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Strategic Information Technology Plan

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NOAA Strategic Information Technology Plan

Table of Contents

Opening Message 1
The OCIO Vision Supports NOAA's Mission 1
NOAA's Evolving IT Strategy Helps to Transform NOAA 1
Planning Our IT Strategy for the Next 3-5 years 2
Goal 1 – IT Security 6
Secure the NOAA enterprise against Cyber security threats 6
Goal 2 – Mission-Focused IT 8
Apply information technology to help accomplish the NOAA mission 8
Goal 3 – High Performance Computing 10
Meet the mission's evolving computing needs 10
Goal 4 –Enterprise IT Services 11
Apply a common architecture and framework for IT services and solutions 11
Goal 5 – Skilled IT Workforce 14
Develop and maintain the high-performing workforce of the future 14
NOAA IT by Mission Goal 16
1. Ecosystems Mission Goal 16
2. Climate Mission Goal 17
3. Weather and Water Mission Goal 19
4. Commerce and Transportation Mission Goal 22
5. Mission Support Goal 23
5.1. Modeling and Observing Infrastructure Sub-Goal 24
5.2. Satellite Sub-Goal 25
5.3. Leadership and Corporate Services Sub-Goal 26
5.3.1 IT Administration and Regulation 27
5.3.2 IT Security 28
5.3.3 IT Program Management 30
5.3.4 Enterprise Architecture 32
5.3.4.1 Align IT with the OMB Lines of Business and E-Gov initiatives 34
5.3.5 IT Support for Administrative Systems 35
5.3.5.1 Operate the Financial Management and Administrative Systems 35
5.3.5.2 Meet NOAA and federal-wide objectives of Grants Management 36
5.4. Fleet Services Sub-Goal 37
Appendix 1. NOAA IT Governance Processes 1

Opening Message

The OCIO Vision Supports NOAA's Mission

NOAA's mission is continually evolving to help solve the Nation's greatest challenges, through energy security and sustainability; mitigation of, and adaption to, climate change; the sustainable use and protection of ocean and coastal resources; assisting with the economic recovery and job creation; and, improving the public's safety and security. Increasingly, stakeholders are also calling for NOAA to improve the quality and management of its environmental observations, data, monitoring, forecasts, and predictions (develop the prediction of non-climate ecosystem impact models); help improve environmental literacy; track regional-scale climate trends and collect data and use tools to address their impacts; and, deliver reliable scientific information, in a timely and efficient manner, to its partners, stakeholders, citizens and businesses.

It is in this dynamic mission context that Information Technology (IT) becomes both critical and pivotal to helping accomplish NOAA's mission by leading change and innovation for several important reasons. First and foremost, NOAA Enterprise IT must lead the charge to help make available computing platforms, networks, data storage and information analytics to efficiently collect, analyze and disseminate the massive quantities of observational data needed by the public and our partners for reporting and warning, by effectively harnessing the power of cloud computing, virtualization, and state-of-art business intelligence products and tools. Next, as consumer and professional use of social media sites becomes increasingly (and inextricably) intertwined, NOAA's Enterprise IT needs to provide secure and flexible environments that stimulate participation by harnessing the power of collaboration tools and portals to promote innovation across mission, line, stakeholder and user boundaries. With the increasing scale, scope, and geographic dispersal of NOAA's various scientific mission offices, NOAA's Enterprise IT must support unified communications by efficiently and reliably switching this traffic amongst formats, media and channels. Finally, NOAA's Enterprise IT must support responsible and sustainable IT development in alignment with NOAA's overall sustainability efforts in 'going green'.

As NOAA's Chief Information Officer, I am committed to making that full spectrum of innovative IT products and services available to enable the mission. The strategy established with my initial *500 Day Plan* recognized that these innovative and agile IT solutions need to sit atop a responsive, flexible, efficient and effective IT service delivery organization and secure infrastructure that responds equally well to both enterprise-wide and individual line office IT needs; and, in accordance, I have focused the past three years on building and maturing this foundational structure. My vision for the future seeks now to provide NOAA with a transformed, secure, and agile information enterprise with the advanced computing capability necessary to propel NOAA's scientific and operational missions.

NOAA's Evolving IT Strategy Helps to Transform NOAA

My first two *500-Day Plans,* developed in close cooperation with the NOAA CIO Council, responded to the need to lay the foundation for a world-class IT organization. The first Plan period established a set of core goals to consolidate the essential, foundational building blocks for Enterprise IT, implemented through a set of carefully selected, interrelated projects and initiatives. The second Plan period continued to develop on these core goals to make substantial inroads towards maturing the Enterprise IT function to deliver effective and efficient service. These core goals included: *Securing NOAA's Information and IT investments from Threats; Building Robust High Performance Computing Capabilities; Operating NOAA IT as a Customer-focused Service Provider; Increasing Efficiency and Effectiveness through Enterprise-wide IT Solutions; and, Attracting, Developing, and Retaining a Skilled IT Workforce*.

Accomplishments in each *500 Day Plan* goal area have progressively improved the level of NOAA's IT business management, degree of customer satisfaction, and effectiveness of IT operations in serving the needs of NOAA's IT service segments (citizens, businesses, stakeholders and business partners) by addressing their

unique IT challenges and needs. Projects in each goal area have ranged in scope and complexity across a broad spectrum: from making NOAA's scientific data easily available to the public from across the many, siloed, mission specific areas, to managing the multiplicity of system interfaces across the enterprise, all the while continuing to provide enterprise IT services securely, efficiently and effectively against the challenging backdrop of NOAA's widely dispersed geographic footprint (over 750 buildings and 1600 unpopulated sites across the nation.)

While work still remains to be done in completely addressing the *500 Day Plan* goals, many of the necessary IT foundational constructs are now in place to begin to provide the support needed by our mission offices, stakeholders, and business partners to function as world-class providers of information and services to our citizens and businesses:

- We've deployed a series of key IT infrastructure projects to lay the foundational building blocks for an effective, efficient and secure enterprise IT:
  - Implemented an initial cyber security 'nerve center' to protect NOAA assets and information
  - Completed the initial phases of the NOAAnet program to unify and secure NOAA networks nationwide to reduce cost and improve performance
  - Completed the initial design for a new Pacific Region Center to Consolidate Pacific NOAA IT and facilities to centralized location to achieve organizational efficiency and facilitate collaboration
  - Awarded an initial Unified Communications contract to provide NOAA with a common platform for email, calendar, collaboration and directory tools
- We've conducted the planning to institute a NOAA enterprise-wide IT governance structure to:
  - Help identify and select IT products and services to enable the NOAA mission
  - Acquire these IT products and services through an integrated, NOAA-wide acquisition environment with improved transparency and decision-making ability
  - Provide the program and project management governance structures, processes and methods to successfully guide and manage NOAA's portfolio of projects and initiatives
- Through a set of mission-oriented IT initiatives, we've enhanced NOAA's ability to process observing data and forecasting models:
  - Significantly scaled NOAA's high performance computing ability to process higher resolution and more complex forecast models
  - Established the NOAA Data Governance Model to begin creating comprehensive, optimized, and integrated data management processes for Observing data

Planning Our IT Strategy for the Next 3-5 years

The time, then, is opportune to plan our IT strategy for the next period. As noted, several important foundational IT building blocks are already in place and many others are well on their way to implementation. Furthermore, and as anticipated, the NOAA mission is evolving with enhanced objectives and goals for serving the public. A new Climate Service is being established. The increasing complexity of sharing information amongst NOAA's business partners; the requirement for better information reliability; the demand for ease of access to massive volumes of data that must be provided (and the alternate channels available to exchange that data); are all putting ever-increasing demand on creative OCIO services. Further, this data needs be analyzed to develop forecasts, predictions and trends, by leveraging state-of-art business intelligence tools and techniques.

This situation mandates an extended strategic IT planning horizon (3 years to 5 years), more appropriate to the transformational IT planning that is now needed, and longer than the 500 day window of the first two plans that was sufficient for the earlier tactical, foundational activities. This need for extended planning is

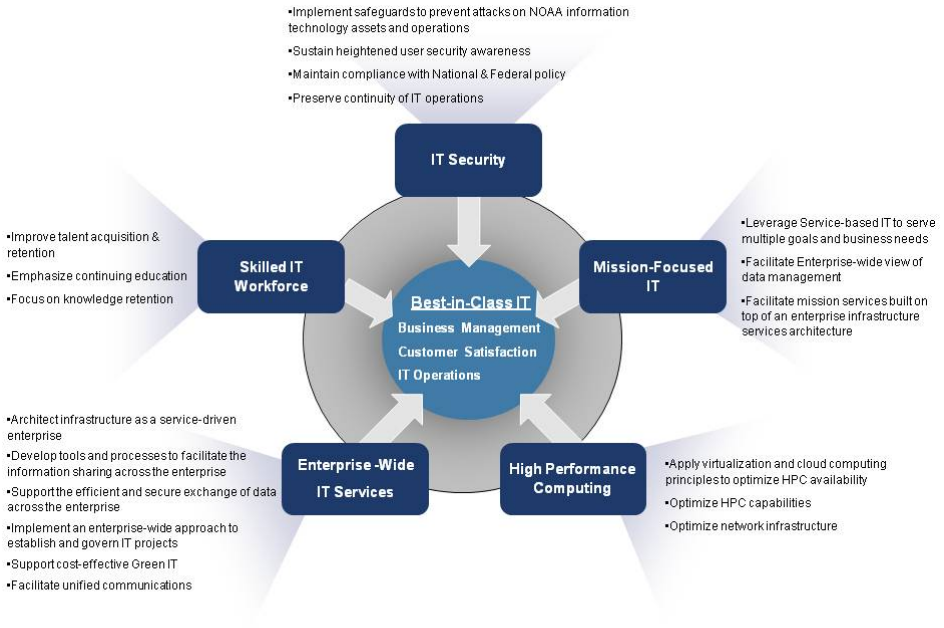
accentuated further by NOAA's increasing appetite for an 'enterprise view' of IT (as compared to the earlier, 'line-office', driven planning and focus); budget planning complexity and cycles that have extended; and, the overall demand for greater visibility and transparency into the IT acquisition and project delivery process. Responding to these needs calls for a level of IT planning that responsibly partners with and supports all facets of the evolving NOAA mission. Additionally, exciting new technologies have emerged (or are just around the corner) that promise to provide new, effective, and efficient transformational solutions and rewarding economies of scale. To provide the necessary support to NOAA's enduring scientific activities, it is vital to keep pace with the most significant, relevant technological advances and find appropriate ways to incorporate them efficiently and innovatively into the CIO's strategic IT goals in supporting the NOAA enterprise. Several of the most current technological developments that are relevant to NOAA are discussed below.

Technology	Relevance	NOAA Approach
Web 2.0 and Social Networking, associated with web applications that facilitate interactive information sharing, interoperability, user-centered design and collaboration. Such applications allow users to interact with other users or to change website content. Some common examples of these applications include: Blogs; Wikis; Peer-to-Peer (P2P) Networks; Mashups; Tagging; Podcasts; and, Really Simple Syndication (RSS).	NOAA is under continuing pressure to realign its funding and effort on mission-oriented programs and minimize support activities. Additionally, effective communication across line offices and programs is becoming increasingly important to increase efficiencies across the enterprise.	Apply Web 2.0 collaboration tools and concepts such as Wikis, RSS, and tagging to help facilitate communication, collaboration and information sharing across the NOAA enterprise, helping make mission support more efficient and at the same time helping facilitate critical research and analysis important to the mission.
Business Intelligence (BI) is a broad category of methods, applications and technologies for gathering, storing, providing access to, and analyzing data to help enterprise users (for example, professionals or knowledge workers) make better business decisions.	As the leading purveyor of the Nations' observational data, NOAA collects and analyzes massive quantities of weather, climate, and environmental data for reporting and warning.	Identify state-of-art BI strategies and leverage BI products to organize and analyze NOAA's data to provide NOAA's stakeholders and partners with an end-to-end optimized, comprehensive, and integrated data management process across the full lifecycle of observing data, that provides a more efficient and user-friendly way to share information and the added flexibility to adapt to changing information needs.

Technology	Relevance	NOAA Approach
Unified Communications addresses the integration of multiple real-time and non-real-time communications methods such as instant messaging, email, voicemail, telephony, video conferencing, SMS, and fax. It integrates these methods through common interfaces across various platforms such as fixed and mobile platforms and devices, and provides a consistent unified user interface and user experience across multiple devices and media types.	NOAA continues to face a singular challenge in supporting effective communications amongst its various scientific mission offices with their individual communication methods and disparate infrastructure, and the widely dispersed geographical footprint.	Implement a unified communications enterprise platform to enable NOAA to more effectively and efficiently manage voice, image, messaging, and document collaboration, through traditional and wireless channels.
Green IT aims at reducing the environmental footprint and enhancing the social effects of IT products throughout its lifespan through the adoption of sustainable IT practices	NOAA plays an important role in the Nation's efforts to continue economic growth while enhancing environmental quality. NOAA is being increasingly sought upon to play a leadership role in managing and conserving our natural resources to prevent their rapid attrition, even as 'going Green' gains global acknowledgement and impetus.	Implement 'Green IT' practices within NOAA's Enterprise IT to help serve as a direct demonstration of responsible and sustainable development in support of this mission. With IT typically representing 30-40% of an enterprise's energy consumption, it's a good place to find opportunities to conserve and achieve cost savings while also supporting the cause.
Virtualization allows physical IT resources such as servers, operating systems, applications, or storage devices to be segregated or aggregated as logical units.	The NOAA High Performance Computing platform includes some of the most advanced computer hardware available in the world today, and can be leveraged to make this valuable resource more efficient, effective and easily available to more users.	As the demands placed upon NOAA's High Performance Computing (HPC) platforms continue to increase in support of the NOAA mission, leverage the latest 'Virtualization' techniques and tools could help to maximize the efficient use of those resources to realize cost savings and economies of scale for NOAA.

Technology	Relevance	NOAA Approach
Cloud Computing is defined by Gartner as "a style of computing where massively scalable IT-enabled capabilities are delivered 'as a service' to external customers using Internet technologies." In concept, a cloud service provides efficiencies and effectiveness by leveraging the on-demand services; access over networks; 'elastic' capacity; resource pooling; and, variable consumption and associated pricing (where relevant).	NOAA's High Performance Computing assets are currently distributed across multiple data centers and serve a variety of critical mission needs, and can be harnessed to provide more efficient and effective service to users and the mission.	Apply the concepts of Cloud Computing to realize more efficient levels of IT operations and allocation of high-demand computing resources, services and platforms, such as by augmenting NOAA's HPC resources, and improving the process for HPC resource allocation to make it more efficient and effective.

In this overall context, the role of Enterprise IT expands from merely supporting the mission to enabling the NOAA mission; helping influence decisions around potential, new NOAA services; and, injecting leading-edge technologies into programs and services to enable their growth and success. Our current strategy, therefore, incorporates this expanded role in defining the following goals, objectives and approaches.



Goal 1 – IT Security

Secure the NOAA enterprise against Cyber security threats

The importance of NOAA IT Security

Information Security continues to be central to NOAA's mission because any data loss or compromises in data integrity can impact NOAA's ability to evaluate and disseminate life-saving information. NOAA plays a key role in maintaining national Homeland Security. NOAA serves as the U.S. official voice for issuing warnings during life-threatening weather situations. NOAA also collects data and disseminates the information needed to promote safe navigation through our waters and skies, monitors and studies the dispersion of potentially hazardous particles in the atmosphere, and provides high quality aerial and satellite photography to collect data in support of various homeland security surveys.

At NOAA, the frequency, sophistication, and maliciousness of cyber attacks also continues to rapidly increase. Past year's defenses may not be sufficient to withstand the threat of current attacks. These changes in the nature of cyber security threats and NOAA's ability to respond significantly increase the probability that an attack upon NOAA will succeed.

In addition, emerging technologies such as cloud computing, social networking applications, and mobile computing present new security challenges. The NOAA enterprise security architecture must also be structured to address these and other new challenges as they arise.

Maintaining the continuity of operations is critical for NOAA to perform its mission. Damage to, or loss of, complex, high-cost technology assets such as satellites, ground control systems, and space weather systems, due to cyber attacks could take years to repair or replace, at the potential cost of millions of dollars. Additionally, NOAA's inability to disseminate vital forecast and warning information to the public as a result of such loss or damage, can result in the loss of life and property.

The Path Forward

The path to secure the NOAA enterprise against cyber security threats must be a holistic approach that includes physical and procedural safeguards to prevent security incidents, maintains a culture of security awareness across the organization, adheres to the federal and leading industry security guidelines and practices, and provides NOAA with the ability to maintain continuous operations in support of its enduring mission without disruption. Security measures must be proactively incorporated into the design of new technology projects and artfully integrated into existing legacy applications.

Objectives	Approach
Implement safeguards to prevent attacks	• Enable NOAA Cyber Security Center to protect NOAA IT assets and information • Implement latest intrusion detection/prevention tools to prevent unauthorized access to NOAA systems • Continue issuance and maintenance of HSPD-12 access privileges with identity management • Enable all new logical and physical access control systems to accept HSPD-12 credentials to authenticate users • Improve Internet content filtering tools to provide protection for employees from the latest web-based attacks and scams
Sustain heightened user security awareness	• Establish multi- channel communications notify employees high-risk security threats • Expand focused security awareness and rules of behavior training to

	institutionalize effective employee security practices • Monitor IT Security Program Performance Metrics to assess efficacy of security programs and to assess employee compliance with cyber threat reporting and prevention procedures
Maintain compliance	• Align identity, credential, and access management (ICAM) activities to the Federal CIO Council ICAM Roadmap • Maintain compliance with Federal Desktop Core Configuration standards • Leverage the Cyber Security Assessment Management (CSAM) for enterprise compliance with FISMA standards • Extend Certification & Accreditation (C&A) compliance review program eliminate remaining identified material weaknesses
Preserve continuity of IT operations	• Conduct regular CIO COOP table-top exercises to develop and maintain contingency plans addressing potential threats to enterprise IT services • Review and validate disaster contingency plans for all new NOAA systems and technologies

Goal 2 – Mission-Focused IT

Apply information technology to help accomplish the NOAA mission

The importance of Mission-Focused IT

NOAA's mission is to understand and predict changes in the Earth's environment and conserve and manage coastal and marine resources to meet our Nation's economic, social, and environmental needs. The fulfillment of this mission requires NOAA to observe, collect, process, evaluate, disseminate, and archive vast quantities of environmental information and information products. The effective use of Information Technology (IT) is critical to NOAA's ability to accomplish its mission and is therefore integrated throughout most NOAA programs.

Information Technology provides critical support to the NOAA mission by facilitating environmental data collection and improving the quality of that data. IT is an integral part of environmental observing and data collection systems, including radar, sensors, and satellite systems. Once collected, the data is evaluated and processed with Information Technology to create useful products for citizens, other government agencies, and commercial businesses.

Disseminating weather and environmental information is a key NOAA function. Programs supporting the NOAA mission use information technology to disseminate products to the public in a timely manner. NOAA is expanding its web presence and making more products available outside NOAA to research communities and the public via the internet. The public expects access to NOAA's information. For example to aid public safety or provide everyday public service, geospatial information is being disseminated as "near real-time" weather forecasts and storm warnings, water temperature and environmental datasets, port information to aid in transportation and commerce, and buoy data, etc.

In order to understand and predict changes in the Earth's environment, NOAA uses IT to create and preserve the Nation's long-term environmental record. The Nation's ability to make informed decisions affecting the environment and the economy hinge upon the integrity and completeness of environmental datasets. As NOAA collects and processes ever larger volumes of environmental data, the systems that archive and preserve the data for posterity must keep pace.

The Path Forward

For NOAA to continue fulfilling its mission, the efficient and innovative use of Information Technology must continue. Maintenance of existing systems and development of new technologies to observe, analyze, and disseminate data will be necessary. These maintenance and development activities will need to be structured and supported across the enterprise to provide the greatest efficiencies to NOAA. New ideas and technologies must be incorporated to develop the innovative solutions needed to address the challenges of NOAA's mission. NOAA IT should be architected to leverage common enterprise-wide infrastructure IT services that support the mission-specific IT efforts. Mission-specific IT should likewise include architectural elements that can be leveraged across the organization to support related goals and business needs.

Objectives	Approach
Leverage service-based IT across multiple goals and business needs	• Identify improved processes to share observing data such as satellite imagery across programs to support disparate initiatives such as navigation, weather forecasting, coastal environmental analysis, and climate change • Establish and contribute to a registry of IT services

	designed to support all NOAA mission goals and line offices • Expand NOAA program review processes to further identify opportunities to leverage common IT services across programs, missions, and offices
Implement an enterprise-wide data management	• Apply a common set of data standards across NOAA to facilitate data exchange • Provide mission-system input into a consolidated NOAA information product registry • Design new mission systems to maximize the efficient use of existing data sources and information repositories • Provide mission-focused participation on Data Management committees and working groups • Evaluate and adopt the National Information Exchange Model to support information exchange with other governmental agencies and external NOAA partners
Engineer mission services upon an enterprise infrastructure services architecture	• Leverage NOAA enterprise IT infrastructure services to provide enhanced functionality, such as email notifications and dissemination of data via the NOAA websites, for mission systems • Harness NOAA high-performance computing resources to provide increased analytical capabilities for mission systems

Goal 3 – High Performance Computing

Meet the mission's evolving computing needs

The importance of High Performance Computing

The threat and growing concern over global climate change and its impact on national security, as well as the impact of recent hurricanes, and other natural disasters have spurred growing demand for climate and weather information with increased accuracy, shorter lead times and local detail of model simulations. Federal, regional, state, and local decision makers rely on NOAA for credible climate information at finer scales to support strategies to mitigate and adapt to climate variability and change, including long-term resource management practices and public infrastructure decisions. The public relies on NOAA for accurate and timely hurricane, tropical cyclone and tropical storm monitoring and forecasting that provides the lead-time and storm intensity information needed to make decisions regarding coastal evacuations and mobilization of resources.

High Performance Computing (HPC) provides much of the underlying infrastructure used for climate computing and storm modeling. HPC will support critical performance capabilities that include: on-time delivery of forecast model products, hosting a diverse set of environmental models, transfer of new and enhanced science from research systems into operations, driving continuous improvements to operational forecast model products.

The Path Forward

In order to meet the increasing demand for High Performance Computing services, NOAA must expand and make the most efficient use of the available HPC resources. This includes building our current systems in addition to the use of Green IT strategies to minimize the environmental impact of the HPC program. The strategic objectives and tactical approaches identified below seek to achieve those efficiencies by securing the agreements, facilities, and equipment needed to provide the optimal computing capacity, focusing on efficient software development, using a robust and secure communications infrastructure, and utilizing the latest cloud computing and virtualization technologies to support peak processing periods.

Objectives	Approach
Optimize level of available HPC resources	• Build computing partnerships to provide on-demand computing time for external organizations • Fit-up new facilities to support leadership class High Performance Computing • Establish best practices in Green IT for High Performance Computing resources and facilities
Software to optimize HPC capabilities.	• Adopt software engineering standards and practices that facilitate knowledge sharing internally and externally with other federal agencies and academic partners • Streamline and optimize code for performance and enable adoption of new tools and technologies • Improve storage capabilities for climate and weather data
Optimize the communications infrastructure	• Implement improved security protocols to safeguard data • Leverage new partnerships with research networks to extend communications capabilities for High Performance Computing

Goal 4 –Enterprise IT Services

Apply a common architecture and framework for IT services and solutions

The importance of standardized enterprise IT services

NOAA is inherently a scientific organization and its continued ability to achieve its mission is dependent upon information technology. Additionally, NOAA employees rely upon core technology infrastructure services such as email, calendaring, networks, telephony, and mobile communications to do their jobs. As the mission demands for new sources of information and data in greater detail continue to increase, and as employee needs evolve in the face of new technologies, the NOAA IT organizations need to become more innovative, agile, responsive, and efficient and an increased focus must be placed on serving our employees' and customers' needs. However, the infrastructure used to provide that technology is fragmented, difficult to maintain, and lacks the interoperability and scalability needed to meet the growing demands placed upon the organization. In addition, existing contracting and governance processes limit the NOAA's ability to optimize economies of scale and provide transparency across all aspects of IT operation.

The Path Forward

The NOAA CIO Community is committed to modernizing the IT infrastructure and implementing efficient enterprise-wide solutions. A key component of this approach calls for the development of a common architectural understanding and consistent approach to making future IT planning decisions. The envisioned NOAA Enterprise Architecture model includes suite of enterprise technology services that can serve as the foundation upon which new mission-focused technology services can be built and deployed. These mission-specific services will also be implemented such that they can be leveraged across the organization to achieve greater efficiencies associated with economies of scale.

Maintaining a focus on the customer's needs will continue to serve as a guiding principle in defining and implementing enterprise-wide IT services and initiatives. Enterprise IT must provide the consistent and reliable level of service needed for NOAA employees and line offices to achieve their mission. Continuing efforts to define a comprehensive customer service process that addresses various customer needs and touchpoints into IT along will help to define the IT services required to support the enterprise. Understanding the customers' needs and expectations will also serve to establish standards for responsiveness, reliability, and efficiency for IT services.

An enterprise-wide focus is also important to mission support activities. Continuing efforts to modernize the NOAA technology infrastructure provide an opportunity to incorporate new technologies in an enterprise-wide environment. Modernization activities will include improvements and the consolidation of the voice and electronic communications and network infrastructure across the enterprise. In addition, innovative new technologies will be implemented across the organization to facilitate collaboration and information sharing.

To address enterprise challenges associated with contracting and governance procedures, the NOAA Office of the Chief Information Officer (OCIO) and Line Office OCIOs are working together to utilize the new NOAALink contract vehicle. NOAALink will enable NOAA IT organizations to partner with selected leading industry IT experts with the goal of acquiring a broad range of cost-effective, enterprise-wide IT solutions to improve IT service delivery and support. In addition to providing access to a team of industry-leading IT experts, NOAALink provides a common governance framework for the enterprise. This framework will lead to the implementation of a strong set of contract management principles, practices, and templates that provide for continuous visibility into the activities performed under the procurement vehicle, use of an actionable catalog of service offerings and practical Service-Level Agreements (SLAs) for delivery of products and services, and effective contract transition planning and support. This common transparent governance framework will provide the necessary support to efficiently manage NOAA's IT investments across the enterprise.

Objectives	Approach
Provide IT infrastructure services across the enterprise	• Further define Service Oriented Architecture strategy to provide additional guidance during the design and development of IT solutions across NOAA • Implement Fee for Service model • Further define Enterprise Architecture & Taxonomy to incorporate updated data management standards and the enabling infrastructure for emerging technologies • Document the Emerging Technology Strategic Plan • Enable platform independent computing and web collaboration with cost effective business model • Improve the ease of use and performance of corporate IT applications • Utilize the NOAA Infrastructure Cloud computing Environment (NICE)
Facilitate information sharing across the enterprise	• Enhance enterprise messaging services to provide reliable and cost-effective electronic communications for the enterprise • Refine the NOAA Portal to enable all NOAA data and services to be readily available to all users • Facilitate information sharing, interoperability, user-centered design and collaboration across the NOAA enterprise using Web 2.0 technologies such as social-networking, video-sharing, wikis, blogs, and RSS feeds. • Create comprehensive, optimized, and integrated data management processes across the full lifecycle of data observation, analysis, and dissemination • Establish an enterprise-wide registry of data standards • Establish a consolidated registry of NOAA information products • Establish clear governance for Data Management committees and working groups • Utilize Cloud Computing technology to provide a flexible, open platform that allows access and interoperability across heterogeneous NOAA technical environment
Communicate efficiently and securely through a modernized infrastructure	• Provide NOAA with a common platform for email, calendar, collaboration, and directory tools • Unify and secure NOAA networks nationwide to reduce cost and improve performance • Leverage mobile communications technologies to provide access to NOAA IT resources for remote scientific programs
Implement enterprise-wide IT governance	• Establish disciplined NOAALink project, portfolio, and program management methods, tools, and measures to provide consistent, transparent, and accountable oversight of NOAA IT investments

	• Implement NOAALink as to enable efficiencies and economies of scale for purchasers of IT products and services across the enterprise • Align IT strategic investment with NOAA's mission • Establish a pre-qualified cadre of IT vendors with an understanding of NOAA business and technology needs that can be quickly and effectively deployed to provide IT support and services across NOAA • Provide consolidated quality assurance services across the enterprise to ensure adherence to policies and standards • Perform consolidated operations configuration control review to provide increased transparency and identification of dependencies within a program environment
Deliver customer-focused IT services for the enterprise	• Implemented tools and processes to collect customer feedback and needs • Assess current IT service offerings to determine opportunities to improve service deliver • Refine performance measures to verify that resources are focused on areas of highest customer value • Define current user base and communities of interest for emerging technologies to help define related NOAA strategies • Refine and expand IT Services Catalog to include new technology services to benefit customers and update current performance standards to reflect increased customer service levels
Promote cost-effective Green IT	• Develop strategy to reduce IT energy consumption by at least 30% by FY 2012 • Automate PC power management • Reduce printing with workflow tools • Virtualize servers and storage networks to reduce hardware for same workload • Use enhanced microchips that can turn-off individual processors when not in use • Utilize Cloud Computing technologies to optimize resources • Institute new procurement practices such as Energy Star

Goal 5 – Skilled IT Workforce

Develop and maintain the high-performing workforce of the future

The need to develop and maintain a skilled IT workforce

This IT Strategic Plan envisions the creative use of new, enabling technologies to build upon the foundational building blocks already being developed during the first two planning periods – thus placing a future demand for experienced, skilled resources to implement the many existing and new technology areas relevant and applicable now, and in the future, to enable NOAA's IT function to support the NOAA mission. This will place an unprecedented resource demand ranging from the more programmatic (such as experienced IT budgeting and acquisitions workforce; qualified IT project and program managers) to the more technological (IT security, infrastructure, database and programming resources). This situation is compounded by the impact of the aging workforce and the retirement of Baby Boomers that has caused a looming skill gap, creating a supply-demand situation unlike any in history. Every day 10,000 Baby Boomers turn 55 years old. For every two experience workers leaving the workforce, one will enter. By 2010, American businesses will face a labor shortage of more than 10 million workers. By 2030, the gap will grow to 35 million. Not only will there be fewer available workers 'during the trough', but new workers are not bringing with them the skills or education necessary to perform jobs being vacated by the retirement boom. This will lead to a gap between the demand for skilled IT resources and their limited availability in the market.

NOAA will face a similar gap as experienced NOAA IT professionals become eligible for retirement in the coming years. Given the anticipated nationwide demand for talent, replacing retiring staff will become increasingly difficult. To be prepared to close this talent gap, NOAA must maintain its focus on developing and maintaining a skilled IT workforce.

The Path Forward

NOAA needs to implement a multi-dimensional approach to ensure its access to the talented IT workforce that will be needed to carry out NOAA's mission in the coming years. The plan should consider factors such as knowledge retention, recruiting, workforce planning, and continuing education to maximize the supply curve. To control demand, institutionalize practices to enhance productivity, incorporate automation, explore sourcing alternatives, facilitate self-service, and encourage reuse of standard tools and processes.

Objectives	Approach
Enhance talent acquisition	• Maximize use of OPM recruiting programs to target marketing to applicants with specific needed skills • Expand relationships with universities to provide new Internships & Co-op opportunities • Provide recruitment and relocation incentives to attract top talent • Implement Pay for Performance to provide competitive compensation • Utilize the NSF Scholarship for Service program
Emphasize continuing education	• Provide annual continuing education and training for staff • Implement workforce competency requirements in areas such as IT Security and IT Project Management • Implement role-based performance requirements • Budget for an promote employee attendance at relevant national industry, technology, and scientific conferences • Establish programs to help fund continuing formal education • Institute regular "Brown bag" learning sessions on current technology topics

	• Provide technical and scientific subscriptions for employees • Promote and facilitate professional certification programs • Promote participation in Department of Commerce Development and NOAA Leadership programs
Focus on knowledge retention	• Implement and utilize wikis to facilitate information sharing • Expand the NOAA Portal functionality as a source and repository of information for employees • Enhance succession planning by forecasting staff transitions and enhancing knowledge transfer processes • Implement Web 2.0 collaboration tools • Maintain a workforce skills inventory • Identify opportunities to enhance job satisfaction through employee satisfaction survey results • Implement financial retention incentives • Recognize teams and individuals for significant contributions

NOAA IT by Mission Goal

This section presents the IT strategy for NOAA Mission Goals and Sub-Goals that are in the NOAA Exhibit 53 Part 1. The Goals are: Ecosystems; Climate; Weather and Water; and Commerce and Transportation; and Mission Support (which is further divided into the following Sub-Goals: Modeling and Observing Infrastructure; Satellite; Leadership and Corporate Services; Fleet Services).

1. Ecosystems Mission Goal

Mission Goal Description

To protect, restore, and manage the use of living marine, coastal and ocean resources through an ecosystem approach to management that balances ecological, environmental and social influences.

Mission Goal Objectives

- Increase number of fish stocks managed at sustainable levels.
- Increase number of protected species that reach stable or increasing population levels.
- Improve ecosystem health through conservation and restoration of habitat
- Increase environmentally sound aquaculture production.
- Advance understanding and characterization of coastal, marine, and Great Lake ecosystem health and associated socioeconomic benefits, and develop forecasting capabilities to meet management needs.
- Improve public understanding and stewardship so that ecosystem and sustainable development principles are incorporated into planning, management, and use of coastal and marine resources.
- Ensure the sustainability of marine fisheries to strengthen the ocean ecosystems and local economies
- Provide tools, technologies and information services.

IT Strategic Objectives

- Ensure interoperability and seamless transmission of Ecosystem Observation Program (EOP) data through adoption of DMAC standards and protocols.
- Harmonize fisheries data and permitting systems to facilitate reporting and ease the burden for permit applicants.
- Support collaboration across NOAA Fisheries scientific, management, and regulatory communities.
- Provide tools, technologies, and information services that are effectively used by NOAA partners and customers to improve ecosystem-based management
- Providing information management support to states seeking to meet minimum requirements for the National Saltwater Angler Registry as required by the MSRA
- Improve end-to-end management of high quality data and information

IT Architecture Gap and Target Statement

Ecosystem Programs strive to collect and analyze environmental and ecological data on common platforms to ensure data quality, manage data efficiently for the long-term, and develop and implement mechanisms to guarantee data is accessible to all users. The gap includes (1) implementing new observations/characterizations including mapping, satellite monitoring, and local in situ monitoring of key indicators of reef condition, (2) synthesizing and assessing data and information for use by reef managers, (3) providing effective access to and management of data and information.

Also, given the demands placed on the Ecosystem Observation Program (EOP) for data management, there are several areas where the EOP is not operating at it's 100% requirement: 1)the creation of metadata records for all long-term data sets, 2)moving from paper forms and manual data entry to electronic collection of data, 3)recovery of legacy data sets, 4)the transformation of data sets into standard formats and adhering

to standard vocabularies, 5)the creation of services or applications that facilitate the sharing of this information, 6)migration of stovepipe applications, 7)ensuring the security of data within an interoperable environment, and 8)the long term protection of this information through archiving at appropriate facilities.

In addition, NODC, a National Data Center, is striving to provide data stewardship and data archiving for all NOAA's Integrated Ocean Observing Systems (IOOS) and for all the Regional Associations responsible for the design and operation of coastal ocean observing systems. To archive all NOAA ocean observing system data and model analyses, to shorten the time required to publish new versions of these data sets, to increase the resolution of these data sets, and to provide stewardship of new long-term data sets, a combination of FTE and contract costs are required.

Major Initiatives

The following activities are NOAA's IT investments or planned investments that will meet the objectives identified above.

Fisheries Information System (FIS) – Integrate state and federal information collection systems to enhance ecosystems-based marine fisheries through improved data quality and management.

Permits – Implement a single consolidated records system for fishing permits.

Northeast Fisheries information Management System (NE-FIMS) – Develop an integrated fisheries dependent management system for the NMFS Northeast Region.

Marine Recreational Information Program – Implement a system to collect information on recreational anglers to support the development and analysis of recreational fishing surveys.

Vessel Monitoring System – a satellite based tool for monitoring control and surveillance of the 3.4 million mile jurisdiction of the NOAA Office for Law Enforcement.

2. Climate Mission Goal

Mission Goal Description

To understand climate variability and change in order to enhance society's ability to plan and respond by focusing on research to improve understanding of complex climate processes and to enhance the predictive capacity of the global climate system.

Mission Goal Objectives

- Describe and understand the state of the climate system through integrated observations, analysis, and data stewardship.
- Understand and improve climate predictive capability from weeks to decades to a century, with an increase range of applicability for management and policy decisions.
- Improve the quality and quantity of climate observations in order to maintain a consistent climate record that will support the analyses, interpretation, and archiving of the global climate record and improve our ability to determine why changes are taking place.
- Support the scientific life cycle to help bring research and development initiatives to operational applications.
- Stand-up a National Climate Service. NOAA will create a National Climate Service during the FY10-14 period.
- Provide climate models and prototype forecasts and/or projections to climate assessment reports and key stakeholders to inform resource management and policy decision-making.

IT Strategic Objectives

- Modernize central processing capabilities.
- Develop new modeling products for forecast and climate predictions.
- Improve the current suite of climate products by completing the conversion of climate products into Geographic Information System (GIS) format visual display of climatic information
- Increase capability to ingest, control, and access of high volumes (petabytes) of environmental data.
- Make strategic use of expanded high performance computing resources to address gaps in climate modeling, and establish climate data records for continuing research into the causes and impacts of climate change, and investigate options for mitigating climate change and its impacts.
- Revitalize Climate Computing
- Continue to enhance our current climate observations by beginning testing of enhanced sensors for the Tropical Atmospheric Ocean (TAO) Buoy Array located in the Equatorial Pacific
- Continue the deployment of the modernized U. S. Historic Climatology Network (USHCN-M)
- Continue development/implementation and maintenance of operational archive and user access capabilities for the National Climate Services Portal and National Climate Model Portal (NCMP) to provide access to the next generation of NOAA climate and weather models and analyses products.

IT Architecture Gap and Target Statement

NOAA has a significant and critical role in the stewardship of environmental data. Decisions of national importance are being made without the best possible projections. Insurers are abandoning hurricane insurance markets. Infrastructure is being built or rebuilt in coastal areas vulnerable to sea level rise and hurricanes. Water resource management and agricultural decisions are being made as observations and models suggest the potential for more severe droughts. Energy technologies that might affect global change need to be examined. As a geopolitical challenge, many severe effects of global warming are expected in regions where fragile governments are less capable of adapting or coping. NOAA has the climate models and Earth System Models to address these urgent issues, but it lacks the computational resources to fully utilize the models to provide the best science-based information to decision-makers.

Substantially augmented computational resources will dramatically improve the availability of projections of changes of important climatic quantities, such as regional climate change and extreme events that will allow society to efficiently plan for and adapt to climate change. Stakeholders need climate change information on regional scales, and providing the necessary computational resources will enable this.

Major Initiatives

The following activities are NOAA's IT investments or planned investments that will meet all of the IT objectives identified above.

Comprehensive Large Array-data Stewardship System (CLASS) – Develop a data storage and distribution system for high volumes (petabytes) of archived environmental data derived from the following satellites and observing systems: GOES, POES DMSP, MetOp, NPP, JPSS, NEXRAD, USCRN, COOP/NERON, climate model, oceanographic sensors and buoys, and solar environmental data.

U. S. Historical Climatology Network (USHCN-M) modernization is a major climate initiative – Develop a modern network of 1,000 stations nationwide, collecting accurate, near real-time surface weather data obtained with state-of-the-art measurement, monitoring and communication equipment to replace existing HCN sites.

National Integrated Drought Information System (NIDIS) – Provide drought information through web-based portal that organizes and delivers historical and real-time climate and weather information for researchers and emergency responders.

NOAA Research Scientific Computing Support – Provides periodic technical refreshment of IT computing

resources and associated IT maintenance and support services used to conduct short, mid, and long term climate and weather research.

NOAA National Data Centers (NNDC) - NOAA's Data Centers are responsible for the perpetual stewardship, archiving, and dissemination of climatological and environmental data. Across the NOAA data centers there is a need to be able to integrate data from various observing systems. There is also a need for data at common space and time scales to be stored and accessible in formats that can be easily interchanged. This data also needs to be available and useful for visual form and is required to effectively manage and plan for extreme events. The NNDC works to close these gaps by allowing the Nation to be better prepared to mitigate the effects of climate and weather extremes that are amplified by changes in population.

National Climate Services Portal and National Climate Model Portal (NCMP) – Provide access to next generation of NOAA climate and weather models and analyses products.

3. Weather and Water Mission Goal

Mission Goal Description

Serve society's needs for weather and water information by producing timely and accurate environmental observations, analyses, predictions and warnings for a range of atmospheric and hydrologic conditions including hurricanes, tornadoes, flood, droughts, tsunamis, wildfires, air quality, and space weather.

Mission Goal Objectives

- Increase lead time and accuracy for warnings and forecasts.
- Improve operational forecasts of high-impact events such as hurricanes, tornadoes, solar storms, fire weather, damaging wind, tsunamis, and poor air quality.
- Improve forecasting in the intensity, structure, and rapid changes in hurricane-strength storms
- Improve drought monitoring, forecasting, and early warning.
- Improve predictability of the onset, duration and impact of hazardous and severe events.
- Increase development, application, and transition of advanced science and technology to operations
- Continue space weather forecast improvements in preparation for the solar maximum
- Improve quantitative precipitation forecasts & estimates for the Arctic

IT Strategic Objectives

- Increase capability and performance of key observing systems.
- Modernize central processing capabilities.
- Modernize information dissemination capabilities.
- Develop new modeling/forecast products.
- Implement new models to improve coastal prediction focusing on storm surge modeling and coastal erosion
- Improve data acquisition, processing, modeling, and delivery methods
- Develop increased computing capabilities for software engineering, data processing and analysis, graphics, archive and access, and networking.
- Evaluate the expansion of Arctic Services including the existing Alaska Weather Data Buoy Network to improve weather and climate forecasts for the changing (retreating sea-ice) Arctic ocean environment.
- Complete migration to the Community Hydrologic Prediction System (CHPS) to all River Forecast Centers and begin system enhancements
- Improve internet-based delivery of geospatial data and products.

- Integrate data and applications development with topographic/bathymetric, land cover and other relevant inundation related information into tools for use by decision makers.
- Begin development of regionally targeted inundation visualization tools using latest technologies (ex. Google Earth, 3-D visualizations) from various inundation model outputs (ex. SLOSH and ADICRC models). Provide information at a scale that enables local communities and landowners to view social, economic and ecological tradeoffs/consequences of planning and development activities.

IT Architecture Gap and Target Statement

An infrastructure is needed to test and empirically evaluate the feasibility of products and services going from research to the operations environment and from the operations environment to the public user environment. Users are demanding more focused, timely, and integrated hazard messages in a variety of formats, and NOAA must do better at responding to these needs. Effective community response to any hazard begins with the two-way real-time flow of information between warning officials and decision-makers. To ensure Local Forecast and Warning/NWS can continue to meet its mission of protecting lives and property, NOAA must enhance communication capabilities by leveraging emerging technologies the public is rapidly and continually adopting today.

The future is in mobile devices, which industry has provided the ability to contact community leaders, any where - any time. Investment is necessary by NOAA to adapt to these emerging technologies to ensure our hazard information reaches partners and users through the media they expect/require -- through projects like NWSChat, Mobile Alerts, enhanced Internet based displays for mobile devices, Geographic Information Systems (GIS), real time multi-media briefings, GPS-enabled applications and other technologies.

In its current state, NOAA's IT infrastructure can barely handle current requirements for gathering, processing, and distributing information. Dramatic increases in volumes of environmental data collected from the new observing systems, and the exponential growth of model data, are increasing at a pace that will simply overwhelm our current plans for enhancing our IT infrastructure. NOAA's IT investment strategy must evolve commensurate with these emerging requirements or risk its ability to transport and use relevant environmental data from its operational observing systems. As a critical component of NOAA's IT infrastructure, the corporate WAN, or NOAANet, must be scalable with sufficient security, computing and dissemination capacity, and service redundancy to maintain pace with the growing volume of environmental data products.

The Advanced Weather Interactive Processing System (AWIPS) NOAAPort satellite broadcast network is the vehicle by which satellite and other observational data are transmitted to the NOAA'S NWS field forecasters. Today, AWIPS NOAAPort does not have the necessary capacity to transmit new data sets associated with planned NOAA investments in NPOESS and GOES-R instruments, numerical weather prediction model upgrades, and higher resolution dual polarized radar data.

n December 2007, a Certification & Accreditation of the Space Weather National Critical IT System identified numerous security violations. Significant staff effort was redirected from transition to operations work to develop a roadmap to address the C&A findings. Nearly all of the violations can be traced to the use of 25+ year old DEC computers that cannot be retrofitted to meet current IT security standards and protocols. New Space Weather products and services needed to address this gap will require high-performance computing resources and operational support at the Environmental Modeling Center.

Tsunami Warning Centers have unique and extensive communication requirements. Current bandwidth and IT resources do not allow for: expanded observational data loads, acquisition and computation of all mission-critical data for the TWCs.

Major Initiatives

The following initiatives are NOAA's IT investments or planned investments that will meet the IT objectives identified above.

- Increase capability and performance of key observing systems.

Next Generation Weather Radar (NEXRAD) – Acquire modern hardware advancements in radar meteorology and information technology to improve the performance of the nation's Doppler weather radar network. NEXRAD acquires observation information about tornadoes and severe thunderstorms. The Dual Polarization modification will improve the ability to estimate precipitation amounts, detect size and location of hail and snow, and discriminate between weather and non-weather phenomena.
Office of Hydrologic Development (OHD) – Acquire advanced hardware and software to increase capabilities for nationwide water resource forecasting, enhanced short-term predictions of river levels and longer-term forecasts.
NOAA Environmental Real-time Observations Network (NERON) – Develop a modern network of 8,000 stations nationwide collecting accurate, near real-time surface weather data obtained with state-of-the-art measurement, monitoring, and communication equipment.
National Data Buoy Center (NDBC) Ocean Observing System of Systems (NOOSS) – Includes the Data Assembly Center; shore-based stations; and meteorological, oceanographic, Tsunami, and climate buoys.
Automated Surface Observing System (ASOS) – Replace vintage 1980 architecture with state of the art data collection, processor, software, and network communications components for the nation's primary surface weather observing platform, which observes and collects basic weather elements (visibility, precipitation, temperature, wind etc.) at over 1000 locations including nearly 600 airports.

- Modernize central processing capabilities.

Advanced Weather Interactive Processing System (AWIPS) – Develop a modern technology platform and a continuous technology refresh cycle for NOAA's distributed data processing system used at NWS field offices, regional offices, and headquarters that integrates all meteorological, hydrologic, satellite, and weather radar data received from all other observational and analytical elements that enables the forecaster to prepare and issue more accurate and timely forecasts and warnings.

- Modernize information dissemination capabilities.

Telecommunications Gateway (NWSTG) System – Modernize the hardware, software, and telecommunications infrastructure, and provide a critical infrastructure protection backup for the NOAA central switching system that provides continuous acquisition and dissemination of domestic and foreign meteorological and hydrological data and products between providers and users.
NOAA Weather Radio (NWR) All Hazards Weather Network (NAHWN) [aka, All Hazards Emergency Message Collection System (HazCollect)] - Automate the collection and dissemination of non-weather civil-emergency messages over NOAA Weather Radio (NWR) and to quickly and securely authenticate messages received by emergency managers.
NOAA Weather Radio Improvement Program (WRIP) –Begin development and deployment of the system to replace the Console Replacement System, consolidate the NWR and NOAA Weather Wire Service (NWWS) in a single satellite network, and provide access to NNWR transmitters for dissemination of live localized and national emergency voice alerts.
NWS Dissemination Systems – This initiative supports the continuing operations for the National Weather Wire Service (NWWS), the International Satellite Communications System (ISCS), and NOAA Weather Radio (NWR).

- Develop new modeling/forecast products.

National Air Quality Forecast Capability (NAQFC) – Develop the computational capability to provide 12km Ozone and Particulate Matter forecasts.
Fire Weather Services and Modeling – Develop the hardware, software, and telecommunications resources to provide live data to meteorologists during fire events. Develop the computation capability to produce a coupled fire spread mode to 1km spatial resolution.
Meteorological Assimilation Data Ingest System (MADIS) – Make value-added data available for the purpose of improving weather forecasting, by providing support for data assimilation, numerical weather prediction, and other hydrometeorological applications.
Develop applications to disseminate geospatial data – using Keyhole Markup Layout (KML) and enterprise licenses for Google Earth and Google Maps – for point forecasts, severe storm floods and warnings, hurricane warnings, storm verification, post-storm damage assessment, etc.

Data Assimilation and Modeling – Develop new methods for coupling atmosphere, ocean, land surface and cryosphere models which will enable the next generation of numerical forecast systems to be developed.

NOAA Profiler Network –A vertical looking, radar-based observation system for acquiring information about tornados, flash floods, and winter storms. There are 35 operational Profiler radars deployed in the US, 32 in the central US and 3 in Alaska.

4. Commerce and Transportation Mission Goal

Mission Description

To support the nation's commerce with information for safe, efficient, and environmentally sound air, sea, and surface transportation.

Mission Goal Objectives

- Support decisions in aviation, marine, and surface navigation.
- Research, develop, and deploy more accurate and timely information products
- Research, develop, and deploy advanced monitoring and observing systems, new models, prediction techniques, and assessments
- Support decisions in coastal resource management
- Build public understanding of the scientific, technological, and environmental factors of commerce and transportation.
- Partner with public and private organizations to provide the environmental science, services, and stewardship that the nation needs to realize sound and sustainable economic growth.

IT Strategic Objectives

- Transition aviation weather program products and services from a primarily text based model to a digital environment with machine-to-machine interface capabilities, including internet dissemination of geospatial data.
- Continue planning and development of the NextGen Weather Information Database (WIDB) to meeting Initial Operating Capability (IOC) in FY 2013 by establishing the project office, forecast process development and IT systems and infrastructure development.
- Transition nautical chart production from "dumb" raster data representation into more usable vector data.
- Merge the two separate production components of the Nautical Charting System into a single production system from which multiple products can be derived.
- Eliminate the single point of failure regarding the real-time provision of oceanographic and meteorological observations for safe maritime navigation and Homeland Security applications.

IT Architecture Gap and Target Statement

National Airspace System users are increasingly relying on digital data for weather related decisions. The FAA is developing Air Traffic Management systems requiring digital weather information that can be delivered over a network enabled communications system and processed by automated systems able to route aircraft around hazardous weather areas. The ability to determine the current and future weather at any point in the NAS is a key requirement of NextGen. Current NOAA/NWS systems are primarily based on legacy test products. The transition to digital aviation weather information will require a significant change to the way we currently do business, while providing the opportunity to dramatically improve the level of service in all weather disciplines. Other gaps include the need for more precise data to be collected in order to both better define the GEO-IDE model and more specifically obtain expanded water level observation and GPS data for the Great Lakes.

The gaps in this program relate directly to the volume of data acquired under the observation capability. A gap exists in NOAA's ability to provide oceanographic products and services support for the 100% observation requirements. These deficiencies fall into three general areas: analyzing, processing and verifying data for product derivation; providing the IT infrastructure and support to manage the data; and quality controlling the data, particularly in real time. A large gap exists in NOAA's ability to provide adequate data stewardship for the growing volumes of hydrographic survey and other environmental data archived and managed by the National Geophysical Data Center.

Major Initiatives

Next Generation Air Transport System (NextGen) – A single authoritative source of four dimensional (latitude, longitude, altitude, and time) digital weather data that can be fully integrated into flight decision support tools to facilitate safe and efficient air transportation and reduce costs associated with weather-related delays.

Physical Oceanographic Real Time System & National Water Level Observation Network (PORTS & NWLON) - A decision support tool which improves the safety and efficiency of maritime commerce and coastal resource management through the integration of real time environmental observations, forecasts, and other geospatial information.

Nautical Charting System – The primary products of the NCS are navigational charts and chart derived products. The charts come in three basic types: Electronic Nautical Charts (ENCs) for use in Electronic Chart Display and Information Systems; Raster Navigational Charts (RNCs) used in electronic navigation systems; and lastly, the traditional lithographic (paper) chart.

Geodetic Support System – Processes data for the National Spatial Reference System and geoid models. Plans are to expand to 1,500 Continuously Operating Reference Stations (CORS).

Search and Rescue Satellite Aided Tracking (SARSAT) – Locates those in distress almost anywhere in the world at anytime. Its Mission Control Center processes the distress signal and alerts the appropriate search and rescue authorities to who is in distress and where they are located.

5. Mission Support Goal

In this section, strategic goals for NOAA IT infrastructure are discussed. IT infrastructure is defined as all common and enterprise level functions and systems that support mission activities and are not directly used for most mission programs. It includes (but is not limited to): IT Security, networks, end-user workstations, office automation hardware and software, help desks, financial and administrative systems. In accordance with the **NOAA Strategic Plan for FY 2009 - 2014**, the Mission Support Goal provides critical support for NOAA's mission. NOAA will ensure state-of the-art IT infrastructure and secure information technology and

systems with the objective of increasing internal and external availability, reliability, security, and the use of information technology and services.

5.1. Modeling and Observing Infrastructure Sub-Goal

Mission Sub-Goal Description

Integrate observing system architectures, data management architectures, and computing and modeling capabilities to better enable NOAA's mission.

Mission Sub-Goal Objectives

- Ensure a strategic, integrated, and balanced observing system investment portfolio for NOAA through the use of quantitative analysis
- Integrate national and regional efforts to optimize ocean observations, data management, and understanding
- Provide for research, development, and operational capabilities that improve, maintain, and operate models and provide guidance for environmental forecasts at all temporal and spatial scales
- Ensure computational infrastructure and high performance computing strategies needed to sustain computational workloads of NOAA's research and operational modeling enterprise and support NOAA's data management and stewardship capabilities

IT Strategic Objectives

- Increase capability and performance of key observing systems.
- Modernize central processing capabilities.
- Improve forecast models, computing capacity, and product generation
- Improve transition to operations of high-resolution hurricane models.
- Improve forecast tool creation to improve the 1-5 day hurricane guidance.
- Improve storm surge model R&D and inundation mapping for coastal regions.
- Define data requirements and technical specifications prior to transitioning buoy systems from research to operations.
- Provide an integrated earth observation and data management system that will enhance NOAA's capabilities to meet mission goals and enable NOAA's resources to be applied more efficiently and effectively by reducing unnecessary duplication, improving coverage, and providing networks to disseminate information when and where it is needed around the world

IT Architecture Gap and Target Statement

Computational Resources necessary to: 1) advance our understanding of long-term climate change, 2) accelerate improvement in hurricane forecasting by a decade, 3) implement ensemble forecasts necessary to determine accurate probabilities of forecast error, 4) meet requirements for providing analyses of record using
all available data and information, 5) transition space weather models, products, and data into operations is critical to maintain and improve the success of NOAA Space Weather Program capabilities, 6) develop a robust ecosystem forecast capability and integrate ecosystems models with physics based models

Under the current process, with data management and integration efforts focused on individual models and tools, gaining access to data is very time-consuming process for users, who must pull data from many available data websites and invest their resources to re-format the data to suit their purposes. While some users have sufficient knowledge and experience with ocean data to perform these activities, the nature of the data supply structure has created substantial barriers for the average data user, high costs of data retrieval, and reduced a user's ability to deliver value-added products and services for the public. The current data

management environment unduly increases the costs of collecting, storing and distributing the very data that is necessary to support NOAA's products and services.

Resources provided for NOAA's data management architecture activities are insufficient to develop and implement the NOAA-wide components that are needed to integrate and make interoperable NOAA's environmental data management systems. Funding provided will allow for some coordination with various data integration efforts (e.g. Integrated Ocean Observing System, National Integrated Drought Information System, and the Comprehensive Large-Array Stewardship System) but will not provide for leveraging the lessons learned from these efforts to bring legacy systems into compliance with the technology and standards needed to provide easy access and integration of all of NOAA's environmental data and information

Major Initiatives

The following activities are NOAA's IT investments or planned investments that will meet all of the IT objectives identified above.

NCEP Weather and Climate Operational Supercomputer Systems (WCOSS Primary and Backup) – The NOAA NCEP Weather & Climate Supercomputer Systems (Primary and Backup) produce environmental forecasts and assimilate data used to execute the numerical models that form the basis for all routine weather and climate forecasts produced in the US. Modernize information dissemination capabilities. Hurricane Forecast Improvement: Improve hurricane modeling, the joint hurricane testbed, and hurricane data assimilation.
NCEP Weather and Climate Computing Infrastructure Services (WCCIS) – WCCIS provides support resources for (a) weather and climate forecasting capabilities and (b) operational model development for forecasts and warnings.
NOAA R&D High Performance Computing System – Provides high performance computing resources for weather and climate research in the development and use of sophisticated numerical models to predict and understand atmospheric and oceanic phenomena.
Global Earth Observation Integrated Data Environment (GEO IDE) – Establish a Services Oriented Architecture (SOA) for NOAA data management systems, providing common services, and leveraging the benefits of existing data management systems.

5.2. Satellite Sub-Goal

Mission Sub-Goal Description

Provide a continuous stream of satellite data and information with the quality and accuracy to meet users' requirements for spatial and temporal sampling and timeliness of delivery

Mission Sub-Goal Objectives

- Increase the quantity, quality, and accuracy of satellite data that are processed and distributed within targeted time.
- Increase government procurement of NOAA-licensed remote sensing systems.
- Produce products and services that support NOAA's ability to transform Earth and Space observations and data into resource management decisions that ultimately create improvements in public safety, security, and quality of life

IT Strategic Objectives

- Increase capability and performance of key observing systems.
- Modernize central processing capabilities.
- Develop ground systems for new/interim satellites.
- Acquire and deploy high-capacity, reliable, and efficient satellite environmental observation infrastructures that provide optimal support for NOAA's entire product and services portfolio

IT Architecture Gap and Target Statement

NOAA needs to have an integrated, multi-mode, high-bandwidth ground system capability that provides flexibility to support various satellite missions including the current environmental satellites, satellite ground systems currently in development (interoperable with the NPOESS and GOES-R ground systems) and future research to operations satellite missions using an integrated ground system. NOAA's current systems cannot handle high data rates or all the data formats currently being planned for use by NOAA, NASA and other agencies.

With increasing demands and requirements for IT security, the current steady-state funding is not adequate to ensure a fully compliant infrastructure in the future. The increase provides essential IT Security infrastructure for NESDIS Systems associated with satellite operations. This increase will provide baseline IT security controls for 11 National Critical systems that provide highly valued infrastructure services to the American people.

Major Initiatives

The following activities are NOAA's IT investments or planned investments that will meet all of the IT objectives identified above.

Joint Polar Satellite System (JPSS) Ground System – Develop the IT support for the ground segments to operate, monitor, control, and produce the environmental observation products for the Nation's civil and military polar-orbiting operational meteorological satellite system into a single national entity capable of satisfying both civil and national security requirements for space-based remotely sensed environmental data.
GOES-R Ground System – Develop the ground segments to operate, monitor, control, and produce the environmental products for NOAA's next generation of civilian geostationary satellites.
GOES Ground System – GOES ground system monitors and controls NOAA's Geostationary environmental satellites.
POES Ground System – The POES ground system monitors and controls NOAA's polar-orbiting operational environmental satellites. IT hardware/software upgrades are underway for future satellites.
Environmental Satellite Processing Center (ESPC) – This investment is for the consolidation of two environmental processing systems (for Polar and GOES satellite data) into one central processing system for environmental satellite data: the Environmental Satellite Processing Center (ESPC).

Satellite Operations Control Center Command and Data Acquisition (SOCC/CDA) – This initiative supports the Geostationary Operational Environmental Satellites (GOES) and Polar Orbiting Environmental Satellites (POES) programs through SOCC and CDA facilities in Suitland, MD, Wallops, VA, Fairbanks, AK, and Greenbelt, MD.

Office of Satellite Data Processing and Distribution (OSDPD) Systems Critical Infrastructure Protection (CIP) – Provide a backup facility to the Environmental Satellite Processing Center (ESPC) primary facility that is the central processing system for environmental satellite data.
JPSS Data Exploitation (JDE) – Provide the essential data processing and distribution systems including high speed computers, telecommunications, and automated procedures to deliver enhanced environmental observations to operational weather forecasters, government and international scientists, private enterprises, and university researchers from the NPP and JPSS Satellites.

5.3. Leadership and Corporate Services Sub-Goal

Mission Sub-Goal Description

Support NOAA's mission through cost-effective, value-added solutions to its financial, facilities, workforce, and information technology needs

Mission Sub-Goal Objectives

- Improve collaborative decision making based on knowledge of corporate goals, programmatic performance, and stakeholder demand
- Increase internal and external availability, reliability, security, and use of NOAA IT and services
- Increase number of facilities with improved collocation of NOAA services and partners
- Improve efficiency and performance of financial, administrative, workforce management, acquisition, and other support transactions and services
- Increase the levels of diversity and expertise appropriate to the conduct of NOAA functions
- Enhance contribution of NOAA services to all-hazards Homeland Security efforts

IT Strategic Objectives

For detailed descriptions of IT Strategic Objectives pertaining to the IT Services Program Capabilities, see sections 5.3.1 through 5.3.5 (and the associated sub-sections) below.

IT Architecture Gap and Target Statement

For detailed descriptions of IT Architecture Gap and Target Statements pertaining to the IT Services Program Capabilities, see sections 5.3.1 through 5.3.5 (and the associated sub-sections) below.

Major Initiatives

For detailed descriptions of Major Initiatives pertaining to the IT Services Program Capabilities, see sections 5.3.1 through 5.3.5 (and the associated sub-sections) below.

5.3.1 IT Administration and Regulation

IT Goal Description

Improve the policy, planning, and management of NOAA IT.

IT Goal Objectives

- Increase the efficiency and effectiveness of NOAA IT management.
- Develop and oversee policies on the acquisition of IT resources, management of IT projects, IT security, and the use of IT resources to meet NOAA mission requirements

IT Strategic Objectives

- Improve governance, licensing, cost sharing, competency, and customer service.

IT Architecture Gap and Target Statement

None.

Major Initiatives

NOAA-Wide Enterprise IT Planning – IT resources are used to support NOAA-wide IT Planning activities for strategic, operational and capital planning and investment management.

IT Governance Model – Apply and mature the governance model to implement standard infrastructure through strategic sourcing vehicles.

IT Fee-for-Service Model – Establish IT Fee-for-Service model.

Enterprise Licensing – Support the federal government-wide approach for enterprise licenses on common software in the areas of Office Automation; Network Management; Antivirus; Database; Business Modeling Tools; and Open Source software support. Develop enterprise license agreements for widely used software.

Service Level Agreement (SLA) Templates – Develop a sharable library of Service Level Agreement templates for common IT infrastructure services, based on industry best practices.

IT Workforce Training Academy – Develop and implement a virtual IT Workforce Training Academy, to include C&A training for senior authorizing officials.

Customer Service Model – Issue the NOAA IT Service Catalog.

5.3.2 IT Security

IT Goal Description

Implements policies, standards, and procedures for NOAA IT systems which are consistent with government-wide laws and regulations and information assurance standards to adequately protect NOAA's information systems, whether maintained in-house or commercially, and prevent any unplanned disruptions of processing which would seriously impact NOAA's mission.

IT Goal Objectives

- To protect NOAA from information system intrusions, and prevent compromises that put NOAA at risk for any disruption of operations or unauthorized access to information resources.
- Develop policies for and oversee implementation of FISMA, DOC security policies, and the NOAA IT Security Architecture, operation of the enterprise NOAA Computer Incident Response Team (N-CIRT), and establishment of the NOAA Cyber Security Center (NCSC)

IT Strategic Objectives

- Achieve and maintain Certification and Accreditation (C&A) for all NOAA IT systems.
- Comply with the Federal Information Security Management Act (FISMA) and National Institute of Standards and Technology (NIST) Guidance Special Publication 800-53A.
- Employ an affordable, centralized, standardized, and repeatable C&A process.
- Employ a certification and accreditation process.
- Integrate the use of standard security controls, verification techniques and procedures.
- Develop Plans of Action and Milestones (POA&Ms) standards to ensure adequate attention and visibility and help NOAA Line/Staff Offices apply consistent and reasonable resource management practices to POA&M management.
- Reduce the number of outstanding POA&Ms greater than 120 days past due, ultimately trending to zero.
- Develop evidence to support informed, risk-based accreditation decisions by senior agency officials.
- Develop or enhance appropriate technical, personnel, administrative, physical, environmental, and telecommunications safeguards in IT systems.
- Develop or enhance an enterprise-level robust Patch Management process and system.
- Establish and maintain an incident response and intrusion capability.
- Deploy regional Intrusion Detection Systems (IDS).
- Secure Personally Identifiable Information (PII).
- Fund IT Security at 10% of systems life cycle costs.
- Implement Homeland Security Presidential Directive (HSPD) -12.
- Prevent unnecessary exposure to compromises by overseeing security testing that ensures enterprise software purchases have well-designed code

- Reduce risk to timely delivery of radar, satellite, and model data due to increases in security posture from cost effective IT security consulting services
- Detect and defend against active nation state-sponsored cyber attacks.
- Eliminate 'single points of failure'.
- Encrypt NOAA email messages.

IT Architecture Gap and Target Statement

A number of critical issues remain in the execution of a sound IT security program within NOAA. These issues include: 1) Certification and Accreditation of all systems, 2) the development of a standardized and uniform process for conducting C&As, 3) producing quality C&As that achieves DOC IG verification of the C&A process, 4) inadequate funding for IT security in all systems and projects, 5) Implementation of the new National Institute of Standards and Technology (NIST) Guidance Special Publication 800-53A. The targets for this goal are to provide full capability of securing and documenting the security of NOAA systems, formulate and enforce IT security policy, timely responding to security incidents, and develop processes which ensure consistent application of security controls, develop and deploy a centralized security management model, provide centralized authentication servers to control user accounts, system access, and network access as part of a single sign-on strategy, and provide a single unified network security model for TCN-2 level network to promote inter line office collaborations. Achieving the target architecture will result in a more consistent, reliable, and secure IT environment for NOAA systems.

Major Initiatives

NOAA Enterprise IT Security – Implementation of policies, standards, procedures, and initiatives, such as those identified below, to adequately protect NOAA's information systems and prevent any unplanned disruptions of processing which would seriously impact NOAA's mission.

NOAA Computer Incident Response Team (N-CIRT) – Expand NOAA's ability to anticipate, recognize, evaluate, and respond to computer security incidents. Enhance nationwide 24x7 security monitoring and incident response. Acquire, deploy, and manage Intrusion Detection Systems (IDS). Test and evaluate products for security vulnerabilities prior to enterprise deployment.

Enterprise Security Software – Acquire, manage, and deploy enterprise security software for patch management, virus protection, anti-spam, security event correlation, and other functions. Reduced security software license administration.

NOAA Silver Spring Metro Center (SSMC) IT Infrastructure – Eliminate known single points of failure.

Homeland Security Presidential Directive (HSPD)-12 Logical Access Control System (LACS) – Implement the logical access requirements of HSPD-12 (Policy for a Common Identification Standard for Federal Employees and Contractors) to complement and leverage the Facilities Program's implementation of the HSPD-12 Physical Access Control System (PACS).
Certification & Accreditation (C&A) Process – Complete C&A packages in accordance with the CIO Council-approved schedule
Standard Configurations - Create standard configurations for desktops, laptops, servers, and routers.
Spam and virus protection – Implement comprehensive spam and virus prevention at the Messaging Operations Center.
Cyber-Security Assessment and Management (CSAM) – Improve the automation of NOAA's IT Security C&A process by completing the initial implementation phase of DOC's instance of the CSAM system for 95% of NOAA systems.
Continuous Monitoring (CM) – Complete CM activities (i.e., quarterly vulnerability scanning for all systems,

annual penetration testing for high impact systems, annual assessment of select controls for all systems not undergoing C&A testing) in accordance with CIO Council-approved schedule

Quality Assurance (QA) - Execute a quality assurance program.
POA&M Management – Resolve POA&Ms that are greater than 120 days past due.
Federal Desktop Core Configuration (FDCC) – Standardize the implementation of FDCC to secure user desktops.
Electronic Mail Encryption – Develop short-term and long-term plans for implementing email encryption in NOAA.

5.3.3 IT Program Management

IT Goal Description

To manage NOAA's IT infrastructure including wide and local area networks, messaging systems, collaboration tools, telephony, workstations, help desks, enterprise COTS software, and administrative applications.

IT Goal Objectives

- To develop a new enterprise infrastructure under a "One-NOAA" approach that provides for common solutions across all Line Offices.
- To consolidate, integrate, and reduce the total cost of operations for NOAA's existing IT infrastructure.

IT Strategic Objectives

- Establish a single NOAA Wide Area Network (NOAAnet).
- Provide economies of scale in network operations and management.
- Expand High-Performance Computing (HPC) resources and capabilities.
- Establish NOAA's HPC presence by partnering with a world-class computing facility.
- Continue to develop additional partnerships on leadership-class systems to explore next-generation hurricane modeling, weather modeling, and climate change modeling capabilities.
- Maximize the efficiency of the transition of research to operations.
- Deploy a unified messaging solution to upgrade from legacy electronic mail, calendaring, and telephony systems, and provide effective project collaboration tools, document sharing, and enhanced video conferencing capabilities.
- Reduce the number of Internet connections.
- Consolidate help desks in the DC-metro area.
- Establish a OneNOAA Web Presence.
- Consolidate web servers.
- Establish a single IT Services Contract.
- Define a common project/program management process.
- Institute a standard, shared set of project/program document templates.
- Enhance the existing project/program review process.

IT Architecture Gap and Target Statement

Historically IT infrastructure has evolved independently among the LOs. For example, each LO has independently developed and manages wide area networks, phone systems, local area networks, and help desks at major NOAA locations. There are, however, some enterprise level successes. These include a Washington DC area Metropolitan Area Network, enterprise email based upon the Sun One and Mozilla, and Oracle calendaring. These successes notwithstanding, NOAA has a long way to go before it can be declared to

have an enterprise level IT infrastructure. Committed management and technical action must be taken on a number of fronts including: Wide Area Networks, web management, collaboration software, and a centralized network management model.

Major Initiatives

IT Infrastructure - Manage NOAA's IT infrastructure including wide and local area networks, messaging systems, collaboration tools, telephony, workstations, help desks, enterprise COTS software, and administrative applications. Specific key IT Infrastructure initiatives are further described below.

NOAAnet Single Enterprise Network – Establish an integrated, carrier-provided Wide-Area Network that: eliminates 12 legacy networks; connects major NOAA locations and functions logically; includes a single network cloud, standard configuration and architecture, and better security; establishes prime and back-up capabilities; connects all current metro area networks (MANs); and provides Internet access through specific points of presence. Establish and operate a single backbone network to provide secure, capable communications among NOAA's over 200 geographically-dispersed locations. Employ carrier-provided Multi-Protocol Label Switching (MPLS) technology to establish traffic separation over independent Virtual Private Networks (VPNs) and enable communications among any NOAA locations while assuring the separation required supporting unique security boundaries and supporting differing performance requirements.

High-Performance Computing (HPC) – Acquire, install, operate, and maintain new and expanded supercomputing resources for NOAA, in order to address the growing gap between the capabilities of NOAA's Environmental Modeling Program (EMP) and the nation's demand for EMP products, including hurricane forecasts, storm surge, fire weather, aviation weather, and climate change predictions. Implement a new HPC Environmental Security Architecture to support model-based predictions for NOAA's highest priority mission needs. Increase the flexibility of the HPC architecture and optimize the ability to scale codes to better meet NOAA's requirements. Explore possibilities for on-demand computing partnerships.

NOAA Unified Communications and Telephony – Acquire, implement, operate, and maintain a NOAA-wide messaging system. Redesign NOAA's messaging infrastructure to include a redundant, highly-available architecture consisting of 2 sites (Landover and Fairmont, WV). Acquire, install, and operate a new telephone system for the NOAA Silver Spring Metro Center (SSMC) campus. Acquire, implement, operate, and maintain an enterprise-wide collaboration strategy and solution.

- Implement new electronic mail system and a calendar with enhanced functionality.
- Better integration with PDA and smartphone technology.
- Active Directory – with real-time info that shows where people are right now.
- Dialing on your desktop PC – your PC is your phone.
- Integration of information on the desktop.
- Project collaboration tools and document sharing.
- Enhanced video conferencing.

Transport Services Integration (aka, Trusted Internet Connections) – Implement in accordance with OMB memorandum [M-08-05, Implementation of Trusted Internet Connections (TIC)], which encourages agencies to strengthen security by leveraging IT Infrastructure and ISS Lines of Business (LOB), GSA Networx, and the Federal Desktop Core Configuration (FDCC), and reduce the number of direct Internet connections.

NOAA IT Service Center Consolidation – Consolidate 19 Washington DC-metro area help desks to minimize redundancy and provide consistent operations through a single contractor.

OneNOAA Web Presence (aka, Enterprise-level OneNOAA Web Management) - Redesign NOAA's websites, consolidate web servers, and acquire the hardware, software, and staff to manage NOAA's web presence.

NOAA Web Operations Center (WOC) - Continue to physically consolidate web servers at the WOC.

Standard Desktop Configuration – Implement standard a desktop configuration for Windows XP, Windows VISTA, and Windows 7 in order to provide a baseline level of security, reduce risk from security threats and

vulnerabilities, to improve system performance, decrease operating costs, and ensure public confidence in the confidentiality, integrity, and availability of government information.

NOAALink – Establish NOAALink as an IT acquisition vehicle that will leverage the purchasing power for customers of IT products and services throughout the enterprise. Implement a strategic sourcing contract for IT support services in the areas of network management, messaging, collaborative tools, web services, IT security, infrastructure support, desktop and server management, and applications development and management, under the NOAALink acquisition effort.

5.3.4 Enterprise Architecture

The NOAA Enterprise Architecture (EA) serves as a strategic roadmap for transitioning legacy IT investments to the future, based on the evolving mission needs and priorities. The EA provides a holistic and integrated view of NOAA, including business processes (e.g., the NOAA Functional Model), performance expectations, the IT services and applications required to support the processes and enable better performance, the data/information required, and the technical standards and specifications needed to achieve enterprise IT goals. The EA includes a description of the current (legacy) environment, the target environment needed to support NOAA's strategic business direction and priorities, and the transition/sequencing plan for moving to the target IT environment. In keeping with PPBES, the EA is organized by NOAA's mission goals.

In response to Federal mandates to improve how U.S. Government agencies select, acquire, deploy and manage their extensive technology resources (e.g., the Clinger-Cohen Act of 1996), NOAA initiated an Enterprise Architecture (EA) to provide a framework and blueprint to guide the future direction of its IT investments. This future direction is explicitly driven from NOAA's corporate strategy and business priorities, using a "top-down" and business driven methodology for aligning IT investments with corporate mission requirements.

In this methodology, NOAA's current and future enterprise (as envisioned in the Strategic Plan) is organized and described in the context of an industry standard architectural framework.

Federal agencies are required to identify IT Management principles to ensure proper decision making and overall management of its IT investments. These principles are essential to achieve effective and consistent governance of enterprise IT resources. In response to this requirement, the NOAA CIO Council vetted and approved the following principles in 2008, which apply to all NOAA operating units:

- NOAA's IT initiatives and strategies are focused on supporting business priorities, processes, and goals prioritized through the budget process.
- Wherever possible and practical, and without diminishing the delivery of services, NOAA implements IT solutions that share and/or reuse common processes, services, infrastructure, and system components.
- NOAA maintains appropriate security, privacy, and protection of its IT assets, which includes the data collected or produced as well as the systems and networks that process, disseminate, and store this information.
- NOAA treats its data and information as corporate resources and manages them appropriately throughout their life cycles. Note: The term "life cycle" includes collection, processing, discovery, access, storage, disposal, and preservation.
- NOAA bases IT acquisitions, development, and operations upon well-defined, approved, widely publicized, and transparent standards.

IT Goal Description

The Enterprise Architecture is a management practice to maximize the contribution of NOAA's resources to achieve its mission. The EA establishes a clear line-of-sight from business requirements to IT investments to measurable performance improvements for the entire NOAA enterprise.

IT Goal Objectives

- Lead the development and implementation of the NOAA IT Enterprise Architecture (EA), integrating NOAA's IT EA into the DOC IT EA, OMB Federal Enterprise Architecture (FEA), and NOAA Business Operations Manual (BOM)
- Ensure that IT security requirements are fully integrated with the NOAA EA and governance process.
- Simplify and unify NOAA's IT architecture across all Line Offices, mission areas and programs.
- Inform and guide PPBES decisions with IT implications through architecturally based analysis of alternatives to close program gaps.
- Provide vetted IT target architecture to guide and inform NITRB investment decisions, and serve as a vehicle for CIO monitoring and enforcement of agreed-to transition plans.
- Provide specific and actionable guidance to program managers for IT components (e.g., standards for interoperability).
- Define and implement EA roles and responsibilities pertinent to NOAALink.

IT Strategic Objectives

- Evolve and mature the framework and process for incorporating IT security requirements into the NOAA EA.
- Identify and incorporate lessons learned in the EA life-cycle, governance model and repeatable maintenance process.
- Integrate the EA with PPBES and CPIC.
- In collaboration with NOAA's Homeland Security Program Office, align NOAA's defined Mission Essential Functions with the Lines of Business and sub-functions defined in the FEA Business Reference Model (BRM).
- Identify and promote opportunities to consolidate IT architecture components (e.g., applications, services, etc.) for shared business requirements across NOAA.
- Assess the alignment of NOAA's IT resources with agency mission goals and objectives, and develop transition strategies to close gaps where needed.
- Identify and foster enterprise-wide adoption of open standards to enable system interoperability and data sharing across applications and functional disciplines (TRM and Data Architecture).

IT Architecture Gap and Target Statement

The NOAA EA satisfies external stakeholder (OMB and DOC) technical expectations, but is generally recognized as a somewhat academic exercise with marginal return on value within NOAA. The intent is to transform it into a practical, relevant and value added tool to guide CIO and corporate decisions regarding NOAA's IT future. This transformation began with an initiative to integrate the NOAA security architecture into the EA, leveraging the resources and urgency of need associated with IT security.

Subsequent efforts will focus on usage of the EA to consolidate resources (e.g. infrastructure) wherever possible, and on integrating applications and data across programs and Line Offices. Currently, the NOAA EA is not approved by NOAA goal team leads, although this level of vetting is essential to achieve the buy-in needed to implement the target architecture. Education, outreach and a concerted and focused campaign to sell the NOAA EA to goal team leads and other strategically placed stakeholders is needed to close this gap. Apart from the NOSA segment architecture (a subset and extension of the NOAA EA), the EA is not structured

in a manner that enables meaningful or efficient analysis of the significant amounts of empirical information contained within the NOAA EA document. This is a significant gap which limits the potential and is showstopper barrier to achieving the long-term goals of EA. To close this gap, the EA program has initiated a pilot repository using an industry-standard EA tool, with an initial focus on testing and proving the value of the repository's capabilities to such functions as the CPIC process and COOP operations.

Major Initiatives

Security Integration – In collaboration with NOAA's IT security program office, continue efforts to integrate IT security into the NOAA EA, including Homeland Security Presidential Directive (HSPD) -12.

NOAA-Wide Enterprise IT Architecture –Support NOAA-wide IT Architecture activities for strategic, operational and capital planning and investment management.

EA Processes – Update documentation of the EA lifecycle, maintenance process and governance model to incorporate lessons learned. Integrate the EA with PPBES and CPIC. Complete testing of NOAA's EA tool pilot (repository and analytical capabilities) and transition to a production capability (to include training for key users, etc.). Develop and execute an EA communications, education and outreach strategy and plan, to include development of a meaningful EA web site, and an on-line collaboration tool for active participants in EA program activities,

Data Management – Evolve and mature the NOAA data architecture through partnerships with the DMIT and DMC and the IOOS program.

Technical Reference Model (TRM) – Update the NOAA TRM and publish the contents on the NOAA intranet for easy access and use.

Segment Architecture – Define a strategy and process for developing Segment Architectures beyond the NOAA Observing Systems Architecture (NOSA).

Service Layer – Define and publish the service layer of the NOAA Enterprise Architecture, with a focus on the catalog of infrastructure services.

Network Standards – Develop network standards to include in the NOAA Technical Reference Model (TRM).

Architectural Improvements – Initiate architectural improvements to National Weather Service (NWS) IT investments (e.g., AWIPS, NWSTG, and Space Weather)

Target Infrastructure Architecture – Develop the target architecture for high-priority infrastructure services. Establish mechanisms to implement the target infrastructure architecture through NOAALink. Enhance existing mechanisms to ensure that NOAA Capital Planning and Investment Control (CPIC) processes are driving toward the target infrastructure architecture.

5.3.4.1 Align IT with the OMB Lines of Business and E-Gov initiatives

IT Goal Description

Expand E-Government by utilizing technology to improve how the Federal Government serves citizens, businesses and agencies.

IT Goal Objectives

NOAA will participate with other federal agencies to construct, transition to, and implement the Geospatial Line of Business. NOAA will be a provider of e-Government services for weather events, earth observing, environments and geospatial data. Within NOAA, support program collaboration for geospatial initiatives, regional ecosystem responses, and incident responses.

IT Strategic Objectives

- Leverage the existing Geographic Information Systems (GIS) Committee, under the CIO Council, to support the NOAA implementation of the federal framework for the GeoSpatial Line of Business (LOB).
- Work with government-wide geospatial standards and architecture through participation in the Geospatial LOB and the national geospatial data infrastructure.
- Create composite geospatial data products that span NOAA Line and Program office missions.
- Remove the physical barriers to geospatial data access within NOAA.
- Promote interoperability and collaboration within NOAA via eGov.

IT Architecture Gap and Target Statement

The Federal Government continues to improve services and deliver results through the adoption and implementation of the President's E-Government (E-Gov) initiatives and government wide solutions. The United States Government is one of the largest users and acquirers of data, information and supporting technology systems in the world, by investing approximately $65 billion annually on Information Technology (IT). The Federal Government has made improvements but continues to strive to be the world's leader in managing technology and information to achieve the greatest gains of productivity, service and results. For the past five years, the President's Management Agenda (PMA) initiative to Expand E-Government has delivered significant results to the taxpayer and federal employees alike. The departments and agencies are determined to build upon past success and continue to apply the principles and complete implementation of government wide solutions to achieve greater savings, better results and improved customer service levels.

Major Initiatives

E-Gov – NOAA will fully align with all applicable national E-Gov initiatives. Specifically, NOAA has a role in the following initiatives: 1) Recreation One-Stop, 2) E-Rulemaking, 3) Geo-Spatial One-Stop, 4) Disaster Management, 5) Grants.gov.
Geospatial Line of Business (Geo LOB) – NOAA staff will be active participants in the Geo LOB by actively attending Task Force meetings, supporting the development of the Quantitative and Qualitative Geospatial Investments Data Call templates, responding to Quantitative Geospatial Data Calls, supporting development of A-16 report templates, reviewing the Geospatial Coordination FACA Charter, reviewing and commenting on outputs from Joint Business Case and Performance Management Working Group, reviewing plans for the formulation of the Geo LoB Program Management Office.

5.3.5 IT Support for Administrative Systems

5.3.5.1 Operate the Financial Management and Administrative Systems

IT Goal Description

To provide central computer operations and management for NOAA's administrative and financial systems.

IT Goal Objectives

Improve the efficiency and performance of financial, administrative, workforce management, and acquisition transactions and services.

IT Strategic Objectives

- Improve NOAA's financial management and administrative IT infrastructure.
- Invest in IT to improve processing of financial, administrative, workforce, management and acquisition services.

- Support the development of the End-to-End (E2E) system.

IT Architecture Gap and Target Statement

Replacement of CBS, running at a Consolidated Data Center (CDC) for Server Consolidation, is required to support the Department's decision that it will replace CBS at the end of its expected life (i.e., 2012). The Department will mandate migration to a replacement CBS system that will require NOAA to migrate its Data Warehouse, feeder systems, interfaces, and of course the Core Financial System itself. This initiative would be mandated to comply with OMB A-127 and FSIO directives to use a Shared Service Provider (SSP) that complies with all current Financial System requirements, security guidance, OMB/OFFM/FSIO, etc.

Major Initiatives

Management and Reporting Systems (MARS) – Provide the front end to CBS for better reporting.
Help Desk - Provide enhanced administrative system helpdesk support.
E2E Support - Support ongoing maintenance of the End to End Resource Management System.
HSPD-12 Integration - Integrate HSPD-12 authentication and access controls and data extract logging capability (triggered by a request for PII data) into the non-core CBS applications.
Non-Core CBS Financial Management System (PCS) - Ensure that the non-core CBS applications (which contain Privacy Act, PII, and BII data) remain secure and are protected against unnecessary disclosure of this information.
Financial Management IT Operations – Provide the central computing services for NOAA financial and administrative activities.

5.3.5.2 Meet NOAA and federal-wide objectives of Grants Management

The Grants Management Division (GMD) supports NOAA's mission by reviewing solicitations for applications, processing applications, negotiating awards, managing administrative and financial aspects of awards, monitoring progress against expenditures, resolving audit problems, and closing out awards when the projects are completed.

IT Goal Description

To provide a fast coherent, flexible and robust application in support of the evaluation, award, and long-term management and operations of the NOAA grant making function.

IT Goal Objectives

- Develop grants management data standards based on DOC's Interim Grants Manual.
- Generate corporate standard business processes which contribute to a more efficient and effective use of government-wide grants management resources.
- Provide improved customer access and communications by establishing direct lines of accountability with program managers, grant administrative staff and external customers.
- Achieve full compliance and compatibility with the government-wide e-Grants Line of Business (LOB) initiative.
- Implement a well-designed and well-functioning grants management system that will accept any type of federal grant.
- Release updated software in accordance with established configuration management guidelines and procedures.

IT Strategic Objectives

Provide a single unified grant processing and administration system, using an electronic solution that will reduce processing time and increase efficiency.

IT Architecture Gap and Target Statement

The NOAA Grants Online (GOL) system provides a scalable and robust system for handling all aspects of the grant process, from researching and applying for grants, to reporting on progress, to their closure. GOL receives and parses direct downloads hourly from the www.grants.gov citizen interface.

Major Initiatives

- **Grants Online Interface** - Provide an interface between Grants Online and the Core Financial System.
- **Grants Management Line of Business (GMLOB) –** Migrate to a Grants Management Line of Business (GMLOB) provider.

5.4. Fleet Services Sub-Goal

NOAA's fleet of ships and small boats faces the challenge of expanding mission requirements, age and obsolescence, and finite resources for recapitalization. NOAA's duties to chart, manage, and explore ocean resources demands the replacement of 10 of the 20 aging ships with service life expectancies ending between 2010-2024. In 2008, the Department of Commerce approved the NOAA FY 2010-2024 Ship Recapitalization Plan, which recommends the purchase of nine new ships. NOAA is developing an FY 2011-2025 NOAA Aircraft Recapitalization Plan to further assess current NOAA airborne data collection capabilities and ensure the sustainability of vital airborne data collection. NOAA is also investigating the possible uses of independently or remotely piloted Unmanned Aircraft Systems (UAS) for obtaining research data.

Mission Sub-Goal Description

Provide the number of ship operating days and aircraft flight hours needed to meet NOAA's data collection requirements with high customer satisfaction

Mission Sub-Goal Objectives

Increase the number of ship operating days and aircraft flight hours that safely, reliably, and successfully meet NOAA's data collection requirements with high customer satisfaction

IT Strategic Objectives

- Designate information owners and implement data management plans on each NOAA ship
- Continue to research and develop new performance metric(s) to adequately capture and measure the effectiveness of the execution of mission operations and platform availability
- Examine methodology to improve cross-Goal, cross-LO prioritization of data-collection requirements to support fleet allocation plans.

IT Architecture Gap and Target Statement

NOAA's fleet of ships and vessels face expanding mission requirements, rising fuel costs, age and obsolescence, and finite resources for recapitalization. Current NOAA missions require roughly 20,000 annual operating days at sea, however, this fleet currently meets only one fifth of that need. 10 of NOAA's 20 ships will reach or exceed their 30 year useful service life between FY 2010 and FY 2024, leaving only nine ships to

meet NOAA's at-sea data requirements. Without further investment, NOAA's ships will fail to comply with NOAA's legal mandates, authorities, policies, and priorities.

Major Initiatives

NOAA Marine and Aviation Operations – NOAA ships and aircraft use IT resources to support data acquisition capabilities, which enable scientists and environmental managers to make decisions based on real-time data access and visualization. Investment includes IT implementation on new FSVs.

Appendix 1. NOAA IT Governance Processes