

**The USNORTHCOM Integrated Architecture:  
Developing and managing a capabilities-based architecture as a program  
to enhance the Homeland Defense and Military Assistance to Civil Authorities  
Mission Areas**

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**Abstract**

The United States Northern Command (USNORTHCOM) Integrated Architecture is a capabilities-based methodology, grounded in the two missions of the command: Homeland Defense (HLD) and Military Assistance to Civil Authorities (MACA). USNORTHCOM has identified 17 critical warfighting capabilities and 13 Joint Mission Essential Tasks (JMETS) that enable those capabilities. The command architecture provides a means of describing and assessing/analyzing the infrastructure, personnel, and organization to perform those tasks.

This approach requires a collaborative process that utilizes an integrated, capabilities-based architecture to identify prioritized capability requirements, gaps and shortfalls, and integrated doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) solutions. Gaps in command capabilities, operational requirements, and associated risks are identified via analysis between the “As-Is” and “To-Be” architectures. Time-phased capabilities are illustrated in the transition and sequencing plans.

The architecture process has several key ‘touchpoints’ to other USNORTHCOM processes and functions, namely, the IT investment management, resource allocation, and capabilities-based acquisition processes. The USNORTHCOM Chief Architect manages the development and maintenance of the command’s architecture as a program, structuring the office as a program management office (PMO).

Lastly, the paper delineates the triad of capabilities-based architecture, investment management decision support, and implementation.

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## **1.0 Introduction**

Due to the nature of its mission, the DOD possesses some of the most structured processes and mature practices in the Federal Government. The DOD was one of the first Federal agencies to embrace the use of architectural principles and practices in the management of information technology and its return on investment (ROI). Consequently, the DOD is recognized as the source of many processes that can be applied throughout the public and private sector.

Traditionally, organizations have scrutinized their information technology investments more for cost than benefits or enhanced capability. With increased budgets for information technology, organizations are now questioning the benefits of these investments more closely. The clear trend, at present and for the future, is that benefits and derived capabilities will be the major concern for information technology investments. In this environment, Enterprise Architecture (EA) becomes a vital candidate for this scrutiny and planning.

EA, as a discipline and practice, addresses the linkage between an organization's strategic plan and its implementation of both information technology and non-materiel solutions. An EA is more than simply a plan that optimizes existing information technology and ensures its alignment with strategic goals. EA adds a crucial element of control, ensuring the proper integration of changes in corporate practices and non-materiel solutions as well as new or advanced technologies into an agency's architecture. Properly designed, the EA provides a coherent presentation of all the policies, standards, and procedures, as well as evaluation and oversight tools, necessary to enforce the mandates of the Clinger-Cohen Act of 1996 and Federal Enterprise Architecture.

As a newly established enterprise, USNORTHCOM has embraced the concepts and precepts of the Federal and DOD Enterprise Architecture discipline. The command is using both mature, time tested and new, innovative methodologies to develop, maintain, and integrate the EA with the command's pressing needs for efficient and cost-saving investment management, capital planning and control, and capabilities-based acquisitions. This article addresses USNORTHCOM's generation and use of its EA, the identification of key interfaces or '*touchpoints*' between the Chief Architect's Office (CAO) and the functions of operations, investment management, and acquisition.

## **2.0 USNORTHCOM Background**

United States Northern Command (USNORTHCOM) was established during the summer of 2002, obtaining Initial Operational Capability (IOC) on 1 October 2002 and Final Operational Capability (FOC) on 11 September 2003. The United States Northern Command Integrated Architecture is a capabilities-based product, grounded in the two missions of the command: Homeland Defense (HLD) and Military Assistance to Civil Authorities (MACA).

USNORTHCOM has identified 17 critical warfighting capabilities and 13 Joint Mission Essential Tasks (JMETs) that enable those capabilities. The command architecture provides a means of describing and assessing/analyzing the infrastructure, personnel, and organization to perform those tasks.

A capability, as defined by Joint doctrine, is the ability to execute a specific course of action (COA). COAs are simply sequences of operations that can be executed to support or accomplish a mission. The capabilities-based architecture acts as a blueprint or roadmap for systems development. The blueprint can and should be a critical tool in creating a new process for conducting systems development and acquisition that focuses on delivering the interoperability needed to support concepts such as network centric warfare.

The top three command goals are to maintain and improve its capabilities to defend the United States and North America unilaterally or in concert with our allies, continue to serve as the single US-only organization solely focused on homeland defense, and deliver US capabilities to address vulnerabilities and threats to the homeland. Consequently, USNORTHCOM conducts operations to deter, prevent, and defeat threats and aggression aimed at the United States, its territories and interests within the assigned area of responsibility; and provides military assistance to civil authorities including consequence management operations as directed by the President or the Secretary of Defense.

### **3.0 Managing the Architecture as a Program**

The USNORTHCOM Enterprise Architecture is a corporate asset that must be managed as a formal program. Successful execution of the EA process is an enterprise-wide endeavor requiring management, allocation of resources, continuity, and coordination. Creating an EA Program and managing the EA as a program calls for sustained leadership and strong commitment.

The EA effort at USNORTHCOM is being treated as a formal program with full sponsorship-through the agency's CPIC or investment management process. The Chief Architect's Office (USNORTHCOM/J665) has been established as a program management office (PMO) to manage, monitor, and control the development and maintenance of the EA and associated products. J665 identifies and performs DOD and alternate approaches for EA generation, managing both in-house and outsourced contractor EA development work. J665, as the CAO, is also charged with identifying requirements, determining needed resources, and securing EA funding.

In the role of EA Program Manager, the USNORTHCOM Chief Architect has management responsibility for the overall EA program, with the authority, responsibility, and accountability for the development, maintenance, and eventual employment and use of the architecture. The Program Manager is responsible for planning, staffing, and ultimate success of the program, including acquisition of sustaining funds, negotiating schedules, timely and accurate delivery of EA products, and the establishment of an appropriate support environment that ensures proper application of architecture assets.

USNORTHCOM is in the process of generating a formal plan for EA program management. The Chief Architect is creating a program management plan (PMP) that includes a roadmap to accomplish the architecture goals set for the CAO. The PMP will delineate the plans and set of actions to develop, use, and maintain the EA, including its management, control, and oversight. The precepts of the PMP are further delineated in a USNORTHCOM Operation Instruction (OI)

to be mandated in the very near future. This Command OI will establish the architecture processes and procedures as USNORTHCOM directed activities.

J665, in the role of an EA PMO, is working very closely with USNORTHCOM's investment management staff. As one of the many architecture "*touchpoints*," this interface between the EA and ITIM (Information Technology Investment Management) is allowing for improved information sharing, enhanced IT investments, coordinated resource allocation, and improved budget generation. The architecture has become an investment management tool and an integral part of the command's infrastructure change process.

#### **4.0 GAO EAMMF Guidance**

By describing the elements of an effective EA management program, the EAMMF provides a benchmarking tool for judging an enterprise's efforts to manage architecture development and its subsequent use [IT-EAMMF, 2003]. With the core elements of the EAMMF grounded in the Federal CIO Council's "*Practical Guide*", many agencies, including USNORTHCOM have adopted the EAMMF as a *de facto* standard for measuring EA management maturity.

Using the contents of the EAMMF as success criteria, both internal and external stakeholders can assess and illustrate an enterprise's EA management strengths and weaknesses at a given point in time or over a period of time. The progressive stages of the EAMMF provide a roadmap for incremental improvement of architecture management. Lower maturity stages form a foundation for higher ones, serving as prerequisites for greater maturity.

Being simply a framework describing *what* needs to be accomplished, the EAMMF does not indicate *how* these functions are to be done. USNORTHCOM has augmented the framework with detailed criteria for each core element and has assigned an element owner *who* is responsible for directing the maturing of that functionality.

In using the EAMMF for architecture improvement planning and assessment, USNORTHCOM has recognized the need to have a completed and approved architecture that is being maintained and used to leverage organizational change through support to the investment management decision makers. This has gone a long way to implementing and maturing the command's IT management processes, controls, and structures, providing a guide and set of constraints for using the command's approved architecture in making IT investment decisions.

Figure 1 illustrates the GAO EAMMF set of core elements for the five stage maturity model. USNORTHCOM assesses its maturity based upon a three level red/yellow/green "stop light" grading scale for each element of the matrix. As of the writing of this paper, USNORTHCOM is working to achieve stage two.

STAGE 1: Creating EA awareness	STAGE 2: Building the EA Management Foundation	STAGE 3: Developing EA Products	STAGE 4: Completing EA Products	STAGE 5: Leveraging the EA to manage change
By default not satisfying Stage 2 core element classifies an organization in Stage 1. This process continues through each stage.	1. Adequate resources exist	10. Written and approved organization policy exists for EA development.	16. Written and approved organization policy exists for EA maintenance.	24. Written and approved organization policy exists for IT investment compliance with EA.
	2. Committee or group representing the enterprise is responsible for directing, overseeing, or approving EA.	11. EA products are under configuration management	17. EA products and management processes undergo independent verification and validation.	25. Process exists to formally manage EA change.
	3. Program office responsible for EA development and maintenance exists.	12. EA products describe or will describe both the "as-is" and the "to-be" environments of the enterprise, as well as a sequencing plan for transitioning from the "as-is" to the "to-be."	18. EA products describe both the "as-is" and the "to-be" environments of the enterprise, as well as a sequencing plan for transitioning from the "as-is" to the "to-be."	26. EA is integral component of IT investment management process.
	4. Chief Architect exists.	13. Both the "as-is" and the "to-be" environments are described or will be described in terms of business, performance, information/data, application/service, and technology.	19. Both the "as-is" and the "to-be" environments are described in terms of business, performance, information/data, application/service, and technology.	27. EA products are periodically updated.
	5. EA is being developed using a framework, methodology, and automated tool.	14. Business, performance, information/data, application/service, and technology descriptions address or will address security.	20. Business, performance, information/data, application/service, and technology descriptions address security.	28. IT investments comply with EA.
	6. EA plans call for describing both the "as-is" and the "to-be" environments of the enterprise, as well as a sequencing plan for transitioning from the "as-is" to the "to-be."	15. Progress against EA plans is measured and reported.	21. Organization CIO has approved current version of EA.	29. Organization head has approved current version of EA.
	7. EA plans call for describing both the "as-is" and the "to-be" environments in terms of business, performance, information/data, application/service, and technology.		22. Committee or group representing the enterprise or the investment review board has approved current version of EA.	30. Return on EA investment is measured and reported.
	8. EA plans call for business, performance, information/data, application/service, and technology descriptions to address security.		23. Quality of EA products is measured and reported.	31. Compliance with EA is measured and reported.
	9. EA plans call for developing metrics for measuring EA progress, quality, compliance, and return on investment			

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Figure 1. Enterprise Architecture Maturity Model Framework (EAMMF)

Not only has USNORTHCOM used the EAMMF as a measurement tool, but has employed the framework as a roadmap in the planning of future activities. The framework is keystone in the command's plans of managing EA development as a program and in directing that development as part of it's Program Management Plan (PMP). The EAMMF has, therefore, been used very effectively for measuring, reporting, and overseeing progress in implementing the plan.

## 5.0 USNORTHCOM Architecture Methodology

The USNORTHCOM Chief Architect and his staff employ a number of approaches and architecture development methodologies. Of course, while following the guidance of the Federal Enterprise Architecture framework (FEAF), key among the approaches are the concepts and precepts of the Department of Defense Architecture framework (DODAF). The command also uses a method of operational task identification and DOTMLPF resource allocation as part of its architecture simply called the NORAD-NORTHCOM Enterprise Architecture Process (EAP).

### 5.1 Department of Defense Architecture Framework

Many current and evolving DOD efforts focus on the common goals of interoperability, integration, and cost-effective investments. Various reference models and information standards provide source documentation for guidelines and attributes, and must be consulted in building

architecture products. The Department of Defense Architecture Framework (DODAF) cites several of these reference models.

The most essential aspect of the Framework guidance is that the purpose for building the architecture description should be clearly understood and articulated at the outset. The purpose will influence the choice of what information to gather, what products to build, and what kinds of analysis to apply.

Development of C4ISR architectures is a distributed process. Because there has been no uniform guidance governing architecture development, DOD organizations describe their respective architectures using disparate perspectives, formats, and terminology. It has been virtually impossible to interrelate or compare one architecture with another. Therefore, the architect and program management must conduct an integration process in order to identify interoperability issues and to find opportunities for technology leveraging and sharing. By using the DODAF over time, system architects can dovetail architectures and develop opportunities to identify and enhance interoperability, integration, and cost-effectiveness. Identify DOTMLPF gaps and shortfalls, and provide or enhance mission critical capabilities.

The DOD Architecture Framework defines the operational, systems, and technical views of any given architecture. Figure 2 illustrates these three views and their relationships.

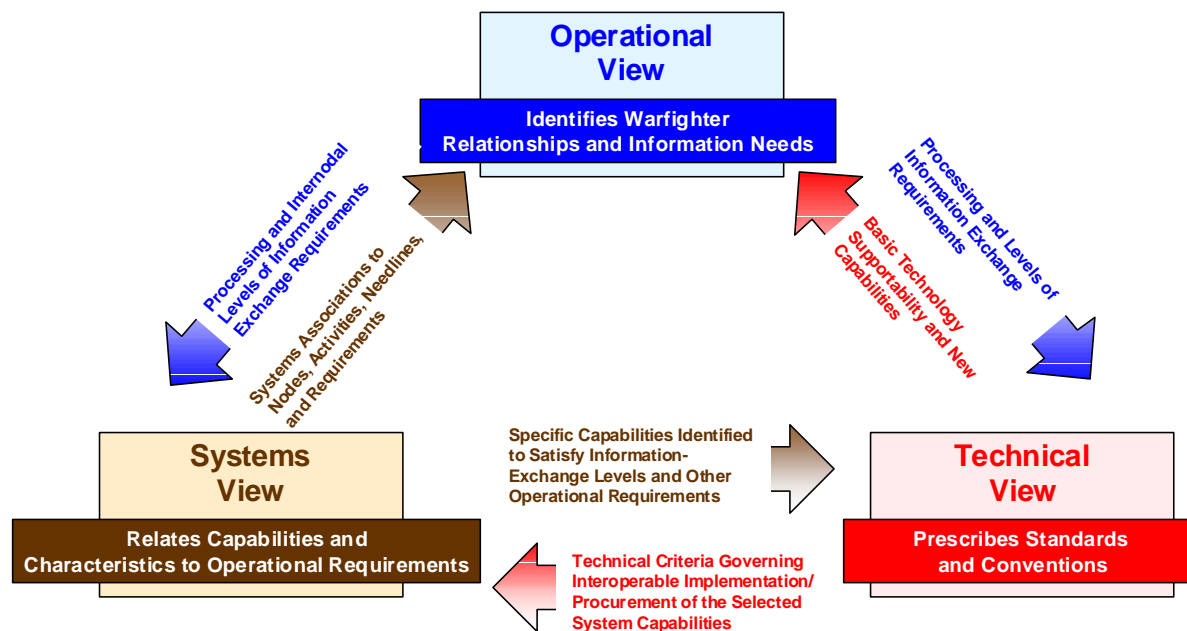


Figure 2. DODAF: One Architecture, Three Views

The *operational view* describes the tasks and activities, operational elements, and information flows required to accomplish or support an operation. It specifies the nature of each needline's information exchange in sufficient detail to determine what specific degree of interoperability is required. The *systems view* identifies which systems support the requirement. It translates the required degree of interoperability into a set of needed system capabilities, and compares

current/postulated implementations with the needed capabilities. The *technical view* articulates the criteria that govern the implementation of each required system capability. To be consistent and integrated, an architecture description must provide explicit linkages among its various views.

## **5.2    *Enterprise Architecture Process (EAP)***

The Enterprise Architecture Process (EAP) is an integrated capabilities-based approach to describe the NORAD-NORTHCOM Enterprise Architecture operational environment, employing a mission-centric, functional assessment methodology. EAP provides a repeatable process to determine gaps and shortfalls and to recognize efficiencies and effectiveness within the command, ensuring quality information remains accurate, timely, valid, useful, concise, and linked to strategic guidance. EAP results shall be used to influence DOTMLPF solutions through enhanced IT Investment Management practices. Additionally, this assessment tool can be employed recursively to hone the command and control (C<sup>2</sup>) requirements of the two commands in order to provide feedback to the resource allocation community.

EAP follows the practices and procedures, adheres to the conditions and guidance, and follows the precepts as framed by the Department of Defense Architecture Framework (DODAF). The EAP applies a simple structured four-step methodology to generate objective results.

Centered on the common warfighting construct of Joint Mission Essential Tasks (JMETs), and a baseline of supporting tasks, the EAP identifies a series of detailed tasks to achieve mission and vision success. All tasks identified by the EAP support the JMETs, Key Result Areas (KRAs), Command Capabilities, and other command-level processes delineated and approved by the dual-hatted commander of NORAD-NORTHCOM. The process also identifies resources aligned to integrated DOTMLPF solutions to fulfill and complete each task. See Figure 3 for an example EAP DOTMLPF Resource Diagram.

Information exchanges/needlines between tasks are identified and characterized. The information and work flow needed to accomplish a mission thread is determined. Resources, such as C4ISR IT systems and personnel, are associated with each task. Organizations performing the individual tasks are illustrated in the EAP products. The end result of this process captures the commands' C4ISR systems, personnel, and processes that are directly linked to the C<sup>2</sup> requirements that will enable strategic mission success. All products are reviewed and verified by a cadre of informal user groups.

Step 1 is a mission assessment in which tasks are associated with each of the command's Joint Mission Essential Tasks. In Step 2, the tasks are linked together by the mission essential information exchanges or information needlines. The third step maps the flow of tasks to the specific organizational unit performing the tasks. And lastly, in Step 4, the analysis identifies DOTMLPF resources needed to complete the tasks. DOTMLPF Needs Diagrams delineate the various gaps and shortfalls. The architect translates these architecture gaps into mission requirements or need statements in order to affect an eventual funded project.



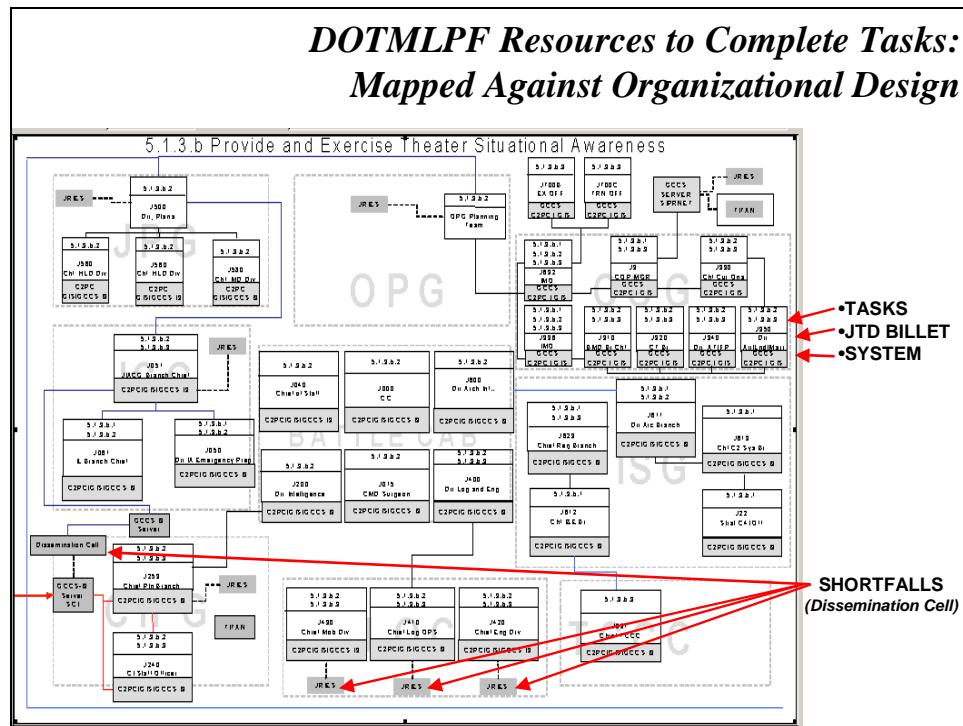


Figure 3. EAP DOTMLPF Resource Diagram

### 5.3 Commands Architecture Repository and Decision Support Source (CARDSS)

The Commands Architecture Repository and Decision Support Source (CARDSS) is a software application tool that serves as a repository for operational, systems, technical, and program information, providing a decision support mechanism through automated queries, searches, sorts, and report generation. CARDSS supports critical USNORTHCOM functions, such as IT investment management, systems gap analyses, and mission system integration opportunities. In short, the CARDSS database provides NORAD and USNORTHCOM with the ability to understand and respond to the state of the enterprise.

The USNORTHCOM Chief Architect uses the CARDSS application to enable the command to leverage mission analysis data, collected through the EAP, into an integrated decision making process regarding DOTMLPF gaps, shortfalls, and duplications. As the NORAD-NORTHCOM architecture repository, CARDSS is the warehouse for the operational, systems, and technical elements and components of the enterprise architecture supporting standardization, modernization, and interoperability across the Commands and the multitude of interfaces with both DOD and civil agencies.

Once fully populated, CARDSS becomes the data ‘source’ to make fully informed investment management decisions. Leveraging accurate and current architecture data relating to the “As-Is” architecture, “To-Be” architecture, and Transition between them; improved, enhanced budget

and resource questions can better be made by the acquisition community stakeholders with the support of the architecture team.

The top five functionalities of the CARDSS database, in support of both the architecture team and the acquisition community, relate to making informed DOTMLPF decisions. Primary is the identification of the DOTMLPF gaps, shortfalls, and duplications. Next is the maintenance of a set of prioritized solutions for the Command's DOTMLPF gaps, shortfalls, and duplications. Third among the five CARDSS functions is the ability to determine the funding profiles for the DOTMLPF solutions, followed by the generation of timelines for implementing the DOTMLPF solutions. Lastly, identification of the technical standards for the enterprise and the enforcement of compliance are key to successful investment management. As the architectural tool for USNORTHCOM, CARDSS not only provides the above listed functionality, but numerous other roles for the architect and the other command directorates he supports.

## **6.0 DOTMLPF Needs and Solutions**

The Joint Capabilities Integration and Development System (JCIDS), as delineated in CJCSI 3170.01C, dated 24 June 2003, outlines the concepts and practices associated with DOTMLPF analyses. JCIDS implements a capabilities-based approach that better leverages staff expertise to identify improvements to existing mission capabilities and to develop new warfighting capabilities. This approach requires a collaborative process that utilizes joint concepts and integrated architectures to identify prioritized capability gaps and shortfalls to arrive at integrated DOTMLPF solutions (both materiel and non-materiel) to resolve those gaps.

USNORTHCOM is employing its EA to better define the relationship between materiel considerations and those of doctrine, organization, training and the rest of the DOTMLPF aspects. This permits a top-down capabilities identification, using the command's architecture to flow emerging needs from top-level strategic guidance and vision documentation. This analysis process determines capability gaps, identifies the attributes of a capability or combination of capabilities that would resolve the gaps, identifies DOTMLPF materiel and non-materiel solutions for implementation and roughly assesses the cost and operational effectiveness of the mission given each of the potential solutions.

The USNORTHCOM EAP as an integrated capabilities-based architecture approach describes the NORAD-NORTHCOM operational environment, delineating mission essential tasks and information exchanges, locating operational nodes, and describing associated DOTMLPF resources. The EAP process identifies:

1. DOTMLPF resource requirements and mission needs
2. Where DOTMLPF gaps, shortfalls, and duplications exist, and
3. Potential solutions for DOTMLPF gaps, shortfalls, and duplications linked to strategic documentation such as vision and mission statements.

EAP results are used to influence DOTMLPF solutions through enhanced investment management practices.

## 7.0 Investment Management Support

The central tenet of the federal approach to ITIM has been the Select/Control/Evaluate model. This model was initially identified in the GAO Strategic Information Management (SIM) Executive Guide, dated May 1994, and expanded in the OMB IT Investment Guidance, published in November of 1995. It is the Select/Control/Evaluate process that the USNORTHCOM Enterprise Architecture directly supports via a number of ‘*touchpoints*.’ Architecture ‘*touchpoints*’ are those opportunities to interface and exchange data between the architecture products and the data needs of the investment management process.

Architecture data, maintained in the CARDSS database, are integral to all three phases of the investment management process. In the Select phase, the architecture helps select those projects that will best support/enhance the command’s mission needs. In the Control phase, as projects develop and expenditures continue, the architecture assists decision makers and project/portfolio managers to ensure that the project continues to meet mission needs at the expected levels of cost and risk, are expectations being met. While in the Evaluate phase, actual versus expected results are compared. Does the project deliver the expected mission capability? In this phase, the architecture helps to identify any changes or modifications required to obtain the desired end-state result or target architecture. In this role the Chief Architect is acting as the command’s “*change agent*.”

Key architectural support comes in the form of CARDSS data. As an architecture repository and aid to investment decision makers, the CARDSS database is the source of most capabilities-based acquisition information. CARDSS provides a data querying, sorting, and searching capability which allows stakeholders to obtain the data necessary to make informed investment decisions. Such investment questions include, but are not limited to:

- Does an existing system already fulfill this capability?
- Does the proposed system adhere to the current standards?
- What current manual information exchanges need to be automated?
- Which staff will perform the tasks supported by the proposed system?
- Which is the USNORTHCOM priority for the proposed system?
- Is funding available for the system or is it considered an unfunded requirement?

Capabilities-based architectures are generated in support of the Joint Capabilities Integration and Development System (JCIDS) process as established by the Chairman of the Joint Chiefs of Staff. JCIDS implements an integrated, collaborative approach to guide development of new capabilities through architecture *touchpoints*. As documented in CJCSI 3170.01C, it is mandatory to ensure that DOTMLPF aspects of new capabilities are being appropriately consider in all phases of the process. Change recommendations are developed, evaluated, and prioritized based on their contribution to future joint concepts and operations. Change, in the form of transitional increments between the “As-Is” and “To-Be” architectures is the concern of the USNORTHCOM Chief Architect, working in concert with the command’s acquisition community. This approach requires a collaborative process that utilizes an integrated architecture to identify prioritized capability requirements, gaps, and shortfalls and integrated doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) solutions.

The JCIDS provides a common coordination and integration process for DOD units working with other agencies and departments. The potential exists for DOD capabilities to satisfy needs of these other government agencies and, conversely, a capability provided by another agency or department may satisfy a DOD need. Thus, the capabilities-based architecture methodology is ideal for USNORTHCOM in its role of military support to civilian agencies and authorities, especially in linking support capabilities with the Department of Homeland Security.

## **8.0 Implementing the Architecture**

Implementing the architecture is the key to EA success. In many cases, the EA, in hardcopy format simply is relegated to a life on the shelf of history and the softcopy fares no better. Using the architecture to do something meaningful and beneficial is a must. There are many uses and benefits to the Enterprise Architecture, least of which are the following:

- Support to the investment management process
- Training aids
- Communications and Marketing Tool
- Staff orientation
- Systems Inventory
- Shared Vocabulary
- Manages Complexity and Change
- Visualizes Stakeholder Requirements
- Improved Risk Assessment and Reduction
- Provides a Blueprint or Roadmap of organization's direction

In its early stages, USNORTHCOM is embracing the architecture's ability to support both materiel and nonmateriel investment management. In this role, the EA is used as a tool to make better investment decisions. Thus, the Chief Architect and his staff are deeply embedded in the USNORTHCOM budgeting and acquisition processes. The Chief Architect fulfills this role as the owner and maintainer of the Command's Transition and Sequencing Plan. At USNORTHCOM the transition plan is called the Block and Spiral Process.

The Block and Spiral Database provides an inventory of NORAD-NORTHCOM approved, funded, and planned investment projects. The database maintains a schedule of all key project milestones, such as start and end dates (initial operational capability (IOC) and final operational capability (FOC)), critical design reviews, select/control/evaluate dates, and other related data important to the project and portfolio managers, the architect, and NORAD-NORTHCOM commanders.

Using the Block and Spiral process as his transition plan, in conjunction with the command's Technical Reference Model (TRM), the Chief Architect is able to play a major role in the annual budgeting and resource allocation processes of the Command. Consequently, the command's EA is employed at several points in the acquisition process, providing change management for infrastructure changes and insertion of emerging technologies into the Command's physical architecture.

## 9.0 Summary

Across the Federal landscape, enterprise architecture frameworks ensure uniformity and standardization in migrating and integrating information systems. The potential for a global constancy, the ability to compare architectures, however, is accomplished only when the frameworks are applied consistently across the multitude of departments, bureaus, and agencies that make up the Federal Government. Consequently, compliance with one or more accepted frameworks is a paramount requirement.

USNORTHCOM is employing both the DODAF and an in-house developed methodology called the EAP. DODAF and EAP concepts and products are thoroughly compliant with all of the fundamentals of enterprise architecting now found in the Federal Enterprise Architecture documentation. The Command expands these concepts to the identification of DOTMLPF solutions to operational, mission, and architecture needs by identifying several “*touchpoints*” between the architecture and acquisition processes. The capabilities-based architecture is used to relate potential solutions to capability needs and enhancements. While, the capabilities-based acquisition process attempts to efficiently acquire solutions to operational mission needs. Together, the two disciplines collaborate to either enhance or provide new capabilities to the Command.

In an attempt to better service the entire breath of both NORAD and USNORTHCOM, the Chief Architect’s Office is in the preliminary stages of developing an architecture repository and a tool that will support the effective and efficient making of investment management decisions. The CARDSS database is this dual purpose tool, supporting both the architecture and the acquisition directorates of USNORTHCOM.

Thriving to achieve not only materiel solutions to the Command’s needs, the architect is using the CARDSS database as a source of information to also drive out non-materiel solutions. These non-materiel solutions to mission gaps and shortfalls include, but are not limited to organization changes and business process reengineering, enhanced training and continuation education, improved facilities (operations centers, command posts, and watch centers), and policy documentation.

In conclusion, USNORTHCOM is leveraging the best architecture practices and procedures of those Federal agencies (both military and civilian) that have been identified as successes. These include US Transportation Command (USTRANSCOM) headquartered at Scott AFB, the former US Customs Service, and the US Coast Guard. The Command is doing this by following the direction and guidance established by the Government Accounting Office (GAO) and the Office of Management and Budget Federal Enterprise Architecture Program Management Office (OMB FEA PMO). In particular, the Chief Architect is measuring his successes and progress against the maturity model developed by GAO.

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## Acronyms

<b>C4ISR</b>	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
<b>CIO</b>	Chief Information Officer
<b>COA</b>	Course of Action
<b>CS</b>	Civil Support
<b>DOD</b>	Department of Defense
<b>DODAF</b>	Department of Defense Architecture Framework
<b>DOTMLPF</b>	Doctrine, Organization, Training, Materiel, Leadership and education, Personnel, and Facilities
<b>EA</b>	Enterprise Architecture
<b>EAMMF</b>	Enterprise Architecture Maturity Model Framework
<b>EAP</b>	Enterprise Architecture Process
<b>FEAF</b>	Federal Enterprise Architecture Framework
<b>FOC</b>	Final Operating Capability
<b>GAO</b>	Government Accounting Office
<b>HLD</b>	Homeland Defense
<b>HLS</b>	Homeland Security
<b>HQ</b>	Headquarters
<b>IER</b>	Information Exchange Requirement
<b>IOC</b>	Initial Operating Capability
<b>NC</b>	NORTHCOM
<b>NORTHCOM</b>	Northern Command
<b>OI</b>	Operational Instruction
<b>OMB</b>	Office of Management and Budget
<b>OV</b>	Operational View
<b>ROI</b>	Return on Investment
<b>SV</b>	Systems View
<b>TV</b>	Technical View
<b>U.S.</b>	United States
<b>USNORTHCOM</b>	United States Northern Command