice on contracting procedures and input on technical specifications and requirements may be sought from service providers with expertise in the field.

Step 2: Project Management

Coordinate: Individually or through partnerships

Agencies may decide to independently acquire imagery by following their own scheduling requirements and contracting procedures whereas other organizations may opt to form partnerships that leverage project costs and reduce contract management responsibilities. This phase consists of project planning, marketing, negotiation, creating a procurement selection committee, and determining the specifics related to QA/QC and archive and distribution policies.

Funding Coordination

Funding sources are identified, and if applicable, partners negotiate project funding agreements that specify how the organizations share costs. Partnering decreases potential duplicative efforts and allows organizations to obtain imagery that they otherwise could not afford.

Request for Proposal (RFP)

Agencies create RFPs to solicit bids from imagery service providers. These companies review the project requirements, and interested providers submit technical and cost proposals.

Proposal Evaluation

Organizations evaluate service provider proposals per established contracting procedures, often using panels consisting of stakeholders, partner representatives, and technical staff. Proposals are evaluated on technical merit, quality, proposal completeness, past performances, and price, among other factors.

Negotiate Rates with Professional Service Providers

The contracting agency or agencies may negotiate the project cost with the professional service provider chosen to do the work. The lack of technical and contractual expertise has caused some state and local programs to ineffectively negotiate rates with imagery service providers.

Task Award

Projects are awarded based on evaluation score, imagery service provider preference, costs, and other factors, depending on the responsible agency and/or the acquisition requirements.

Step 3: Data Acquisition and Production

Image Acquisition

Service provider acquires the imagery and sends regular progress reports to the contracting organization.

Pre-Production Sample

Service providers produce sample files that are representative of the project area, and send them to the

contracting agencies for approval before starting the complete production run.

Ortho Rectification
Imagery is ortho rectified using flight data, a Digital Elevation Model (DEM), ground control or reference control from previous orthoimagery, and aerial triangulation processes. The service providers place the imagery into a mapping coordinate system, tone balanced, and processed in a variety of ways to meet all technical requirements of the contract.

Create Metadata
Service provider delivers imagery with metadata that completely describes the source imagery specifications, production process, and file formats.

Step 4: Quality Assurance/Quality Control (QA/QC)

Evaluate Pre-Production Sample
Service provider measures and evaluates production samples to ensure they meet contract specifications and correct images not within acceptable parameters before delivery to the client.

QA data base
All discrepancies in images recorded in QA are added to QA database.

Evaluate Post-Production Imagery
The contracting organization or a representative evaluates the imagery product against technical contract specifications to ensure product compliance. Imagery not meeting specifications is returned to the service provider for correction

Step 5: Archive and Distribution

Various Distribution Schemas Determined by Contracting Organizations – Often Restricted
Upon final delivery, the imagery may be made available to the public through an internet portal or other means. In other instances, copyright, licensing requirements on use and redistribution, high purchasing costs, or a combination of these factors may restrict the availability and use of the imagery to others. Many organizations have no imagery archiving policies in place, which can result in the inability to find and retrieve this data for historical use purposes.

3.2 Business Processes: Future State

The future state concept of operations will focus on standardizing the business processes and consolidating the efforts done at the federal, state, and local agencies. In the future state, the duplicative efforts seen in the current state will be eliminated and the federal government will serve as the main coordinating entity. However, IFTN will not meet the needs of all agencies and ongoing independent activities are expected to continue. Figure 3-3 below shows a graphic representation of IFTN meeting the needs of many programs, however, there will still remain a number of programs independent from IFTN that will continue current state operations.

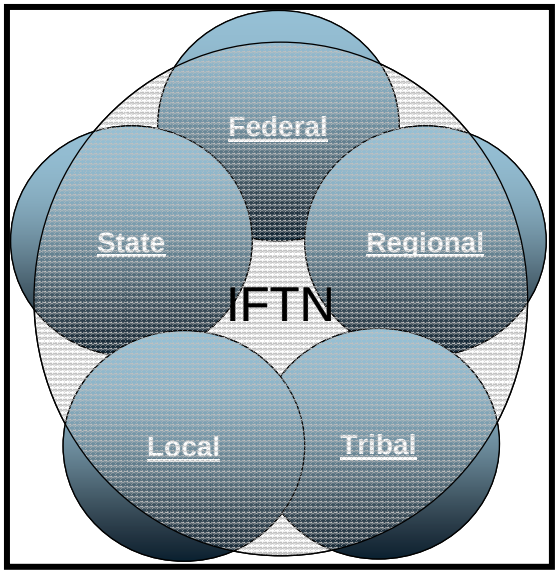

Figure 3-3: Future State Operations

Figure 3-4 represents a consolidation of many of the business processes seen in the current state, it is only a representation of the federally ran portion of the program. The future state establishes a business process that follows existing best practices models. As opposed to the current state, the business processes in the future state are defined and streamlined and assurances are made that all processes critical to orthoimagery production will be completed.

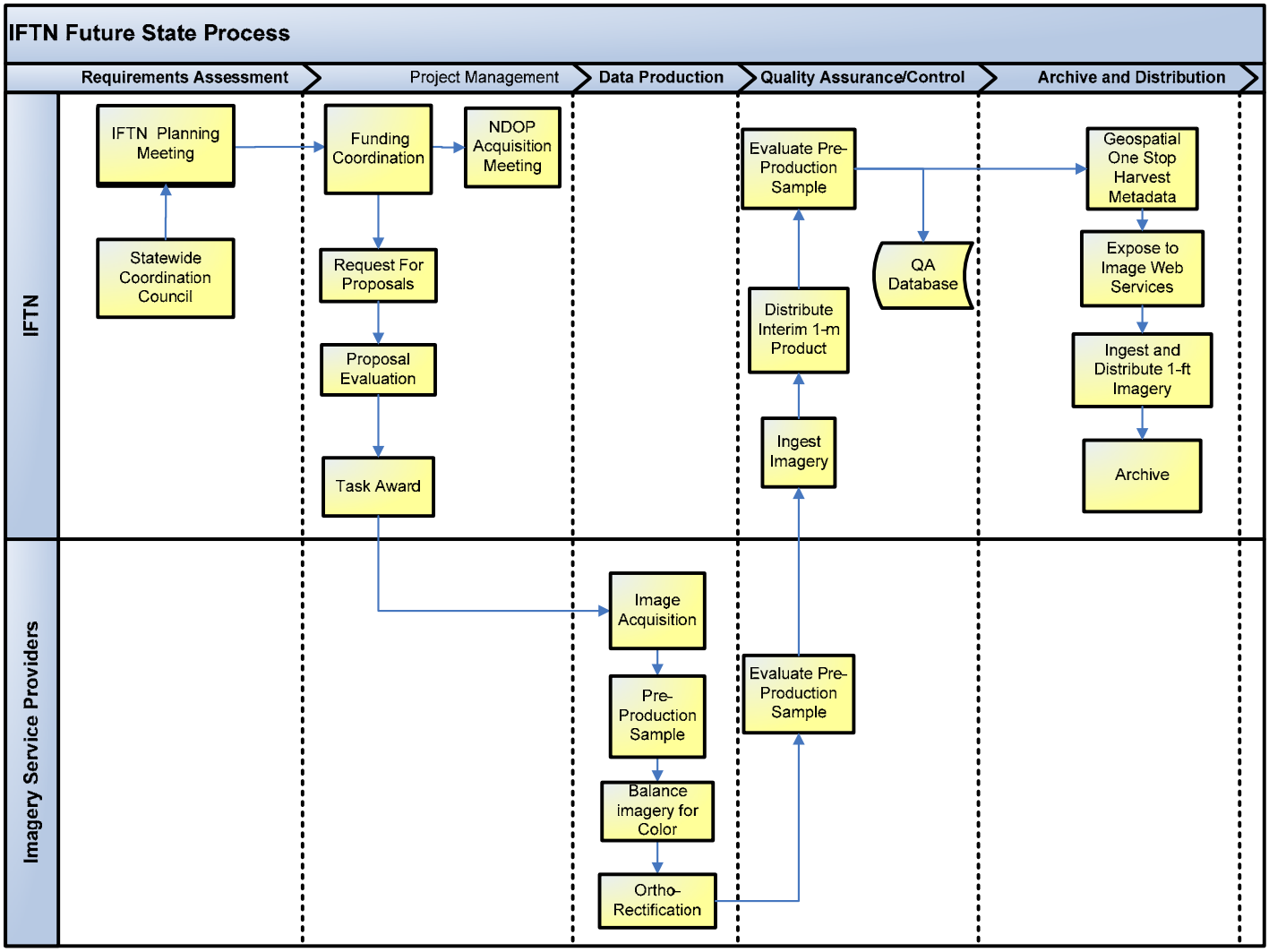

Figure 3-4: Future State Business Processes

The business process in the future state increases the currency of imagery by imposing industry best practices and by providing a reliable model for orthoimagery production.

3.2.1 Summary of Steps

The steps explained in this section are general in nature and due to the lack of standard processes are not cross walked to the steps in Figure 3-4.

Step 1: Requirements Assessment

IFTN Planning Meeting

Quarterly (or more frequent) meetings will be held to coordinate the orthoimagery acquisition cycle for the following calendar year. Participants will discuss funding levels and specific acquisition plans, and they will confirm states and regions to be covered in the next cycle. Participants discuss buy up options put forward by states in addition to considering new state requirements and relaying them to/from Acquisition and Technical Committee as required. Information submitted from acquisition and technical committees are considered and recommendations are provided to steering committee for final approval.

If they desire any of the buy-up options or want to manage portions of the program in their jurisdiction, each statewide GIS coordination council will work with all stakeholder communities to specify its digital orthoimagery requirements in an annual business plan that will support the IFTN planning process.

Step 2: Project Management

Funding Coordination
Project funding agreements (Memorandum of Agreement (MOA), Memorandum of Understanding (MOU), Joint Funding Agreement (JFA), etc.) between the federal government and state/local partners will be assembled.

NDOP Acquisition Meeting
Meetings will be held to coordinate acquisition and contracting issues/changes to IFTN. Input is provided to Project, Technical and Steering Committee. Program recommendations are submitted to steering committee for final approval.

Request for Proposal (RFP)
As required, an RFP will be issued to imagery service providers. Imagery service providers can then review the project requirements and submit technical and cost proposals. Because IFTN will be driven by technical specifications, all industry sectors will be able to compete on contracts whether they are small, medium, or large imagery service providers, and whether imagery is derived from satellite, airborne film, or airborne digital sources. Buy-up provisions will allow acquisition of imagery that meets more specific needs. Contract incentives may be used to assure timely product delivery within 6 to 9 months depending on the product.

Proposal Evaluation
As required, proposals from imagery service providers will be evaluated by a panel consisting of stakeholders, partner representatives, and technical staff. Proposals are evaluated on technical merit, quality, proposal completeness, past performance, and cost.

Task Award
Project areas will be awarded based on annual requirements and other factors considered by the NDOP committee.

Step 3: Data Acquisition and Production

Image Acquisition
After the issuance of task orders, imagery service providers will preplan flight operations, obtain required ground control, and collect available elevation models. Then they acquire the imagery and send regular progress reports to the contracting organization.

Pre-Production Sample
Service providers produce sample files that are representative of the project area, and send it to the contracting agencies for approval before starting the complete production run.

Ortho-Rectification
Imagery is ortho rectified using flight data, a Digital Elevation Model (DEM), ground control or reference control from previous orthoimagery, and aerial triangulation processes. The imagery is placed into a mapping coordinate system, tone balanced, and processed in a variety of ways to meet all technical requirements of the contract.

Create Metadata
Imagery is delivered with metadata that completely describes the source imagery specifications, production process, and file formats.

Step 4: Quality Assurance / Quality Control (QA/QC)

Evaluate Pre-Production Sample
Pre-production samples will be evaluated for color balancing according to image histogram parameters provided in the RFP specifications. Images and image histograms not within the parameters will be adjusted by either the contracting organization's QA team or by the imagery service provider.

QA data base
All discrepancies in images recorded in QA are added to QA database.

Evaluate Post-Production Imagery
Post-production imagery is evaluated by the contracting authority or their representative against technical contract specifications to ensure that the delivered product is in compliance. Imagery not meeting specifications is returned to the vendor for correction.

Step 5: Distribution and Archive

Put imagery in the Public Domain
Once final delivery is made and accepted by the contracting organization, the imagery may be discoverable via GOS and accessible through a web mapping service or other means. Consistent approach for critical infrastructure and Homeland Security related issues.

Expose to Image Services
Images are inserted into image services at determined intervals during the acquisition season.

Table 3-1 shows a side by side comparison of the business processes in the current state and in the future state. It is important to note that the steps shown are meant to reflect the federally ran portion of the program. Certain activities will continue in the state and local levels.

Table 3-1: Comparison of Current and Future State Business Processes

Business Processes	Current State			Future State		
	Federal	State	Local	Federal	State	Local
Step 1: Requirements Assessment						
Planning Meeting	X	X	X	X		
Statewide Coordination Council				X		
Step 2: Project Management						
Coordinate: Seek Partnerships	X	X	X			
Funding Coordination	X	X	X	X		
NDOP Acquisition Meeting				X		
Request for Proposal (RFP)	X	X	X	X		
Proposal Evaluation	X	X	X	X		
Negotiate Rates with Imagery Service Providers	X	X		X		
Task Award	X	X	X	X		
Step 3: Data Production (Imagery Service Providers)						
Image Acquisition						
Ortho Rectification						
Pre-Production Sample						
Balance Tiles for Color						
Create Metadata						
Step 4: Quality Assurance / Quality Control						
Evaluate Pre-Production Sample (by ISP)	X	X		X		
Ingest Imagery				X		
Distribute Interim Product	X			X		
Evaluate Pre-Production Sample (by IFTN)				X		
QA Database	X	X		X		
Step 5: Archive and Distribution						
Expose via Internet Portal	X	X				
License Data		X	X			
Expose to Ordering System	X	X				
Expose to Image Web Services	X	X		X		
Geospatial One Stop				X		
Ingest and Distribute 1-ft				X		
Archive Imagery	X	X		X		

The future state business process meets the goals for the Geo LoB, because it provides current and accurate imagery in a shared environment to support development of information systems. In the simplest form, the future state business process identifies, evaluates, and implements common orthoimagery services, processes, and best practices by enhancing coordination across geospatial stakeholders. The final product in future state meets the interoperability of data across all levels of government by promoting the alignment of common geospatial data to critical GIS applications on a national scale.

4. Comparison of Baseline and Alternatives

After conducting a current state to future state comparison, this section presents a more detailed comparison of the baseline and the four alternatives. The alternatives differ in the land area of coverage and in the funding models for the high resolution program; however, they intend to provide a more streamlined and seamless approach to acquiring, sharing, and managing orthoimagery.

The baseline can be defined as a decentralized process with multiple, independently-managed programs. In each alternative examined in this analysis there will be a consolidation of many independent programs into one federally managed program, providing a standard product and ensuring consistent funding and refresh cycles. The comparison of the baseline and the alternatives will address the following areas:

- Non-Quantifiable Benefits – A current state to future state comparison of the non-quantifiable benefits identified through the data collection process.
- Life Cycle Cost Comparison – A full lifecycle cost comparison for the current state and for each competing alternative.
- Business Requirements Analysis – 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.

4.1 Baseline

Modern technology has made it possible to produce a wide range of digital orthoimagery products and applications for digital orthoimagery are expanding to provide solutions to more stakeholder groups. However, the landscape is rapidly changing and stakeholders need routinely updated orthoimagery. The stakeholder groups making investments into orthoimagery programs include:

- Federal Coordinating Committees
- Federal, Tribal, State, Regional, and Local Agencies
- Non Profit Organizations and Associations
- Private Sector

In the current state, most stakeholders develop and manage independent orthoimagery programs. As seen in Table 4-1 below, orthoimagery programs vary in needs, resolution and type of imagery, frequency of the flights, schedules of collection, and accuracy. This results in spotty coverage, and duplicative efforts.

Table 4-1: Baseline Program Features

Ground Resolution	Varies from high resolution (3-in) to low resolution (10-m) over very small to large multi-state areas
Image Type	Varies from natural color, CIR, and black and white
Leaf On or Off	Leaf on and Leaf off
Frequency	Heavily dependent on funding. Can vary between one year and five or more years
Area Coverage	Determined by each individual program
Funding Model	Partnerships are sought to leverage costs
Program Steward (Federal/State/Local)	Determined by each individual program.

Moreover, creating and maintaining current orthoimagery is difficult. The process is expensive, time consuming, and technically challenging to plan, acquire, and process orthoimagery, and manage its distribution. Stakeholders seldom have the resources to commit to the ongoing maintenance of such a project. Since the benefits of doing so outweigh the costs of time and money, the challenge is to develop cost-sharing strategies that maximize overall imagery production.

No single imagery standard is in use by all organizations, which complicates efforts to identify similar imagery needs across agencies. One solution has been the creation of partnerships and coordinating councils between agencies with similar imagery requirements to achieve greater cost savings through economies of scale. These activities are the exception in the current state. These collaborations require much effort, careful project planning, active commitment from the project partners, and strong organizational and managerial skills on the part of coordinators. These factors are especially important due to the multi-year nature of the projects and the technical complexities of the contracts.

4.1.1 Presentation of Costs: Baseline

Due to the high level of decentralization, duplicative efforts, and a lack of standardization and partnerships, data production costs are the major cost elements for programs at the federal, state, and local levels. Significant funds have also been spent in efforts to establish partnerships that can leverage resources. The cost analysis for the current state consisted of obtaining cost information for the four major cost elements (Equipment, Software, Support Services, and Personnel) of USDA's National Agricultural Imagery Program (NAIP), USGS' Homeland Security Infrastructure Program (HSIP) and a sample of other federal, state, and local programs.

Baseline: 10-Year Life Cycle Cost Estimate is $1.70B

The estimated ten-year life cycle cost for the baseline is $1.70 billion. This includes total cost estimation for 643 surveyed programs at the federal, state, and local levels. In the current state, the major cost elements are Equipment which accounts for approximately 8% of total program costs, Software which accounts for approximately 0.2% of total program costs, Support Services which includes data acquisition and production accounts for 82.5% of total program costs, and Personnel which accounts for 9.2% of total program costs, as can be seen in Figure 4-1.

The complete CES for the Baseline can be found in Appendix H.

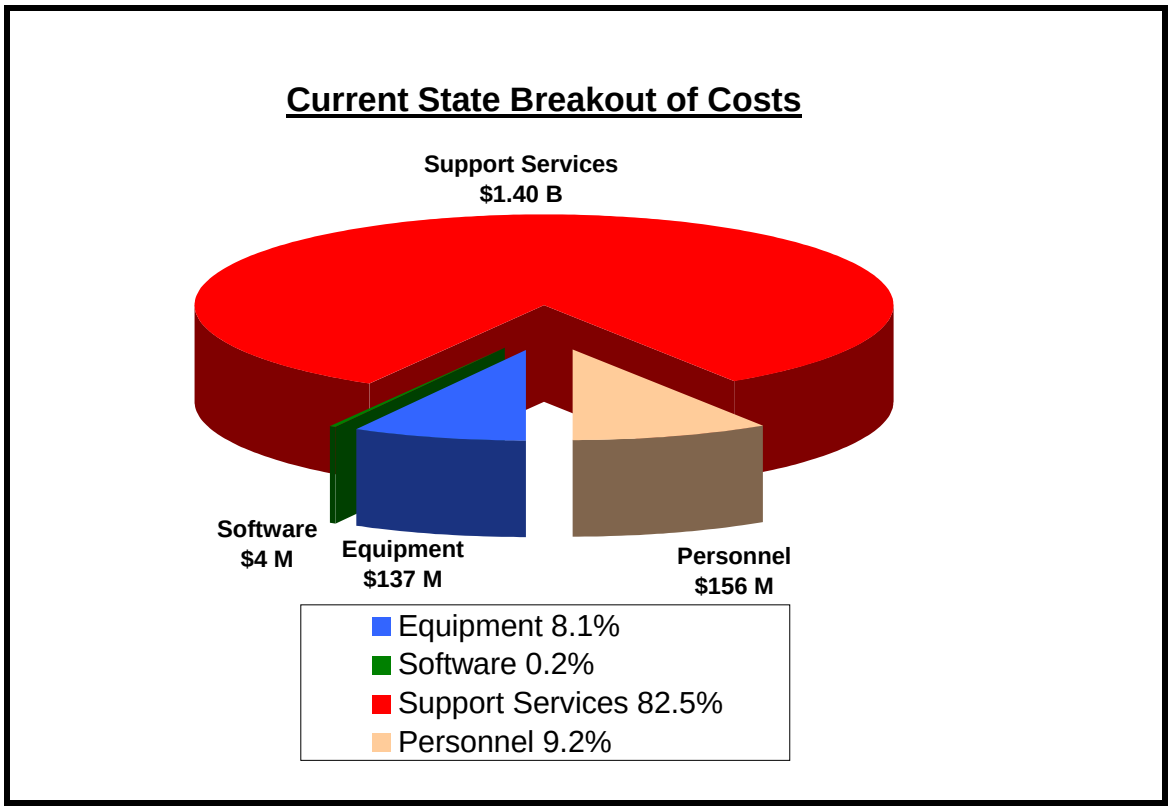

Figure 4-1: Percentage Breakout of Costs - Baseline

4.1.2 Major Cost Elements: Baseline

Equipment

In the baseline Equipment costs are related general maintenance costs, additional servers, high-end workstations, and scheduled technology refresh as the existing hardware is outdated. The total Equipment cost for the ten year life cycle is estimated to be $137M, as can be seen in Figure 4-1 above.

Software

Software costs in the baseline are incurred in the form of software licensing and compression software. Software costs make up a small percentage of the total LCCE. The total Software cost for the ten year life cycle is estimated to be $4M, as can be seen in Figure 4-1 above.

Support Services

Support Services represent the greatest cost related to the baseline, and are in the form of data acquisition and production costs, including acquisition. The total Support Service cost for the ten year life cycle is estimated to be $1.40B, as can be seen in Figure 4-1 above.

Personnel

Personnel costs are incurred at USDA and USGS, state, and local governments for technical support, contracting, management, data integration, data distribution, and quality assurance staff. The total Personnel cost for the ten year life cycle is estimated to be $156M, as can be seen in Figure 4-1 above.

4.1.3 Summary of Costs: Baseline

The table below shows the baseline Life Cycle Cost Estimate (LCCE) per Fiscal Year (FY). The baseline costs represent a "Do Nothing" approach in which only required periodic maintenance would take place but the business processes and the current programs would stay the same.

Table 4-2: Estimated Costs by Fiscal Year: Baseline

	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	Total
Baseline Costs	$166M	$169M	$170M	$170M	$170M	$172M	$170M	$170M	$170M	$172M	$1.70B
Discounted Costs	$166M	$165M	$1616M	$156M	$152M	$150M	$144M	$140M	$136M	$134M	$1.50B

4.2 Alternative #1: Original IFTN Concept with Population Model for 1-ft Program

This alternative describes a nationwide orthoimagery program that will collect and disseminate standardized multi resolution products on set schedules.

4.2.1 Description of Alternative

This alternative will require that the existing USDA-administered NAIP be enhanced to provide annual 1-m imagery over all states except Alaska and Hawaii. Hawaii and the Insular Areas will be acquired on a 3 year cycle. This program will typically collect imagery during the growing season (leaf-on) in natural color.

USGS will administer a companion program, under which, Alaska will receive 1-m imagery for the entire state once every five years. It will also produce 1-ft resolution imagery once every three years for all states east of the Mississippi River and for all counties west of the Mississippi River with population densities greater than 25 people per square mile. In addition, 50% matching funds will be available for partnerships to acquire 6-in imagery over urban areas identified by the U.S. Census Bureau that have populations of at least 50,000 and overall population densities of at least 1,000 people per square mile. This program will typically acquire imagery during winter and spring months (leaf-off) in natural color.

This alternative will eliminate duplicative efforts, use nationwide contracting to reduce overall costs, and increase the value and availability of imagery by adhering to common standards and by placing it in a public domain. Table 4-3 below shows a description of the IFTN features and specifications:

Table 4-3: Program Features: Alternative #1

Ground Resolution	6-in	1-ft	1-m
Image Type	Natural Color	Natural Color	Natural Color
Leaf On or Off	Off	Off	On
Frequency	Every 3 Years	Every 3 Years	Every Year in Lower 48 States Every 5 Years in Alaska Every 3 Years in Hawaii, and Insular Areas
Area Coverage	Identified Urban Areas	Areas East of the MS River, and all counties West of the MS River with >25 people per sq. mi.	Entire Nation, including all Insular Areas and territories
Funding Model	50% Mandatory Cost Share	100% Federally Funded	100% Federally Funded
Federal Program Steward	USGS	USGS	USDA except Alaska which is USGS

4.2.2 Presentation of Costs: Alternative #1

The total cost estimation consists primarily of 2 programs at the federal level, USDA-FSA's 1-m program for the Lower 48 states, Hawaii, and Insular Areas and territories, and USGS' 1-m program over Alaska, 1-ft over areas that meet the population model, and 6-in program over urbanized areas. This cost estimate also takes into account that as a best case scenario this alternative will have a 90% adoption rate by FY 12. As a result, 10% of other programs (federal, state, and local) costs are reflected in the 10-Year LCCE.

Alternative #1: 10-Year Life Cycle Cost Estimate is $ 1.38B

In this alternative, the major cost contributors are Equipment which accounts for approximately 5.2% of total program costs, Software which accounts for approximately 0.1% of total program costs, Support Services which includes data acquisition and production accounts for 86.7% of total program costs, and Personnel which accounts for 8.0% of total program costs, as can be seen in Figure 4-2.

The complete CES for Alternative #1 can be found in Appendix H.

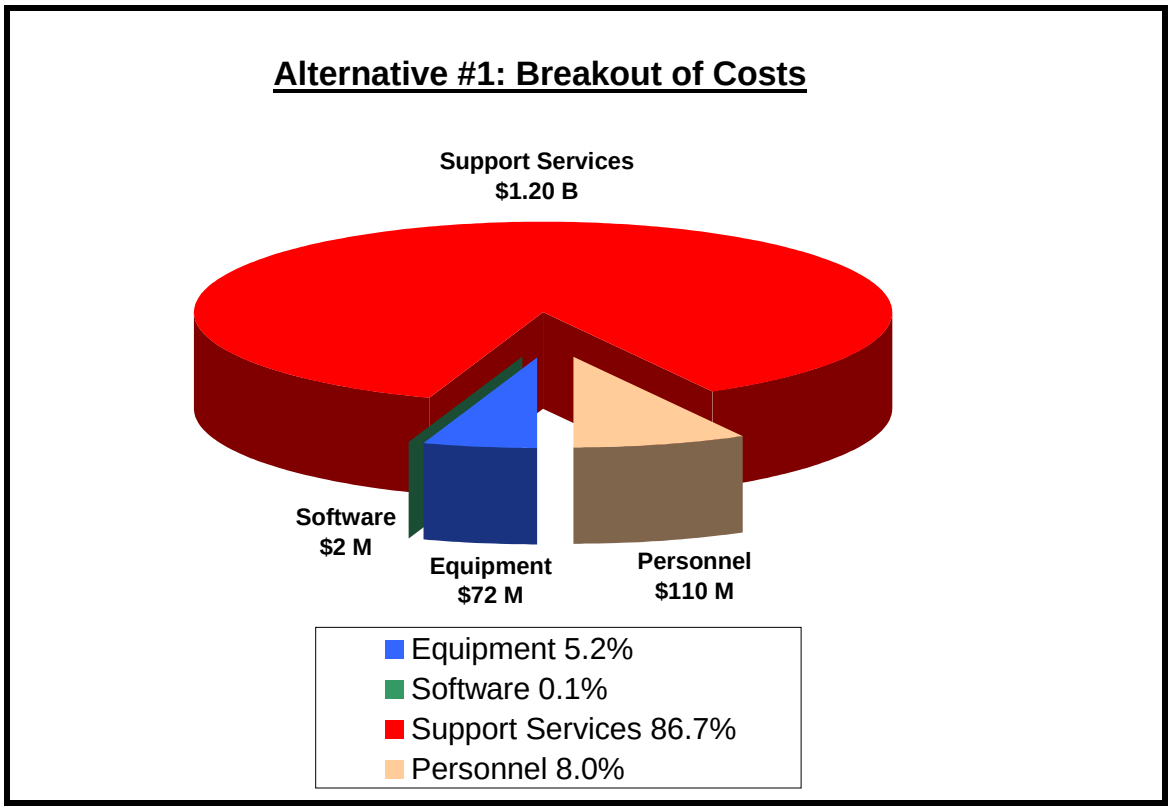

Figure 4-2: Percentage Breakout of Costs – Alternative #1

4.2.3 Major Cost Elements: Alternative #1

Equipment

Additional investments in equipment would be required at FSA and USGS to support a program such as IFTN. The increase in capacity requirements will allow for investments in equipment such as additional servers, high-end workstations, and supporting capital improvements. For Alternative #1, total Equipment costs over the ten year life cycle are estimated to be $72M, as can be seen in Figure 4-2 above.

Software

Investments in additional software licensing will be required at both FSA and USGS. Software investments make up a small percentage of total investment costs. For Alternative #1, total Software costs over the ten year life cycle are estimated to be $2M, as can be seen in Figure 4-2 above.

Support Services

Increase in support services cost; specifically data acquisition and production will be required to support IFTN. A population model will apply for the 1-ft. and 6-in. imagery capture. For Alternative #1, the total Support Services costs over the ten year life cycle are estimated to be $1.20B, as can be seen in Figure 4-2 above.

Personnel

FSA and USGS will require additional personnel to support the contracting, quality assurance, and archiving and distribution phases of the program. For Alternative #1, total Personnel costs over the ten year life cycle are estimated to be $110M, as can be seen in Figure 4-2 above.

4.2.4 Summary of Costs: Alternative #1

Alternative #1 is estimated to provide discounted net present value (NPV) of $267M over the ten year life cycle. The Return on Investment (ROI) is estimated to be 4.44:1. See section 2.1 for further explanation on financial metrics.

Table 4-4: Estimated Costs by Fiscal Year: Alternative #1

	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	Total
Alternative #1 Costs	$166M	$169M	$155M	$148M	$141M	$120M	$120M	$120M	$120M	$122M	$1.38B
Discounted Costs	$166M	$165M	$147M	$136M	$127M	$104M	$101M	$99M	$96M	$95M	$1.24B
Financial Metrics	ROI	NPV									
	4.44:1	$267M									

4.3 Alternative #2: Original IFTN Concept with Full Federal Funding for 1-ft Program

This alternative describes a nationwide orthoimagery program that will collect and disseminate standardized multi resolution products on set schedules.

4.3.1 Description of Alternative

This alternative will require that the existing USDA-administered NAIP be enhanced to provide annual 1-m imagery over all states except Alaska and Hawaii. Hawaii and the Insular Areas will be acquired on a 3 year cycle. This program will typically collect imagery during the growing season (leaf-on) in natural color.

USGS will administer a companion program, under which, Alaska will receive 1-m imagery for the entire state once every five years. In this alternative, 100% of the area in the lower 48 states and Hawaii will be acquired under the 1-ft program every three years using federal funds (no population model). Alaska and the Insular Areas and territories will also be acquired using federal funds but will continue to adhere to population requirements for the 1-ft program.

In addition, 50% matching funds will be available for partnerships to acquire 6-in imagery over urban areas as defined by the U.S. Census Bureau that have populations of at least 50,000 and overall population densities of at least 1,000 people per square mile. This program will typically acquire imagery during winter and spring months (leaf-off) in natural color.

This alternative will eliminate duplicative efforts, use nationwide contracting to reduce overall costs, and increase the value and availability of imagery by adhering to common standards and by placing it in a public domain. Table 4-5 below shows a description of the alternatives' features and specifications:

Table 4-5: Program Features: Alternative #2

Ground Resolution	6-in	1-ft	1-m
Image Type	Natural Color	Natural Color	Natural Color
Leaf On or Off	Off	Off	On
Frequency	Every 3 Years	Every 3 Years	Every Year in Lower 48 States Every 5 Years in Alaska Every 3 Years in Hawaii, and Insular Areas
Location	Identified Urban Areas	All States and HI (AK and Territories have Pop. Model)	Entire Nation, including all Insular Areas and territories
Funding Model	50% Mandatory Cost share	100% Federally Funded	100% Federally Funded
Federal Program Steward	USGS	USGS	USDA except Alaska which is USGS

4.3.2 Presentation of Costs: Alternative #2

The cost estimation for alternative #2 consists primarily of 2 programs at the federal level, USDA-FSA's 1-m program for the Lower 48 states, Hawaii, and Insular Areas and territories, and USGS' 1-m program over

Alaska, 1-ft and 6-in programs. In this alternative, the federal government is estimated to fully fund nationwide coverage at 1-m resolution, including all Insular Areas and territories and 1-ft resolution over all states and Hawaii. The federal government would also fund 1-ft coverage over Alaska and the Insular Areas; however they would need to adhere to a population model. For the 6-in program, a cost share between the federal government and the state/local government would be required to trigger production. This cost estimate also takes into account that as a best case scenario this alternative will have a 90% adoption rate by FY 12. As a result, 10% of other programs (federal, state, and local) costs are reflected in the 10-Year LCCE.

Alternative #2: 10-Year Life Cycle Cost Estimate is $1.73B

In this alternative, the major cost elements are Equipment which accounts for approximately 4.9% of total program costs, Software which accounts for approximately 0.1% of total program costs, Support Services which includes data acquisition and production accounts for 88.5% of total program costs, and Personnel which accounts for 6.4% of total program costs, as can be seen in Figure 4-3 below.

The complete CES for Alternative #2 can be found in Appendix H.

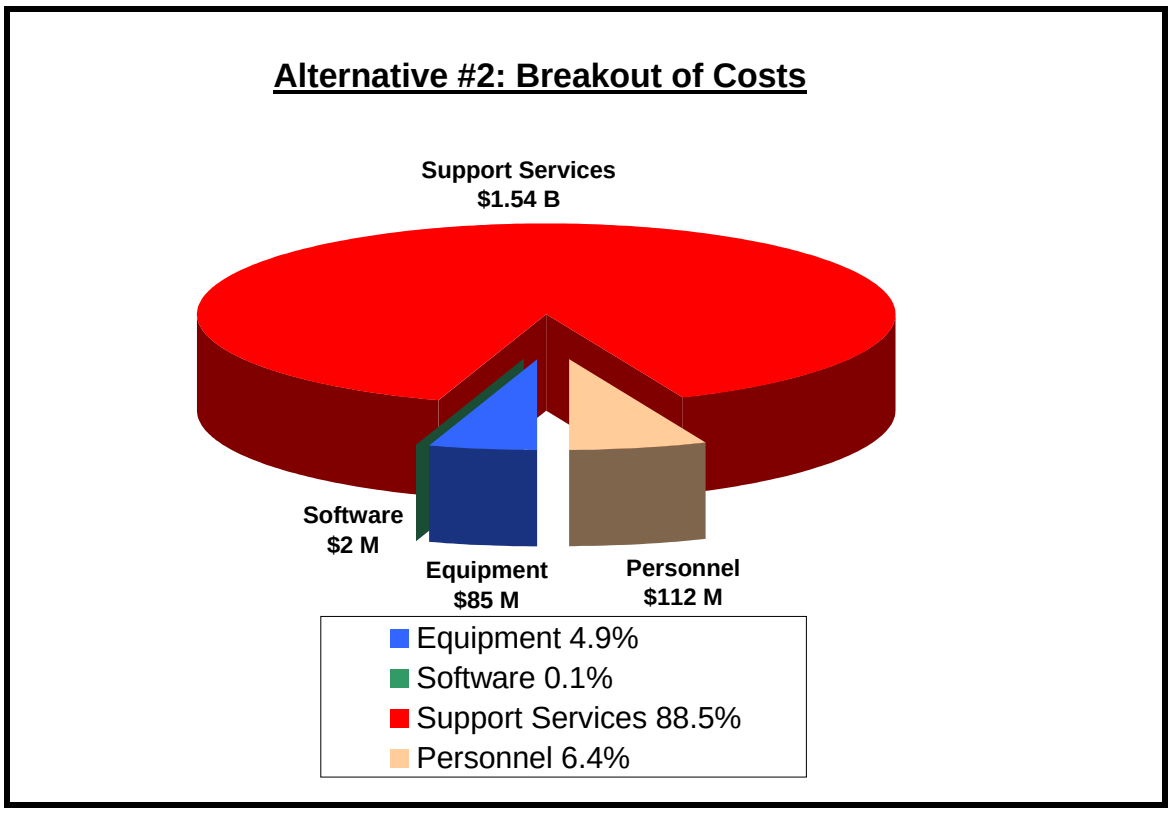

Figure 4-3: Percentage Breakout of Costs – Alternative #2

4.3.3 Major Cost Elements: Alternative #2

Equipment

Additional investments in equipment would be required at FSA and USGS to support a program such as

IFTN. This increase in capacity requirements will allow for investments in equipment such as additional servers, high-end workstations, and supporting capital improvements. For Alternative #2, total Equipment costs over the ten year life cycle are estimated to be $85M, as can be see in Figure 4-3 above.

Software

Investments in additional software licensing will be required at both FSA and USGS. Software investments make up a small percentage of total investment costs. For Alternative #2, total Software costs over the ten year life cycle are estimated to be $2M, as can be seen in Figure 4-3 above.

Support Services

Increase in support services cost; specifically data acquisition and production will be required to support IFTN. In Alternative #2, The 1-ft program will not adhere to a population model and will be fully federally funded, while the 6-in program will be done at a 50% cost share between the federal government and state/local agencies. For Alternative #2, total Support Services costs over the ten year life cycle are estimated to be $1.54B, as can be seen in Figure 4-3 above, with the federal government incurring 100% of the costs for the 1-m program and the 1-ft program.

Personnel

FSA and USGS will require additional personnel to support the contracting, quality assurance, and archiving and distribution phases of the program. For Alternative #2, total Personnel costs over the ten year life cycle are estimated to be $112M, as can be seen in Figure 4-3.

4.3.4 Summary of Costs: Alternative #2

Alternative #2 is estimated to provide discounted NPV of -$29M over the ten year life cycle. The ROI is estimated to be -0.27:1. See section 2.1 for further explanation on financial metrics.

Table 4-6: Estimated Costs by Fiscal Year: Alternative #2

	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	Total
Alternative #2 Costs	$166M	$169M	$156M	$170M	$193M	$174M	$175M	$175M	$175M	$179M	$1.73B
Discounted Costs	$166M	$165M	$148M	$157M	$173M	$152M	$149M	$145M	$141M	$139M	$1.53B
Financial Metrics	ROI	NPV									
	(0.27:1)	($29M)									

4.4 Alternative #3: Original IFTN Concept with Mandatory 50% Cost Share for 1-ft Program

This alternative describes a nationwide orthoimagery program that will collect and disseminate standardized multi resolution products on set schedules.

4.4.1 Description of Alternative

This alternative will require that the existing USDA-administered NAIP be enhanced to provide annual 1-m imagery over all states except Alaska and Hawaii. Hawaii and the Insular Areas will be acquired on a 3 year cycle. This program will typically collect imagery during the growing season (leaf-on) in natural color.

USGS will administer a companion program, under which, Alaska will receive 1-m imagery for the entire state once every five years. Under this alternative, the lower 48 states and Hawaii will receive up to 50% cost share using federal funds for the 1-ft program every three years with no population model. Alaska and the Insular Areas and territories will also receive up to 50% cost share using federal funds for the 1-ft program every three years; however it will adhere to a population model. States (or other partners) must provide a 50% match to trigger production of any areas. When matching funds are available, production can occur in smaller areas of each state. All work will be done in accordance with the approved Statewide Business Plan (with federal representation).

In addition, 50% matching funds will be available for partnerships to acquire 6-in imagery over urban areas as defined by the U.S. Census Bureau that have populations of at least 50,000 and overall population densities of at least 1,000 people per square mile. This program will typically acquire imagery during winter and spring months (leaf-off) in natural color.

This alternative will eliminate duplicative efforts, use nationwide contracting to reduce overall costs, and increase the value and availability of imagery by adhering to common standards and by placing it in a public domain. Table 4-7 below shows a description of the alternatives' features and specifications:

Table 4-7: Program Features: Alternative #3

Ground Resolution	6-in	1-ft	1-m
Image Type	Natural Color	Natural Color	Natural Color
Leaf On or Off	Off	Off	On
Frequency	Every 3 Years	Every 3 Years	Every Year in Lower 48 States Every 5 Years in Alaska Every 3 Years in Hawaii, and Insular Areas
Location	Identified Urban Areas	All States and HI (AK and Territories have Pop. Model)	Entire Nation, including all Insular Areas and territories
Funding Model	50% Mandatory Cost Share	50% Mandatory Cost Share	100% Federally Funded
Federal Program Steward	USGS	USGS	USDA except Alaska which is USGS

4.4.2 Presentation of Costs: Alternative #3

The cost estimation for alternative #3 consists primarily of 2 programs at the federal level, USDA-FSA's 1-m program for the Lower 48 states, Hawaii, and Insular Areas and territories, and USGS' 1-m program over Alaska, 1-ft and 6-in programs. In this alternative, the federal government is estimated to fully fund nationwide coverage at 1-m resolution, including all Insular Areas and territories. There is also a mandatory 50% cost share with the state/local agencies to trigger production for 1-ft coverage over the lower 48 states and Hawaii. The mandatory cost share for the 6-in program would remain constant in this alternative. This cost estimate also takes into account that as a best case scenario this alternative will have a 90% adoption rate by FY 12. As a result, 10% of other programs (federal, state, and local) costs are reflected in the 10-Year LCCE.

Alternative #3: 10-Year Life Cycle Cost Estimate is $1.71B

In this alternative, the major cost elements are Equipment which accounts for approximately 4.8% of total program costs, Software which accounts for approximately 0.1% of total program costs, Support Services which includes data acquisition and production accounts for 89.0% of total program costs, and Personnel which accounts for 6.1% of total program costs, as can be seen in Figure 4-4.

The complete CES for Alternative #3 can be found in Appendix H.

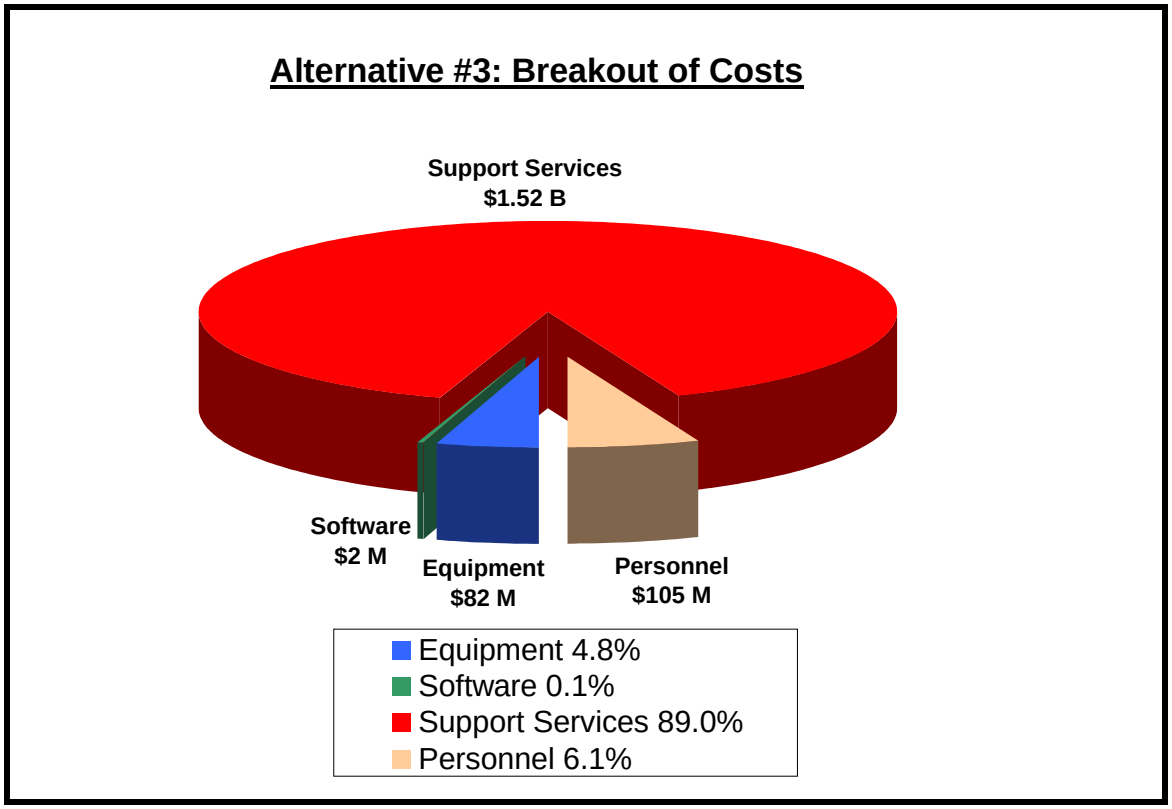

Figure 4-4: Percentage Breakout of Costs – Alternative #3

4.4.3 Major Cost Elements: Alternative #3

Equipment

Additional investments in equipment would be required at FSA and USGS to support a program such as IFTN. This increase in capacity requirements will allow for investments in equipment such as additional servers, high-end workstations, and supporting capital improvements. For Alternative #3, total Equipment costs over the ten year life cycle are estimated to be $82M, as can be seen in Figure 4-4.

Software

Investments in additional software licensing will be required at both FSA and USGS. Software investments make up a small percentage of total investment costs. For Alternative #3, total Software costs over the ten year life cycle are estimated to be $2M, as can be seen in Figure 4-4.

Support Services

Increase in support services cost; specifically data acquisition and production will be required to support IFTN. In comparison to Alternative #2, the 1-ft program will be funded through a mandatory 50% cost share between the federal government and the state/local agencies. For Alternative #3, total Support Services costs over the ten year life cycle are estimated to be $1.52B, as can be seen in Figure 4-4.

Personnel

FSA and USGS will require additional personnel to support the contracting, quality assurance, and archiving and distribution phases of the program. For Alternative #3, total Personnel costs over the ten year life cycle are estimated to be $105M, as can be seen in Figure 4-4 above.

4.4.4 Summary of Costs: Alternative #3

Alternative #3 is estimated to provide discounted NPV of -$10M over the ten year life cycle. The ROI is estimated to be -0.09:1. See section 2.1 for further explanation on financial metrics.

Table 4-8: Estimated Costs by Fiscal Year: Alternative #3

	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	Total
Alternative #3 Costs	$166M	$169M	$156M	$170M	$192M	$170M	$171M	$171M	$171M	$174M	$1.71B
Discounted Costs	$166M	$165M	$148M	$156M	$172M	$148M	$145M	$141M	$137M	$136M	$1.51B
Financial Metrics	ROI	NPV									
	(0.09:1)	($10M)									

4.5 Alternative #4: Original IFTN Concept with Optional 50% Cost Share for 1-ft Program

This alternative describes a nationwide orthoimagery program that will collect and disseminate standardized multi resolution products on set schedules.

4.5.1 Description of Alternative

This alternative will require that the existing USDA-administered NAIP be enhanced to provide annual 1-m imagery over all states except Alaska and Hawaii. Hawaii and the Insular Areas will be acquired on a 3 year cycle. This program will typically collect imagery during the growing season (leaf-on) in natural color.

USGS will administer a companion program, under which, Alaska will receive 1-m imagery for the entire state once every five years. Under this alternative, the lower 48 states and Hawaii will receive up to 50% cost share using federal funds for the 1-ft program every three years with no population model. Alaska and the Insular Areas and territories will also receive up to 50% cost share using federal funds for the 1-ft program every three years; however it will adhere to a population model. All work will be done in accordance with the approved Statewide Business Plan (with federal representation). States will have the option to provide additional funds to trigger coverage of any areas not covered by the 50% federally funded portion of the program. They can decide to provide an additional 10% or up to the remaining 50%, as well as have the option to not provide any additional funding and receive the entire state on a six-year cycle.

In addition, 50% matching funds will be available for partnerships to acquire 6-in imagery over urban areas as defined by the U.S. Census Bureau that have populations of at least 50,000 and overall population densities of at least 1,000 people per square mile. This program will typically acquire imagery during winter and spring months (leaf-off) in natural color.

This alternative will eliminate duplicative efforts, use nationwide contracting to reduce overall costs, and increase the value and availability of imagery by adhering to common standards and by placing it in a public domain. Table 4-9 below shows a description of the alternatives' features and specifications:

Table 4-9: Program Features: Alternative #4

Ground Resolution	6-in	1-ft	1-m
Image Type	Natural Color	Natural Color	Natural Color
Leaf On or Off	Off	Off	On
Frequency	Every 3 Years	Every 3 Years	Every Year in Lower 48 States Every 5 Years in Alaska Every 3 Years in Hawaii, and Insular Areas
Location	Identified Urban Areas	All States and HI (AK and Territories have Pop. Model)	Entire Nation, including all Insular Areas and territories
Funding Model	50% Mandatory Cost Share	50% Federally Funded Up to 50% Optional Cost Share from Partners to Complete Coverage	100% Federally Funded
Federal Program Steward	USGS	USGS	USDA except Alaska which is USGS

4.5.2 Presentation of Costs: Alternative #4

The cost estimation for Alternative #4 consists primarily of 2 programs at the federal level, USDA-FSA's 1-m program for the Lower 48 states, Hawaii, and Insular Areas and Territories, and USGS' 1-m program over Alaska, 1-ft and 6-in programs. In this alternative, the federal government is estimated to fully fund nationwide coverage at 1-m resolution, including all Insular Areas and territories.

There is an optional cost share program for 1-ft imagery with state/local agencies (or other partners). Federal funds will be allocated to guarantee completion of 50% coverage for each for each of the Lower 48 states and Hawaii. Alaska and the Insular Areas and territories will be fully funded for 1-ft imagery over Counties that meet the original population model requirements. State and local agencies will have several options under this alternative based on their approved Statewide Business Plan:

- Complete coverage of their jurisdiction with 50% Matching Funds
- Complete any incremental coverage of their jurisdiction, i.e. an additional 10% for a total of 60%.
- Add no additional funding and receive 50% of their state every three years (100% of the state every 6 years)

A mandatory cost share for the 6-in program would remain constant in this alternative.

This cost estimate also takes into account that as a best case scenario this alternative will have a 90% adoption rate by FY 12. As a result, 10% of other programs (federal, state, and local) costs are reflected in the 10-Year LCCE.

Alternative #4: 10 Year Life Cycle Cost Estimate is $1.55B

In this alternative, the major cost elements are Equipment which accounts for approximately 5.1% of total program costs, Software which accounts for approximately 0.1% of total program costs, Support Services which includes data acquisition and production accounts for 87.9% of total program costs, and Personnel which accounts for 6.9% of total program costs, as can be seen in Figure 4-5.

The complete CES for Alternative #4 can be found in Appendix H.

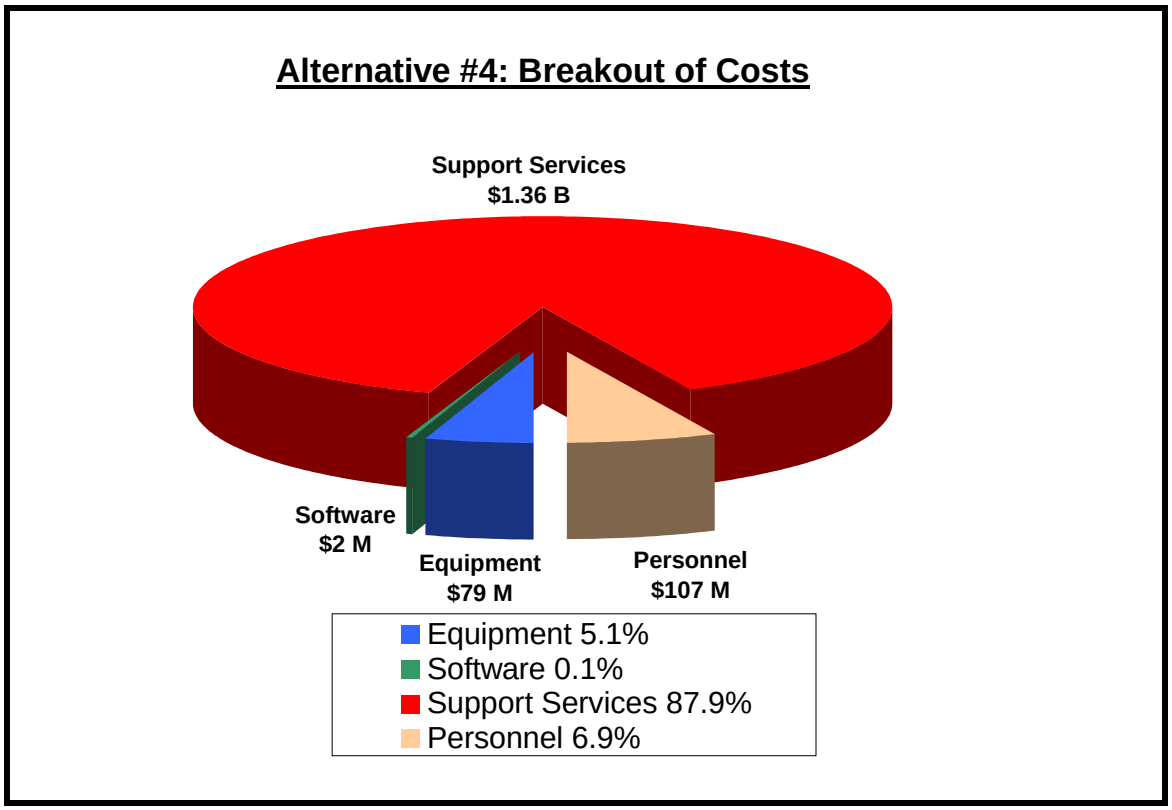

Figure 4-5: Percentage Breakout of Costs – Alternative #4

4.5.3 Major Cost Elements: Alternative #4

Equipment

Additional investments in equipment would be required at FSA and USGS to support a program such as IFTN. This increase in capacity requirements will allow for investments in equipment such as additional servers, high-end workstations, and supporting capital improvements. For Alternative #4, total Equipment costs over the ten year life cycle are estimated to be $79M, as can be seen in Figure 4-5 above.

Software

Investments in additional software licensing will be required at both FSA and USGS. Software investments make up a small percentage of total investment costs. For Alternative #4, total Software costs over the ten year life cycle are estimated to be $2M, as can be seen in Figure 4-5 above.

Support Services

Increase in support services cost; specifically data acquisition and production will be required to support IFTN. In comparison to Alternative #3, the 1-ft program will be funded through 50% guaranteed federal funds and an optional 50% cost share from state or local agencies to increase the coverage up to 100%. For Alternative #4, total Support Services costs over the ten year life cycle are estimated to be $1.36B, as can be seen in Figure 4-5 above.

Personnel

Additional personnel will be required at both FSA and USGS to support the contracting, quality assurance,

and archiving and distribution phases of the program. For Alternative #4, total Personnel costs over the ten year life cycle are estimated to be $107M, as can be seen in Figure 4-5 above.

4.5.4 Summary of Costs: Alternative #4

Alternative #4 is estimated to provide discounted NPV of $126M over the ten year life cycle. The ROI is estimated to be 1.51:1. See section 2.1 for further explanation on financial metrics.

Table 4-10: Estimated Costs by Fiscal Year: Alternative #4

	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	Total
Alternative #4 Costs	$166M	$169M	$156M	$160M	$167M	$145M	$146M	$146M	$146M	$149M	$1.55B
Discounted Costs	$166M	$165M	$147M	$147M	$149M	$127M	$124M	$120M	$117M	$116M	$1.38B
Financial Metrics	ROI	NPV									
	1.51:1	$126M									

4.6 Comparison of Non-Quantifiable Benefits

To represent the complete picture of value for each alternative to the decision maker, the analysis team identified and categorized a number of qualitative benefits. The benefits were collected from the IFTN interviews, surveys and additional supporting documentation then organized into the following value categories:

- User Value: Consists of benefits experienced by the end-users of imagery (e.g., private industry, academia, citizens, and organizations).
- Government Operational Value: Consists of positive effects on operations achieved by creating a quality and consistent process and product.
- Industry Value: Consists of the benefits absorbed by the industry to support expansion of the GIS field.

This benefit comparison used the current state to future state approach as none of the identified benefits were unique to any one alternative. The benefits represent those which can be related to improvements in quality of service, improved decision making, enhanced products, and enhanced interoperability across agencies.

Table 4-11 below shows a detailed comparison of the qualitative benefits. It is important to note that, many non-quantifiable benefits in the current state are program specific, rather than consistent across agencies and users. This is a result of the lack of standardization of the program management process and the product.

Table 4-11 IFTN Program Non-Quantifiable Benefits

Classification of Benefit	Current State	Future State (Alternatives #1, #2, #3, #4)
	These are localized benefits – limited to those products that are generated through agency specific requirements	These benefits will be provided consistently on a nationwide basis. Levels the playing field.
User Value: Consists of benefits experienced by the end-users of imagery (e.g., private industry, academia, citizens, and organizations).	• Cost savings through the use of a resource previously not available • Coverage and schedule appropriate to application areas where data is available	• Access to current and historical imagery in the public domain • Reliability of product and schedule • Continuity of process and funding • Opportunities to meet additional business requirements with buy-up options • Increased interoperability across jurisdictions • Common source data • Local users will have higher resolution imagery • Access to consistent historical products • Increased applications available • Increased user base
Government Operational Value: Consists of the positive effects on operations achieved by creating a quality and consistent process and product.	• Ability to determine distribution and cost recovery • Programs control the workflow process • Continuity of partnerships • Programs determine required coverage and schedule • Programs monitor the quality and consistency of the product	• Quality & consistency in operating data • Reliability of product and schedule • Standardization of procurement process • Creation of economies of scale through consolidation of federal, state, and local programs • Interagency interoperability • Increased government user base • More effective use of resources for other projects and programs
Industry Value: Consists of the benefits absorbed by the Industry to support expansion of the GIS field.	• Professional service providers can sell the same product multiple times • Business opportunities to work on speculation • Opportunity to produce imagery products over the same area multiple times	• Increased opportunity for value added services • Overarching guidance for coordinating efforts across states and agencies • Common source data • Improved scheduling of workflow for professional service providers • Positive economic impact • Increased customer base

A benefit of the current state is an organization's ability to maintain control of their imagery program. Many organizations are reluctant to accept standards developed at the federal level. Local control ensures an organization's ability to acquire imagery to meet their own schedules, required resolution and features, participation in the QA/QC process, and exclusion from a national standard that may be too restrictive. Some organizations have stable funding for their programs, but most do not.

The future state will offer improved access to imagery in a public domain through existing distribution

mechanisms with the additional discovery capabilities of the Geospatial One Stop (GOS) Portal. The user will also benefit from having a consistent product and using common source data, which in turn increases interoperability across jurisdictions.

Alternatives #2, #3, and #4 eliminate the population requirements for the 1-ft program. As a result, states that would not have met the initial population requirement will no longer receive a lower resolution product due to having larger uninhabited land areas. This benefit can be seen in the form of increased customer satisfaction although at an increased cost. Through a survey conducted by NSGIC in which state representatives were asked to rank the identified alternatives in order of preference, Alternative #2 had the highest ranking. The survey showed that state and local agencies have a preference for a program that would provide 1-ft nationwide coverage and be funded 100% by the federal government. Alternative #4 which possesses a 50% optional cost share for the 1-ft program was ranked as the second preferred alternative.

4.7 Life Cycle Cost Comparison

Life cycle cost can be defined 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 operation and maintenance costs. A Base-Year estimate was used to compute life cycle costs. Base-Year cost estimates show decision point impacts, rather than changes in costs due to inflation. Changes in costs from year to year are due to specific actions or decisions rather than just inflation. A breakout of Then-Year life cycle costs, which include inflation and are used for budgetary purposes, can be found in Appendix I.

The life cycle cost comparison consisted of comparing costs for the baseline and the alternatives over a ten year period. Certain criteria were taken into account for the comparison, such as Net Present Value (NPV) and Return on Investment (ROI). NPV is the discounted monetized value of expected benefits. NPV is computed by assigning monetary values to benefits and costs, discounting future benefits and costs using an appropriate discount rate, and subtracting the sum total of discounted costs from the sum of total discounted benefits. ROI was also used to calculate the most cost effective solution. ROI is a calculation of the most tangible financial gains or benefits that can be expected from a project versus the costs of implementing the suggested program. The reason for such a comprehensive comparison is that the cheapest program to implement will not necessarily be the best investment. Often times, more expensive programs will provide a higher ROI or NPV. Additionally, the delta in operation and sustainment costs for each program from the baseline is shown. This delta is an important value as implementing IFTN through any of the proposed alternatives will provide a direct monetary cost savings to the program sponsors. It should also be noted that benefits identified in section 4.6 are not represented in the ROI figures for the alternatives. Attaching monetary values to these benefits would increase the ROI for all alternatives.

The four major cost elements identified in the life cycle cost comparison were Equipment, Software, Support Services and Personnel costs. Table 4-12 below shows a summarized estimate of the alternative's lifecycle cost estimate compared to the baseline along with their respective ROI, NPV and the calculated operational cost savings.

Table 4-12: Financial Comparison of Alternatives

Comparison of Total Costs To Baseline			Financial Metric Comparison Across Alternatives		
Alternatives	Discounted Baseline LCCE Costs	Discounted Alternative LCCE Costs	Operational Cost Deltas From Baseline	Return on Investment	Net Present Value
Alternative #1: Original IFTN Concept	$1.50B	$1.24B	$938M	4.44:1	$267M
Alternative #2: Original IFTN Concept with Full Federal Funding for 1-ft Program		$1.53B	$637M	-0.27:1	-$29M
Alternative #3: Original IFTN Concept with Mandatory 50% Cost Share for 1-ft Program		$1.51B	$660M	-0.09:1	-$10M
Alternative #4: Original IFTN Concept with Optional 50% Cost Share for 1-ft Program		$1.38B	$796M	1.51:1	$126M

Data acquisition and production costs account for approximately 83% of total program costs for all alternatives. The alternatives presented in this study differ mostly in the land area of coverage and in the funding model for each.

Alternative #1, the original IFTN concept is characterized by the population model for the 1-ft program. Under this alternative all counties east of the Mississippi River will receive 1-ft resolution imagery as well as all counties west of the Mississippi River with population densities greater than 25 people per square mile. As a result, the population model decreases overall data acquisition and production costs for the program. However it could adversely affect the level of customer satisfaction and the rate of adoption of the program in many western states. As evident in the table above, alternative #1 provides a higher ROI and NPV mostly due to lower data acquisition and production costs through lesser land area of coverage. The ROI for this alternative is 4.44:1, meaning that for every dollar invested, the program will receive $4.44 in return, and the NPV is estimated to be $267M.

Alternative #2, is characterized by nationwide coverage in 1-m and 1-ft resolution (AK has population model), and fully funded by the federal government. This alternative presents much higher data acquisition and production costs due to the elimination of the population model and the larger area of coverage required. Over the ten year life cycle, Alternative #2 has a higher life cycle cost than the current baseline, it also presents a negative ROI of -0.27:1 and an NPV of -$29M.

Alternative #3 also provides nationwide coverage at 1-m and 1-ft resolutions (AK has population model). The 1-ft program will be done through a mandatory cost share with state coordination councils. The land area of coverage remains the same as in Alternative #2; however, costs will be divided between federal and state. Based on survey information, approximately 50% of the states do not believe they could allocate the mandatory 50% cost share funds meaning that much of the nation would have no coverage of 1-ft imagery. Since data acquisition and production costs are similar to those in Alternative #2, this alternative also presents a negative ROI of -0.09:1 and an NPV of -$10M.

Alternative #4 provides some uncertainty in the total coverage of land area. This alternative is characterized by an optional cost share for the 1-ft program. Under Alternative #4, the federal government would fund 50% of the total area for each state, except Alaska, according to the statewide business plan on a three year cycle. State coordination councils will have the option to buy up the remaining 50% of the state or a lesser amount, i.e. 20%. Based on survey information, approximately 51% of the states indicated that they will buy up the remaining 50% on a three year cycle, while 43% will buy up between 10 and 30% additional coverage. The ROI for this alternative is 1.51:1 and the NPV for this alternative is $126M.

As noted in Table 4-12, all of the alternatives show an operational cost savings over the baseline. This means that once implemented program sponsors will realize direct monetary savings.

Figure 4-6 below shows a comparison of estimated lifecycle cost estimates in constant dollars. The alternatives have similar initial investment costs; however, through the out years of the program, total estimated costs for alternatives #1 and #4 are lower than those of alternatives #2 and #3.

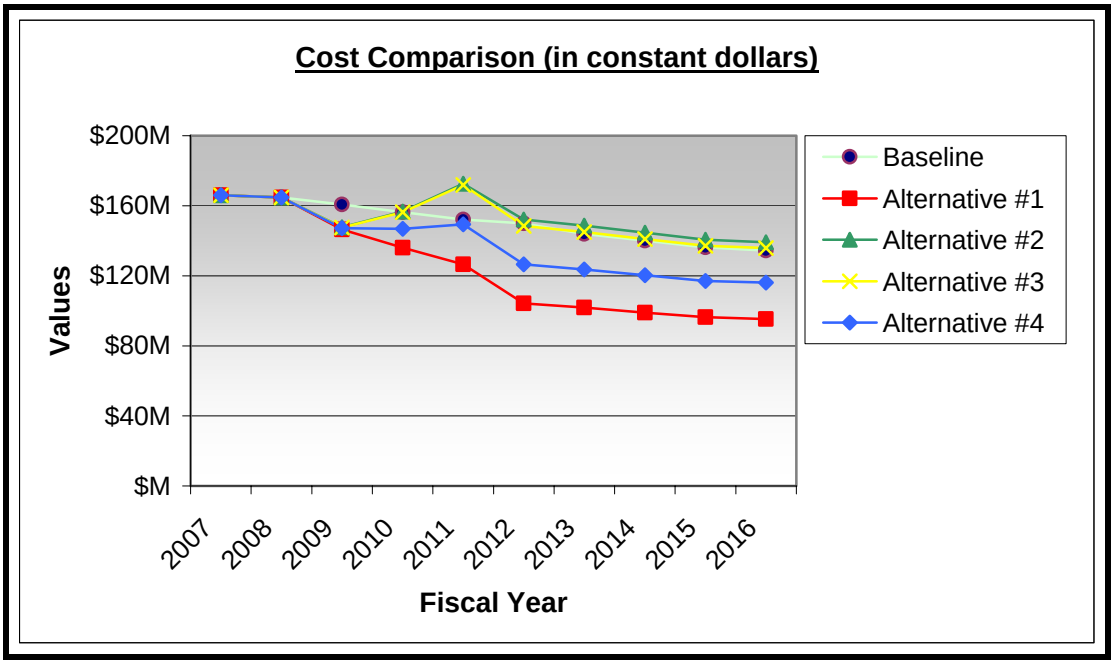

Figure 4-6: Constant Dollars LCCE Comparison

Figure 4-7 shows Investment or Development/Modernization/Enhancement costs for all four alternatives. The alternatives have similar upfront costs, yet alternatives #2 and #3 have slightly higher upfront costs due to increased investments related to data acquisition and production for nationwide 1-ft coverage.

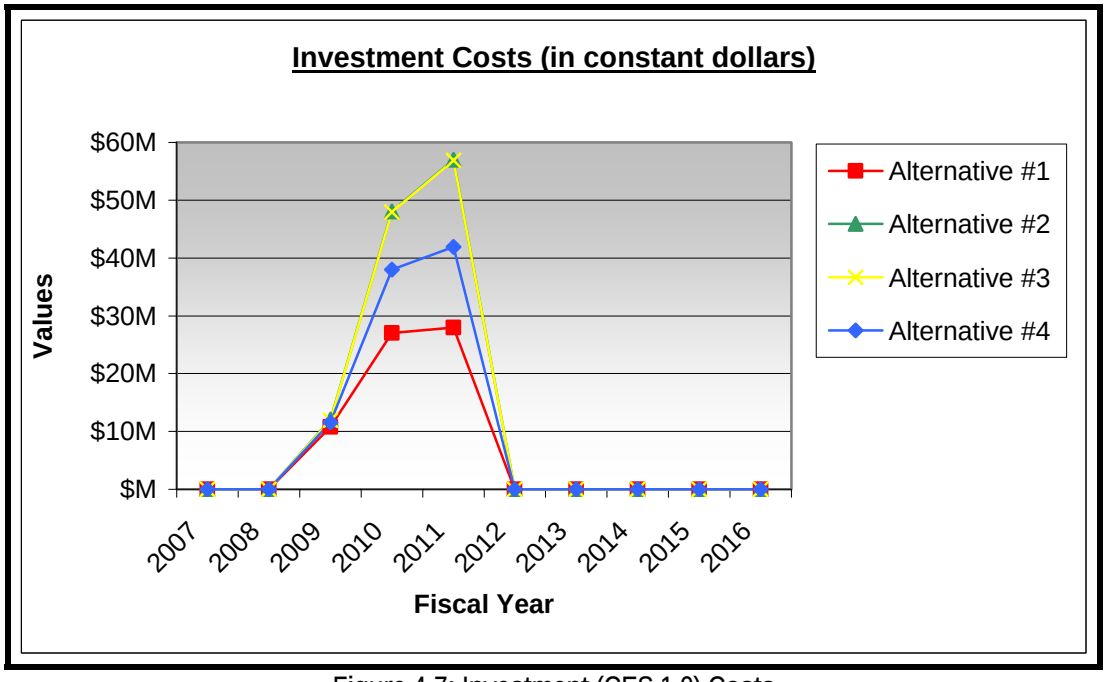

Figure 4-7: Investment (CES 1.0) Costs

Figure 4-8 shows a comparison of Steady State or Operations and Maintenance costs for the baseline and the four alternatives. The figure clearly shows lower sustainment costs for alternatives #1 and #4 due to lower overall data acquisition and production costs, which affect the infrastructure needed to support such a program.

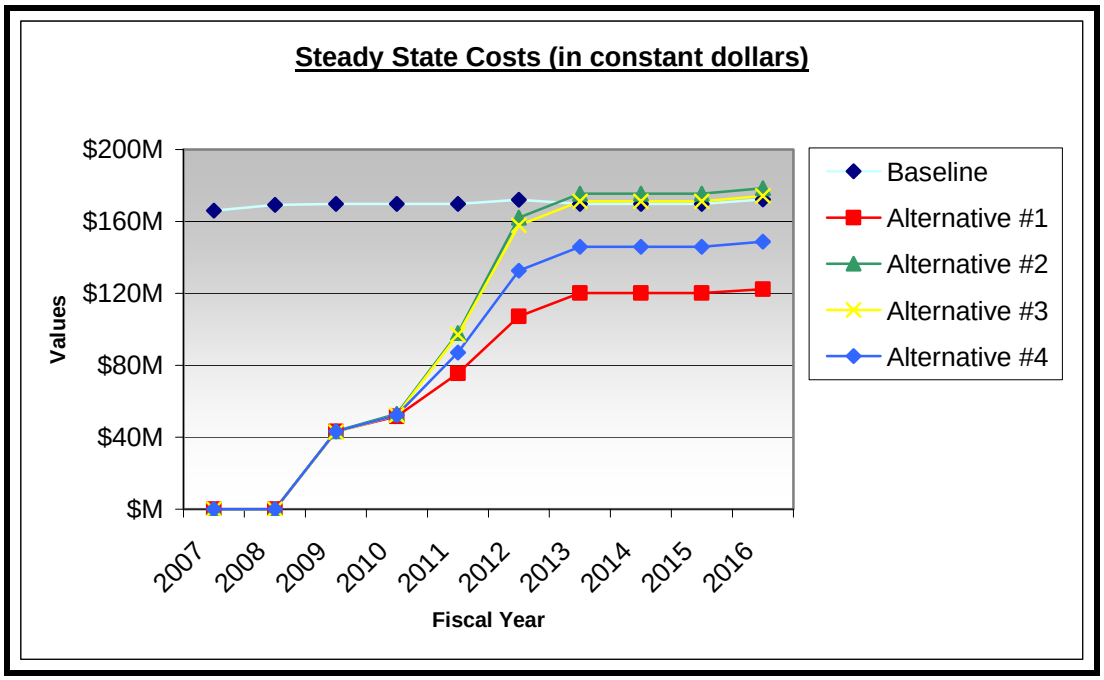

Figure 4-8: Steady State (CES 2.0) Costs

Figure 4-9 shows Legacy Phase Out (LPO) costs. It consists of moving from the current state to a program such as IFTN. Estimated phase-in of IFTN will begin in FY 09 and reach approximately 90% adoption rate by FY 12. This assumption applies to the four alternatives; therefore LPO costs are similar across the board. The costs for the remaining 10% of programs not adopting IFTN are located in Steady State costs.

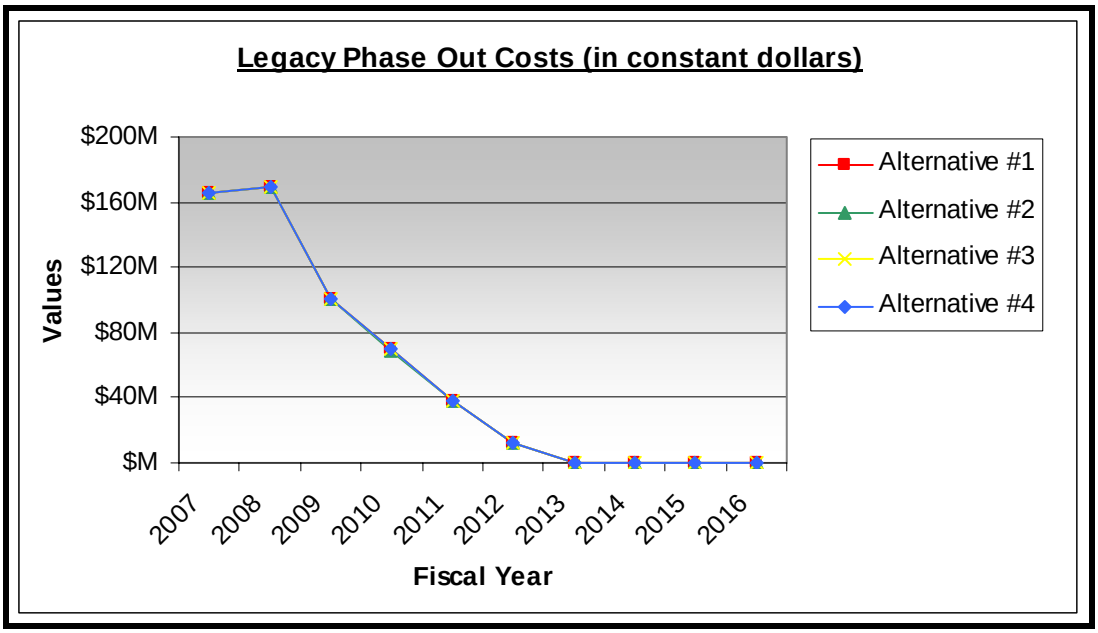

Figure 4-9: Legacy Phase Out (CES 3.0) Costs

Table 4-12 represents the total costs for Investment Costs, Steady State Costs, and Legacy Phase Out Costs for the current state and selected alternatives. Each alternative is compared to the current state from FY07 to FY16. Decreases in total costs occur in alternatives #1 and #4, while modest increases in costs occur in alternatives #2 and #3. The Steady State costs for the alternatives include the transition period between FY07-FY09, during which each alternative carries the additional costs from the current state, until complete legacy system phase out.

Table 4-12: Comparison of Costs by CES Elements

Cost Element	Current State	Alternative #1	Alternative #2	Alternative #3	Alternative #4
1.0 Investment	$.0M	$65.8M	$117.1M	$116.8M	$91.5M
2.0 Steady State	$1.70B	$760.2M	$1.06B	$1.04B	$901.9M
3.0 Legacy Phase Out	$.0M	$556.0M	$555.5M	$556.5M	$556.0M
Total (in constant dollars)	$1.70B	$1.38B	$1.73B	$1.71B	$1.55B
Total Discounted Costs	$1.50B	$1.24B	$1.53B	$1.51B	$1.38B
% Change		-18.65%	2.54%	0.71%	-8.76%

4.8 Requirements Analysis

Business requirements were recorded through SME interviews, survey responses, document review, and IFTN sponsor input, and then cross-checked with the Performance Reference Model (PRM). The PRM is a standardized 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 an orthoimagery 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 directly relate to the IT initiative.

During the initial assessment of the business requirements, it is important to identify and verify the overall program goals to determine which requirements take precedence for comparison purposes. The main requirements relate to accessibility of the product for the end user, scalability of a program to a national scale, standardization of orthoimagery products, and the reduction of duplicative efforts across agencies and jurisdictions.

The requirements presented in the following table represent rational outcomes based on the selected alternatives and current state as identified by the Executive Sponsors. 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 is presented in Table 4-13. The business requirements were identified through the data collection effort and categorized according to the PRM. A rating system of 1 – 5 was established and defined as follows:

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

Table 4-13: Comparison of Business Requirements

Business Requirements	Current State	Alternative 1: Original IFTN Concept	Alternative #2: Original IFTN Concept with Full Federal Funding for 1-ft Program	Alternative #3: Original IFTN Concept with 50% Mandatory Cost Share for 1-ft Program	Alternative #4: Original IFTN Concept with 50% Optional Cost Share for 1-ft Program
MISSION AND BUSINESS RESULTS: Intended to capture the outcomes that agencies seek to achieve.					
Set consistent standards for imagery (resolution across boundaries, refresh)	3	4	4	4	4
Create public domain orthoimagery, devoid of any licensing restrictions allowing the customers unlimited access to the most current data sets	3	4	4	4	4
Achieve maximum cost savings through large area contracting/economies of scale	2	4	4	4	3
Reduce turnaround time between orthoimagery production and distribution	3	3	2	3	3
Develop common source data	2	4	4	3	4
Able to sustain funding	2	4	2	3	4
Application of consistent quality control processes and specifications	2	4	4	4	4
Facilitate coordination efforts across federal, state, and local agencies	2	4	4	4	4
Reduce the number of independent contracts	2	4	4	3	3
Imagery available across jurisdictions or state boundaries	3	4	4	3	4
CUSTOMER RESULTS: Intended to capture how well an agency or specific process within an agency is serving its customers.					
High Resolution imagery for urban and developing areas is consistently available	3	4	4	3	3
Provide access to all imagery at one location (i.e. via the Geospatial One Stop (GOS) Portal)	2	4	4	4	4
Help ensure regular update cycles for imagery	2	4	4	3	3
Standard image products available to show Pre-Event information in disasters	2	4	4	4	3
Ancillary Products such as Raw Stereo, Digital Elevation Model (DEM), Meta Data, Digital Terrain Model (DTM) are readily available	2	3	3	3	3
Turnaround time for ortho-rectification does not exceed twelve months	2	3	3	3	3
PROCESSES AND ACTIVITIES: Intended to capture the outputs that are the direct result of the process that an IT initiative supports.					
Reduction in administrative costs related to maintaining independent imagery programs	2	3	3	3	3
State and local programs will be required to align budget cycles to coincide with IFTN production schedules	2	3	3	3	3
Provide predictable operating requirements for vendors	2	4	4	3	3
TECHNOLOGY: Designed to capture key elements of performance that directly relate to the IT initiative.					
Decrease storage capacity to host and distribute imagery	2	3	4	3	3
Adequate network infrastructure that supports the archive and distribution functions of all programs	2	4	4	4	4
AVERAGE TOTALS:	2	4	4	3	3

In the current state, none of the identified requirements are being fully met. Alternatives #1 and #2 best meet the business requirements when compared against the current state and the remaining alternatives.

As stated throughout the CBA, the role of the IFTN proposal is to meet the business requirements of all agencies at the federal, state, and local levels as a centrally managed orthoimagery program for the majority of orthoimagery requirements. In particular, the objective of the IFTN proposal and any ultimate proposal, such as the selected alternatives, is to provide a program that would allow federal, state and local agencies, to respond to each organization's business requirements.

4.9 Risk Analysis

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, SME interviews, surveys, and IFTN sponsor feedback as stated in section 2.4 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 lifecycle. Both internal and external risks should be identified.

The first step in any risk analysis is to identify the risks and the rationale behind each. The identified risks to each selected alternative and the rationale for each have been organized into the following categories:

- Financial risk
- Technical risk
- Operational risk
- Legal & Contractual risk
- Organizational risk

Each of the five risk categories consists of four associated components: (1) the probability of failing to achieve a particular outcome; (2) the impact of failing to achieve that outcome; (3) the percentage of overall costs; and (4) the 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 the four selected alternatives. The risk factor is calculated by multiplying the probability by the impact and percentage of overall costs:

(Probability) X (Impact) X (% of overall costs) = Risk Factor

The scores from each category are then added up to arrive at a total score for each selected alternative. To determine a numerical value for probability and impact, the IFTN CBA team assigned a scoring system to these two components according to the following criteria outlined in tables 4-14 and 4-15.

Table 4-14: Probability Scoring Key

Probability – Ranking Scale	
What is the likelihood that the risk will happen?	
1	Remote – 10% Chance
2	Unlikely – 20% Chance
3	Likely – 50% Chance
4	Highly Likely – 75% Chance
5	Near Certainty – 100%

Table 4-15: Impact Scoring Key

Impact – Ranking Scale		
What is the impact of the defined risk score?		
	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 acceptable limits
4	Critical	Overall outcome below acceptable limits
5	Catastrophic	Overall outcome unacceptable

The following tables detail the risk score and rationale for each alternative. In order to accomplish an in depth risk analysis, the rationale for each risk category was deduced from the data collection effort and verified by the IFTN Sponsors. Table 4-16 shows the overall risk analysis for Alternative #1.

Table 4-16: Alternative #1 Risk

Alternative 1: Original IFTN Concept						
Risk	Description	Rationale	Probability (1-5)	Impact (1-5)	% Overall Costs	Risk Factor
Financial	Risk associated with changes in lifecycle investment costs.	• Uncertainty of sustainable federal funding • Budget cycles not aligning • Congress not providing funds due to discrimination of pop. model	3	5	25%	3.75
Technical	Risks associated with the changes in the technology underlying the IFTN program over its lifecycle.	• Current technology becoming obsolete	1	5	15%	0.75
Operational	Risks associated with direct or indirect losses resulting from inadequate or failed internal processes, people, and systems or from external events.	• Unsure if infrastructure can support a nationwide program • Unsure that state and local agencies will give up control of their programs • Uncertainty of meeting 6-9 month turnaround time	2	2	25%	1.00
Legal & Contractual	Risks associated with USDA and USGS' explicit relationships with vendors, contractors, and external imagery users.	• Small business having to consolidate with larger vendors • Inability to maintain long term federal contracts	3	2	5%	0.30
Organizational	Risks associated with the business processes, and the key stakeholders' views of the IFTN program	• Customer dissatisfaction with population model • Lower adoption rate • Program specific or ad hoc requirements may not be met.	4	4	30%	4.80
Total Score			13	18	100%	10.60

Table 4-17 below shows the risk analysis for Alternative #2. The main risk concern for this alternative is the fact that the federal government would be incurring the larger burden of overall program costs and responsibilities.

Table 4-17: Alternative #2 Risk

Alternative #2: Original IFTN Concept with Full Federal Funding for 1-ft Program						
Risk	Description	Rationale	Probability (1-5)	Impact (1-5)	% Overall Costs	Risk Factor
Financial	Risk associated with changes in lifecycle investment costs.	• Uncertainty of sustainable federal funding • Budget cycles not aligning • Congress considers the cost excessive and doesn't fund.	4	5	25%	5.00
Technical	Risks associated with the inability to accurately predict the technology underlying the IFTN program over its lifecycle.	• Current technology becoming obsolete	1	5	15%	0.75
Operational	Risks associated with direct or indirect losses resulting from inadequate or failed internal processes, people, and systems or from external events.	• Unsure if infrastructure can support a nationwide program • Unsure that state and local agencies will give up control of their programs • Uncertainty of meeting 6-9 month turnaround time	2	2	25%	1.00
Legal & Contractual	Risks associated with USDA and USGS' explicit relationships with vendors, contractors, and external imagery users.	• Small business having to consolidate with larger vendors • Inability to maintain long term federal contracts	3	2	5%	0.30
Organizational	Risks associated with the business processes, and the key stakeholders' views of the IFTN program	• The federal government incurring a larger burden of program costs and responsibilities (Financial, operational, etc.) • Program specific or ad hoc requirements may not be met.	3	3	30%	2.70
Total Score			12	17	100%	9.75

Table 4-18 below shows the risk analysis for Alternative #3. The main risk concern for this alternative is the fact that in order to trigger production for the 1-ft program, state and local agencies would obligatorily provide 50% of the costs. This is a big uncertainty due to the perception that many states cannot afford 50% of the 1-ft program cost.

Table 4-18: Alternative #3 Risk

Alternative #3: Original IFTN Concept with Mandatory 50% Cost Share for 1-ft Program						
Risk	Description	Rationale	Probability (1-5)	Impact (1-5)	% Overall Costs	Risk Factor
Financial	Risk associated with changes in lifecycle investment costs.	• Uncertainty of sustainable federal funding • Budget cycles not aligning • Congress not providing funds due to cost share model • Uncertainty that states can afford 50% mandatory cost share	3	5	25%	3.75
Technical	Risks associated with the inability to accurately predict the technology underlying the IFTN program over its lifecycle.	• Current technology becoming obsolete	1	5	15%	0.75
Operational	Risks associated with direct or indirect losses resulting from inadequate or failed internal processes, people, and systems or from external events.	• Unsure if infrastructure can support a nationwide program • Unsure that state and local agencies will give up control of their programs • Uncertainty of meeting 6-9 month turnaround time	2	2	25%	1.00
Legal & Contractual	Risks associated with USDA and USGS' explicit relationships with vendors, contractors, and external imagery users.	• Small business having to consolidate with larger vendors • Inability to maintain long term federal contracts • More difficult for imagery service providers to predict operating requirements	3	2	5%	0.30
Organizational	Risks associated with the business processes, and the key stakeholders' views of the IFTN program	• The state and local governments incurring a larger burden of program costs and responsibilities (Financial, operational, etc.) • Lower adoption rate • Program specific or ad hoc requirements may not be met.	4	4	30%	4.8
Total Score			12	17	100%	10.60

Table 4-19 below shows the risk analysis for Alternative #4. The main risk concern for this alternative is the uncertainty that comes with offering an optional cost share for the 1-ft program. It will be increasingly difficult to estimate workload and program costs, due to the fact that programs have the option to add-on to the 50% they will receive from the federal government in any increments desired, or wait 6 years to receive their entire state at 1-ft coverage.

Table 4-19: Alternative #4 Risk

Alternative #4: Original IFTN Concept with Optional 50% Cost Share for 1-ft Program						
Risk	Description	Rationale	Probability (1-5)	Impact (1-5)	% Overall Costs	Risk Factor
Financial	Risk associated with changes in lifecycle investment costs.	• Uncertainty of sustainable federal funding • Budget cycles not aligning • Uncertainty of how much states can afford under 50% optional cost share	2	5	25%	2.50
Technical	Risks associated with the inability to accurately predict the technology underlying the IFTN program over its lifecycle.	• Current technology becoming obsolete	1	5	15%	0.75
Operational	Risks associated with direct or indirect losses resulting from inadequate or failed internal processes, people, and systems or from external events.	• Unsure if infrastructure can support a nationwide program • Unsure that state and local agencies will give up control of their programs • Uncertainty of meeting 6-9 month turnaround time	2	2	25%	1.00
Legal & Contractual	Risks associated with USDA and USGS' explicit relationships with vendors, contractors, and external imagery users.	• Small business having to consolidate with larger vendors • Inability to maintain long term federal contracts • Operations requirement are a larger unknown for imagery service providers to predict operating requirements	3	2	5%	0.30
Organizational	Risks associated with the business processes, and the key stakeholders' views of the IFTN program	• Uncertainty of the burden on the state and local governments related to program costs and responsibilities (Financial, operational, etc.) • Lower adoption rate • Program specific or ad hoc requirements may not be met.	2	4	30%	2.40
Total Score			10	18	100%	6.95

Each risk was examined according to each individual category, then in relation to the others, and scored according to its level of significance. The risk of each alternative, either in duration, cost, or meeting the business requirements contributes to the largest fluctuation in scores between probability and impact for each selected alternatives. These fluctuations are most prevalent in the Financial and Organizational categories.

The most risk adverse alternative results in the lowest score. A comparison of the four selected alternatives concluded that Alternative #4 is the most risk adverse while Alternatives #1 and #3 are the most risk prone with the highest score. Alternative #1 presents more risk due to the inclusion of the population model. Alternative #2 places the financial and operational responsibility on the federal government, but it also defers risk away, since this alternative is not dependent upon buy-in from state and local governments. Alternative #3 includes a mandatory cost share, and there lies great uncertainty in the ability of states providing the mandatory 50% that will trigger production. Alternative #4 presents risks related to the uncertainty of the number of states that will buy up every three years, rather than receive their entire state on a six-year cycle.

4.9.1 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 lifecycle. Having identified the risk factor for the four alternatives, they are then applied to each alternative's discounted lifecycle cost estimate. Table 4-20, below shows a comparison of risk adjusted life cycle costs.

Table 4-20: Financial Comparison of Alternatives: Risk Adjusted

Comparison of Total Costs To Baseline			Financial Metric Comparison Across Alternatives		
Alternatives	Discounted Baseline LCCE Costs	Risk Adjusted Alternative LCCE Costs	Operational Cost Deltas From Baseline	Return On Investment	Net Present Value
Alternative #1: Original IFTN Concept	$1.50B	$1.37B	$938M	2.26:1	$136M
Alternative #2: Original IFTN Concept with Full Federal Funding for 1-ft Program		$1.68B	$637M	-2.96:1	-$178M
Alternative #3: Original IFTN Concept with 50% Mandatory Cost Share for 1-ft Program		$1.67B	$660M	-1.60:1	-$170M
Alternative #4: Original IFTN Concept with 50% Optional Cost Share for 1-ft Program		$1.47B	$796M	0.37:1	$31M

After costs and benefits for each alternative are identified, they are converted into a common measurement unit by discounting future dollar values and transforming future benefits and costs to their "present value." Present values are calculated by multiplying the future value times the discount factors published in the

OMB Circular A-94. After discounting the costs and benefits, the risk factor previously identified for each alternative is applied. The result is a decrease in NPV for each alternative; however, alternatives #1 and #4 continue to show a positive NPV.

Figure 4-10 illustrates the different risk adjusted cost estimates for the alternatives over the ten-year life cycle. A significant difference between the alternatives can be seen in the out years of the program; although all share similar initial investment costs.

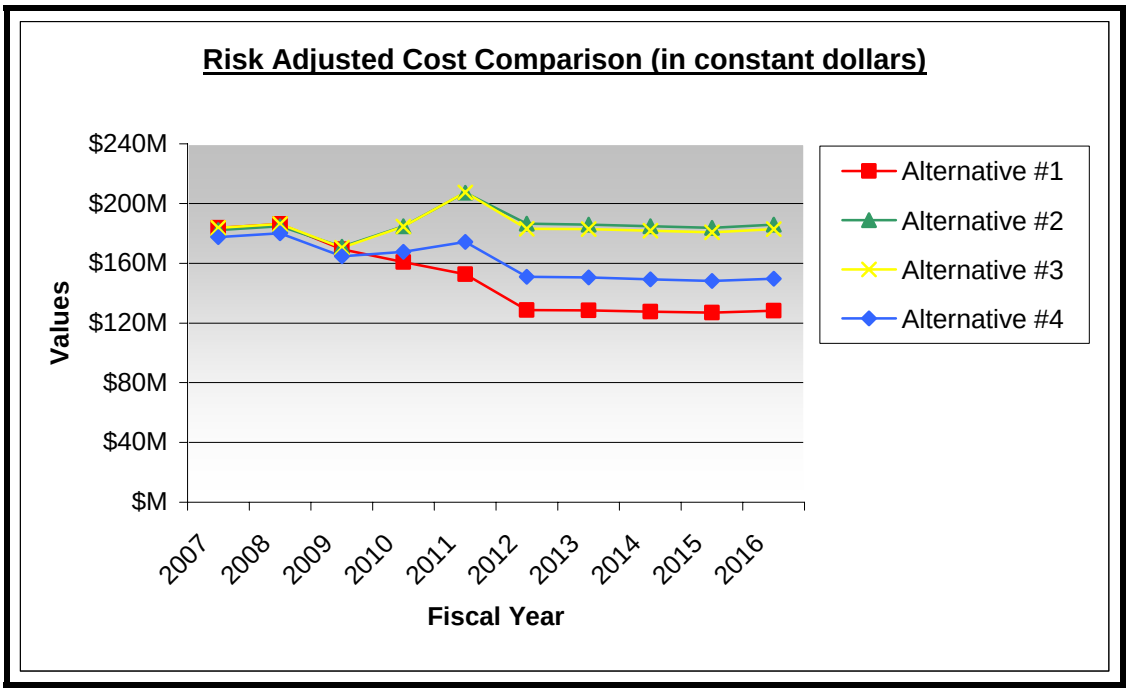

Figure 4-10: Total Risk Adjusted Costs

Table 4-21 highlights the comparison of overall risk adjusted costs, accompanied by the percentage change in total program costs. In comparison to the current state, alternatives #1 and #4 show a decrease in costs while alternatives #2 and #3 present an approximate cost increase of 11%.

Table 4-21: Comparison of Costs by CES Elements: Risk Adjusted

Cost Element	Current State	Alternative #1	Alternative #2	Alternative #3	Alternative #4
1.0 Investment	$.0M	$65.8M	$117.1M	$116.8M	$91.5M
2.0 Steady State	$1.70B	$760.2M	$1.06B	$1.04B	$901.9M
3.0 Legacy Phase Out	$.0M	$556.0M	$555.5M	$556.5M	$556.0M
Total Discounted Costs	$1.50B	$1.24B	$1.53B	$1.51B	$1.38B
Total Risk Adjusted Costs	$1.50B	$1.37B	$1.68B	$1.67B	$1.47B
% Change		-9.06%	11.90%	11.33%	-2.03%

5. Findings

This section explains how the actionable information from the previous sections supports selection of the recommended alternative. The findings show how investment in the recommended alternative provides the ideal mix of meeting business requirements, exhibiting acceptable risk and reducing yearly operating expenses. The key comparative areas of performance (meeting requirements), cost and risk are summarized in Table 5-1. It is ultimately the best mix of these comparative areas, while meeting or not exceeding any vital threshold, which determines the recommended solution.

5.1 Functional Comparison of Alternatives

The ability of the Current State and the four alternatives to meet the key selection criteria was rated using a four-point scale with 1-lowest value, 2-marginal value, 3-good value, and 4-best value. Scoring was determined through calculating values within each area-specific section in the document and then holding a final review and validation meeting with the program sponsors. Each functional area was viewed independently of the others to achieve the greatest objectivity in determining the final scoring for each alternative.

Table 5-1: Functional Comparison of the Current State and the Alternatives

Criteria	Current State		Alternative 1: Original IFTN Concept		Alternative #2: Original IFTN Concept with Full Federal Funding for 1-ft Program		Alternative #3: Original IFTN Concept with Mandatory 50% Cost Share for 1-ft Program		Alternative #4: Original IFTN Concept with Optional 50% Cost Share for 1-ft Program	
	Score	Rationale	Score	Rationale	Score	Rationale	Score	Rationale	Score	Rationale
Business Processes	2	National needs are not met. There is also a need for product standardization, and public domain imagery.	4	Future state business process implements common orthoimagery services and best practices.	4	Future state business process implements common orthoimagery services and best practices.	4	Future state business process implements common orthoimagery services and best practices.	4	Future state business process implements common orthoimagery services and best practices.
Non-Quantifiable Benefits	2	Individual Programs: • Control the orthoimagery process • Determine their required coverage and schedule • Determine the level of accuracy required • Are free of restrictions from federal government • Have no common standards or protocols • Make their own choices about access to imagery	4	• Access to current and archived imagery in the public domain • Reliability of product and schedule • Continuity of process and funding • Options available to acquire high resolution imagery and buy-up features • Increased interoperability across jurisdictions • Consistent treatment for critical infrastructure	4	• Access to current and archived imagery in the public domain • Reliability of product and schedule • Continuity of process and funding • Options available to acquire high resolution imagery and buy-up features • Increased interoperability across jurisdictions • Consistent treatment for critical infrastructure	4	• Access to current and archived imagery in the public domain • Reliability of product and schedule • Continuity of process and funding • Options available to acquire high resolution imagery and buy-up features • Increased interoperability across jurisdictions • Consistent treatment for critical infrastructure	4	• Access to current and archived imagery in the public domain • Reliability of product and schedule • Continuity of process and funding • Options available to acquire high resolution imagery and buy-up features • Increased interoperability across jurisdictions • Consistent treatment for critical infrastructure

	Current State		Alternative 1: Original IFTN Concept		Alternative #2: Original IFTN Concept with Full Federal Funding for 1-ft Program		Alternative #3: Original IFTN Concept with Mandatory 50% Cost Share for 1-ft Program		Alternative #4: Original IFTN Concept with Optional 50% Cost Share for 1-ft Program	
Cost	2	Higher cost due to duplicative efforts, and few large area contracts.	4	ROI of 2.26:1 and NPV of $136M.	1	ROI of -2.96:1 and NPV of -$178M.	1	ROI of -1.60:1 and NPV of -$170M.	3	ROI of 0.37:1 and NPV of $30M.
Business Requirements	1	Varying imagery types and resolutions collected on different schedules. Each organization meets its own mission.	3	Sustainable and flexible digital imagery program that generally meets the needs of tribal, local, state, regional, and federal agencies.	3	Sustainable and flexible digital imagery program that generally meets the needs of tribal, local, state, regional, and federal agencies.	2	Sustainable and flexible digital imagery program that generally meets the needs of tribal, local, state, regional, and federal agencies.	2	Sustainable and flexible digital imagery program that generally meets the needs of tribal, local, state, regional, and federal agencies.
Risk	1	• Continuous duplication of effort • Limited access to imagery already produced • Inability to maintain partnerships • Patchwork of products	2	• Congress not providing funds due to population model • Customer dissatisfaction with population model • Low adoption rate due to pop. model • Program specific or ad hoc requirements may not be met.	3	• The federal government incurring a larger burden of program costs and responsibilities (Financial, operational, etc.) • Program specific or ad hoc requirements may not be met.	2	• Uncertainty that states can afford 50% mandatory cost share • The state and local governments incurring a larger burden of program costs • Low adoption rate due to mandatory cost share • Program specific or ad hoc requirements may not be met.	4	• Uncertainty of how much states will buy up with optional 50% cost share • The state and Local governments incurring a larger burden of program costs • Program specific or ad hoc requirements may not be met.
Total Score	8		17		15		13		17	

The functional comparison of benefits in the previous table permits a relatively straightforward comparison of each criterion (cost, business requirements, risk, business processes, and non-quantifiable benefits). The costs of each selected alternative were evaluated through the use of financial metrics, such as ROI and NPV. The analysis of the business requirements was based on a survey completed by the IFTN Executive Sponsors and additional data collection efforts outlined in the Methodology section. The risk analysis consisted of evaluating risks from internal and external sources to obtain an appropriate risk factor for each alternative.

Migration of the business process from the current state to the future state consists of standardizing and consolidating the program management processes (contracting, data acquisition and production, QA/QC, and archiving and distribution) at the federal level. Therefore, a comparison of the alternatives was not conducted; rather a current state to future state comparison was completed. An approach similar to the one used for the business processes was completed for the comparison of non-quantifiable benefits. The non-quantifiable benefits identified through the data collection effort were consistent across the alternatives; therefore a current state to future state approach was also used.

5.2 Recommended Alternative

This section provides a summary of cost, business processes and risk which leads to the logical conclusion of selecting Alternative #4 as the recommended alternative. Alternative #1 scored very closely but it came down to risk as the final discriminator in selecting Alternative #4. As seen in Table 5-1, each of the four alternatives received the same scores in the categories of business processes and non-quantifiable benefits; therefore, the remaining categories, cost, business requirements and risk were used to select the recommended alternative.

The Recommended Alternative is #4: Original IFTN Concept with Optional 50% Cost Share for 1-ft Program

Cost

The alternative presenting the highest ROI does not automatically make for the best recommended solution; other factors of cost require consideration. For example, two projects may have an ROI of 10% and 5% respectively making the first project, at a glance, more appealing. Adding in that project 1 in this example requires ten times the investment dollars of project 2 detracts from the initial appeal of project 1. As in the comparison of alternatives #1 and #4, the ROI can be viewed as significantly different. Although they are both positive, Alternative #4 is providing less than one dollar of return for each dollar invested. This fact does not necessarily make this alternative a poor investment.

Table 5-2 shows a summarized comparison of risk adjusted costs and financial metrics for alternatives #1 and #4.

Table 5-2: Summary Cost Comparison

Alternatives	Discounted Baseline LCCE Costs	Risk Adjusted Alternative LCCE Costs	Return On Investment	Net Present Value	NPV of Investment Cost
Alternative #1: Original IFTN Concept	$1.50B	$1.37B	2.26:1	$136M	$60.2M
Alternative #4: Original IFTN Concept with 50% Optional Cost Share for 1-ft Program		$1.47B	0.37:1	$31M	$83.4M

Shifting from ROI, the NPV analysis shows that both alternatives provide a positive return relative to the baseline. This means that by investing in either alternative the customer will experience lower operating costs. An important consideration for the decision maker is each alternative's required investment. As a percentage of total life cycle cost, investment is roughly 5% for both alternatives and are nominally separated by $20M. While a sum of $20M is not an insignificant number it becomes less a vast separation between these two alternatives when viewed relative to their total life cycle cost funding requirements and is further punctuated by, once fully deployed, both of the alternatives offer direct monetary savings by a decrease in operational costs to the program sponsors.

In respect to required investment funding and return on investment dollars, Alternative #1 demonstrates a strong, viable solution by financial standards. Alternative #4, while also financially viable, is not the most cost effective solution based on the financial standards used.

Business Requirements

Alternative #4 eliminates the population model for the 1-ft program in the lower 48 states and Hawaii. The elimination of the population model increases costs, but also makes the acquisition of 1-ft imagery more equitable by leveling the requirements to obtain 1-ft imagery. States will have 50% of 1-ft acquisition costs funded by the federal government. This option is significant because each statewide coordination council (which includes federal representation) will identify the areas to be acquired under the 1-ft program, subject to NDOP committee approval.

Alternative #1 will require less coordination effort across agencies, and will offer a greater reduction in the number of independent contracts. It will also provide more consistent coverage due to the predetermination of the land area that will be flown.

As shown in Table 5-3, alternatives #1 and #4 met the measured business requirements very similarly; the only difference being in Customer Results. Alternative #4 scored one point less in the Customer Results category of the requirements; however, it still achieves a high rating in the evaluation. The Customer Results score was lower due to the uncertainty that results from the optional cost share for the 1-ft program. One reason for this is that the land area of coverage is not predetermined which hinders on the ability of program personnel and imagery service providers to appropriately plan their operations.

Table 5-3: Summary of Business Requirements Scores

Business Requirements	Alternative #1: Original IFTN Concept	Alternative #4: Original IFTN Concept with Optional 50% Cost Share for 1-ft Program
Mission and Business Results	4	4
Customer Results	4	3
Processes and Activities	3	3
Technology	4	4
Total Score:	4	3

Based on the summary in Table 4-13, Comparison of Business Requirements, the aggregate scores comprising each of the four sub-categories result in a composite score of 4 and 3 for alternatives #1 and #4 respectively. The total scores listed above are not an average of the listed sub-categories; the total scores listed were determined by the sub-elements within section 4.8. The outcome of rounding puts the total score delta at one significant digit although the two measure up more closely through examination of the individual requirement scores. Again, Alternative #1 stands as a slightly more attractive selection.

Risk Analysis

Table 5-4 below shows a summary of the overall risk scores from section 4.9 of the document. Alternative #1 presented the highest overall risk, due mostly to the inclusion of the population model. This affected Alternative #1 in the financial risk category to a great extent pushing its score roughly 50% higher than that of Alternative #4. The main risk assumption with this category for Alternative #1 is potential resistance from Congress to fund an inequitable program based on population requirements. Also, the rate of adoption of this initiative can be affected by the initial exclusion of a significant amount of coverage in the 1-ft program. Alternative #4 presented the lowest risk of all those examined. However, the risks mainly associated with this alternative are the uncertainty of the burden on the state and local governments related to program costs and responsibilities, and the inability to predict operating requirements for imagery service providers.

Table 5-4: Summary of Risk Analysis Scores

Risk Category	Alternative #1: Original IFTN Concept	Alternative #4: Original IFTN Concept with Optional 50% Cost Share for 1-ft Program
Financial	3.75	2.50
Technical	0.75	0.75
Operational	1.00	1.00
Legal & Contractual	0.30	0.30
Organizational	4.80	2.40
Total Score:	10.60	6.95

The greatest change by risk category between the two alternatives is organizational. Many risks are associated with a proposal containing a population based model. The uncertainty of whether an organization will continue to manage their programs independently rather than subscribe to a program that may be viewed as containing inequities may be great.

Recommendation

Having taken into account Costs, Business Requirements, and Risk, the IFTN CBA recommends: Alternative #4: Original IFTN Concept with 50% Optional Cost Share for 1-ft Program. This alternative presents a positive ROI and NPV while providing an equitable program to all federal, state, and local agencies. This is particularly appealing to western states, since most of their less populous areas require higher resolution imagery to support industries such as, utility corridors, transportation, energy development, and tourism. In addition, funding for Alternative #4 is more likely to be supported by Congress than Alternative #1. The rate of adoption of such a program is also expected to be higher than that of Alternative #1 due to the population requirements which limit the national coverage of 1-ft imagery. Alternative #4 offers the flexibility that will allow statewide coordinating councils (with federal representation) to determine the exact land area of coverage for the 1-ft program.

In the final analysis, risk must be understood as the real potential of an alternative being unable to execute in a way precluding it from meeting its functional scores and, particularly in an instance of having high financial risk, not meeting its measured financial metrics. Alternative #1 falls into this dilemma as identified through the CBA risk analysis process. Throughout the study, alternatives #1 and #4 scored very closely in respect to process requirements and financial analysis. In the end they were separated by a broad gap in risk scoring. Alternative #4 achieved the lowest risk score of all the alternatives where as Alternative #1 scored the highest. Specifically Alternative #1's financial risk received a probability scoring of 3 which makes it likely to occur. When applying the high level of financial risk occurrence to Alternative #1 it becomes less likely to realize the financial metrics displayed in Table 5-2. The probability rating of likely to occur affectively closes the gap in NPV between alternatives #1 and #4. Therefore it can be concluded Alternative #4 is a more viable option to implement IFTN. Ultimately Alternative #4 meets the thresholds of functional and financial measures while maintaining an acceptable level of risk.

6. Appendices

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- Appendix I-5: Cost Model: Then Year (Alternative #4)

Appendix A: Referenced and Related Documents

Appendix A-1: Documents

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

- ASPRS report to USGS on Digital Orthoimagery. Photogrammetric Engineering & Remote Sensing. November 23, 2005
- Cost Benefit Analysis of the National Map. Circular 271. USGS. May 5, 2004
- Federal Geographic Data Committee 2005 Annual Report.
- Geospatial Interoperability Return on Investment Study. National Aeronautics and Space Administration Geospatial Interoperability Office. Prepared by Booz Allen Hamilton. April 2005.
- GIS for Homeland Security. ESRI 2005
- Imagery for the Nation (IFTN). NSGIC Brochure. July 12, 2006
- Mapping for Congress – Supporting Public Policy with GIS. Thomas, Christopher, Ospina, Milton. ESRI 2006.
- Measuring Up – The Business Case for GIS. Thomas, Christopher, Ospina, Milton. ESRI 2004.
- Results of a National Survey: IFTN Proposal, NSGIC: September 12, 2006. PowerPoint presentation.
- Standards for Success – GIS for Federal Progress and Accountability. Thomas, Christopher. ESRI 2006.
- The National Map – Orthoimagery. USGS. November 2002
- Urban/Regional Information Systems Association (URISA) Endorsement of the IFTN Proposal
- Utah Aerial Photography & Elevation. NDOP Steering Committee. October 24, 2006. PowerPoint presentation.
- Western Governor's Association: Policy Resolution 06-14. "Geospatial Data is Part of the Nation's Critical Infrastructure." June 13, 2006

Appendix A-2: Other Government Documents

The following government documents were used in the preparation of this analysis:

- Capital Planning IT Investment Committee, Federal Chief Information Office Council. "*ROI and the Value Puzzle*." April 1999
- USDA Information Technology Capital Planning and Investment Control Guide for Fiscal Year 2007. Office of the Chief Information Officer. April 2005.
- USDOI Information Technology Capital Planning and Investment Control Guide for Fiscal Year. Office of the Chief Information Officer. February 2005.
- OMB Circular A-11 Part 6: Preparation and Submission of Strategic Plans, Annual Performance Plans, and Annual Program Performance Reports. June 2005.
- OMB Circular A-11 Part 7: Planning, Budgeting, Acquisition, and Management of Capital Assets. June 2005.
- OMB Circular A-16 Revised: Coordination of Geographic Information and Related Spatial Data Activities, August 19, 2002
- OMB Circular A-94 Appendix C: Discount Rates for Cost-Effectiveness, Lease Purchase, and Related Analyses, January 2007
- OMB Circular A-94: Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, October 29, 1992.

Appendix A-3: Additional Web Resources

- www.whitehouse.gov/omb
- www.usda.gov
- www.usgs.gov
- www.ndop.gov
- www.nsgic.org
- www.mapps.org
- www.esri.com

Appendix B: Acronyms

Below is a list of acronyms used through out the CBA.

Acronym	Definition
APFO	Aerial Photography Field Office
ASPRS	American Society for Photogrammetry and Remote Sensing
CBA	Cost Benefit Analysis
CES	Cost Element Structure
CIR	Color Infrared
CPIC	Capital Planning and Investment Control
DEM	Digital Elevation Model
DHS	Department of Homeland Security
DTM	Digital Terrain Model
D/M/E	Development/Modernization/Enhancement
EROS	Earth Resources Observation and Science
FGDC	Federal Geographic Data Committee
FSA	Farm Service Agency
FY	Fiscal Year
GIS	Geographic Information System
GOS	Geospatial One Stop
HSIP	Homeland Security Infrastructure Program
IFTN	Imagery For The Nation
IT	Information Technology
LiDar	Light Detection and Ranging
LCCE	Life Cycle Cost Estimate
LPO	Legacy Phase Out
MAPPS	Management Association for Private Photogrammetric Surveyors
NAIP	The National Agriculture Imagery Program
NDOP	National Digital Orthophoto Program
NPV	Net Present Value
NSGIC	National States Geographic Information Council
OCIO	Office of the Chief Information Officer
OMB	Office of Management and Budget
PRM	Performance Reference Model
QA	Quality Assurance
QC	Quality Control
RFP	Request For Proposal
ROI	Return On Investment
SME	Subject Matter Expert
SS	Steady State
USDA	United States Department of Agriculture
USGS	United States Geological Survey

Appendix C: Terms and Definitions

Term	Definition
Adoption Rate	The rate at which federal, state, and local agencies will cease to run their own independent programs and buy into IFTN.
Capital Planning and Investment Control (CPIC)	Decision making process for ensuring that IT investments integrate strategic planning, budgeting, procurement, and the management of IT in support of agency missions and business needs. The term comes from the Clinger Cohen Act of 1996 and generally is used in relationship to IT management issues.
Capital Programming	An integrated process within an agency for planning, budgeting, procurement and management of the agency's portfolio of capital assets to achieve agency strategic goals and objectives with the lowest life cycle cost and least risk.
Cost Benefit Analysis	A technique designed to determine the feasibility of a project or plan by quantifying its costs and benefits.
Inflation	The proportionate rate of change in the general price level, as opposed to the proportionate increase in a specific price.
Lifecycle Cost	The overall estimated cost for a particular program alternative over the time period corresponding to the life of the program, including direct and indirect initial costs plus any periodic or continuing costs of operation and maintenance.
Net Present Value	The difference between the discounted present value of benefits and the discounted present value of costs.
Nominal Interest Rate	An interest rate that is not adjusted to remove the effects of actual or expected inflation. Market interest rates are generally nominal interest rates.
Real or Constant Dollar Values	Economic units measured in terms of constant purchasing power. A real value is not affected by general price inflation.
Real Interest Rate	An interest rate that has been adjusted to remove the effect of expected or actual inflation.
Return on Investment (ROI)	The amount of profit, before tax and after depreciation, from an investment made, usually expressed as a percentage of the original total cost invested
Risk Adjusted Life Cycle Costs	The overall estimated cost for a particular investment alternative over the time period corresponding to the life of the investment, including direct and indirect initial costs plus any periodic or continuing costs of operation and maintenance that has been adjusted to accommodate any risk identified in the risk management plans.
Risk Adjusted Life Cycle Benefits	The overall estimated benefits for a particular investment alternative over the time period corresponding to the life of the investment, including direct and indirect initial benefits plus any periodic or continuing benefits of operation and maintenance that has been adjusted to accommodate any risk identified in the risk management plans.
Steady State (Operational)	An asset or part of an asset that has been delivered and is performing the mission.
Sunk Cost	A cost incurred in the past that will not be affected by any present or future decision. Sunk costs should be ignored in determining whether a new investment is worthwhile.

Appendix D: List of Figures

Appendix E: List of Tables

Appendix F: List of Interviewees

The second phase of the data collection effort consisted of conducting interviews of orthoimagery professionals as well as government personnel involved in the use of GIS and orthoimagery. Forty three total interviews were conducted over a three month period and pertinent cost and programmatic data was gathered which assisted in the CBA effort.

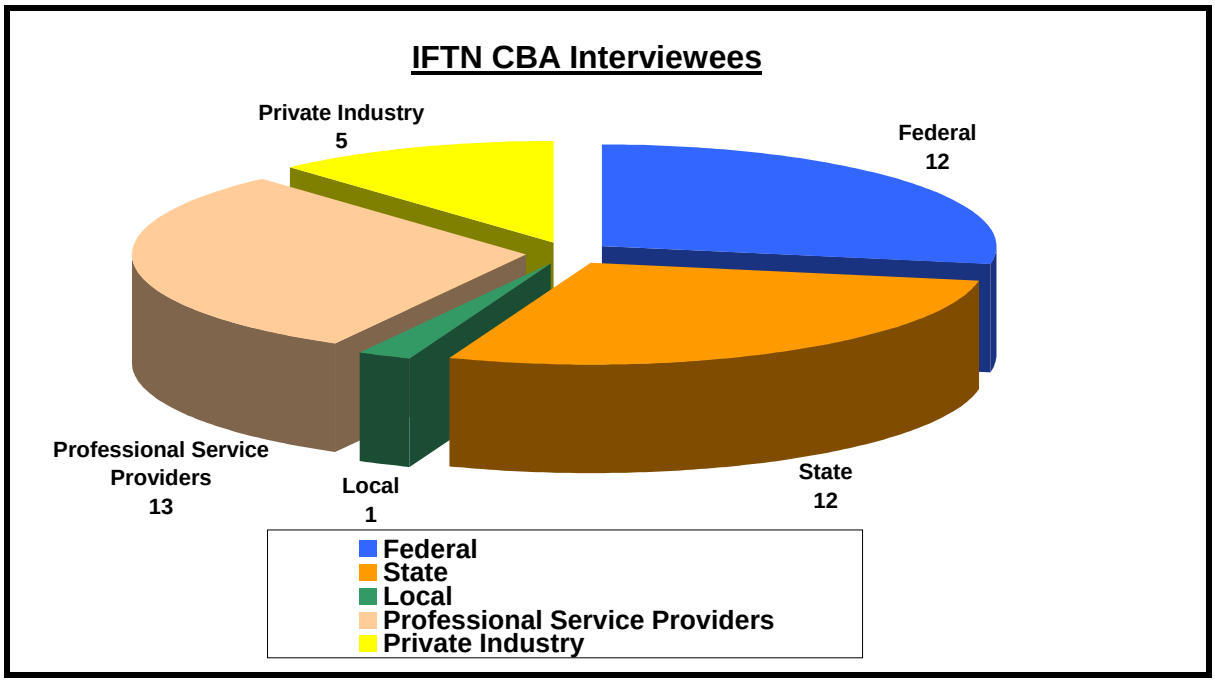

Figure F-1: Breakout of IFTN Interview Participants

The IFTN CBA survey was hosted through the online survey tool, Zoomerang. A total of 42 individuals completed the survey and its main purpose was to gather cost information related to the data acquisition and production, quality assurance, and archiving distribution functions of a program.

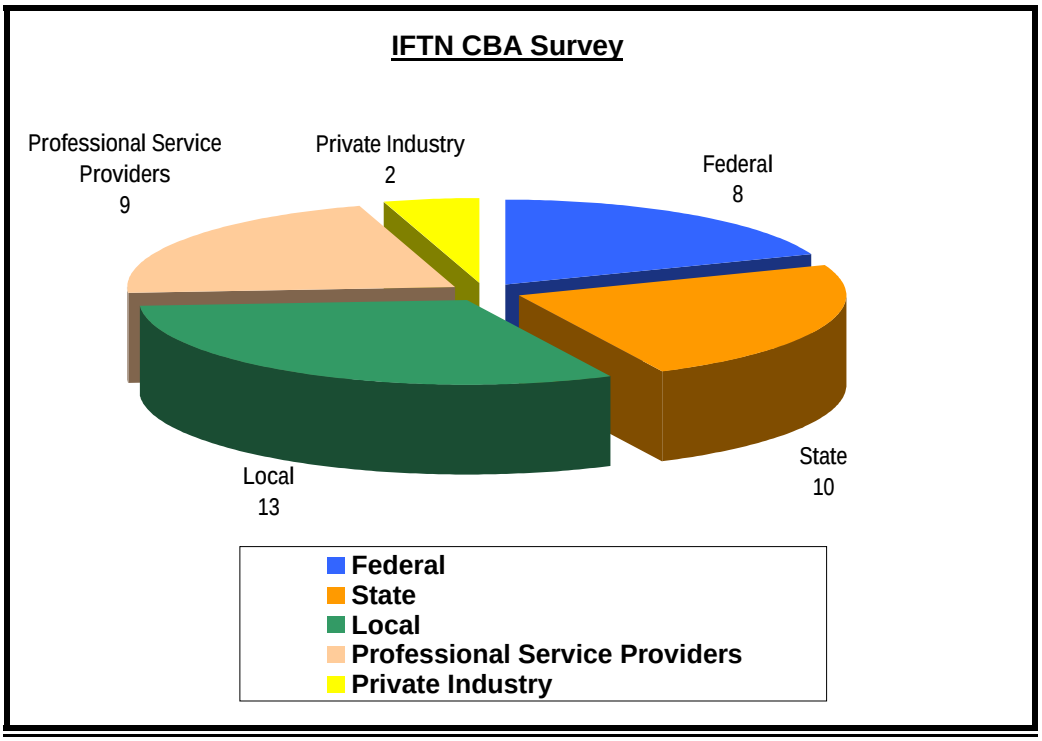

Figure F-2 Breakout of IFTN Survey Participants

NSGIC conducted survey via the online survey tool, Survey Monkey. There were 1,887 respondents encompassing Government, Private Sector, Academia, Associations, etc. This survey was intended to obtain qualitative and quantitative data for orthoimagery programs.

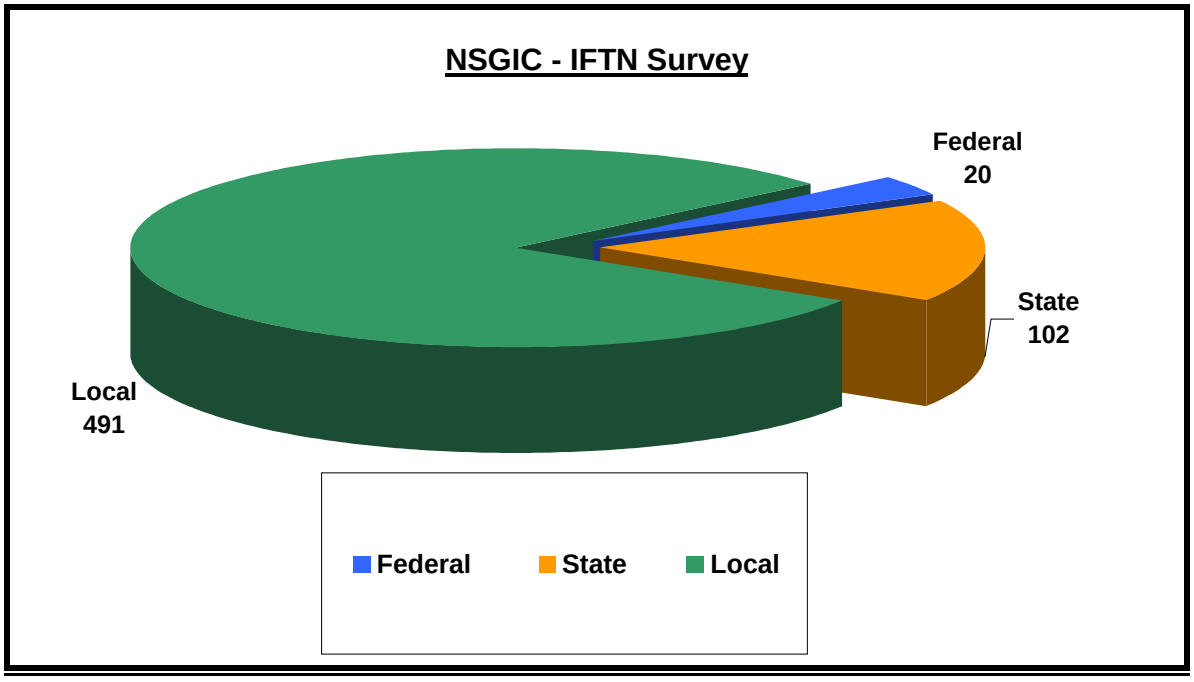

Figure F-3: Breakout of NSGIC - IFTN Survey Participants

Appendix G: Description of Baseline and the Alternatives

Table G-1: Summary of Current State and Alternatives

	Current State	Alternative 1: Original IFTN Concept	Alternative #2: Original IFTN Concept with Full Federal Funding for 1-ft Program	Alternative #3: Original IFTN Concept with Mandatory 50% Cost Share for 1-ft Program	Alternative #4: Original IFTN Concept with Optional 50% Cost Share for 1-ft Program
Description	Decentralized programs that vary in frequency, imagery type, cloud cover, funding cycles, and resolutions.	Nationwide program that will collect standardized multi-resolution products on set schedules.	Nationwide program that will collect standardized multi-resolution products on set schedules.	Nationwide program that will collect standardized multi-resolution products on set schedules. This alternative does not ensure any coverage of 1-foot or 6-inch products over states that do not cost share.	Nationwide program that will collect standardized multi-resolution products on set schedules. No cost share is required for the 1-foot program, but only 50% of each state will be acquired every three years. Increasing the area can be accomplished with cost share funds.
Ground Resolution & Area Coverage	Varies from high resolution (3-inch) to low resolution (10-meter) over very small to large multi-state areas	o 1 M. = Entire Nation o 1 Ft. = Adhering to Pop. Model o 6 In. = Identified Urban Areas	o 1 M. = Entire Nation o 1 Ft. = All States and Insular Areas (AK has Pop. Model) o 6 In. = Identified Urban Areas	o 1 M. = Entire Nation o 1 Ft. = All States and Insular Areas (AK has Pop. Model) o 6 In. = Identified Urban Areas	o 1 M. = Entire Nation o 1 Ft. = All States and Insular Areas (AK has Pop. Model) o 6 In. = Identified Urban Areas
Frequency	Heavily dependent on funding.	o 1 M. = Every Year in Lower 48 States, 3 Years HI and Insular Areas, 5 Years AK o 1 Ft. & 6 In. = Every 3 Years	o 1 M. = Every Year in Lower 48 States, 3 Years HI and Insular Areas, 5 Years AK o 1 Ft. & 6 In. = Every 3 Years	o 1 M. = Every Year in Lower 48 States, 3 Years HI and Insular Areas, 5 Years AK o 1 Ft. & 6 In. = Every 3 Years Based on Funding Models	o 1 M. = Every Year in Lower 48 States, 3 Years HI and Insular Areas, 5 Years AK o 1 Ft. & 6 In. = Every 3 Years Based on Funding Models
Image Type	Varies from natural color to CIR, and black and white.	Natural Color.	Natural Color.	Natural Color.	Natural Color.
Funding Model	Partnerships are sought to leverage costs.	o 1 M. = 100% Federally Funded o 1 Ft. = 100% Federally Funded o 6 In. = 50% Cost Share	o 1 M. = 100% Federally Funded o 1 Ft. = 100% Federally Funded o 6 In. = 50% Mandatory Cost Share	o 1 M. = 100% Federally Funded o 1 Ft = 50% Mandatory Cost Share o 6 In. = 50% Mandatory Cost Share	o 1 M. = 100% Federally Funded o 1 Ft. = 50% Optional Cost Share o 6 In. = 50% Mandatory Cost Share

Appendix H: Cost Model: Base Year

Appendix H-1: Cost Model: Base Year (Baseline)

USDA / USGS Imagery For The Nation (IFTN) BASELINE

Cost Benefit Analysis: Major Cost Elements

As stated per OCIO/CPIC Guidelines

CES ID	Cost Category	Total Sunk Costs	10 Year Life Cycle Costs in Base Year Dollars										Total Costs
		FY 04 - 06	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY07-FY16
	Total Life Cycle Cost by Fiscal Year	**$0**	**$165,994,794**	**$169,305,918**	**$169,837,177**	**$169,837,177**	**$169,837,177**	**$172,094,783**	**$169,862,877**	**$169,862,877**	**$169,862,877**	**$172,345,873**	**$1,698,841,530**
1.0	Development/Modernization/Enhancement (D/M/E)												
1.1	(D/M/E) Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.2	(D/M/E) Software	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.3	(D/M/E) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.4	(D/M/E) Support Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.5	(D/M/E) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.6	(D/M/E) Personnel	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.7	(D/M/E) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.8	(D/M/E) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.9	(D/M/E) Total Costs	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
2.0	Steady State (SS)												
3.1	(LPO) Equipment	$0	$12,802,852	$12,780,675	$13,312,951	$13,312,951	$13,312,951	$15,570,558	$13,338,652	$13,338,652	$13,338,652	$15,821,647	$136,930,542
2.2	(LPO) Software	$0	$357,445	$354,695	$353,678	$353,678	$353,678	$353,678	$353,678	$353,678	$353,678	$353,678	$3,541,564
2.3	(LPO) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.4	(LPO) Support Services	$0	$135,571,471	$140,705,271	$140,705,271	$140,705,271	$140,705,271	$140,705,271	$140,705,271	$140,705,271	$140,705,271	$140,705,271	$1,401,918,910
2.5	(LPO) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.6	(LPO) Personnel	$0	$17,263,026	$15,465,276	$15,465,276	$15,465,276	$15,465,276	$15,465,276	$15,465,276	$15,465,276	$15,465,276	$15,465,276	$156,450,514
2.7	(LPO) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.8	(LPO) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.9	(LPO) Total Costs	**$0**	**$165,994,794**	**$169,305,918**	**$169,837,177**	**$169,837,177**	**$169,837,177**	**$172,094,783**	**$169,862,877**	**$169,862,877**	**$169,862,877**	**$172,345,873**	**$1,698,841,530**
3.0	Legacy Phase Out (LPO)												
3.1	(SS) Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.2	(SS) Software	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.3	(SS) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.4	(SS) Support Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.5	(SS) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.6	(SS) Personnel	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.7	(SS) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.8	(SS) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.9	(SS) Total Costs	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Figure H-1: Baseline – 10 Year Life Cycle Cost Estimate (Base Year)

Appendix H-2: Cost Model: Base Year (Alternative #1)

USDA / USGS Imagery For The Nation (IFTN) — Alternative #1

Alt. #1 - Original IFTN Concept

Cost Benefit Analysis: Major Cost Elements

As stated per OCIO/CPIC Guidelines

CES ID	Cost Category	Total Sunk Costs	10 Year Life Cycle Costs in Base Year Dollars										Total Costs
		FY 04 - 06	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY07-FY16
	Total Life Cycle Cost by Fiscal Year	**$0**	**$165,994,794**	**$169,305,918**	**$154,887,826**	**$147,917,301**	**$141,293,850**	**$119,740,576**	**$120,208,135**	**$120,208,135**	**$120,208,135**	**$122,288,773**	**$1,382,053,443**
1.0	Development/Modernization/Enhancement (D/M/E)												
1.1	(D/M/E) Equipment	$0	$0	$0	$818,302	$180,504	$142,930	$0	$0	$0	$0	$0	$1,141,736
1.2	(D/M/E) Software	$0	$0	$0	$18,750	$20,000	$0	$0	$0	$0	$0	$0	$38,750
1.3	(D/M/E) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.4	(D/M/E) Support Services	$0	$0	$0	$8,803,898	$25,692,385	$26,580,872	$0	$0	$0	$0	$0	$61,077,155
1.5	(D/M/E) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.6	(D/M/E) Personnel	$0	$0	$0	$1,164,981	$1,174,574	$1,249,560	$0	$0	$0	$0	$0	$3,589,114
1.7	(D/M/E) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.8	(D/M/E) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.9	(D/M/E) Total Costs	**$0**	**$0**	**$0**	**$10,805,930**	**$27,067,463**	**$27,973,362**	**$0**	**$0**	**$0**	**$0**	**$0**	**$65,846,755**
2.0	Steady State (SS)												
2.1	(SS) Equipment	$0	$0	$0	$2,135,249	$2,266,651	$2,292,755	$2,507,966	$3,997,658	$3,997,658	$3,997,658	$6,078,297	$27,273,893
2.2	(SS) Software	$0	$0	$0	$63,750	$82,500	$82,500	$62,500	$92,081	$92,081	$92,081	$92,081	$659,574
2.3	(SS) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.4	(SS) Support Services	$0	$0	$0	$37,065,000	$44,065,000	$66,865,000	$97,942,155	$108,336,111	$108,336,111	$108,336,111	$108,336,111	$679,281,597
2.5	(SS) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.6	(SS) Personnel	$0	$0	$0	$3,921,808	$5,069,626	$6,244,200	$6,615,944	$7,782,285	$7,782,285	$7,782,285	$7,782,285	$52,980,719
2.7	(SS) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.8	(SS) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.9	(SS) Total Costs	**$0**	**$0**	**$0**	**$43,185,807**	**$51,483,777**	**$75,484,455**	**$107,128,565**	**$120,208,135**	**$120,208,135**	**$120,208,135**	**$122,288,773**	**$760,195,783**
3.0	Legacy Phase-Out (LPO)												
3.1	(LPO) Equipment	$0	$12,802,852	$12,780,675	$8,177,061	$5,621,730	$3,066,398	$1,022,133	$0	$0	$0	$0	$43,470,849
3.2	(LPO) Software	$0	$357,445	$354,695	$236,648	$162,695	$88,743	$29,581	$0	$0	$0	$0	$1,229,806
3.3	(LPO) Commercial Services	$0			$0	$0	$0	$0	$0	$0	$0	$0	$0
3.4	(LPO) Support Services	$0	$135,571,471	$140,705,271	$83,151,647	$57,166,758	$31,181,868	$10,393,956	$0	$0	$0	$0	$458,170,971
3.5	(LPO) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.6	(LPO) Personnel	$0	$17,263,026	$15,465,276	$9,330,732	$6,414,878	$3,499,025	$1,166,342	$0	$0	$0	$0	$53,139,280
3.7	(LPO) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.8	(LPO) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.9	(LPO) Total Costs	**$0**	**$165,994,794**	**$169,305,918**	**$100,896,088**	**$69,366,061**	**$37,836,033**	**$12,612,011**	**$0**	**$0**	**$0**	**$0**	**$556,010,906**

Figure H-2: Alternative #1: Original IFTN Concept (Base Year)

Appendix H-3: Cost Model: Base Year (Alternative #2)

USDA / USGS Imagery For The Nation (IFTN) — Alternative #2

Alt. #2 - Original IFTN Concept with Full Federal Funding for 1-ft Program

Cost Benefit Analysis: Major Cost Elements

As stated per OCIO/CPIC Guidelines

CES ID	Cost Category	Total Sunk Costs	10 Year Life Cycle Costs in Base Year Dollars										Total Costs
		FY 04 - 06	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY07-FY16
	Total Life Cycle Cost by Fiscal Year	**$0**	**$165,994,794**	**$169,305,918**	**$156,214,046**	**$170,295,515**	**$192,703,151**	**$174,699,539**	**$175,405,235**	**$175,405,235**	**$175,405,235**	**$178,545,582**	**$1,733,974,250**
1.0	Development/Modernization/Enhancement (D/M/E)												
1.1	(D/M/E) Equipment	$0	$0	$0	$2,008,986	$160,504	$142,930	$0	$0	$0	$0	$0	$2,312,420
1.2	(D/M/E) Software	$0	$0	$0	$18,750	$0	$0	$0	$0	$0	$0	$0	$18,750
1.3	(D/M/E) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.4	(D/M/E) Support Services	$0	$0	$0	$8,803,898	$46,692,385	$55,580,872	$0	$0	$0	$0	$0	$111,077,155
1.5	(D/M/E) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.6	(D/M/E) Personnel	$0	$0	$0	$1,247,181	$1,200,800	$1,285,459	$0	$0	$0	$0	$0	$3,733,440
1.7	(D/M/E) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.8	(D/M/E) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.9	(D/M/E) Total Costs	**$0**	**$0**	**$0**	**$12,078,815**	**$48,053,689**	**$57,009,260**	**$0**	**$0**	**$0**	**$0**	**$0**	**$117,141,764**
2.0	Steady State (SS)												
2.1	(SS) Equipment	$0	0	0	$2,381,924	$3,703,110	$3,657,734	$3,934,245	$5,659,912	$5,659,912	$5,659,912	$8,800,259	$39,457,007
2.2	(SS) Software	$0	0	0	$83,750	$102,500	$62,500	$62,500	$92,018	$92,018	$92,018	$92,018	$679,324
2.3	(SS) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.4	(SS) Support Services	$0	$0	$0	$37,065,000	$44,065,000	$87,865,000	$151,242,155	$161,614,133	$161,614,133	$161,614,133	$161,614,133	$966,693,687
2.5	(SS) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.6	(SS) Personnel	$0	0	0	$3,921,808	$5,151,826	$6,352,626	$6,875,296	$8,039,171	$8,039,171	$8,039,171	$8,039,171	$54,458,242
2.7	(SS) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.8	(SS) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.9	(SS) Total Costs	**$0**	**$0**	**$0**	**$43,452,482**	**$53,022,436**	**$97,937,860**	**$162,114,195**	**$175,405,235**	**$175,405,235**	**$175,405,235**	**$178,545,582**	**$1,061,288,260**
3.0	Legacy Phase-Out (LPO)												
3.1	(LPO) Equipment	$0	$12,802,852	$12,780,675	$8,159,771	$5,609,843	$3,059,914	$1,019,971	$0	$0	$0	$0	$43,433,027
3.2	(LPO) Software	$0	$357,445	$354,695	$236,147	$162,351	$88,555	$29,518	$0	$0	$0	$0	$1,228,712
3.3	(LPO) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.4	(LPO) Support Services	$0	$135,571,471	$140,705,271	$82,975,828	$57,045,881	$31,115,935	$10,371,978	$0	$0	$0	$0	$457,786,365
3.5	(LPO) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.6	(LPO) Personnel	$0	$17,263,026	$15,465,276	$9,311,003	$6,401,315	$3,491,626	$1,163,875	$0	$0	$0	$0	$53,096,122
3.7	(LPO) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.8	(LPO) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.9	(LPO) Total Costs	**$0**	**$165,994,794**	**$169,305,918**	**$100,682,749**	**$69,219,390**	**$37,756,031**	**$12,585,344**	**$0**	**$0**	**$0**	**$0**	**$555,544,226**

Figure H-3: Alternative #2: Original IFTN Concept with Full Federal Funding for 1-ft Program (Base Year)

Appendix H-4: Cost Model: Base Year (Alternative #3)

USDA / USGS Imagery For The Nation (IFTN) — Alternative #3

Alt. #3 - Original IFTN Concept with Mandatory 50% Cost Share for 1-ft Program

Cost Benefit Analysis: Major Cost Elements

As stated per OCIO/CPIC Guidelines

CES ID	Cost Category	Total Sunk Costs	10 Year Life Cycle Costs in Base Year Dollars										Total Costs
		FY 04 - 06	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY07-FY16
	Total Life Cycle Cost by Fiscal Year	**$0**	**$165,994,794**	**$169,305,918**	**$155,957,719**	**$169,796,322**	**$191,966,445**	**$170,439,138**	**$171,144,834**	**$171,144,834**	**$171,144,834**	**$174,285,181**	**$1,711,180,020**
1.0	Development/Modernization/Enhancement (D/M/E)												
1.1	(D/M/E) Equipment	$0	$0	$0	$1,998,986	$160,504	$142,930	$0	$0	$0	$0	$0	$2,302,420
1.2	(D/M/E) Software	$0	$0	$0	$18,750	$0	$0	$0	$0	$0	$0	$0	$18,750
1.3	(D/M/E) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.4	(D/M/E) Support Services	$0	$0	$0	$8,803,898	$46,692,385	$55,580,872	$0	$0	$0	$0	$0	$111,077,155
1.5	(D/M/E) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.6	(D/M/E) Personnel	$0	$0	$0	$1,109,523	$1,112,519	$1,183,781	$0	$0	$0	$0	$0	$3,405,823
1.7	(D/M/E) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.8	(D/M/E) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.9	(D/M/E) Total Costs	**$0**	**$0**	**$0**	**$11,931,157**	**$47,965,408**	**$56,907,583**	**$0**	**$0**	**$0**	**$0**	**$0**	**$116,804,148**
2.0	Steady State (SS)												
2.1	(SS) Equipment	$0	$0	$0	$2,391,924	$3,703,110	$3,657,734	$3,934,245	$5,524,025	$5,524,025	$5,524,025	$8,664,372	$38,923,459
2.2	(SS) Software	$0	$0	$0	$102,500	$102,500	$62,500	$62,500	$92,425	$92,425	$92,425	$92,425	$699,701
2.3	(SS) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.4	(SS) Support Services	$0	$0	$0	$37,065,000	$44,065,000	$87,865,000	$147,942,155	$158,475,368	$158,475,368	$158,475,368	$158,475,368	$950,838,628
2.5	(SS) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.6	(SS) Personnel	$0	$0	$0	$3,349,716	$4,442,076	$5,554,595	$5,860,561	$7,053,015	$7,053,015	$7,053,015	$7,053,015	$47,419,010
2.7	(SS) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.8	(SS) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.9	(SS) Total Costs	**$0**	**$0**	**$0**	**$42,909,140**	**$52,312,686**	**$97,139,829**	**$157,799,460**	**$171,144,834**	**$171,144,834**	**$171,144,834**	**$174,285,181**	**$1,037,880,798**
3.0	Legacy Phase-Out (LPO)												
3.1	(LPO) Equipment	$0	$12,802,852	$12,780,675	$7,072,675	$4,862,464	$2,652,253	$884,084	$0	$0	$0	$0	$41,055,004
3.2	(LPO) Software	$0	$357,445	$354,695	$239,403	$164,590	$89,776	$29,925	$0	$0	$0	$0	$1,235,834
3.3	(LPO) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.4	(LPO) Support Services	$0	$135,571,471	$140,705,271	$84,265,709	$57,932,675	$31,599,641	$10,533,214	$0	$0	$0	$0	$460,607,980
3.5	(LPO) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.6	(LPO) Personnel	$0	$17,263,026	$15,465,276	$9,539,636	$6,558,500	$3,577,363	$1,192,454	$0	$0	$0	$0	$53,596,256
3.7	(LPO) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.8	(LPO) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.9	(LPO) Total Costs	$0	**$165,994,794**	**$169,305,918**	**$101,117,423**	**$69,518,228**	**$37,919,033**	**$12,639,678**	**$0**	**$0**	**$0**	**$0**	**$556,495,074**

Figure H-4: Alternative #3: Original IFTN Concept with Mandatory 50% Cost Share for 1-ft Program (Base Year)

Appendix H-5: Cost Model: Base Year (Alternative #4)

USDA / USGS Imagery For The Nation (IFTN) — Alternative #4

Alt. #4 - Original IFTN Concept with Optional 50% Cost Share for 1 Foot Program

Cost Benefit Analysis: Major Cost Elements

As stated per OCIO/CPIC Guidelines

CES ID	Cost Category	Total Sunk Costs	10 Year Life Cycle Costs in Base Year Dollars										Total Costs
		FY 04 - 06	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY07-FY16
	Total Life Cycle Cost by Fiscal Year	**$0**	**$165,994,794**	**$169,305,918**	**$155,657,165**	**$159,561,575**	**$166,797,507**	**$145,322,845**	**$145,968,909**	**$145,968,909**	**$145,968,909**	**$148,843,892**	**$1,549,390,424**
1.0	Development/Modernization/Enhancement (D/M/E)												
1.1	(D/M/E) Equipment	$0	$0	$0	$1,710,824	$160,504	$142,930	$0	$0	$0	$0	$0	$2,014,258
1.2	(D/M/E) Software	$0	$0	$0	$18,750	$0	$0	$0	$0	$0	$0	$0	$18,750
1.3	(D/M/E) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.4	(D/M/E) Support Services	$0	$0	$0	$8,803,898	$36,692,385	$40,580,872	$0	$0	$0	$0	$0	$86,077,155
1.5	(D/M/E) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.6	(D/M/E) Personnel	$0	$0	$0	$1,044,485	$1,112,519	$1,183,781	$0	$0	$0	$0	$0	$3,340,785
1.7	(D/M/E) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.8	(D/M/E) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.9	(D/M/E) Total Costs	**$0**	**$0**	**$0**	**$11,577,957**	**$37,965,408**	**$41,907,583**	**$0**	**$0**	**$0**	**$0**	**$0**	**$91,450,948**
2.0	Steady State (SS)												
2.1	(SS) Equipment	$0	$0	$0	$2,328,254	$3,351,278	$3,305,902	$3,582,413	$5,110,720	$5,110,720	$5,110,720	$7,985,703	$35,885,713
2.2	(SS) Software	$0	$0	$0	$102,500	$102,500	$62,500	$62,500	$92,363	$92,363	$92,363	$92,363	$699,452
2.3	(SS) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.4	(SS) Support Services	$0	$0	$0	$37,065,000	$44,065,000	$77,865,000	$122,942,155	$133,453,432	$133,453,432	$133,453,432	$133,453,432	$815,750,883
2.5	(SS) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.6	(SS) Personnel	$0	$0	$0	$3,676,615	$4,703,938	$5,816,457	$6,122,422	$7,312,394	$7,312,394	$7,312,394	$7,312,394	$49,569,006
2.7	(SS) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.8	(SS) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.9	(SS) Total Costs	**$0**	**$0**	**$0**	**$43,172,370**	**$52,222,716**	**$87,049,859**	**$132,709,491**	**$145,968,909**	**$145,968,909**	**$145,968,909**	**$148,843,892**	**$901,905,055**
3.0	Legacy Phase-Out (LPO)												
3.1	(LPO) Equipment	$0	$12,802,852	$12,780,675	$7,057,946	$4,852,338	$2,646,730	$882,243	$0	$0	$0	$0	$41,022,784
3.2	(LPO) Software	$0	$357,445	$354,695	$238,904	$164,247	$89,589	$29,863	$0	$0	$0	$0	$1,234,743
3.3	(LPO) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.4	(LPO) Support Services	$0	$135,571,471	$140,705,271	$84,090,220	$57,812,026	$31,533,832	$10,511,277	$0	$0	$0	$0	$460,224,097
3.5	(LPO) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.6	(LPO) Personnel	$0	$17,263,026	$15,465,276	$9,519,769	$6,544,841	$3,569,913	$1,189,971	$0	$0	$0	$0	$53,552,797
3.7	(LPO) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.8	(LPO) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.9	(LPO) Total Costs	$0	**$165,994,794**	**$169,305,918**	**$100,906,838**	**$69,373,451**	**$37,840,064**	**$12,613,355**	**$0**	**$0**	**$0**	**$0**	**$556,034,421**

Figure H-5: Alternative #4: Original IFTN Concept with Optional 50% Cost Share for 1-ft Program (Base Year)

Appendix I: Cost Model: Then Year (with inflation)

Appendix I-1: Cost Model: Then Year (Baseline)

USDA / USGS Imagery For The Nation (IFTN) BASELINE

Cost Benefit Analysis: Major Cost Elements

As stated per OCIO/CPIC Guidelines

CES ID	Cost Category	Total Sunk Costs	10 Year Life Cycle Costs in Then Year Dollars										Total Costs
		FY 04 - 06	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY07-FY16
	Total Life Cycle Cost by Fiscal Year	**$0**	**$165,994,794**	**$173,030,648**	**$177,387,560**	**$181,285,433**	**$185,269,059**	**$191,857,438**	**$193,530,444**	**$197,783,460**	**$202,130,042**	**$209,592,438**	**$1,877,861,316**
1.0	Development/Modernization/Enhancement (D/M/E)												
1.1	(D/M/E) Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.2	(D/M/E) Software	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.3	(D/M/E) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.4	(D/M/E) Support Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.5	(D/M/E) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.6	(D/M/E) Personnel	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.7	(D/M/E) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.8	(D/M/E) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.9	(D/M/E) Total Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.0	Steady State (SS)												
3.1	(LPO) Equipment	$0	$12,802,852	$13,061,850	$13,900,511	$14,201,669	$14,509,452	$17,341,119	$15,174,766	$15,503,958	$15,840,391	$19,204,414	$151,540,983
2.2	(LPO) Software	$0	$357,445	$362,498	$369,411	$377,538	$385,844	$394,332	$403,008	$411,874	$420,935	$430,196	$3,913,081
2.3	(LPO) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.4	(LPO) Support Services	$0	$135,571,471	$143,800,787	$146,964,404	$150,197,621	$153,501,969	$156,879,012	$160,330,350	$163,857,618	$167,462,486	$171,146,660	$1,549,712,379
2.5	(LPO) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.6	(LPO) Personnel	$0	$17,263,026	$15,805,513	$16,153,234	$16,508,605	$16,871,794	$17,242,974	$17,622,319	$18,010,010	$18,406,230	$18,811,167	$172,694,873
2.7	(LPO) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.8	(LPO) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.9	(LPO) Total Costs	$0	$165,994,794	$173,030,648	$177,387,560	$181,285,433	$185,269,059	$191,857,438	$193,530,444	$197,783,460	$202,130,042	$209,592,438	$1,877,861,316
3.0	Legacy Phase Out (LPO)												
3.1	(SS) Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.2	(SS) Software	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.3	(SS) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.4	(SS) Support Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.5	(SS) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.6	(SS) Personnel	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.7	(SS) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.8	(SS) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.9	(SS) Total Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Figure I-1: Baseline – 10 Year Life Cycle Cost Estimate (Then Year)

Appendix I-2: Cost Model: Then Year (Alternative #1)

USDA / USGS Imagery For The Nation (IFTN) — Alternative #1

Alt. #1 - Original IFTN Concept

Cost Benefit Analysis: Major Cost Elements

As stated per OCIO/CPIC Guidelines

CES ID	Cost Category	Total Sunk Costs	10 Year Life Cycle Costs in Then Year Dollars										Total Costs
		FY 04 - 06	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY07-FY16
	Total Life Cycle Cost by Fiscal Year	**$0**	**$165,994,794**	**$173,030,648**	**$161,777,856**	**$157,896,193**	**$154,144,077**	**$133,504,474**	**$136,974,346**	**$139,987,781**	**$143,067,512**	**$148,745,779**	**$1,515,123,462**
1.0	Development/Modernization/Enhancement (D/M/E)												
1.1	(D/M/E) Equipment	$0	$0	$0	$854,703	$192,681	$155,929	$0	$0	$0	$0	$0	$1,203,314
1.2	(D/M/E) Software	$0	$0	$0	$19,584	$21,349	$0	$0	$0	$0	$0	$0	$40,933
1.3	(D/M/E) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.4	(D/M/E) Support Services	$0	$0	$0	$9,195,530	$27,425,661	$28,998,318	$0	$0	$0	$0	$0	$65,619,510
1.5	(D/M/E) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.6	(D/M/E) Personnel	$0	$0	$0	$1,216,803	$1,253,814	$1,363,203	$0	$0	$0	$0	$0	$3,833,821
1.7	(D/M/E) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.8	(D/M/E) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.9	(D/M/E) Total Costs	**$0**	**$0**	**$0**	**$11,286,621**	**$28,893,505**	**$30,517,450**	**$0**	**$0**	**$0**	**$0**	**$0**	**$70,697,577**
2.0	Steady State (SS)												
2.1	(SS) Equipment	$0	$0	$0	$2,230,234	$2,419,566	$2,501,274	$2,796,251	$4,555,237	$4,655,453	$4,757,873	$7,393,328	$31,309,215
2.2	(SS) Software	$0	$0	$0	$66,586	$88,066	$90,003	$69,684	$104,924	$107,232	$109,592	$112,003	$748,089
2.3	(SS) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.4	(SS) Support Services	$0	$0	$0	$38,713,799	$47,037,742	$72,946,160	$109,200,376	$123,446,453	$126,162,275	$128,937,845	$131,774,477	$778,219,126
2.5	(SS) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.6	(SS) Personnel	$0	$0	$0	$4,096,266	$5,411,636	$6,812,090	$7,376,431	$8,867,731	$9,062,821	$9,262,204	$9,465,972	$60,355,151
2.7	(SS) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.8	(SS) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.9	(SS) Total Costs	**$0**	**$0**	**$0**	**$45,106,885**	**$54,957,009**	**$82,349,526**	**$119,442,742**	**$136,974,346**	**$139,987,781**	**$143,067,512**	**$148,745,779**	**$870,631,581**
3.0	Legacy Phase-Out (LPO)												
3.1	(LPO) Equipment	$0	$12,802,852	$13,061,850	$8,540,810	$6,000,986	$3,345,277	$1,139,624	$0	$0	$0	$0	$44,891,400
3.2	(LPO) Software	$0	$357,445	$362,498	$247,175	$173,671	$96,814	$32,981	$0	$0	$0	$0	$1,270,584
3.3	(LPO) Commercial Services	$0			$0	$0	$0	$0	$0	$0	$0	$0	$0
3.4	(LPO) Support Services	$0	$135,571,471	$143,800,787	$86,850,565	$61,023,378	$34,017,760	$11,588,717	$0	$0	$0	$0	$472,852,678
3.5	(LPO) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.6	(LPO) Personnel	$0	$17,263,026	$15,805,513	$9,745,801	$6,847,643	$3,817,250	$1,300,410	$0	$0	$0	$0	$54,779,642
3.7	(LPO) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.8	(LPO) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.9	(LPO) Total Costs	**$0**	**$165,994,794**	**$173,030,648**	**$105,384,350**	**$74,045,679**	**$41,277,100**	**$14,061,732**	**$0**	**$0**	**$0**	**$0**	**$573,794,304**

Figure I-2: Alternative #1: Original IFTN Concept (Then Year)

Appendix I-3: Cost Model: Then Year (Alternative #2)

USDA / USGS Imagery For The Nation (IFTN) — Alternative #2

Alt. #2 - Original IFTN Concept with Full Federal Funding for 1-ft Program

Cost Benefit Analysis: Major Cost Elements

As stated per OCIO/CPIC Guidelines

CES ID	Cost Category	Total Sunk Costs	10 Year Life Cycle Costs in Then Year Dollars										Total Costs
		FY 04 - 06	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY07-FY16
	Total Life Cycle Cost by Fiscal Year	**$0**	**$165,994,794**	**$173,030,648**	**$164,660,268**	**$182,836,069**	**$210,815,316**	**$194,980,617**	**$199,870,144**	**$204,267,287**	**$208,761,168**	**$217,173,670**	**$1,922,389,981**
1.0	Development/Modernization/Enhancement (D/M/E)												
1.1	(D/M/E) Equipment	$0	$0	$0	$2,098,354	$171,332	$155,929	$0	$0	$0	$0	$0	$2,425,615
1.2	(D/M/E) Software	$0	$0	$0	$19,584	$0	$0	$0	$0	$0	$0	$0	$19,584
1.3	(D/M/E) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.4	(D/M/E) Support Services	$0	$0	$0	$9,195,530	$49,842,377	$60,635,776	$0	$0	$0	$0	$0	$119,673,683
1.5	(D/M/E) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.6	(D/M/E) Personnel	$0	$0	$0	$1,302,661	$1,281,809	$1,402,367	$0	$0	$0	$0	$0	$3,986,837
1.7	(D/M/E) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.8	(D/M/E) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.9	(D/M/E) Total Costs	**$0**	**$0**	**$0**	**$12,616,129**	**$51,295,518**	**$62,194,072**	**$0**	**$0**	**$0**	**$0**	**$0**	**$126,105,719**
2.0	Steady State (SS)												
2.1	(SS) Equipment	$0	0	0	$2,487,881	$3,952,931	$3,990,393	$4,386,477	$6,449,337	$6,591,222	$6,736,229	$10,704,183	$45,298,653
2.2	(SS) Software	$0	0	0	$87,476	$109,415	$68,184	$69,684	$104,853	$107,160	$109,517	$111,926	$768,215
2.3	(SS) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.4	(SS) Support Services	$0	$0	$0	$38,713,799	$47,037,742	$95,856,043	$168,627,086	$184,155,508	$188,206,929	$192,347,481	$196,579,126	$1,111,523,713
2.5	(SS) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.6	(SS) Personnel	$0	0	0	$4,096,266	$5,499,382	$6,930,378	$7,665,595	$9,160,447	$9,361,977	$9,567,940	$9,778,435	$62,060,419
2.7	(SS) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.8	(SS) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.9	(SS) Total Costs	**$0**	**$0**	**$0**	**$45,385,422**	**$56,599,470**	**$106,844,998**	**$180,748,842**	**$199,870,144**	**$204,267,287**	**$208,761,168**	**$217,173,670**	**$1,219,651,000**
3.0	Legacy Phase-Out (LPO)												
3.1	(LPO) Equipment	$0	$12,802,852	$13,061,850	$8,644,090	$6,073,554	$3,385,730	$1,153,405	$0	$0	$0	$0	$45,121,482
3.2	(LPO) Software	$0	$357,445	$362,498	$250,164	$175,771	$97,984	$33,380	$0	$0	$0	$0	$1,277,242
3.3	(LPO) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.4	(LPO) Support Services	$0	$135,571,471	$143,800,787	$87,900,811	$61,761,308	$34,429,122	$11,728,854	$0	$0	$0	$0	$475,192,353
3.5	(LPO) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.6	(LPO) Personnel	$0	$17,263,026	$15,805,513	$9,863,652	$6,930,449	$3,863,410	$1,316,135	$0	$0	$0	$0	$55,042,185
3.7	(LPO) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.8	(LPO) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.9	(LPO) Total Costs	**$0**	**$165,994,794**	**$173,030,648**	**$106,658,717**	**$74,941,081**	**$41,776,246**	**$14,231,775**	**$0**	**$0**	**$0**	**$0**	**$576,633,262**

Figure I-3: Alternative #2: Original IFTN Concept with Full Federal Funding for 1-ft Program (Then Year)

Appendix I-4: Cost Model: Then Year (Alternative #3)

USDA / USGS Imagery For The Nation (IFTN) — Alternative #3

Alt. #3 - Original IFTN Concept with Mandatory 50% Cost Share for 1-ft Program

Cost Benefit Analysis: Major Cost Elements

As stated per OCIO/CPIC Guidelines

CES ID	Cost Category	Total Sunk Costs	10 Year Life Cycle Costs in Then Year Dollars										Total Costs
		FY 04 - 06	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY07-FY16
	Total Life Cycle Cost by Fiscal Year	**$0**	**$165,994,794**	**$173,030,648**	**$162,895,342**	**$181,251,231**	**$209,425,184**	**$190,030,718**	**$195,015,517**	**$199,305,859**	**$203,690,588**	**$211,991,538**	**$1,892,631,419**
1.0	Development/Modernization/Enhancement (D/M/E)												
1.1	(D/M/E) Equipment	$0	$0	$0	$2,087,909	$171,332	$155,929	$0	$0	$0	$0	$0	$2,415,170
1.2	(D/M/E) Software	$0	$0	$0	$19,584	$0	$0	$0	$0	$0	$0	$0	$19,584
1.3	(D/M/E) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.4	(D/M/E) Support Services	$0	$0	$0	$9,195,530	$49,842,377	$60,635,776	$0	$0	$0	$0	$0	$119,673,683
1.5	(D/M/E) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.6	(D/M/E) Personnel	$0	$0	$0	$1,158,879	$1,187,572	$1,291,443	$0	$0	$0	$0	$0	$3,637,894
1.7	(D/M/E) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.8	(D/M/E) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.9	(D/M/E) Total Costs	**$0**	**$0**	**$0**	**$12,461,902**	**$51,201,281**	**$62,083,147**	**$0**	**$0**	**$0**	**$0**	**$0**	**$125,746,331**
2.0	Steady State (SS)												
2.1	(SS) Equipment	$0	$0	$0	$2,498,326	$3,952,931	$3,990,393	$4,386,477	$6,294,497	$6,432,976	$6,574,501	$10,538,897	$44,668,997
2.2	(SS) Software	$0	$0	$0	$107,060	$109,415	$68,184	$69,684	$105,317	$107,634	$110,001	$112,421	$789,716
2.3	(SS) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.4	(SS) Support Services	$0	$0	$0	$38,713,799	$47,037,742	$95,856,043	$164,947,759	$180,578,959	$184,551,696	$188,611,833	$192,761,294	$1,093,059,124
2.5	(SS) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.6	(SS) Personnel	$0	$0	$0	$3,498,725	$4,741,750	$6,059,768	$6,534,219	$8,036,745	$8,213,554	$8,394,252	$8,578,925	$54,057,938
2.7	(SS) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.8	(SS) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.9	(SS) Total Costs	**$0**	**$0**	**$0**	**$44,817,910**	**$55,841,838**	**$105,974,388**	**$175,938,138**	**$195,015,517**	**$199,305,859**	**$203,690,588**	**$211,991,538**	**$1,192,575,775**
3.0	Legacy Phase-Out (LPO)												
3.1	(LPO) Equipment	$0	$12,802,852	$13,061,850	$7,387,296	$5,190,499	$2,893,467	$985,708	$0	$0	$0	$0	$42,321,672
3.2	(LPO) Software	$0	$357,445	$362,498	$250,053	$175,693	$97,941	$33,365	$0	$0	$0	$0	$1,276,995
3.3	(LPO) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.4	(LPO) Support Services	$0	$135,571,471	$143,800,787	$88,014,185	$61,840,966	$34,473,528	$11,743,982	$0	$0	$0	$0	$475,444,919
3.5	(LPO) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.6	(LPO) Personnel	$0	$17,263,026	$15,805,513	$9,963,997	$7,000,953	$3,902,713	$1,329,524	$0	$0	$0	$0	$55,265,727
3.7	(LPO) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.8	(LPO) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.9	(LPO) Total Costs	$0	**$165,994,794**	**$173,030,648**	**$105,615,530**	**$74,208,112**	**$41,367,649**	**$14,092,579**	**$0**	**$0**	**$0**	**$0**	**$574,309,312**

Figure I-4: Alternative #3: Original IFTN Concept with Mandatory 50% Cost Share for 1-ft Program (Then Year)

Appendix I-5: Cost Model: Then Year (Alternative #4)

USDA / USGS Imagery For The Nation (IFTN) — Alternative #4

Alt. #4 - Original IFTN Concept with Optional 50% Cost Share for 1 Foot Program

Cost Benefit Analysis: Major Cost Elements

As stated per OCIO/CPIC Guidelines

CES ID	Cost Category	Total Sunk Costs	10 Year Life Cycle Costs in Then Year Dollars										Total Costs
		FY 04 - 06	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY07-FY16
	Total Life Cycle Cost by Fiscal Year	**$0**	**$165,994,794**	**$173,030,648**	**$162,581,419**	**$170,326,022**	**$181,967,211**	**$162,027,366**	**$166,002,904**	**$169,329,730**	**$172,729,745**	**$179,410,017**	**$1,703,399,855**
1.0	Development/Modernization/Enhancement (D/M/E)												
1.1	(D/M/E) Equipment	$0	$0	$0	$1,786,928	$171,332	$155,929	$0	$0	$0	$0	$0	$2,114,189
1.2	(D/M/E) Software	$0	$0	$0	$19,584	$0	$0	$0	$0	$0	$0	$0	$19,584
1.3	(D/M/E) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.4	(D/M/E) Support Services	$0	$0	$0	$9,195,530	$39,167,750	$44,271,573	$0	$0	$0	$0	$0	$92,634,854
1.5	(D/M/E) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.6	(D/M/E) Personnel	$0	$0	$0	$1,090,948	$1,187,572	$1,291,443	$0	$0	$0	$0	$0	$3,569,963
1.7	(D/M/E) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.8	(D/M/E) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.9	(D/M/E) Total Costs	**$0**	**$0**	**$0**	**$12,092,991**	**$40,526,655**	**$45,718,945**	**$0**	**$0**	**$0**	**$0**	**$0**	**$98,338,591**
2.0	Steady State (SS)												
2.1	(SS) Equipment	$0	$0	$0	$2,431,825	$3,577,365	$3,606,564	$3,994,204	$5,786,058	$5,875,864	$5,967,645	$9,266,901	$40,506,425
2.2	(SS) Software	$0	$0	$0	$107,060	$109,415	$68,184	$69,684	$104,513	$106,080	$107,681	$109,318	$781,934
2.3	(SS) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.4	(SS) Support Services	$0	$0	$0	$38,713,799	$47,037,742	$84,946,575	$137,074,067	$151,809,221	$154,891,194	$158,040,971	$161,260,043	$933,773,612
2.5	(SS) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.6	(SS) Personnel	$0	$0	$0	$3,840,166	$5,021,278	$6,345,445	$6,826,181	$8,303,112	$8,456,592	$8,613,448	$8,773,755	$56,179,976
2.7	(SS) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.8	(SS) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.9	(SS) Total Costs	**$0**	**$0**	**$0**	**$45,092,849**	**$55,745,799**	**$94,966,767**	**$147,964,136**	**$166,002,904**	**$169,329,730**	**$172,729,745**	**$179,410,017**	**$1,031,241,947**
3.0	Legacy Phase-Out (LPO)												
3.1	(LPO) Equipment	$0	$12,802,852	$13,061,850	$7,371,911	$5,179,689	$2,887,441	$983,655	$0	$0	$0	$0	$42,287,399
3.2	(LPO) Software	$0	$357,445	$362,498	$249,532	$175,327	$97,737	$33,296	$0	$0	$0	$0	$1,275,835
3.3	(LPO) Commercial Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.4	(LPO) Support Services	$0	$135,571,471	$143,800,787	$87,830,889	$61,712,178	$34,401,734	$11,719,524	$0	$0	$0	$0	$475,036,584
3.5	(LPO) Supplies	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.6	(LPO) Personnel	$0	$17,263,026	$15,805,513	$9,943,246	$6,986,373	$3,894,586	$1,326,755	$0	$0	$0	$0	$55,219,500
3.7	(LPO) Intra-Governmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.8	(LPO) Miscellaneous Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3.9	(LPO) Total Costs	$0	**$165,994,794**	**$173,030,648**	**$105,395,578**	**$74,053,568**	**$41,281,498**	**$14,063,230**	**$0**	**$0**	**$0**	**$0**	**$573,819,317**

Figure I-5: Alternative #4: Original IFTN Concept with Optional 50% Cost Share for 1-ft Program (Then Year)

The Imagery for the Nation Cost Benefit Analysis was conducted by:

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