Implementing the National Wildland Fire Enterprise Architecture Blueprint

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EXECUTIVE SUMMARY

In February 2011 the Department of the Interior Deputy Assistant Secretary for Law Enforcement, Security, and Emergency Management and the USDA Forest Service Deputy Chief for State and Private Forestry issued a memorandum to chart a course for the implementation of the National Wildland Fire Enterprise Architecture Blueprint. Jim Douglas and John Phipps were assigned the responsibility for developing a set of options in coordination with representatives from the various agencies and program areas affected by the Blueprint. This report represents the results of that assignment.

The report reviews the background, history, and current state of information technology investments, governance, and capabilities in the wildland fire programs of the four Interior fire bureaus and the USDA Forest Service, identifies five Alternate Futures, and presents recommendations. The report was prepared with the benefit of consultation and input from a variety of individuals within wildland fire and the agency Chief Information Officers.

In summary, at present there is no overall governance of wildland fire investments, no agreed upon vision or strategy for making future investments, and limited standards or protocols for data and management. Each agency maintains separate, parallel organizations. The NWCG provides some coordination of user requirements and voluntary standards. The decision space of each organization is limited. A number of applications provide important support to wildland fire planning and operational activities. But significant inefficiencies exist in sharing of data, project management, and application support. There is no consensus view on business requirements and priorities, nor is there an agreed upon strategy or vision to guide new investments or evaluate the efficacy of current investments.

Changing the governance, strategies, and organizations necessary to achieve the stated goal of the Blueprint to operate as "a virtual single agency" will require sustained senior level management commitment as well as investing in significant changes in long-standing cultural norms for the agencies and for interagency structures.

Ideally, wildland fire information and technology investments should be governed by a single interagency executive structure, supported by a common organization, and responding to a consensus vision and strategy, with engagement by partners in other programs, disciplines, and agencies. To begin moving toward that ideal, three initial, immediate actions should be taken:

1. Establish a single, interagency executive level governance body to oversee the development of requirements, set priorities, agree on investments, and oversee the implementation and operation of applications and other investments;
2. Establish a core interagency staff to support the governance body in developing strategies and priorities, evaluating proposals, and coordinating the management of projects and applications;
3. Develop an agreed upon interagency vision and strategy to guide investments and management of all wildland fire information and technology investments.

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INTRODUCTION

The Assignment

This report is submitted in response to the assignment given to us on February 22, 2011, to deliver a set of options for the implementation of the National Wildland Fire Enterprise Architecture (NWEA) Blueprint. In that assignment, we were asked to develop options that include:

- Establishment of a governance structure that has clear decision-making authority within the wildland fire community and that interfaces with department and agency IT governance structures.
- A management organization for the wildland fire IT applications portfolio, including project conception and analysis, project approval, project management, and steady-state operations and maintenance, with clear and accountable leadership.
- A process for setting investment priorities and for reviewing/approving/ implementing investment decisions within the wildland fire community.
- A process for completing and approving a target application architecture.
- A high level implementation schedule with responsibilities, dependencies, and target dates, including a transition plan for moving from the current set of governance/management structures and portfolio of projects and applications.

We were asked to respect certain principles and guidelines:

- Engage all of the interested parties and stakeholders within the wildland fire community as well as those outside of wildland fire.
- Solutions and approaches should reduce redundancy, be cost-effectiveness, and be efficient.
- Solutions must be able to harmonize with individual agency policies and expectations.
- Where possible, rely on existing organizations and capabilities.
- Explore how to integrate and coordinate with related functions and activities such as decision support systems and geospatial information services.
- Explore how to integrate and coordinate with research projects and initiatives that may result in information technology investments or applications.

Methodology

In preparing this report, the authors solicited input from various stakeholders, provided opportunity for review of initial concepts, and reviewed the literature of the National Wildland Fire Enterprise Architecture development along with existing information technology projects and investments in wildland fire.

In March 2011 the we convened a one day “town hall” meeting in Boise, Idaho, of approximately 35 representatives of the wildland fire community including fire directors, the National Wildfire Coordinating Group (NWCG) staff and committees, wildland fire IT managers, and project managers. This forum provided each of the individuals an opportunity to speak to the issues contained in the project assignment and for the project leaders to interact with those individuals to ask and respond to questions. Using the results of the town hall meeting the project leaders developed an initial set of “alternative future” scenarios to address organizational, governance, and other issues.

These draft alternate future scenarios were shared with the attendees of the town hall meeting, along with the Chief Information Officers of the Department of the Interior (DOI), the four DOI fire bureaus, and the Chief Information Officer of the Forest Service. Smaller focus group meetings were held in April. In Boise, 6-8 person focus group sessions were held with fire directors (or their representatives), the NWCG Information Technology Committee, project managers, NWCG staff, and others. With a few exceptions all of those in attendance at the March town hall meeting participated in one of the Boise focus groups. In Washington, DC, focus groups were scheduled with fire executives (those managing fire directors) and the Chief Information Officers of DOI, its bureaus, and the Forest Service. These latter sessions were more sparsely attended, with the Bureau of Land Management and National Park Service not participating in the fire executive's session and only the Forest Service Chief Information Officer and representatives of the DOI Chief Information Officer participating the sessions scheduled for that community.

As a result of these sessions the alternate futures were refined and revised along with a better understanding of wildland fire IT management issues and challenges. The meetings with the Forest Service and DOI chief information offices helped the project leaders understand the context and requirements of managing the wildland fire IT investments within the DOI and the Forest Service governance structures. During preparation of this report various sections were reviewed by many of these individuals to ensure accuracy of facts.

We reviewed the July 2008 NWFEA Blueprint and various guidance documents in the Department of the Interior and Forest Service. The NWCG staff coordinated an interagency data call to provide a single, comprehensive report on all current wildland fire IT projects and investments.

THE NATIONAL WILDLAND FIRE ENTERPRISE ARCHITECTURE

Enterprise Architecture

Throughout this report and in associated documents a number of similar terms are often used interchangeably, but which have important distinctions. To better understand the use of those terms and the distinctions between them, the following definitions are used in this document. As a technical matter these definitions may not comport precisely with the terminology in the Enterprise Architecture discipline, but provide the lay reader with a working understanding of the concepts.

Enterprise Architecture (EA) is used to connote the set of requirements, processes, governance, data, technology, and tools used to conduct business, along with the relationship between those components within the organization and with external elements. As such it has no good or bad "value" but is simply a catalog. An enterprise architecture is a set of *business* documents, not information technology documents. An EA is used in determining how to employ information technology solutions for business requirements.

EA Blueprint consists of three states: (1) Current State, the "as is"; (2) Target Vision State, the "to be" desired future state needed to satisfy business requirements and (3) a strategy for moving from the Current State to the Target State. Once implemented, projects and investments in the Development and Target States become part of the Current State.

EA Program or organization is the means by which the Current State catalog is maintained, the Target State is developed and revised, and the path from Current to Target is managed.

With an EA there are four principal components:

Business *– the strategy, governance, organizations, processes, products, and standards by which the enterprise operates on a day-to-day basis*
Data/information *- the definitions and classifications of the data that the enterprise requires in order to efficiently operate*
Applications *- the interactions among the processes and standards used by the enterprise*
Technology *- the hardware, operating systems, programming, and networking solutions used by the organization*

NWFEA History and Chronology

The chronology of interagency wildland fire information technology coordination and standards dates to the formation of the National Wildland Fire Coordinating Group (NWCG) in the mid-1970s when there was discussion of interagency wildland fire information technology coordination and standards as part of the creation of the NWCG. In 1996 the *NWCG IRM Strategy Project and Wildland Fire Business Model* report identified the need for an enterprise architecture program for the interagency wildland fire community. That same year the1996 Clinger-Cohen Act mandated that each federal Department and Agency establish and maintain enterprise architecture programs. The NWCG IRM Program Management Office was formed in August 2000 to coordinate interagency wildland fire automation projects and to establish and maintain an interagency wildland fire enterprise architecture that represents the business objectives of the federal and state wildland fire community.

In 2003 the General Accounting Office (now Government Accountability Office) issued GAO-03-1047, "Geospatial Information Technologies Hold Promise for Wildland Fire Management, but Challenges Remain" that identified the need for a national wildland fire enterprise architecture.

In May 2004 the Wildland Fire Leadership Council (WFLC) chartered the NWFEA Steering Group to facilitate the development of wildland fire enterprise architecture and to coordinate wildland fire management enterprise architecture efforts of the participating agencies to provide a means for increasing efficiency and eliminating redundancy. In part, the charter reads:

> *"An EA [enterprise architecture] program for the wildland fire community supports and serves the interests of the WFLC, the NWCG, and their associated agencies. This EA program, hereinafter referred to as the National Wildland Fire Enterprise Architecture (NWFEA) program, will enable the interagency wildland fire community to provide better service to the citizens by collaboratively creating an EA that:*
>
> - *Provides a holistic strategic and integrated approach to managing the wildland fire enterprise as a single business function of the government*
> - *Provides a dynamic library of documents and models which describe the business, data, applications, and technology of the wildland fire enterprise that spans across Department and Agency boundaries.*
> - *The NWFEA program builds upon the foundation described in the NWCG IRM Strategy Project Report published by the National Wildfire Coordinating Group (PMS909, August 1996), and will align with current federal enterprise architecture principles and guidance."*

In October 2005 the National Wildfire Coordinating Group chartered a project team to develop the National Wildland Fire Enterprise Architecture. The charter outlined these objectives for the project:

"The objectives of this project are to establish a wildland fire enterprise architecture program that:

- *Improves effectiveness of business strategic planning, decision making, and prioritization*
- *Resolves governance issues in the inter-department/agency environment for management of the wildland fire community*
- *Enables the national wildland fire community to deploy and manage its operations as a single line of business of the government*
- *Offers a dynamic toolset that identifies the relationships and dependencies of the various wildland fire components including, but not limited to: strategic plans, activities, products, data, services, organizations, and systems. Tools must support industry standard modeling techniques such as UML [Unified Modeling Language] and IDEF0 [Integration Definition for Function Modeling].*
- *Provides a methodology for the coordinated improvement of all national wildland fire operations, products, and services*
- *Provides a NWFEA repository that serves as the authoritative source for the consolidated national wildland fire EA artifacts used for interagency decision making.*
- *Provides a framework to enable interoperability between wildland fire department and agency enterprise architecture programs and repositories*
- *Aligns with the Federal Enterprise Architecture (FEA) and is clearly linked to the FEA Reference Models*
- *Supports the capital planning and investment processes*

- *Provides the framework and infrastructure to achieve the highest EA maturity model rating in 5-10 years (Reference OMB's EA Maturity Framework)"*

In 2008, the Project Team delivered a "Blueprint" to the NWCG; in July 2008 the Fire Executive Council approved the Blueprint and forwarded it to the Chief Architects of the Department of the Interior and the USDA Forest Service. In September 2010 the Department of the Interior Investment Review Board approved the NWFEA Blueprint with conditions. Approval at USDA Forest Service is pending.

The NWFEA Blueprint

The 2008 NWFEA Blueprint outlines Goals, Recommendations, and Action Items in support of the wildland fire mission, generally captured in three primary program areas of preparedness, suppression, and hazardous fuel reduction.

Goals and Recommendations

The Blueprint discusses each goal and associated recommendations in detail, provides objectives for each goal, and identifies actions and outcomes for each recommendation. The goals and key recommendations are summarized here. Part II of the Blueprint provides various supporting data and analyses.

Goal 1: Common Governance and Business Activities

- Implement a unified governance structure
- Create an IT governance framework
- Maintain and use the NWFEA

Goal 2: An Integrated Data Environment

- Develop and implement interagency data standards
- Develop consistent data and data interoperability across all systems and business areas

Goal 3: Common Technology Infrastructure and Configuration Standards

- Provide a common platform for system interconnection and information sharing
- Develop a common Incident Based Automation infrastructure
- Acceptance of information technology controls

Goal 4: Systems that Increase Efficiencies and Reduce Costs and Redundancies

- Implement a Wildland Fire strategic approach to systems management
- Support an End to End Fire Reporting System that provide a single point of access to authoritative information
- Support current and new projects
- Support and actively integrate the use of geospatial and emerging technology in wildland fire applications

DOI Investment Review Board Action

In July 2010, the Chief Architect of the Department of the Interior presented the NWFEA Blueprint to the Department's Investment Review Board with a recommendation that it be approved with certain conditions. In September 2010 the Blueprint was approved with the following conditions:

- No major development, modernization or enhancement proposals will be submitted for approval without first completing an approved target application architecture for the affected systems.
- Necessary governance structures will be established for the fire portfolio of IT investments that ensure clear decision making authority. This may be in the form of a joint governance approach or in the form of designation of a managing partner.
- A management oversight structure must be established sufficient to manage the transition to and maintenance of the integrated environment. This oversight structure must have clear and accountable leadership designation.
- To the maximum extent possible the oversight structure will leverage the existing infrastructure capabilities in the partner organizations as opposed to creating an entirely separate standalone organization. Where applicable the use of other common services is encouraged.

THE CURRENT STATE OF WILDLAND FIRE INVESTMENTS AND MANAGEMENT

The content, management, and of governance of wildland fire investments at present is an amalgamation of individual agency and interagency decisions, organizations, and funding. This section summarizes the current set of organizations and governance responsibilities and mechanisms, changes that are currently underway within the Department of the Interior and Forest Service, and the current portfolio of wildland fire information technology investments.

Organizations

National Wildfire Coordinating Group

The National Wildfire Coordinating Group was established by the Secretaries of Agriculture and the Interior in 1976 to coordinate programs of the participating wildfire management agencies to avoid wasteful duplication and to provide a means of constructively working together. Its goal is to provide more effective execution of each agency's fire management program. The group provides a formalized system to agree upon standards of training, equipment, qualifications, and other operational functions. The NWCG consists of the fire programs of the USDA Forest Service, the Bureau of Land Management, National Park Service, Fish and Wildlife Service, and Bureau of Indian Affairs; Forest Service Fire Research; Federal Emergency Management Agency, U.S. Fire Administration; National Association of State Foresters; and the Intertribal Timber Council.

Historically the NWCG has functioned principally as a "standards setting" body using working teams of subject matter experts drawn from various fields of expertise to develop operational-based standards to improve efficiency and interoperability among federal and non-federal wildland fire agencies. In 2007 the NWCG was re-chartered and its mission was expanded to include responsibilities for wildland fire policy and program guidance and direction and strategic policy and program coordination with other program areas.

Organizationally the NWCG consists of the Executive Board comprised of representatives of the member organizations, fourteen standing committees (some of which have additional subcommittees), and a nine person Program Management Unit (PMU) comprised of a Program Manager, Branch Coordinators, Wildland Fire Architects, and support staff. The Executive Board and Committee/Sub-committee members serve in a collateral duty capacity. Committees and subcommittees consist of subject matter experts drawn from all of the member organizations of the NWCG. The NWCG has an annual budget of approximately $2.8 million, funded by "fair share" contributions of each of the member agencies. Of that budget in FY 2011, $621,000 directly supported IT projects (see discussion of the IT portfolio below) with the remainder supporting the work of the various committees and program areas outside of IT.

NWCG Program Management Unit

The PMU is a successor organization, created after the 2007 re-chartering, to the NWCG Information Resource Management Program Management Office (PMO). The PMO was created in 2000 to (1) provide a single point of contact for collection and distribution of standards, "lessons learned", and other IRM best business practices; (2) provide the field with information about collateral IRM efforts and initiatives; (3) establish a data management strategy; (4) establish and manage a portfolio of wildland fire applications; and (5) establish a repository of project deliverables (charters, project plans, data

models, system and user documentation) coordinate interagency wildland fire automation projects and user documentation). The PMU has a broader role in the management of NWCG programs and activities than the former PMO, which was solely focused on enterprise architecture and IT related matters. The architect group within the PMU provides a long-term view of the full scope of wildland fire processes, systems, and technologies. The PMU is funded by the NWCG budget.

NWCG Committees

Within the NWCG committee structure there are three groups that are directly related to IT management issues. Other committees and subcommittees provide user needs and requirements as part of their work.

The Information Technology Committee (ITC) provides interagency vision, strategic direction, and oversight related to development and use of integrated information resource management solutions for the NWCG. The Geospatial Subcommittee of the ITC is a coordinated point of contact for providing high-quality information and expertise on the use of geospatial data, standard, applications, and processes in support of interagency wildland fire management. The Data Standards and Terminology Subcommittee was recently established to coordinate and facilitate the development, approval and maintenance of interagency wildland fire data standards and glossary entries.

Agency Wildland Fire Organizations

Each of the four DOI fire bureaus and the Forest Service has information technology organizations and staff embedded within their wildland fire management program organizations. The Forest Service and the Bureau of Land Management (BLM) are the two largest organizations with approximately 40 staff (including contractors), for each. The DOI Office of Wildland Fire (OWF) has 15 positions, largely in support of the Fire Program Analysis (FPA) project. The three other DOI bureaus have 2-3 staff each, plus additional hosted positions in support of major projects such as the Wildland Fire Decision Support System (WFDSS) and FPA. Most of these positions are located at the National Interagency Fire Center (NIFC) in Boise, Idaho, but many are in various locations around the country.

These organizations provide a variety of functions in support of wildland fire information technology program requirements in both applications and infrastructure/operations. Functions include planning, project and application management, acquisition, geospatial support, security, user (Help Desk) support, data management, and operations of networks, systems, and applications. As the host agency for NIFC the BLM has primary responsibility for network and other infrastructure services for all agencies at NIFC. The WFDSS and FPA projects comprise a significant portion of the staffing among all of the agencies and OWF.

Agency-level Investment Review Boards

In recent months both the Forest Service and the Department of the Interior have restructured their traditional investment review boards to place greater emphasis, responsibility, and accountability on the mission areas (such as wildland fire) of the agencies.

Forest Service

In March 2011 the Forest Service restructured its approach to information resources (IR) governance by creating the Information Resources Direction Board (IRDB) to replace the Investment Review Board. The IRDB is the Forest Service response to a need to improve decision making related to its information along with personnel, technology, software, applications, knowledge, governance, equipment

infrastructure (including radios and phones), physical infrastructure, and funding the agency deploys in the management of its information.

The overall governance solution addresses decision making from the highest levels of the agency (strategic futuring, goal setting and the setting of accomplishment strategies) to the most tactical. The foundational IR governance solution identifies nine categories of decisions. One of those categories is IR Program Direction. Decisions for IR Program Direction are made by the IR Direction Board (IRDB).

The charter for the IRDB states that this board will:

- Establish (decide) a coordinated strategic IR program of work for the agency including what IR policy/standards are needed and high-level budget allocations.
- Decisions made by this governance body will focus on the IR components of agency strategies to include consideration of external stakeholder's plans and needs when working with the Forest Service. The IR component of this direction would also include decisions on what shall be standardized to efficiently meet agency priorities (e.g., data, data standards, protocols, processes, etc.).

The make-up of the IRDB is the Forest Service Deputy Chiefs and the Chief Financial Officer.

Department of the Interior

Within the Department of the Interior the department-level investment review board has been disbanded and is being replaced by a structure in which the mission areas will have responsibility for management and oversight of "segments" of like investments (e.g. wildland fire) and answer to a small Information Resource Management Executive Committee and the Deputies/Principals Operating Groups. Executive-level "Segment Champions" will have responsibility for setting strategic vision and priorities, committing resources, making recommendations on current and future investments, and providing overall leadership. The Deputy Assistant Secretary for Law Enforcement, Security and Emergency Management has been designated as the Segment Champion for all wildland fire investments in DOI. As this approach matures the roles and responsibilities of the Segment Champion are expected to evolve.

Each segment is required to complete a "roadmap" for the segment by December 2011, for use in formulating the FY 2014 budget for the department. Development of the roadmaps is expected to be based on the Office of Management and Budget/Federal CIO Council "Federal Segment Architecture Methodology." In developing the roadmaps the segment champions are expected to engage the affected bureaus and program areas through a chartered "core team."

Governance

Governance is a set of management functions to set strategic direction, ensure that objectives are met, manage risks, allocate resources, and provide a structure for decision making. At present governance for wildland fire investments is dispersed among a number of entities within the DOI and Forest Service. Historically wildland fire projects have been submitted to agency investment review boards (IRB) through the capital planning investment control (CPIC) procedures of agencies of individual agencies. Typically those projects have not been reviewed and approved from a "fire enterprise" standpoint, but rather have followed agency-specific procedures through the Forest Service, BLM, or other agencies.

Many wildland fire investments are below the standards thresholds for CPIC. Several applications that were developed "informally" have been in use without formal agency review and acceptance.

A number of entities play roles at various times in decision making, including the NWCG Executive Board, the five agencies with fire management programs, and the DOI Office of Wildland Fire. Technically no investment decisions can be made or implemented without the approval of the appropriate investment decision making body within the DOI or the Forest Service.

At present no single, well-defined path exists to review, approve, and implement wildland fire investments. Five basic models exist.

Model 1: New proposals are routed through the NWCG where they are reviewed and analyzed by NWCG committees and the PMU and are submitted to the NWCG Executive Board. The Executive Board forwards its endorsement to the Wildland Fire Executive Committee (WFEC), a chartered Federal Advisory Committee. The WFEC forwards its endorsement to the Secretaries of the Interior and Agriculture whose agents, in the form of the DOI Office of Wildland Fire and Forest Service Fire and Aviation Management, take the proposals separately to their respective investment decision making bodies. *This model is a largely theoretical model as the WFEC is a relatively new governance body that has been focused on other types of wildland fire policy and management issues.*

Model 2: New proposals are routed through the NWCG where they are reviewed and analyzed by one or more committees and the PMU and are submitted to the NWCG Executive Board. The Executive Board forwards its endorsement to the DOI Office of Wildland Fire and Forest Service Fire and Aviation Management, which then take the proposals separately to their respective investment decision making bodies. This model was recently used for the proposed Interagency Fuel Treatment Decision Support System (IFT-DSS). In that case the Forest Service declined to move the proposal forward; DOI is in the process of doing so.

Model 3: In a variation of Model 2, new proposals are routed through the NWCG where they are reviewed and analyzed through a deliberative process that involves every committee and the PMU, and the Executive Board. The Executive Board approves/disapproves the project or proposal. These proposals are smaller investments and do not qualify for CPIC processing. They are also small enough investments that NWCG funding is adequate to cover them. This is the model used to govern NWCG Funded Systems described below. Then NWCG Executive Board approves funding for these projects during a regular NWCG budget meeting discussion.

Model 4: New proposals are conceived within individual agency fire management programs and are forwarded to their investment decision making bodies. Consultation/coordination with the interagency community is informal.

Model 5: New proposals are conceived within individual agency fire management programs and are funded, developed, and implemented without review or approval by the agency investment decision making body. Consultation/coordination with the interagency community is informal. *This model often applies to applications and "tools" developed within the research community or to small, minor investments.*

As a result of these five different models or paths there is no comprehensive, wildland fire enterprise information technology governance approach or mechanism that sets and adheres to a strategic vision or direction, sets priorities, allocates resources, or makes decisions. In addition, there is no mechanism

for a standardized, regular snapshot or review of the total portfolio of wildland fire investments including management responsibility, life-cycle status, and cost.

Previous Studies and Analyses

In addition to the 1996 *NWCG IRM Strategy Project and Wildland Fire Business Model* report referenced above and the 2008 NWFEA Blueprint there are a number of other previous and ongoing studies and analyses that inform various aspects of wildland fire IT management. Among these are:

Report of the eGov Disaster Management Task Group to the National Fire and Aviation Executive Board, 2006. In the course of looking at proposals for the applicability of using "Common Alert Protocols" in wildland fire this group examined the processes used to collect and disseminate wildland fire information. Among the findings were that there is no universal, consistent method of collecting fire information, that many wildland fire data elements are entered multiple times in multiple systems, and that use of computer aided dispatch within wildland fire is inconsistent and inefficient. The current IRWIN project is a result of these findings and related recommendations.

Interagency IT Investment & Management Process (End-to-End Fire Investment), circa 2006-2007. Beginning in 2006 an *ad hoc* group of interagency personnel began development of a standardized model for interagency governance and management of wildland fire IT investments. This work was later picked up by the NWCG IRM Working Team (now the NWCG IT Committee). The working team developed detailed guidelines for reviewing and approving projects, project management, and project operations and maintenance. Although recommendations were presented to the NWCG, no formal action to adopt these procedures was ever taken.

FEC NWFEA Blueprint Implementation, 2009-2010. Following the Fire Executive Council (FEC) approval of the Blueprint in 2008 the FEC requested options for implementing an investment process, including staffing, In January 2010 the FEC approved a decision making and project management architecture and a concept for integrating existing agency wildland fire IT organizations. No further action was taken to implement the decision.

Enterprise Geodatabase Transition Plan (Draft), 2011. The NWCG Geospatial Subcommittee (GSC) intends to implement an enterprise geodatabase and portal that supports interagency wildfire suppression, management, and planning. The goal of this project is to provide a common source of shared spatial data, GIS services and infrastructure. To assist in the development of this enterprise geodatabase, the GSC has contracted for the development of an enterprise geodatabase (EGDB) transition plan that defines the requirements and steps for the EGDB implementation, by focusing on system architecture and data management needs of the interagency wildfire community. Among the findings of the study are (1) the same types of data are being independently collected, managed and distributed in multiple systems, contributing to duplication of data, effort and limiting their use for integrated analysis and reporting and (2) there are few common business rules or technology to support consistent data collection, integration and sharing within and between agency systems. This report is currently under review by the subcommittee prior to submitting any recommendations to the NWCG.

NWCG *Target Architecture (Draft),* 2010. In 2010 the NWCG PMU contracted for development of a target architecture in response to the provisions of the NWFEA Blueprint and the

requirements of the DOI IRB. This target architecture was delivered in December 2010. Further action, including in-depth stakeholder review and next steps identified, is pending the results of this study.

Current Wildland Fire IT Portfolio

April 2011 Inventory

As noted above there is no mechanism for providing and maintaining a comprehensive inventory of all wildland fire information technology investments. The February 22, 2011, "Assignment" memorandum requested a complete inventory of all investments. In April 2011 the NWCG Application Architect and Portfolio Coordinator working with the staffs in each of the agencies assembled an inventory at our request. This inventory is divided into three sections:

NWCG Funded Systems – those investments that are fully funded by and within the NWCG budget. These systems are managed by one of the agencies on behalf of the interagency community and have interagency governance or change management mechanisms.

NWCG Affiliated Systems – those investments that have been reviewed and endorsed by the NWCG and are supportive of the interagency business goals and requirements of the NWCG, but funded by one or more wildland fire agency budgets. These systems are managed by one of the agencies on behalf of the interagency community and usually have interagency governance or change management mechanisms.

Agency Fire Systems – those investments that are sponsored and funded by individual agencies and have not been reviewed or endorsed by the NWCG (but many of which are used by multiple agencies). These systems are managed by one of the agencies and often do not have interagency governance or change management mechanisms.

The April 2011 inventory identified 94 separate investments for a total FY 2011 cost of $34.4 million among all agencies.

The following tables summarize the data provided by the respondents for the April 2011 inventory. These data have not been independently verified and in many cases a number of data fields requested were not provided. However, the inventory does provide an overall understanding of the breadth of the various systems, applications, tools, and other investments in wildland fire information technology.

Life-Cycle Status of Current Investments

	Steady State	Mixed	Evaluate	Control	Select	Retire	N/R*	Total
NWCG Funded	7	0	0	10	3	1	0	21
NWCG Affiliated	3	0	0	2	1	0	1	7
Agency Systems	60	3	1	0	0	2	0	66
Total	70	3	1	12	4	3	1	94

*Data not provided

Table 1 - Life-Cycle Status

Managing Partner Designations

	FS	BLM	FWS	BIA	NPS	DOI*	Other**	Total
NWCG Funded	11	9	0	0	1	0	0	21
NWCG Affiliated	2	3	0	0	0	2	0	7
Agency Systems	42	8	1	0	2	2	11	66
Total	55	19	1	0	3	4	11	94

* Office of Wildland Fire, ** NOAA, USGS, States, or none listed

Table 2 - Managing Partners

Usage of the Applications or Systems

	FS	BLM	FWS	BIA	NPS	DOI*	Other**	Inter-agency	N/R***	Total
NWCG Funded	0	0	0	0	0	0	0	21	0	21
NWCG Affiliated	0	0	0	0	0	0	0	7	0	7
Agency Systems	3	1	1	0	1	2	2	14	42	66
Total	3	1	1	0	1	2	2	41	42	94

* Office of Wildland Fire; **Used by more than one, but not all, agencies; ***Data not provided

Table 3 - Application Usage

Investment Costs ($000)

	FS	BLM	FWS	BIA	NPS	OWF	NWCG	Total
NWCG Funded	$0	$0	$0	$0	$0	$0	$2,246	$2,246
NWCG Affiliated	$2,098	$1,027	$0	$0	$0	$3,865	$0	$6,990
Agency Systems *	$18,280	$625	$65	$0	$0	$500	$0	$19,470
Subtotal	$20,378	$1,652	$65	$0	$0	$4,365	$2,246	$28,706
FS Support**	$3,031	--	--	--	--	--	--	$3,031
BLM Support***	--	$2,700	--	--	--	--	--	$2,700
Total	$25,774	$4,352	$65	$0	$0	$4,365	$2,246	$34,437

*costs not reported for 49 of 63 investments; **includes GIS support as well as network and other general support services; ***includes network operations, security, and other general support services

Table 4 – Investment Costs

NWFEA Blueprint Inventory

As part of the development of the NWFEA and the accompanying Blueprint a large amount of data were collected about the nature of the wildland fire IT systems and applications. The NWFEA Blueprint (Part II

– Supporting Analysis, June 2008) identified 74 systems or applications for a total FY 2007 cost of $47.6 million. This analysis also compared the 74 systems and applications to nineteen wildland fire business functions. The following tables summarize those findings.

# of Functions per Application	# of Affected Applications
15	1
10	2
9	2
8	1
7	4
6	6
5	10
4	5
3	11
2	19
1	12
0	1

Table 5 - Business Functions of Applications

Business Function	# of Applications
Fire Planning	38
Fire Response	31
Tactical Preparedness	26
Vegetation Management	24
Safety and Health	19
Financial Management	18
Public Outreach	17
Smoke Management	15
Asset Management	13
Workforce Management	12
Incident Records Management	12
Fire Program Communications	10
Contract Management	9
BAER	9
Incident Communications	8
NIMS/Other Fire Systems Mgt	6
IT Management	5
HR Management	3
Security	3

Table 6- Applications Associated with Business Functions

WILDLAND FIRE IT MANAGEMENT ISSUES

The February 2011 Assignment memo focused on addressing five principal topics associated with the implementation of the NWFEA Blueprint: governance, management organization, investment process, target architecture, and an implementation schedule. Through the process of consulting with various stakeholders and review of various documents we identified a number of issues that supplement or are related to those five topics.

Data Standards/Management and Geospatial Management – As noted in the draft transition plan for an enterprise geodatabase, much of the agency geospatial information efforts to date have been specific to the needs of a single agency or program with limited consideration for how those investments could be repurposed by others. This situation has led to multiple data and technology standards, inconsistent data development procedures, redundant efforts, missed opportunities to share resources and limited the ability to develop a common operating picture for fire suppression, management and planning. The same types of data are being independently collected, managed and distributed in multiple systems, contributing to duplication of data, effort and limiting their use for integrated analysis and reporting. There are few common business rules or technology to support consistent data collection, integration and sharing within and between agency systems. Although this analysis focused specifically on geospatial information, similar concerns were expressed about all types of data used by wildland fire applications.

Multiple Data Entry – Related to the issues of data standards and quality are issues of multiple entries of the same data in multiple systems. This results in inconsistent data, lack of authoritative data, and significant duplication of effort. For example, the contractor on the geodatabase project found 26 different systems or processes where the location (latitude/longitude) for a fire origin is entered.

Vision – In large measure the current portfolio is a collection of individual systems and applications developed singly and often in response to solving a specific problem. As a result, in addition to the data issues mentioned above, there is no over-arching concept of operations, no agreed upon set of business requirements, and little ability to realize economies and efficiencies.

Authority and Purview of NWCG – The NWCG was borne of a need for common standards and approaches. Its historic strength has been in areas of operations. In the area of IT, the NWCG lacks the mandate and authority to apply mandatory standards (data, project management, etc.) and the purview over the full range of agency fire budget decision making. Members of the NWCG Executive Board do not have the background and training to provide direction and oversight to project managers.

Science/Research – The science and research community has been a source of significant innovation and insight in the development of tools and capabilities for the wildland fire community. However, there has been no clear linkage or path from development in the lab to acceptance and deployment of the results of that work.

New Partners – Recently some of the key incident management applications of wildland fire (incident qualifications and resource ordering) have been adopted by the non-fire emergency management community, creating a need for that community to share in the governance (funding, change management, new requirements) beyond the traditional wildland fire community.

Inconsistent Agency Policies – Each wildland fire agency has somewhat different standards and requirements for project management, security, data standards, procurement, and other features.

Consequently the wildland fire agencies have faced difficulties in collaborating on project development and in utilizing applications in a multi-agency environment.

Technology and Infrastructure – The focus on wildland fire IT is usually on applications, but significant issues of technology and the infrastructure necessary to support the applications also exist. A number of *ad hoc* initiatives are underway to look at use of Google Earth mapping capabilities, mobile digital devices, and state-of-the-art remote sensing capabilities.

ALTERNATE FUTURES – GOVERNANCE AND ORGANIZATION

The February 2011 Assignment memorandum requested a set of options for implementation of the NWFEA Blueprint, including components of governance, organization, investment process, target architecture, and schedule. We present those options in the form of five "alternate futures" that contain the requested components. For each alternate future we present a description, a vision, associated doctrine, and an analysis of how it addresses the requested components along with the other major issues discussed above.

This section briefly summarizes the key aspects of each alternate future. A detailed matrix showing all of the alternate futures and components is found in the Appendix.

Alternate Future #1: NWCG Centric (Status Quo)

Overview - This option continues the existing configuration of organizations, governance relationships, and processes. Investments are generally coordinated by the NWCG process, though agencies may choose to develop and obtain approval for investments through non-NWCG channels. The PMU maintains the NWFEA and evaluates investment proposals against the NWFEA and the goals of the Blueprint. Recommendations for investments are forwarded from the NWCG to the DOI Office of Wildland Fire and Forest Service Fire and Aviation Management for action by agency investment approval authorities. Investments are managed by individual agencies according to agency policies and standards. The relationships among various entities are illustrated in Figure 1.

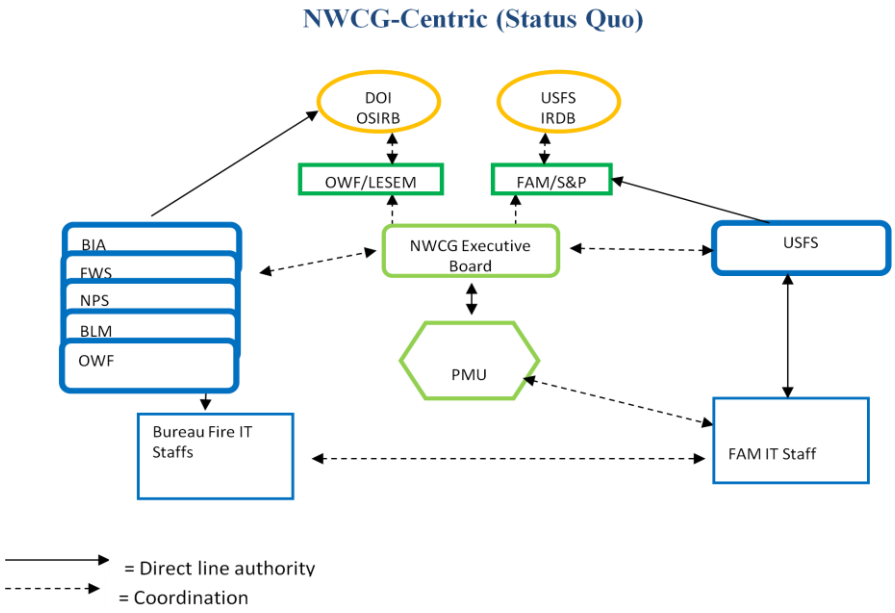

Figure 1 - Status Quo Alternate Future

Vision - Individual agencies develop and implement IT/technology solutions based on their priorities and requirements, seeking opportunities to share data, applications, and management.

Doctrinal Principles

- Operational IT efficiencies and interoperability are important to provide safe and cost-effective operations
- Agency and department interests and identities are paramount
- Sharing of capabilities and management is desirable
- Use governance to promote coordination and communication
- Non-federal requirements are considered in making investment choices.

Implementation Requirements

- No management actions would be required to implement this option.

Alternate Future #2: Enhanced Governance

Overview - This option strengthens interagency wildland fire IT governance by establishing an executive level governance board that will review and approve all wildland fire IT investments prior to submitting to the agency investment approval authorities. This governance board will establish a single, integrated strategic plan for wildland fire IT for submission to those approval authorities and will use the plan to guide future investment decisions. The NWCG Executive Board will provide their views on requirements and priorities, as will other stakeholder groups like the research community. The Interagency Wildland Fire Governance Board will be supported by an Interagency Program Staff that will have responsibility for managing the investment review/approval process, developing standards (data and other), coordinating project management, maintaining a comprehensive inventory of wildland fire investments and status, and maintaining and updating the NWFEA. All wildland fire IT projects will be managed through the executive governing board to ensure consistency with strategic requirements and priorities. Individual agency IT management organizations will be responsible for project management and application operations and maintenance. The relationships among various entities are illustrated in Figure 2.

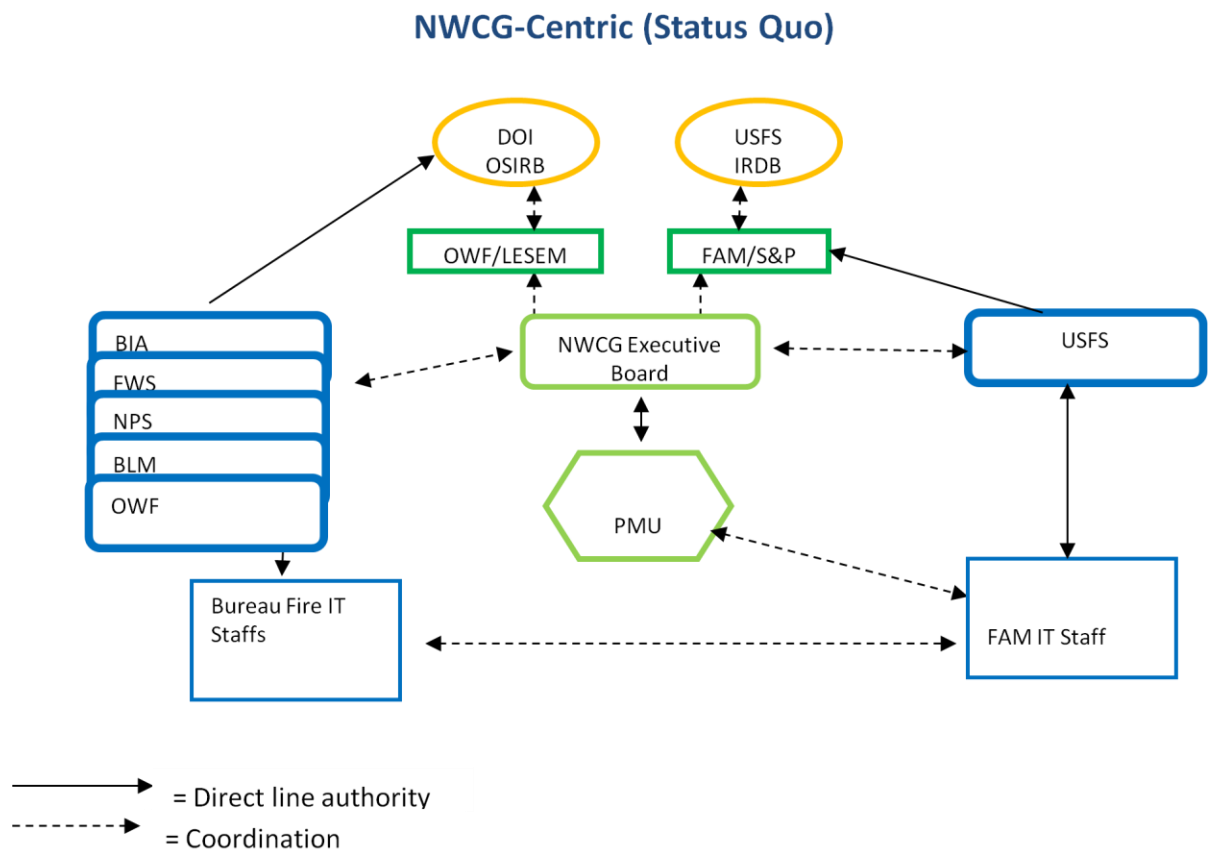

Figure 2 - Enhanced Governance Alternate Future

Vision – Interagency coordination of development and implementation of IT/technology solutions based on common strategies, priorities, and standards for investments.

Doctrinal Principles

- Operational IT efficiencies and interoperability are important to provide safe and cost-effective operations
- Sharing and integration of capabilities and management is essential for meeting user requirements and achieving cost savings
- Investment choices and the management of those investments are governed by common federal mission, goals, and objectives
- Integrated executive governance ensures consistency and unity of effort
- Non-federal requirements are considered in making investment choices

Implementation Requirements

- Determination of the size, membership, and specific authorities and responsibilities of the Interagency Wildland Fire Governance Board and joint chartering by the Department of the Interior and Forest Service. Conceptually the board is small (perhaps 3-5) and is comprised of senior executives with broad management responsibility and perspective.
- Determination of the size, responsibilities, and organization of the interagency program staff and their reporting relationship to the governance board. Some of the staff could be drawn from the current NWCG PMU and agency wildland fire IT organizations. However, current

capacity for strategic planning, investment planning, and portfolio oversight is limited. Additional capacity would need to be added.

- NWCG organizations and relationships would be significantly changed.
- Existing agency wildland fire IT organizations would be minimally affected.

Alternate Future #3: Unified Fire IT Organization

Overview - This option continues the concepts and organization of the Enhanced Governance alternate future and integrates the existing agency wildland fire IT organizations with the interagency program staff to create single unified wildland fire IT organization. This organization, reporting to the Interagency Wildland Fire Governance Board, would have not only the planning and management functions of the interagency program staff but also responsibility for project development, application operations and maintenance, and related technology and infrastructure development and management in support of wildland fire business requirements. Each agency wildland fire director would likely retain some in-house IT advisor/support capability related to their specific needs and requirements. The relationships among various entities are illustrated in Figure 3.

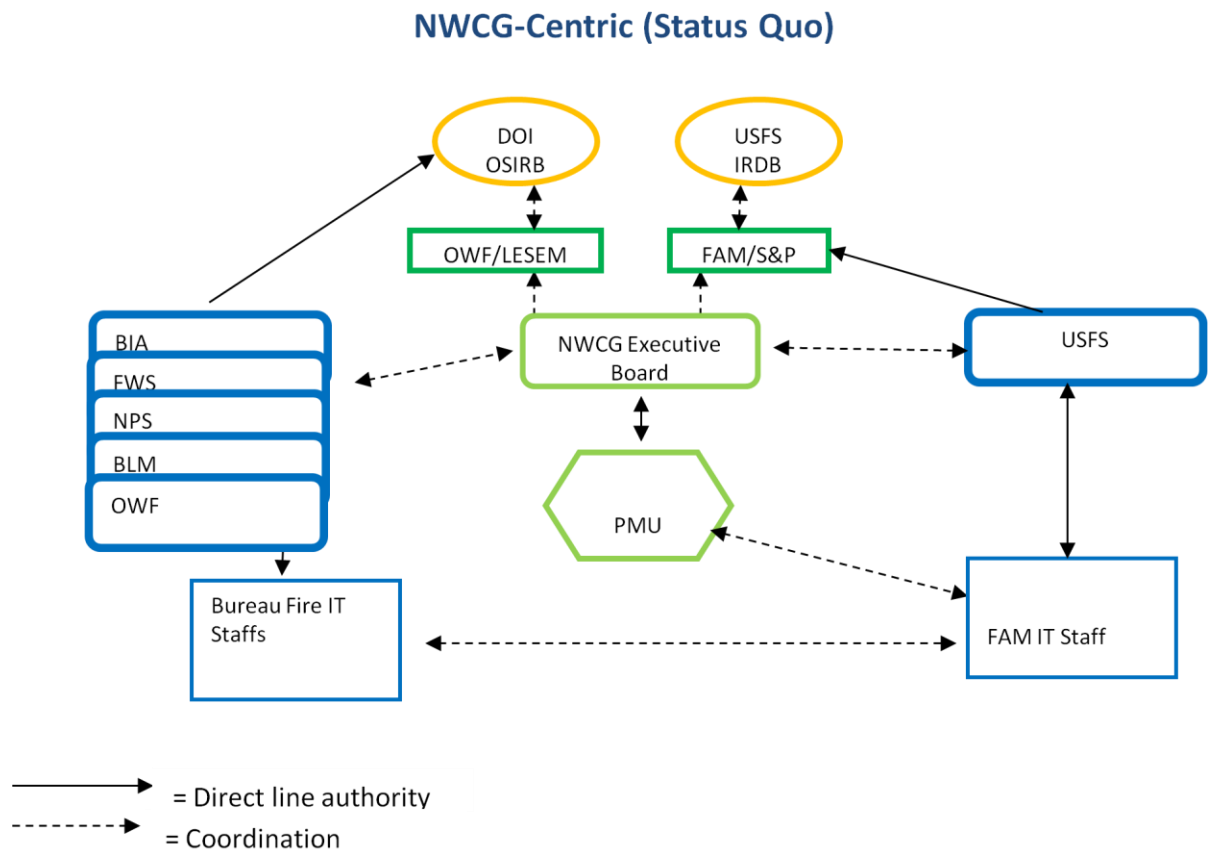

Figure 3 - Unified Fire IT Organization Alternate Future

Vision - Federal wildland fire agencies operate as a virtual single agency to develop, implement, and manage IT/technology solutions that meet mission and program requirements in a holistic, integrated manner.

Doctrinal Principles

- Operational IT efficiencies and interoperability are important to provide safe and cost-effective operations
- Sharing and integration of capabilities and management is essential for meeting user requirements and achieving cost savings
- Investment choices and the management of those investments are governed by common federal mission, goals, and objectives
- Integrated executive governance ensures consistency and unity of effort
- Consolidated, integrated organizations maximize efficient use of resources
- Non-federal requirements are considered in making investment choices

Implementation Requirements

- Determination of the size, membership, and specific authorities and responsibilities of the unified fire organization
- Significant restructuring and reconfiguration of current agency wildland fire IT organizations would be required

Alternate Future #4: Integrated Investment Boards

Overview - This option continues the concepts and organization of the Unified Fire IT Organization alternate future and adds an explicit linkage of the investment approving bodies ("IRBs") of the Forest Service and the Department of the Interior for the purposes of approving wildland fire IT strategic planning, investments, and consideration of related infrastructure and technology issues that arise in the wildland fire interagency working environment. Under this option the two IRBs would meet jointly from time to time to consider all wildland fire related matters in a single line of business approach.

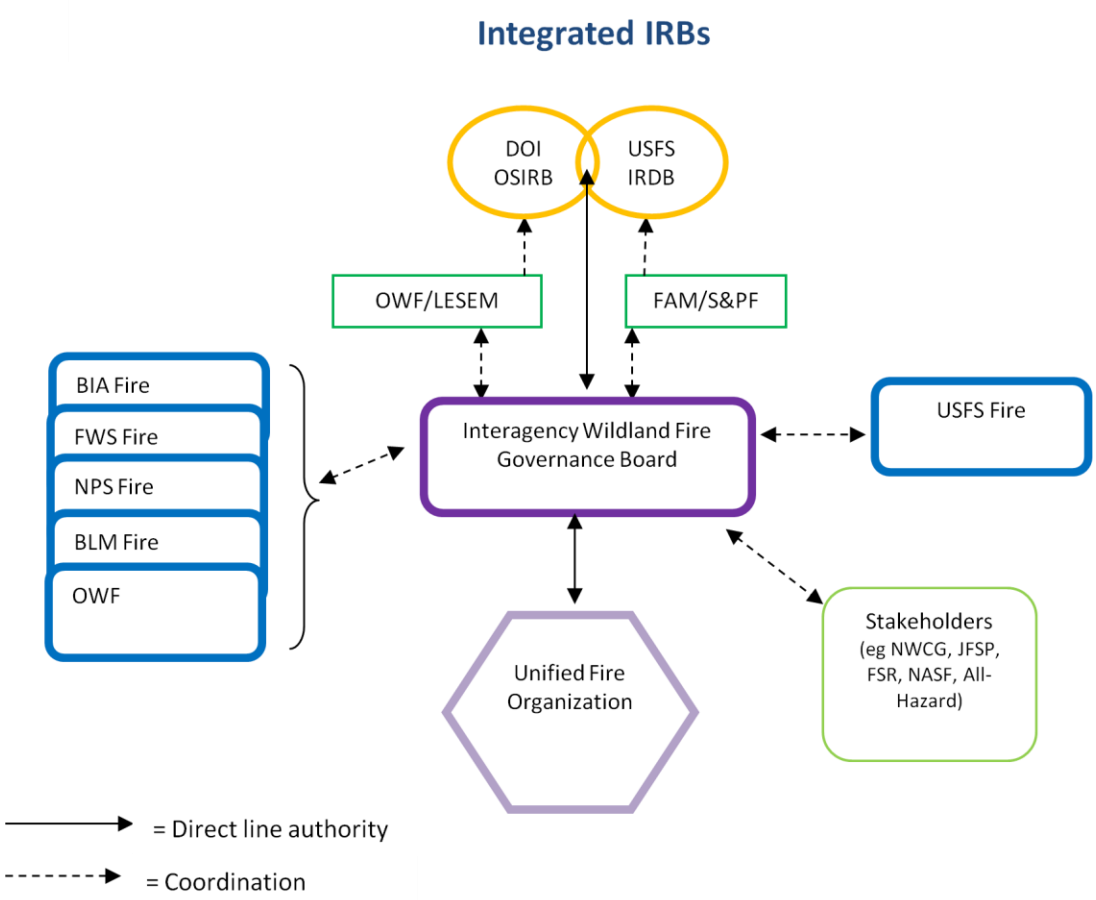

Figure 4 - Integrated IRBs Alternate Future

Vision - Federal wildland fire agencies operate as a virtual single agency to develop, implement, and manage IT/technology solutions that meet mission and program requirements in a holistic, integrated manner, with agency IRBs coordinating and sharing decision-making on wildland fire investments.

Doctrinal Principles

- Operational IT efficiencies and interoperability are important to provide safe and cost-effective operations
- Sharing and integration of capabilities and management is essential for meeting user requirements and achieving cost savings
- Investment choices and the management of those investments are governed by common federal mission, goals, and objectives
- Joint agency decision making on priorities and investments creates efficiencies
- Common mission, goals, objectives, and standards guide and inform agency investments
- Integrated executive governance ensures consistency and unity of effort
- Consolidated, integrated organizations maximize efficient use of resources
- Non-federal requirements are considered in making investment choices

Implementation Requirements

- Forest Service and Department of the Interior agreement to consider wildland fire as a single line of business for IT management purposes
- Coordination of IRB procedures and schedules

Alternate Future #5: All Lands/All Hands

Overview – Under this option the executive level governance structure for reviewing, approving, and managing IT investments would be broadened to include non-federal interests (primarily wildland fire programs) and other federal program areas such as land/resource management, science, and emergency management. The unified wildland fire IT organization in the above options would continue, but work in collaboration with similar entities in other program areas. The governance board would be expanded to include representatives from other program areas.

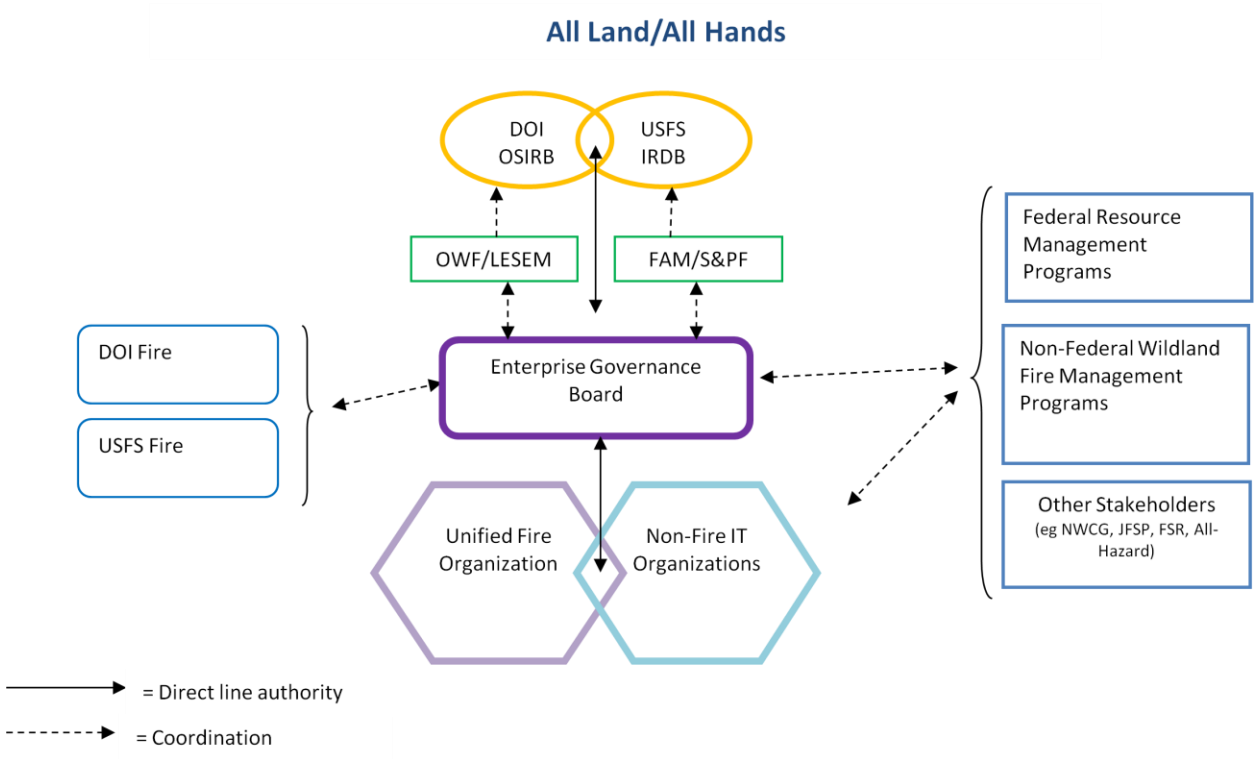

Figure 5 - All Lands/All Hands Alternate Future

Vision - Wildland fire IT/technology solutions are integrated with other related program areas and with non-federal partners

Doctrinal Principles

- Operational IT efficiencies and interoperability are important to provide safe and cost-effective operations

- All wildland fire IT investments meet federal and non-federal interagency user requirements
- All users of wildland fire IT applications are part of the investment decision process
- Wildland fire IT solutions are integrated with other programs
- Common data and technical standards are met by all applications
- Investment choices and the management of those investments are governed by common mission, goals, and objectives
- Interdisciplinary and intergovernmental governance improves the overall quality of investment decisions

Implementation Requirements

- Expansion of the membership, roles, functions, and authorities of the governance board; likely to require chartering of a Federal Advisory Committee
- Coordination of IT management procedures and schedules

LIFE-CYCLE MANAGEMENT

The February 22, 2001, Assignment memo requested that this report include:

"2. *A management organization for the wildland fire IT applications portfolio, including project conception and analysis, project approval, project management, and steady-state operations and maintenance, with clear and accountable leadership.*

3. *A process for setting investment priorities and for reviewing/approving/ implementing investment decisions within the wildland fire community."*

Both of these elements touch on the life-cycle management process as shown in Figure 6, below.

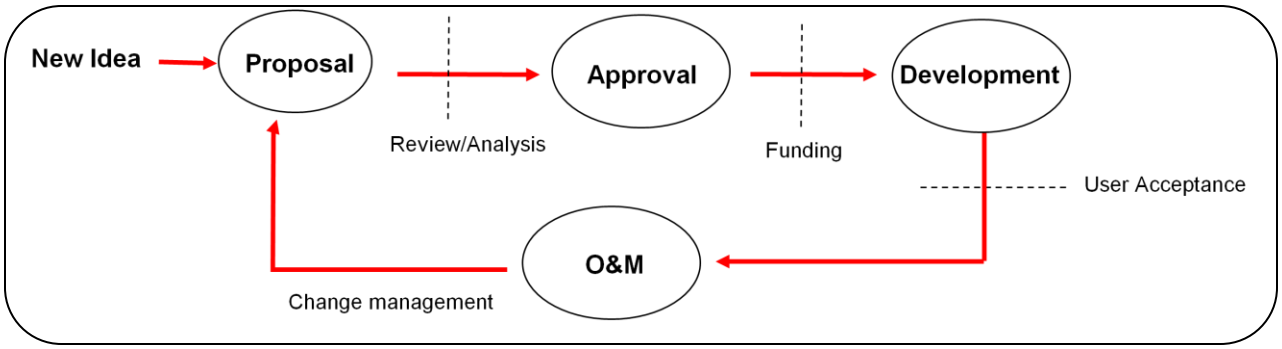

Figure 6

Idea/Proposal - Ideas or proposals may come from users, NWCG committees, changes from existing applications, research results, external sources, and so on.

Review/Analysis – Ideas or proposals are reviewed to ensure proposal meets business requirements and priorities; has a good business case; meets security, infrastructure, and other requirements; has funding and management provisions; and so on.

Approval – Governance authority approves idea or proposal based on review/analysis.

Funding – Approved project receives funding through appropriate budget process.

Development – Project development using appropriate project management processes to ensure approved and funded projects are implemented.

User Acceptance – Upon completion of project development, product is formally accepted prior to moving to operations and maintenance.

Operations and Maintenance – Project is in steady state, using a change management process to keep the application current, meet new requirements, or retire. Significant changes and updates are reviewed and approved through the life-cycle management process.

Figure 7 shows how the life-cycle management process works for each of the five Alternate Futures presented above.

Life-cycle Management Process and Responsibilities for Alternate Futures

	Idea/Proposal	--->	Review & Analysis	--->	Recommendations & Approval					--->	Funding	--->	Development	--->	O&M		Portfolio Management & Oversight
					Recommend	-->	Concur	-->	Approve								
Status Quo	Users* Fire Directors Fire Executives Research Others		**PMU** IT Committee Agency staffs		NWCG Exec Board Agencies		DOI OWF FS FAM Agencies		**DOI OSIRB** **FS IDRB**		NWCG FS FAM DOI OWF DOI bureaus (fire)		**Agencies as managing partners**		**Agencies as managing partners**		PMU Agencies
Enhanced Governance	Users* Fire Directors Fire Executives Research Others		**IPS**** IT Committee Agency staffs		NWCG Exec Board Other Stakeholders		**Executive Governance Board**		**DOI OSIRB** **FS IDRB**		**FS FAM** **DOI OWF**		**Agencies as managing partners**		**Agencies as managing partners**		**IPS**
Unified IT Organization	Users* Fire Directors Fire Executives Research Others		**UFO***** IT Committee		NWCG Exec Board Other Stakeholders		**Executive Governance Board**		**DOI OSIRB** **FS IDRB**		**FS FAM** **DOI OWF**		**UFO**		**UFO**		**UFO**
Integrated IRBs	Users* Fire Directors Fire Executives Research Others		**UFO** IT Committee		NWCG Exec Board Other Stakeholders		**Executive Governance Board**		**DOI OSRB & FS IDRB**		**FS FAM** **DOI OWF**		**UFO**		**UFO**		**UFO**
All Lands/All Hands	Users* Fire Directors Fire Executives Research Others		**UFO** IT Committee		NWCG Exec Board Other Stakeholders		**Executive Governance Board**		**DOI OSRB & FS IDRB**		**FS FAM** **DOI OWF**		**UFO**		**UFO**		**UFO**

Bold indicates lead responsibility when applicable

*Users is a broad term covering field users, NWCG committees, research results, changes to existing applications, etc.

** IPS = Interagency Program Staff

*** UFO = Unified Fire Organization

Figure 7- Life-Cycle Management Alternatives

FINDINGS, CONCLUSIONS, AND OBSERVATIONS

Blueprint Goals and Recommendations

The four goals of the NWFEA Blueprint (see page 5 of this report) remain sound as do most of the associated recommendations. However, to date there has been no mechanism to move forward with implementation of the goals and recommendations due to a lack of governance and organizational structure with sufficient authority and responsibility.

Vision of the Future

At this time there is no clear, shared, agreed upon vision for wildland fire IT at the enterprise level to guide setting of investment priorities and the evaluation of investment proposals. Although the 2008 NWFEA Blueprint presents four broad goals supported by a number of objectives and recommendations these have not been approved and are not generally used in formulating and evaluating investments. Individual agencies and constituent areas within the fire community (e.g. geospatial) pursue investments and initiatives without benefit of an overarching vision or set of priorities. The draft "target architecture" that the NWCG PMU has sponsored is largely technical in nature and does not set forth a broad set of goals and user requirements.

Leadership and Governance

Simply put, there is no effective governance of wildland fire IT at this time. Various organizations and program areas sponsor discrete projects and initiatives which are funded through a variety of means. However, there is no common vision for investments and there is no overall understanding of the status, health, or nature of the investments. The NWCG has attempted to provide some structure, but it lacks the authority, jurisdiction, and budget to effectively govern all IT investments.

Organization

Responsibility for IT management is diffused among NWCG staff, NWCG Committees and Subcommittees, and individual agency wildland fire organizations. Although the NWCG structure provides opportunities for coordination and collaboration, there is no single entity responsible for coordination, integration, and consistency of management. Each application or project is the responsibility of a "managing partner" agency that works within its own set of rules and procedures. As a result, cooperation and coordination between and among agencies is difficult and enterprise approaches to data, infrastructure, security, and the like are lacking. The roles and responsibilities of project managers and managing partner agencies are ambiguous and subject to wide interpretation.

Data

Data standards, common collection methods, and so on are essential for an efficient, enterprise approach to wildland fire IT. Often agencies and individual applications and projects have tailored their data standards, collection, and reporting for that agency or application making cross-agency and cross

application use difficult. The NWCG has attempted to develop standards, but has been largely unsuccessful.

Innovation

The current approach to investment approval, non-systematic and *ad hoc*, has two consequences for recognizing and embracing innovation. First, there is no simple, easy to use mechanism for those with innovative ideas to make the case for their proposals, so opportunities are lost. Second, the current structure creates incentives for organizations to work outside of the system, investing funds and effort in projects and activities that are not agency priorities. Often those informal efforts result in widely used, but unapproved, applications that pose funding as well as operations and maintenance concerns (e.g. security). One area of particular attention is linking "proof of concept" efforts taking place in the agency research community with investment decision making in wildland fire.

Technology

An integral aspect of "IT management" is the consideration of other technologies in support of wildland fire. At a minimum is the infrastructure (servers, desktops, network capacity, and so on) necessary to support IT applications. However, many more technology alternatives and options are increasingly available, such as smart phones, tablets, and unmanned aerial systems. As with information technology, there currently is no vision or strategy for new technologies, no understanding of user requirements and priorities, and little in the way of governance mechanisms for evaluating and making investment decisions.

Partnerships

Much of the discussion about better management and investment in wildland fire information technology has focused on the interface and collaboration between the Forest Service and the DOI bureaus. However, a number of other partnerships exist, or are emerging. One of the longest standing partnerships is between the federal agencies and states and other non-federal wildland fire agencies. Those agencies are integral operational partners and rely upon and share many of the federal IT systems. Assessment of requirements, establishing priorities, and coordinating standards requires collaboration with those non-federal partners. The Land Fire project, now program, illustrates an opportunity to partner between wildland fire requirements and those of other land managers. Much of the data in Land Fire is readily usable for non-fire resource management activities; enhancements to the basic system could increase its value to non-fire users. Finally, the growing adoption by other emergency management entities of wildland fire developed incident management tools, such as qualifications and resource ordering, creates both opportunities for partnerships and complexity to the governance and management of those tools and systems. Adapting and modifying tools and systems for broader uses rather than re-creating them is an efficient use of limited investment resources. Yet, the current governance structures for wildland fire IT do not easily incorporate the interests and needs of these non-fire users.

Change

The current approach to the management of information and other technology in wildland fire lacks enterprise level vision and accountability, inefficiently uses limited resources, and has significant caps in capabilities and capacities. The ideal of an enterprise approach, or in the words of the NWFEA Blueprint "a virtual single agency," presents many advantages to users and to agencies. The reality of an enterprise approach runs counter to long established business processes and organizational prerogatives. Changing the governance, the vision and strategy, the organization, and the partnerships in order to improve services and efficiencies will require a sustained, multi-year management commitment to changing cultures as well as organizations and business processes.

OPTIONS FOR IMPLEMENTATION OF THE BLUEPRINT

The February 22, 2011, assignment memorandum requested a set of options for implementation of the NWFEA Blueprint, to include five specific elements. This section of the report provides a cross-walk between those elements and various portions of the report.

1. ***Establishment of a governance structure that has clear decision-making authority within the wildland fire community and that interfaces with department and agency IT governance structures.***

   Of the five alternate futures presented above, four contain a governance structure that meets the terms of this element. Alternate Future 1, Status Quo, does not provide clear decision-making authority within the wildland fire community and that interfaces with department and agency IT governance structures.

2. ***A management organization for the wildland fire IT applications portfolio, including project conception and analysis, project approval, project management, and steady-state operations and maintenance, with clear and accountable leadership.***

   Of the five alternate futures presented above, four contain organizational structures that meet the terms of this element. Alternate Future 1, Status Quo, does not provide clear and accountable leadership.

3. ***A process for setting investment priorities and for reviewing/approving/ implementing investment decisions within the wildland fire community.***

   Each of the five alternate futures presented above provides for an investment setting process, as show in Figure 7, page 27.

4. ***A process for completing and approving a target application architecture.***

   Each of the five alternate futures presented could include a process for completing and approving a target application architecture. However, Alternate Future 1, Status Quo, does not provide clear roles and responsibilities for the development, review, and approval of such an architecture.

5. ***A high level implementation schedule with responsibilities, dependencies, and target dates, including a transition plan for moving from the current set of governance/management structures and portfolio of projects and applications.***

   The following section of this report, "Recommendations and Actions," sets out an implementation approach.

RECOMMENDATIONS AND ACTIONS

Addressing the various issues in wildland fire information and technology management require addressing governance, vision and strategy, organizational capacity, and new partnerships. We believe that the combination of those elements to best meet program requirements and increase efficiencies is reflected in Alternate Future 4, which would strengthen governance, consolidate capacity, and provide common agency investment strategies and approvals. Achieving Alternate Future 4 within a 3-5 year period is realistic. Ultimately, stronger partnerships with other agency disciplines and programs, as well as with partners outside of the federal wildland fire agencies are desirable – as might occur in Alternate Future 5.

We recommend that a series of steps be taken to move to Alternate Future 4, starting with strengthening governance and vision, then beginning to merge or consolidate function and organizations, and eventually operating under a common agency investment framework. Establishing clear and strong executive leadership and direction is necessary and critical first step.

In addition, the Department of the Interior is required to develop a "roadmap" for wildland fire investments by the end of 2011. Given the common set of business requirements among all federal wildland fire agencies and the integrated nature of much of current the set of investments, a "DOI-only" roadmap would make little sense.

Thus, the following actions should be taken as soon as possible:

1. **Strengthen and consolidate governance**

   Establish a single, executive level governance body as described in Alternative Future 2.

2. **Organizational support**

   Establish an interagency information and technology support capability as described in Alternate Future 2.

3. **Vision and strategy**

   Develop and adopt common wildland fire information and technology vision and strategy for use in evaluating current and new investments.

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APPENDIX - ALTERNATE FUTURES COMPARISON

	1. Status Quo – NWCG-Centric	2. Enhanced Governance	3. Unified Fire IT Organization	4. Integrated IRBs	5. All Lands/ All Hands
OVERVIEW OF THE ALTERNATIVES					
Description *(Summary of the Alternate Future)* *[red text indicates significant changes from prior alternate future]*	• Coordination and review of investments by NWCG Executive Board and staff • Agencies make and implement investment decisions • NWCG PMU maintains EA • Projects and investments are managed by individual agencies, with coordination by NWCG • Limited enterprise data and other standards • Investments may be interagency or single-agency	• Interagency executive-level fire governance board sets vision, priorities, and approves interagency fire investments prior to submittal to agency IRBs • An interagency staff provides direct support to the executive governance board, maintains investment portfolio, maintains EA, develop standards, and coordinates project management/execution • Single, integrated strategic plan and high level architecture is approved by agency IRBs; all investments must fall within this plan • NWCG Executive Board and other entities provide advice to executive governance board • Enterprise data and other standards are applied to all projects and applications • Agencies implement investment decisions; projects and investments are managed by individual agencies • All investments in fire IT are handled through this process	• Interagency executive-level fire governance board sets vision, priorities, and approves interagency fire investments prior to submittal to agency IRBs • Unified, interagency fire IT management organization provides direct support to the executive governance board, maintains investment portfolio, maintains EA, develop standards, and conducts project management/execution • Unified, integrated strategic plan and high level architecture is approved separately by agency IRBs; all investments must fall within this plan • NWCG Executive Board and other entities provide advice to executive governance board • Enterprise data and other standards are applied to all projects and applications • Projects and investments are "owned" by individual agencies but managed through the unified fire IT organization • All investments in fire IT are handled through this process	• Interagency executive-level fire governance board sets vision, priorities, and approves interagency fire investments prior to submittal to agency IRBs • Unified, interagency fire IT management organization provides direct support to the executive governance board, maintains investment portfolio, maintains EA, develop standards, and conducts project management/execution • Unified, integrated strategic plan and high level architecture is approved by agency IRBs; all investments must fall within this plan • NWCG Executive Board and other entities provide advice to executive governance board • Enterprise data and other standards are applied to all projects and applications • Projects and investments are "owned" by individual agencies but managed through the unified fire IT organization • All investments in fire IT are handled through this process • Agency IRBs work jointly to review and approve fire IT strategies and investments	• Interagency executive-level strategic direction and approval process that includes non-fire programs and non-federal entities • Agency IRBs work jointly to review and approve fire investments and integrate with other business areas • Unified, interagency fire IT management organization is responsible for EA, planning, standards, project development, and application O&M • Unified, integrated strategic plan and high level architecture is approved by agency IRBs; all investments must fall within this plan • All federal investments in fire IT are handled through this process

	1. Status Quo – NWCG-Centric	2. Enhanced Governance	3. Unified Fire IT Organization	4. Integrated IRBs	5. All Lands/ All Hands
Vision *(Statement about what the organization wants to become)*	Individual agencies develop and implement IT/technology solutions based on their priorities and requirements, seeking opportunities to share data, applications, and management.	Interagency governance and coordination of development and implementation of IT/technology solutions based on common strategies, priorities, and standards for investments.	Federal wildland fire agencies operate as a virtual unified agency to develop, implement, and manage IT/technology solutions that meet mission and program requirements in a holistic, integrated manner.	Federal wildland fire agencies operate as a virtual unified agency to develop, implement, and manage IT/technology solutions that meet mission and program requirements in a holistic, integrated manner, with agency IRBs coordinating and sharing decision-making on wildland fire investments.	Wildland fire IT/technology solutions are integrated with other related program areas and with non-federal partners
Doctrine *(Principles to guide actions)*	• Operational IT efficiencies and interoperability are important to provide safe and cost-effective operations • Agency and department interests and identities are paramount • Sharing of capabilities and management is desirable • Use governance to promote coordination and communication • Non-federal requirements are considered in making investment choices	• Operational IT efficiencies and interoperability are important to provide safe and cost-effective operations • Sharing and integration of capabilities and management is essential for meeting user requirements and achieving cost savings • Investment choices and the management of those investments are governed by common federal mission, goals, and objectives • Integrated executive governance ensures consistency and unity of effort • Non-federal requirements are considered in making investment choices	• Operational IT efficiencies and interoperability are important to provide safe and cost-effective operations • Sharing and integration of capabilities and management is essential for meeting user requirements and achieving cost savings • Investment choices and the management of those investments are governed by common federal mission, goals, and objectives • Integrated executive governance ensures consistency and unity of effort • Consolidated, integrated organizations maximize efficient use of resources • Non-federal requirements are considered in making investment choices	• Operational IT efficiencies and interoperability are important to provide safe and cost-effective operations • Sharing and integration of capabilities and management is essential for meeting user requirements and achieving cost savings • Investment choices and the management of those investments are governed by common federal mission, goals, and objectives • Joint agency decision making on priorities and investments creates efficiencies • Common mission, goals, objectives, and standards guide and inform agency investments • Integrated executive governance ensures consistency and unity of effort • Consolidated, integrated organizations maximize efficient use of resources • Non-federal requirements are considered in making investment choices	• Operational IT efficiencies and interoperability are important to provide safe and cost-effective operations • Sharing and integration of capabilities and management is essential for meeting user requirements and achieving cost savings • All wildland fire IT investments meet federal and non-federal interagency user requirements • All users of wildland fire IT applications are part of the investment decision process • Wildland fire IT solutions are integrated with other programs • Common data and technical standards are met by all applications • Investment choices and the management of those investments are governed by common mission, goals, and objectives • Interdisciplinary and intergovernmental governance improves the overall quality of investment decisions

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TOPICS SPECIFICALLY CALLED OUT IN TASKING MEMO					
Governance *(Set strategic direction, ensure objectives are met, manage risks, allocate resources, structure for decision making)*	• Agencies set direction and priorities with some coordination by NWCG structure • Agencies may sponsor investments without NWCG review • NWCG Executive Board reviews projects and approves/endorses; forwards to agencies for approval and funding • Projects are funded, approved, and managed by each agency • Each agency is responsible and accountable for status and health of all projects • Agency-specific applications are allowed	• New executive level Interagency Wildland Fire Governance Board (IWFGB) sets strategic objectives and direction • IWFGB reviews and approves all projects and funding prior to forwarding to DOI and USFS investment review entities • IWFGB is responsible and accountable for status and health of all projects • The NWCG Executive Board and other stakeholders (e.g. research) advises the IWFGB on requirements and priorities • Interagency Program Staff provides direct support to the IWFGB • Agencies implement investment decisions; projects and investments are managed by individual agencies • All investments in fire IT are handled through this process • DOI and FS investment decision making organizations receive common information about investments but make independent decisions	• New executive level Interagency Wildland Fire Governance Board (IWFGB) sets strategic objectives and direction • IWFGB reviews and approves all projects and funding prior to forwarding to DOI and USFS investment review entities • IWFGB is responsible and accountable for status and health of all projects • The NWCG Executive Board and other stakeholders (e.g. research) advises the IWFGB on requirements and priorities • Interagency Program Staff provides direct support to the IWFGB • Agencies implement investment decisions; projects and investments are managed by individual agencies • All investments in fire IT are handled through this process • DOI and FS investment decision making organizations receive common information about investments but make independent decisions	• New executive level Interagency Wildland Fire Governance Board (IWFGB) sets strategic objectives and direction • IWFGB reviews and approves all projects and funding prior to forwarding to DOI and USFS investment review entities • IWFGB is responsible and accountable for status and health of all projects • The NWCG Executive Board and other stakeholders (e.g. research) advises the IWFGB on requirements and priorities • Interagency Program Staff provides direct support to the IWFGB • Agencies implement investment decisions; projects and investments are managed by individual agencies • All investments in fire IT are handled through this process • DOI and FS investment decision making organizations make joint decisions about wildland fire investments	• New intergovernmental executive level Enterprise Governance Board (EGB) sets strategic objectives and direction for both federal and non-federal • EGB reviews and approves all projects prior to forwarding to DOI and USFS and non-federal investment review entities • EGB is responsible and accountable for status and health of all projects • All projects are intergovernmental; no agency-specific projects are allowed without interagency concurrence • DOI and FS investment decision making organizations make joint decisions about common program investments

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Portfolio Management Organization *(Oversight of status and condition of projects and applications)*	• Each agency is responsible for managing and tracking status of its investments • Each agency fire organization maintains an IT management organization • NWCG IT Committee and NWCG PMU coordinate and monitor, but have no reporting or other accountability requirements	• A new Interagency Program Staff (built from and around elements of the NWCG PMU and agency IT organizations) coordinates and leads management of the interagency IT portfolio in association with agency IT management organizations • Interagency Program Staff coordinates review of project proposals and provides the IWFGB with reporting and accountability for all projects and applications • Each agency fire organization maintains an IT management organization for project management and implementation	• Unified federal interagency IT management organization is responsible for managing and tracking status of all wildland fire investments • IT management organization coordinates review of project proposals and provides the IWFGB with reporting and accountability for all projects and applications • Each agency fire organization has a IT 'advisor' capability but not an IT management organization	• Unified federal interagency IT management organization is responsible for managing and tracking status of all wildland fire investments • IT management organization provides the IWFGB with reporting and accountability for all projects and applications • Each agency fire organization has a IT 'advisor' capability but not an IT management organization	• Unified intergovernmental IT management organization is responsible for managing and tracking status of all wildland fire investments • IT management organization provides the EGB with reporting and accountability for all projects and applications • Each agency fire organization has a IT 'advisor' capability but not an IT management organization
Project Application Management *(Management of project development, steady state O&M, and change management)*	• Each project/application is managed uniquely (project & business management, O&M, change management boards)	• Each project/application is managed (project & business management, O&M, change management boards, etc.), by the designated "owning" agency following guidelines promulgated by Interagency Program Staff to ensure consistency and collaboration	• Standardized protocols and standards for project & business management, O&M, change management boards are followed by all projects and applications • All projects and applications are managed by the unified federal interagency IT management organization	• Standardized protocols and standards for project & business management, O&M, change management boards are followed by all projects and applications • All projects and applications are managed by the unified federal interagency IT management organization	• Standardized protocols and standards for project & business management, O&M, change management boards are followed by all projects and applications
Enterprise Architecture & Blueprint	• Current EA/Blueprint minimally supported by NWCG PMU; not a management priority	• A new Interagency Program Staff maintains EA and updates Blueprint • Blueprint serves as a guide for evaluating proposed investments	• Unified federal interagency IT management organization maintains EA and updates Blueprint • DOI and FS investment decision making organizations	• Unified federal interagency IT management organization maintains EA and updates Blueprint • DOI and FS investment decision making organizations	• Unified intergovernmental IT management organization maintains EA and updates Blueprint • DOI and FS investment decision making organizations

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		• DOI and FS investment decision making organizations each approve the Blueprint	each approve the Blueprint	jointly approve the Blueprint	jointly approve the Blueprint in context of other agency programs
Capital Planning and Investment Control (CPIC) *(Interface with agency CPIC procedures and guidelines)*	• CPIC requirements are met by each agency that sponsors/owns a project, following agency guidelines	• A new Interagency Program Staff manages CPIC in coordination with agency IT management organizations • Interagency Program Staff coordinates and harmonizes DOI/FS requirements	• Unified federal interagency IT management organization manages CPIC • Staff coordinates and harmonizes DOI/FS requirements	• CPIC requirements are met by the unified IT management organization • DOI and FS IRBs provide common guidance/ requirements	• CPIC requirements are met by the unified IT management organization • DOI and FS IRBs provide common guidance/ requirements
ADDITIONAL TOPICS AND ISSUES					
Strategic Planning and Direction *(Establishing a vision, direction, and set of priorities to meet business requirements)*	• Each agency set requirements and priorities, which are coordinated informally among the agencies and by the NWCG committee structure	• Common vision, strategy, and multi-year planning, including a "target architecture," is coordinated by the Interagency Program Staff and approved by the IWFGB • NWCG Executive Board and other stakeholders provide input	• Unified wildland fire IT organization develops and maintains interagency requirements, etc. • IWFGB sets interagency strategic objectives, direction, and priorities • DOI and FS IRBs separately review and approve strategies and priorities	• Unified wildland fire IT organization develops and maintains interagency requirements, etc. • IWFGB sets interagency strategic objectives, direction, and priorities • DOI and FS IRBs jointly review and approve strategies and priorities	• Unified wildland fire IT organization develops and maintains interagency requirements, etc. • EGB sets interagency and interdisciplinary strategic objectives, direction, and priorities • DOI and FS IRBs jointly review and approve strategies and priorities
Data Standards *(Common standards for data in wildland fire applications)*	• NWCG subcommittee coordinates development of data standards • Minimal common standards • Agencies and applications may develop own standards	• Development of federal common standards is coordinated by the Interagency Program Staff and approved by the IWFGB • Standards apply to all projects and applications	• Unified wildland fire IT organization develops and maintains federal common standards in consultation with non-federal partners • All agencies and applications must adhere to these standards	• Unified wildland fire IT organization develops and maintains federal common standards in consultation with non-federal partners • All agencies and applications must adhere to these standards	• Develop common intergovernmental standards • All agencies and applications must adhere to these standards

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Managing Innovation *(Consideration of new ideas for information technology systems and other technologies)*	• Ad hoc paths for new ideas to be considered • New applications are often developed outside of interagency wildland fire community	• Initiatives and review of proposals for innovation are developed and coordinated through the Interagency Program Staff and approved by the IWFGB • New applications or use of technologies may be developed outside of interagency wildland fire community governance and organization	• Initiatives and review of proposals for innovation are developed and coordinated through the Interagency Program Staff and approved by the IWFGB • No development of new applications or use of technologies outside of interagency wildland fire community governance and organization	• Well defined paths for new ideas to be considered • No development of new applications or use of technologies outside of interagency wildland fire community governance and organization	• Well defined paths for new ideas to be considered • No development of new applications or use of technologies outside of interagency wildland fire community governance and organization
Funding *(Sources and levels of funding)*	• Combination of interagency "NWCG" funds and individual agency fire program funds • NWCG does not have authority to commit funds towards DME or O&M outside of its limited budget	• IFWFGB determines funding sources from among DOI and FS fire budgets	• IFWFGB determines funding sources from among DOI and FS fire budgets	• IFWFGB determines funding sources from among DOI and FS fire budgets	• IFWFGB determines funding sources from among DOI and FS fire budgets and may include non-federal funds
Defining and Advancing User Requirements *(Understanding user requirements and aligning priorities)*	• NWCG Executive Board, PMU, and NWCG Committees coordinate and discuss requirements and priorities • Each agency fire organization may have its own requirements and priorities	• Interagency Program Staff recommends requirements and priorities • Requirements and priorities for interagency efforts set by IWFGB • No separate agency requirements and priorities	• Unified Fire IT Organization recommends requirements and priorities • Requirements and priorities for interagency efforts set by IWFGB • No separate agency requirements and priorities	• Unified Fire IT Organization recommends requirements and priorities • Requirements and priorities for interagency efforts set by IWFGB • No separate agency requirements and priorities	• EGB determines requirements and priorities • No separate agency requirements and priorities

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