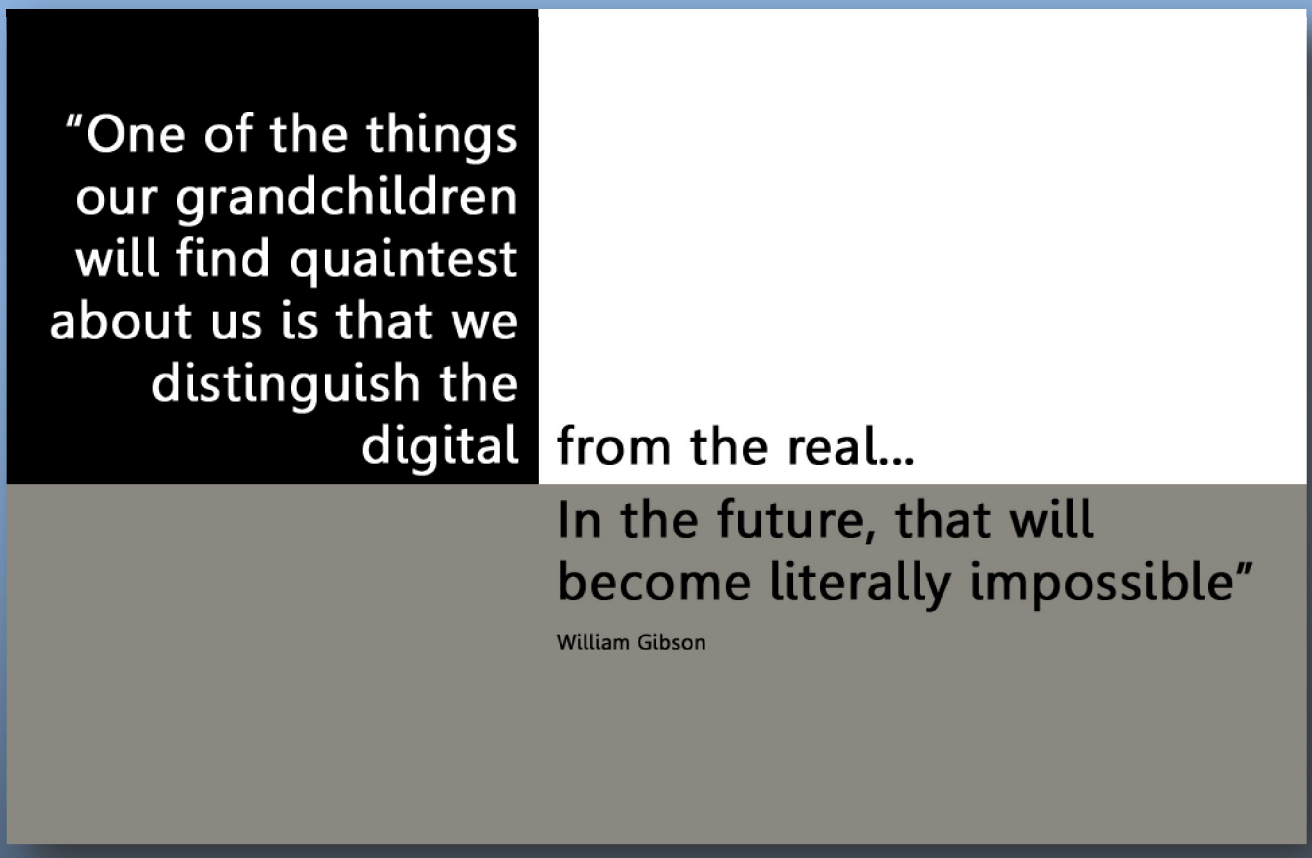
FY 2009 to FY 2014

Smithsonian Institution Information Technology Plan Strategic Overview



Message from the Chief Information Officer

The Smithsonian has outlined a vision for the Institution and established goals that recognize the need to enhance public impact, perform first-class scientific research, modernize management systems, and achieve financial strength. As Chief Information Officer, my staff and I collaborate with Smithsonian leadership to use information technology (IT) to help realize the vision and achieve the goals of the Institution. The *Smithsonian Information Technology Plan* (SITP) documents the role that IT plays in achieving these goals, and will guide the Smithsonian's IT program during the FY 2009–FY 2014 planning period.

Throughout FY 2009, the Smithsonian is revisiting the execution of its mission to create a strategy that will keep the Smithsonian relevant in the decades to come. This strategy will require technology solutions that will influence the future of how information is accessed, used, and managed in carrying out the mission of the Institution.

Given what we know about the mission and technology today, what should the enterprise look like? We cannot use IT to simply automate old processes. Likewise we do not want legacy IT systems to drive processes and customer relationships. In the strategic plan, process and IT need to fit together in a natural way to best deliver the vision. As the Smithsonian's Chief Information Officer, I want you to view me and my organization as partners in identifying and implementing IT solutions Smithsonian-wide to harness opportunities to remain relevant to current and future generations.

Ann T. Speyer **May 7, 2009**

Photo Credits:

Photos used in this year's publication are from Flickr, a photo sharing website, within the photographer's specified creative commons license conditions of use.

Will Lion, http://www.flickr.com/photos/will-lion/2636903303/

carf, http://www.flickr.com/photos/beija-flor/64007908/

ecstaticist, http://www.flickr.com/photos/ecstaticist/2048897750/in/set-72157594498297839/

SnoShuu, http://www.flickr.com/photos/snoshuu/364687858/

theRouge, http://www.flickr.com/photos/therogue/3410001438/

FY 2009-FY 2014

A. Mission and Vision 1
- Strategic Vision 1
- OCIO Mission 1
- OCIO Vision 1

B. Goals & Objectives 2
- Smithsonian Goals & Objectives 2
- IT Strategies 3

C. Information Technology Management Goals & Objectives 4
- C-1. Build the Digital Smithsonian Framework 4
- C-2. Enhance Scientific Computing 7
- C-3. Enable Excellence in Education through Technology 9
- C-4. Enable a World Class Web Presence 11
- C-5. Enable Excellence through Management Systems 13
- C-6. Maintain a Robust and Scalable Information Technology Infrastructure 14
- C-7. Provide Telecommunication and IT Services for a Mobile and Remote Workforce 15
- C-8. Provide Optimized IT Services 16
- C-9. Improve IT Security Balanced Against Mission Needs 17

D. Planning Process 19
- D-1 Assumptions & Constraints 19
- D-2. IT Capital Planning & Investment Control 20
- D-3. Plan 21
- D-4. Select 22
- D-5. Control22
- D-6. Evaluate 23
- D-7. Key Stakeholders 24

E. Infrastructure Analysis 27

F. Transition Framework 30
- F-1. E-Government Initiatives 30
- F-2. Federal Transition Framework Lines of Business 31

G. Transition and Sequencing Timeline 32

Information Technology Resources Summary 41

FY 2009-FY 2014

Knowledge should not be viewed as existing in isolated parts, but as a whole. Every portion throws light on all the others.

-- James Smithson

A. Mission and Vision

The Smithsonian Institution is a trust instrumentality of the United States founded in 1846 in response to the will of Englishman James Smithson who bequeathed the whole of his property to the United States of America with the mission "to found at Washington, under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge."

In the 160 plus years since that time the Smithsonian has grown as a cultural and scientific complex of museums, research centers, and offices to include 19 museums, the National Zoological Park, and 9 research centers. In addition to Washington, DC and its metropolitan area, the Smithsonian maintains facilities and staff in New York City, New York; Cambridge, Massachusetts; Fort Pierce, Florida; near Tucson, Arizona; and Panama. The Smithsonian employs approximately 6,000 staff and 6,500 volunteers; has over 137.2 million collection objects; and in FY 2008, hosted over 173 million visitors to its public websites.

Strategic Vision

The Smithsonian's vision and established goals recognize the need to enhance public impact and engagement, pursue scientific discovery and advances in areas of recognized Institutional strengths, and provide the financial support essential to achieving all of them.

The *Smithsonian Information Technology Plan* (SITP) documents the role that information technology (IT) plays in fulfilling this vision. It describes an IT environment which enhances the quality of services provided to the public each year through museums and outreach activities, and to the scholarly community through research in disciplines that range from astrophysics to zoology.

OCIO Mission

To maintain and modernize the Institution's information technology systems, services and infrastructure in a secure, standards-based IT environment while seeking ways to apply technology to the priorities of the Institution for the increase and diffusion of knowledge.

OCIO Vision

To develop and maintain information technology and telecommunications solutions such that anyone, anywhere can access and use Smithsonian information while conducting mission-related work, or as an external participant seeking to explore and leverage Smithsonian knowledge.

B. Goals & Objectives

Smithsonian Goals & Objectives

The Smithsonian seeks to become a model of service to the public and the scientific community through its museums, publications, outreach, and research activities. To support this vision, the Institution is executing a program that encompasses four strategic goals:

Increased Public Engagement – Diffusion of Knowledge.

Enlarge the Smithsonian's audiences, expand its degree of involvement with the public, and improve the quality of its impact on audiences through public programs and scientific research.

Strengthened Scientific Research – Increase of Knowledge.

Pursue scientific advances and discovery by focusing resources on areas in which the Institution has recognized strengths because of staff, research platforms, and collections.

Enhanced Management Excellence.

Modernize Smithsonian management systems by bringing each of them to a level of quality and sophistication appropriate for an organization the size and complexity of the Institution.

Greater Financial Strength.

Provide the financial support essential to achieving these goals.

During FY 2009, the Institution is undergoing a pan-Institutional strategic planning process. Once completed, the resulting plan will update the Institution's goals and shape future directions of the *Smithsonian Information Technology Plan*.

IT Strategies

OCIO's overarching aim is to provide a consolidated IT infrastructure which supports its internal and external customers. To this end, the Institution is committed to acquiring the resources needed to: (1) maintain and build upon the robust and mature IT infrastructure put in place over the past seven years; (2) continue to build a consolidated, secure IT infrastructure for Smithsonian digital assets (collections; scientific data); (3) to fully support storage, preservation, and access by all internal and external stakeholders. As our IT infrastructure continues to evolve, IT will be better positioned to increase its value to the mission of the Institution.

This can best be accomplished by aligning the IT vision, strategies, and direction with the overall Smithsonian mission, vision, and goals to ensure that the Institution can meet demands for ready access to information related to visitor services, collections, research, exhibitions, and administrative processes.

Strategic planning is the process that tries to make explicit the current and the future state, as well as the critical changes that need to be made between these two points. During this process, we must answer these questions:

1. What are the Smithsonian's priorities?
2. How can IT be used to overcome challenges?
3. How can IT help the Smithsonian succeed?

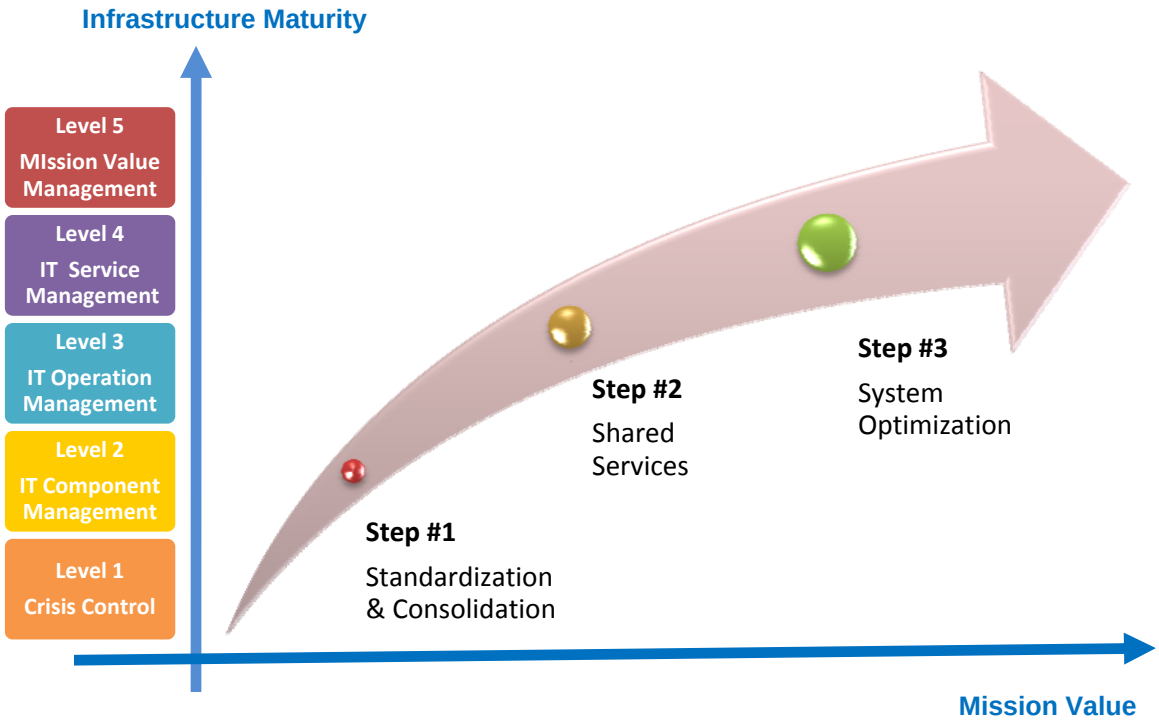


Figure 1: IT Roadmap for Increasing Mission Value

C. Information Technology Management Goals & Objectives

Establishing goals and objectives is a key part of planning for the effective use of IT resources. These objectives provide direction to the Smithsonian's IT program, and are aimed at improving the quality of products and services, as well as how they are delivered.

C-1. Build the Digital Smithsonian Framework

Goal: Build the Digital Smithsonian Framework

Build a consolidated, secure IT infrastructure for Smithsonian digital assets (collections; scientific data) to fully support storage, preservation, and access by all internal and external stakeholders.

For more than two decades the Smithsonian has been digitizing information about the 137.2 million objects and specimens, 89,000 cubic feet of archival materials, and 1.5 million library holdings in its collections. Our job is to authenticate and inform the public about the significance of the collections not to restrict access to them.

Initially, digitizing our collections meant capturing textual information about our collections in electronic form and organizing it into databases. Overtime it has evolved to creating digital surrogates as digital images, audio, and video information in electronic form, and making it accessible to staff and outside scholars for research, and to the public for educational purposes. The Institution also increasingly needs to manage digital assets which are "born digital" such as digital audio files, digital photographs, and digitally captured data—all of which do not need to be converted.

By digitizing collections, archives, library, and research information, the Smithsonian can continue to focus on its founding mission to increase and diffuse knowledge while simultaneously pursuing its current objectives of dramatically enlarging its audiences and the degree of engagement with them, and strengthening its scientific research. Digitizing our collections will help the Institution meet its founding mission to increase and diffuse knowledge broadly, deeply, and personally. Throughout the Institution an urgent need exists to enrich records with textual information and images, and to make this information available to the public on the web.

The Smithsonian uses multiple collections information systems (CIS) which include digital surrogates of collection objects and metadata at various stages of maturity. To date, there are only 13 million automated records; and a digital image exists for only slightly more than 2 million of these objects. About 3.5 million of the automated records and nearly 600,000 digital images are available through the Institution's public website. The Institution's online exhibits and research databases available to the public via the World Wide Web are derived from the digital information contained in its collections systems. It is no longer acceptable for us to share only one percent of our specimens and artifacts in an age when the Internet has made it possible to share it all. In doing this, the relevance of the Smithsonian to education can be magnified many times over.

Digitization efforts are being driven by Smithsonian visitors and colleagues who have growing expectations for digital access to our information and collections; and the need for stewardship and preservation of our collections with digital surrogates of physical objects. While documentation exists for most records, many are skeletal and lack images.

Over the long term, each museum will enrich registrarial-level records with research findings and curatorial notes that have been separated from them. This means that researchers, curators, librarians, archivists, registrars, and managers have access to rich and consistent digital information about collections. Researchers around the world who use collections for scholarly purposes—to identify objects or species, to assess the biodiversity of a region, to examine aspects of American cultural history—also will be able to access data electronically. To ensure the information is accessible in the future, we must also develop data migration plans which define the procedures to ensure the integrity of these digital assets overtime as storage formats and/or systems continuously evolve.

The technology needed to digitize, store, and access this digitized information is readily available in the commercial market yet due to funding constraints we have not yet been able to establish a robust and adequately sized digital infrastructure needed to appropriately support the small percentage of our collection which exists digitally.

Enterprise storage is an area of prime concern. Without having the required central capacity units and projects are acquiring their own storage solutions at extra cost to the Institution, and many of these solutions lack adequate back up plans putting the digitized information at risk. In the best instances digital assets are being stored and managed in enterprise-level collections information systems and in a digital asset management (DAM) system. However we know that many smaller digitization efforts do not have access to these systems and are therefore at increased risk.

frame·work (frām'wûrk) n.

A structure for supporting or enclosing something else, especially a skeletal support used as the basis for something being constructed.

At the most basic level, failure to develop standardized digitized repositories of its collections threatens the ability of the Smithsonian to execute its responsibility for their stewardship and preservation for the collections it holds on behalf of the American public. This responsibility, as well as legal issues inherent in relationships with donors, vendors, and others, demand that collections be managed to the highest standards of security and safety, and in a manner that provides the greatest benefit to the public. The CIS will facilitate physical and legal control of collections as required by law; completing inventories more reliably and rapidly; recording conditions of collection objects in a uniform way; and facilitating better prioritization and scheduling of object treatment for exhibitions and loans.

FY 2009-FY 2014

- *Objectives during this planning period*

1) Ensure that the Smithsonian IT infrastructure and framework—particularly storage, backup, and network connectivity—enables the exchange of digital assets, including related metadata, regardless of where they reside.
2) Establish enterprise-level mission support systems that enable the Institution to transform and remix its collections and research data in ways yet to be imagined, produce excellent museum exhibits and educational programs, and develop innovative ways to diffuse knowledge by enhancing and expanding our national and international outreach efforts to reach new and more diverse audiences.
3) Complete the development of the Enterprise Digital Asset Network (EDAN) to facilitate the discovery and repurposing of digital assets that cut across museum, research centers, libraries, and archives at the Smithsonian.
4) Implement a fully functional enterprise Digital Asset Management (DAM) system with adequate storage and backups for use throughout the Smithsonian.
5) Work with data owners to implement full life-cycle Data Management Plans for their digital collections and assets.
6) Evolve Smithsonian storage procedures towards the development of Trusted Digital Repositories (TDR) in order to provide reliable long-term preservation and immediate access to managed digital resources for both our internal and external users.
7) Ensure adequate and robust network connections to reach beyond the Smithsonian and allow others to interact with the Digital Smithsonian in a secure manner.
8) Provide technology tools and systems to enable the sharing of our authority (e.g., folksonomy and online discussions), and to tap into the supply of volunteers who would be willing to share their knowledge and energy while being widely dispersed geographically and logistically.
9) Work with data owners to develop and implement an agreed upon registration process for digital science datasets at the Smithsonian (e.g., Digital Object Identification (DOI)) to facilitate the access and use of Smithsonian data.
10) Expand the functionality of the Smithsonian's research repository to link research datasets to published articles in a single reference system.

C-2. Enhance Scientific Computing

Goal: Enhance Scientific Computing

Develop interoperable systems for the long term preservation of Smithsonian science, particularly environmental data and other data which cannot be recreated; and to enable re-use, re-purposing, and e-science through access and discovery tools.

In its report submitted in January 2003, the Science Commission appointed by the Board of Regents recommended that the Institution focus its science resources in the four areas in which it has unique and outstanding research capabilities:

1. The origin and nature of the universe.
2. The formation and evolution of the Earth and similar planets.
3. The discovery and understanding of the diversity of life.
4. The study of human diversity and cultural change.

For the benefit of the scientific community and the public, the Commission also recommended that the Smithsonian:

- Develop the intellectual component of its collections by conducting collections-based studies that enhance existing databases, create new databases, and increase potential uses of the collections;
- Aggressively make use of digitization and Internet technologies to expand the reach of Smithsonian science and make its collections more widely available;
- Support expanded resources for web tools essential to maintaining the quality of its research.

Increasingly, the products of science and the starting point for new research, are digital and most often "born digital." All elements for the pillars of science—observation, experiment, theory, and modeling—are transformed by the continuous cycle of generation, access, and use of ever increasing range and volume of digital data.

Smithsonian climate change research includes measuring atmospheric pollutants and greenhouse gases from space; studying the effects of increasing CO2 gas on Chesapeake plant communities and Florida coastal wetlands; and creating vast, linked observatory networks for measuring climate change impact on flora and

In 2006, the amount of digital information created, captured, and replicated [worldwide] was $1{,}288 \times 10^{18}$ bits.

In computer parlance, that's 161 billion gigabytes. This is about 3 million times the information in all the books ever written.

fauna at our centers in Virginia, Maryland, Florida and Panama and worldwide through collaborations with others. In the North, our anthropologists collaborate with native people to understand their adaptations to increasingly unpredictable weather and shrinking sea ice.

Our strengths in this area and our convening power allowed us to recently organize a symposium on tropical deforestation that received media attention around the world. This exercise was illustrative of the importance of the Smithsonian in generating open debate on matters of importance to scientists and the public alike. Through the long-standing efforts of our scientists, the Smithsonian has been among the leaders in understanding climate change and biodiversity issues. We need to first recognize that these problems are not simple, and that communicating the complex science behind the dynamic processes is difficult, but necessary. Now is the time for the Smithsonian to extend its reach by communicating its research in such a way so that our political leaders and the public can understand it, so that global action can be mobilized to help our planet become more sustainable. This will position the Smithsonian to increase the impact of the remarkable efforts of our scientists.

Objectives during this planning period

1) Develop IT systems and infrastructure in a manner that avoids one-size-fits-all solutions. Scientific data exist in many different types and formats subject to varying legal, cultural, protection, and practical constraints. They are often used in different ways according to their contexts and have varying life cycle requirements. The digital dimension of science is global and require solutions that should support communities of practice while promoting data integration and interoperability.
2) Acquire storage, backup, and disaster recovery solutions to support vast amounts of digital data at the petabyte scale.
3) Plan and implement the migration and data curation expertise for scientific datasets to manage enterprise storage from a variety of storage devices.
4) Continue to partner with the Smithsonian Astrophysical Observatory (SAO) and the Laboratory of Analytical Biology (LAB) on the possibility of using the Smithsonian's Data Center in Herndon to host the storage of data from a new telescope, and a high performance computing cluster.
5) Utilize new, specialized applications, such as geographic information system (GIS) tools, which allow annotation of scientific information with corresponding location data, leading to better and faster interpretation of the material collected.
6) Implement web-based tools to enable collaboration with external and internal partners, as well as when working remotely from the Smithsonian to facilitate research.
7) Upgrade computing capacities in order to improve data collection, management, storage, and distribution, as well as data integration for further value-added analysis.
8) Modernize scientific computing workstations (particularly Suns and Macs).[1]
9) Investigate sources to provide a Smithsonian-wide shared High Performance Computing Cluster.

[1] In FY 2009, the Institution planned to begin replacing scientific workstations on a four-year life cycle under the Institution's Periodic Desktop Hardware Replacement Program; however the program was significantly cut to respond to Institutional budget shortfalls.

10) Provide collaborative training tools for researchers and communities of practice—including citizen scientists.

11) Provide the needed technological support for Smithsonian science unit collaborations with not-for-profit groups in developing large repositories of data.

12) Provide Web-based and New Media tools and mechanisms to facilitate the delivery of Smithsonian research findings to the general public and government bodies in an easily interpretable manner.

The Institution must develop a secure and reliable IT infrastructure in which data can be developed, manipulated, stored, shared, and transformed into knowledge. Without such an infrastructure to protect its digital assets the Institution runs the risk of losing irreplaceable data, becoming less competitive to win grants, and failing to sustain its leadership in the scientific community. To date efforts to obtain Federal funding have been limited, with funds being allocated for a small fraction of the scientific computing requirements.

C-3. Enable Excellence in Education through Technology

Goal: Enable excellence in education through technology

Make our collections, talented scholars and other resources accessible worldwide through technology by providing additional platforms and vehicles for educating and inspiring both large and niche audiences.

The Smithsonian is an important educational institution, providing extensive informal and formal education and training for all ages. Through the use of new technology in education, we will reach new generations in the medium with which they voluntarily engage in daily, and make it easier for them to reach us.

- The social networks that did not exist until recently (blogs, twitter, YouTube, Wikipedia, podcasts, and Web cams) are increasingly becoming a primary agent for communicating directly with students, educators, and life-long learners in two-way and group conversations.

- Handheld devices continue to transform the method and frequency of how people get information making it a seamless aspect of their life. Today, people of all ages routinely carry and interact from cell phones to BlackBerrys to IPods. The Smithsonian must leverage these devices, and emerging devices, as cost-effective platforms for delivering Smithsonian content.

- Educational gaming provides tremendous potential for extending the educational mission of the Smithsonian through games being served from its public websites. Games tap into students' intrinsic motivations to challenge themselves, master new skills, and learn new concepts especially through immersive role-playing virtually. Through games students can scaffold process skills and knowledge that will subsequently be reinforced through more formal instruction. These games have their greatest impact if they are ones that students engage with under their own initiative, and if they are situated firmly within the informal space. It is nevertheless possible to create support materials that will enable teachers or parents to build off the students' game play experiences to supplement classroom or after-school learning. The greatest target of opportunity is for K-12 students, though thoughtfully designed games can work for older players as well.

Facilitating the diffusion of skills and knowledge necessary to benefit from the digital dimension is essential to achieving our strategic vision, and must be integral to all educational activities.

Objectives during this planning period

1) Deliver the means to use new technologies to drive educational and outreach opportunities through the Web.
2) Provide collaborative training tools for educators and communities of learning.
3) Provide online resources for educators and students to investigate and learn from collections and interactions with Smithsonian staff.
4) Provide computer games and interactive exhibits for kids and families.
5) Develop a common Smithsonian Educational Portal with a web-enabled portal that enables customers to find, view, and register online for the universe of educational and public programs offered at the Smithsonian. View or download the accompanying pre- or post-visit resources, locate information about any exhibits or collections which may relate to the program and evaluate their customer experiences through rate-your-visit type applications and formal evaluation methods.

C-4. Enable a World Class Web Presence

Goal: Enable a World Class Web Presence

Enable the Smithsonian to be available to all Americans using technological innovations to establish life-long relationships as an authoritative virtual presence.

The Smithsonian seeks to create an authoritative virtual presence where educators, researchers, and the public come together to appreciate, explore, and interact on topics of art, culture, history and science. With a world-class Web presence the Institution can achieve its strategic objective of sharing Smithsonian resources with large and diverse global audiences, and inspiring students throughout the world.

Even though the Smithsonian websites continue to earn awards and gain recognition for their content, this was the first year in which we experienced a decrease in the number of Web visitors across our sites. The number of virtual visits for FY 2008 was 173 million as compared to 184 million last year (overall 5.6% decrease); page view totals also decreased from 829 million to 752 million (overall 9.23% page views decrease). In spite of these decreases, we saw tremendous increase in traffic related to collection orientated sites in FY 2008 such as:

- 10% increase in visits to the Institution's SIRIS online catalog;
- 60% increase in visits to the National Postal Museum's Arago website;
- 60% increase in visits to the Smithsonian Photography Initiative website;
- 339% increase in visits to National Air and Space Museum's eMuseum collection site.

We experienced organic growth on the Web for a decade with little or no coordination among our sites on the strength of our name and content. The social networking phenomenon is turning our consumers into producers. They now spend significant online time socializing and producing content. It's a new paradigm and we have to build new IT delivery mechanisms in order to increase our relevancy. Visitors to our websites will increasingly want to do their own interpretation and engage our experts, rather than simply seeing the objects that tell the narratives we chose to explore. The Institution launched a web strategy initiative in FY 2009 to allow us to understand and adapt to these dynamic changes in a rapidly evolving environment, and also directly engaged digerati[2] in a Smithsonian 2.0 conference to further understand this shifting dynamic.

[2] Digerati -- Opinion leaders who, through their writings and activities, promote a vision of digital technology and the Internet as a transformational element in society.

FY 2009-FY 2014

Objectives during this planning period

1) Participate in developing and implementing a Smithsonian-wide strategy for how the Smithsonian can become a world-class Web presence fostering lifelong relationships with visitors and creating a global community.
2) Reinvent the Smithsonian's central website (si.edu) in order to present a more appealing and navigable website for all ages; and no longer require Web visitors to understand the organizational structure of the Smithsonian to find the information.
3) Develop additional service mechanisms to assist units with the delivery of Smithsonian content leveraging Web 2.0 and Web 3.0 capabilities.
4) Develop the necessary tools to search and explore the Smithsonian's vast repositories of knowledge, as well as share their knowledge as participants in the Smithsonian experience.
5) Develop formal relationships and pan-Institutional efforts to deliver our digital content to social networking sites where our online visitors choose to go rather than force them to come to us first.
6) Create the enabling technological means to welcome millions of visitors of varying ages, learning styles, first languages, and cultural backgrounds through the Smithsonian's Web presence.
7) Provide shared services for unit webmasters to enable and support the Smithsonian's Web presence at reduced unit cost.
8) Partner with units to conduct experiments and pilots of emerging technologies; and when successful, assist with scaling them for Smithsonian-wide implementation and sharing these innovations with other institutions.
9) Improve Web visitor analysis to better understand and engage our visitor to increase visitor loyalty and satisfaction.

C-5. Enable Excellence through Management Systems

Goal: Enable Excellence through Management Systems

Provide Smithsonian staff with the systems, and access to the information contained within, that enable them to perform their jobs and support the advancement of the Smithsonian mission while ensuring resources are wisely managed in a manner that reflects the Smithsonian's status as a public trust.

The Institution will continue to implement *PeopleSoft* Enterprise Resource Planning (ERP) system and the Facilities Management System; and will continue to identify and implement other commercial software products through FY 2014 in order to meet its financial, human resources, facilities, security, records management, physical management, and other management needs. During this planning period we will also continue to focus on upgrading the ERP Financials, HRMS, and Facility Management systems to the latest releases to enable access to the latest functionality and continued support from the commercial software vendors. The upgraded versions provide the platform necessary to support the objectives for this planning period.

Objectives during this planning period

1) Complete the automation of the processing of transactions between the Institution and our banking partners.
2) Convert cost-benefit analysis on support for shared service providers for HRMS and payroll processing.
3) Enhance and expand the Financials and HRMS ERP systems to expand support for managing projects, grants and contracts, reporting, and to replace additional legacy systems.
4) Evolve the ERP Financials to support emerging Federal financial requirements.
5) Implement handheld technology with Facilities Management System applications.
6) Provide self-service functionality for Facilities Management Services Smithsonian-wide.
7) Evaluate the use of enterprise e-commerce systems to support the needs of Smithsonian units.
8) Implement a shared membership and contact management system.

9) Implement a secure donor management system to support the needs of the Office of Development and units for fund raising, in particular the National Fundraising Campaign, integrated with the Institution's ERP system.

10) Expand the Smithsonian Online Academic Appointment (SOLAA) system to include fellows.

11) Define the requirement for and implement a pan-Institutional electronic records management system.

12) Improve the Smithsonian's Intranet to increase staff collaboration, and improve workflow to better reflect how staff access and share information internally.

C-6. Maintain a Robust and Scalable IT Infrastructure

GOAL: Maintain a Robust and Scalable IT Infrastructure

Apply an enterprise approach to managing the Smithsonian's IT infrastructure centrally to create a standards-based IT infrastructure as the foundation for robust and scalable distributed systems and services that support applications throughout the Institution.

The programmatic systems— collections, scientific research, education, exhibitions, outreach, and administrative—represent the primary automation support provided to Smithsonian museum, research, and education missions. The IT infrastructure encompasses the deployed foundation hardware, voice and data communications, system software, and distributed computing framework software linked together through the Smithsonian network (SInet). The Institution-wide communications network provides comprehensive end-to-end data transmission linking servers, shared printers, and workstations. SInet provides services to more than 6,000 end-users along with access to administrative and program applications and databases throughout the Smithsonian.

Objectives during this planning period

1) Maintain and grow the IT infrastructure to meet emerging mission needs—particularly in the area of enterprise storage, backup, and disaster recovery systems, as well as network connectivity and bandwidth.

2) Expand the common-standards-based IT infrastructure to meet commodity service needs in a secure and scalable manner.

3) Consolidate commodity services and databases in use across the Institution to achieve economies of scale, facilitate the sharing of information, increase supportability, and increase the capacity for data transmission in a complex heterogeneous network mix of wireless, broadband and Ethernet transport methods;

4) Regularly replace IT infrastructure components on an industry best practice replacement cycle in accordance with the evolving Smithsonian-wide IT enterprise architecture.

5) Leverage emerging technologies for providing services such as Software as a Service (SaaS), Cloud computing / storage, virtualization of servers, and Web 2.0 and 3.0 participatory services.

C-7. Provide Telecommunication and IT Services for a Mobile and Remote Workforce

GOAL: Provide Telecommunication and IT Services for a Mobile and Remote Workforce

Provide mobile and remote access technologies and services to support staff whose duties require them to work away from the traditional desk environment.

Smithsonian staff need to be able to talk on the phone, receive and send email, access the Internet, and connect to the Smithsonian network remotely whether when working from home or half-the-way around the world. In the past several years:

- The Blackberry with its access to Smithsonian email has gone from a novelty to a mission critical communication device.
- The Smithsonian Washington DC offices are no longer concentrated near the National Mall as offices have been relocated to less expensive office space in the Virginia and Maryland suburbs requiring technology solutions to bridge the distance between coworkers.
- Smithsonian staff are requiring handheld devices accessing a secure wireless network to perform their duties onsite whether it is facilities, collections management, or uploading fresh content to a Smithsonian Web presence.

These demands will continue to increase and the Office of the Chief Information Officer will need to continue to find cost effective secure ways to either provide the services and equipment, or to negotiate cost effective service agreements funded through unit budgets.

Objectives during this planning period

1) Continue to identify methods to satisfy mobile computing and telecommunication requirements.

2) Establish pan-Institutional support for multimedia (videoconferencing, webcasting, podcasts).

3) Deliver services to Smithsonian staff in a manner which is more conducive to the expectations of Millennials[3] who are now joining the Smithsonian as staff, students, and fellows.
4) Expand the secure wireless network to provide increased coverage in both public and staff-only spaces.
5) Increase staff's remote access to the Smithsonian network, services, and the information contained within.

C-8. Provide Optimized IT Services

GOAL: Provide Optimized IT Services

Continuously re-evaluate and adjust the delivery of IT services across the Institution to increase user satisfaction, reduce costs, and achieve a balance between centralized and de-centralized services.

The Smithsonian operates most of its IT infrastructure on a centralized basis while many IT end-user support functions and application server operations are performed by its units. The central IT service organization within the Office of the Chief Information Officer provides network and data center services, help desk services, desktop support, and web-hosting services; and limited application development and maintenance support.

Several of the larger Smithsonian units operate their own application servers and provide desktop and help desk services. Web content and collections information systems are usually managed directly by each unit.

Objectives during this planning period

1) Identify methods to satisfy IT requirements with decreased financial and environmental costs—such as through negotiated pan-Institutional contracts.
2) Perform IT skills assessments of OCIO and unit staff on a regular basis to understand the variety and level of development of current IT skills, to identify new skill requirements, and to develop plans to enhance or to acquire the skills needed to support the Institution.
3) Partner with other Smithsonian units to create centers of excellence for Smithsonian-wide IT implementations that do not necessarily have to reside in OCIO.
4) Implement additional analytical tools to better measure and interpret system performance.

[3] Millennials – The generation born between 1980 and 2000 who grew up with technology as an ingrained part of their daily life. They tend to work in a social and collaborative manner, and will want the same level of access to technology tools that allow them to remain and leverage their social networks virtually at work as they do in their personal life.

5) Improve capacity planning for enterprise storage and backup requirements.

C-9. Improve IT Security Balanced Against Mission Needs

The Institution needs to increase IT security services to protect public information system portals,

GOAL: Improve IT security balanced against mission needs

Broaden the scope of the Smithsonian's IT security program beyond IT operational controls in support of a more balanced enterprise program.

internal communications infrastructure and increase support for securing general support systems as well as for major and associated minor applications. This vision is not meant to impede requirements for rapid innovation; but risk is assumed when IT security/ privacy questions are delayed because security and privacy requirements are not well understood and/or are not adequately resourced.

As the Smithsonian's presence on the global Web continues to expand, the Smithsonian cannot afford to address IT security issues as afterthoughts. If systems and applications are not fully secured prior to moving into production or new technologies are fielded without adequate security or staff support, an increased risk of a security/privacy compromise is being accepted by the enterprise, not just by the mission or system sponsor.

Over the past five years, the OCIO has made significant progress in provisioning operational controls, particularly for the Security Operations Center (SOC) and IT infrastructure / perimeter defenses and security tool support. Over the next five years, the Smithsonian vision for a more balanced enterprise IT security will require additional IT security staff, particularly in the units.

Objectives during this planning period

1) Strengthen internal security controls beyond perimeter defenses for balanced increased access to collections supporting history, art, culture, and science with collaborative communities while minimizing the associated IT security risks.
2) Regularly review and update Smithsonian IT Security directives which establish high-level policies; and technical standards and guidelines which establish best practices and procedures.
3) Increase staffs understanding and reliance on internal IT security controls in reducing IT security risks while assuring we can safely deploy new technologies and new applications.
4) Strive to meet new security requirements such as remote authentication, and full laptop encryption within current resource levels.

While the Institution has made significant progress in its IT Security Program, the *FY 2006 Audit of the Smithsonian Institution Security Program* by the Smithsonian's OIG is still valid in stating that "without the centralization of IT operations and the assignment of responsibility within OCIO for ensuring Institution policies and procedures are being followed, management cannot ensure adequate controls are in place."

D. Planning Process

D-1 Assumptions & Constraints

Information technology planning decisions are influenced by the strategic vision and goals for the Institution, as well as by program, social, political, economic, demographic, and technology issues. The following assumptions and constraints are of note.

Program

- Resources will be focused on initiatives that support the Institution's goals.
- The public will increase its demand for visitor information and for access to collections, exhibitions, and research data in a participatory manner.
- The Smithsonian will be required to provide to the public increased transparency into its operations and processes via the Internet.

Economic

- Funds available during the planning period for IT initiatives will be far less than the demand for them; and we must engage non-Federal funding sources to meet these emerging needs.
- Recruiting and retaining highly skilled workforce who can address emerging IT customer needs will be a continuing challenge.

Technology

- Required information technology skills, knowledge, and abilities will increasingly transition to more complex, online, interactive, web-based systems.
- New technologies can significantly improve the productivity of existing operations.
- New technology will continue to evolve and enable users to have faster access to more timely data, which will trigger demands for new uses of IT to help manage programs and provide new services.
- Commercial software products can satisfy most Smithsonian application needs—the exception being research computing where locally developed applications for data reduction, modeling, and analysis will continue to be needed.
- Access to Smithsonian information using mobile technology will continue to increase.
- Network bandwidth demands will continue to increase.

These assumptions and constraints impose conflicting demands on the IT initiatives of the Institution. While increased demand for more and better IT support will continue, pressure to reduce IT expenditures in spite of emerging needs and the development of a digital Smithsonian will also continue. However, adequate funding, adequate storage, and a highly skilled IT staff are essential to maintaining current business practices and implementing the Institution's plans for improving its business processes and public services.

D-2. IT Capital Planning & Investment Control

To improve Institutional planning, budgeting, and performance management, the Smithsonian has integrated IT planning with overall planning and budget formulation activities. In support of these efforts, the Office of the Chief Information Officer (OCIO) has initiated a year-round perspective on IT planning and budget formulation through the use of tools such as IT strategy and in-process reviews that:

- Support the goals and objectives of the program areas;
- Integrate requirements across the Smithsonian;
- Increase user involvement;
- Link IT planning to overall Institutional processes.

IT plans and budgets need to be linked to the strategy, goals, and objectives for the Institution. Progress in executing the strategy is evaluated with program area performance measures are to: (1) develop plans that reflect resources available to accomplish missions and goals; and, (2) provide measurable indicators of results. Units must work closely with IT support staff to identify and prioritize projects.

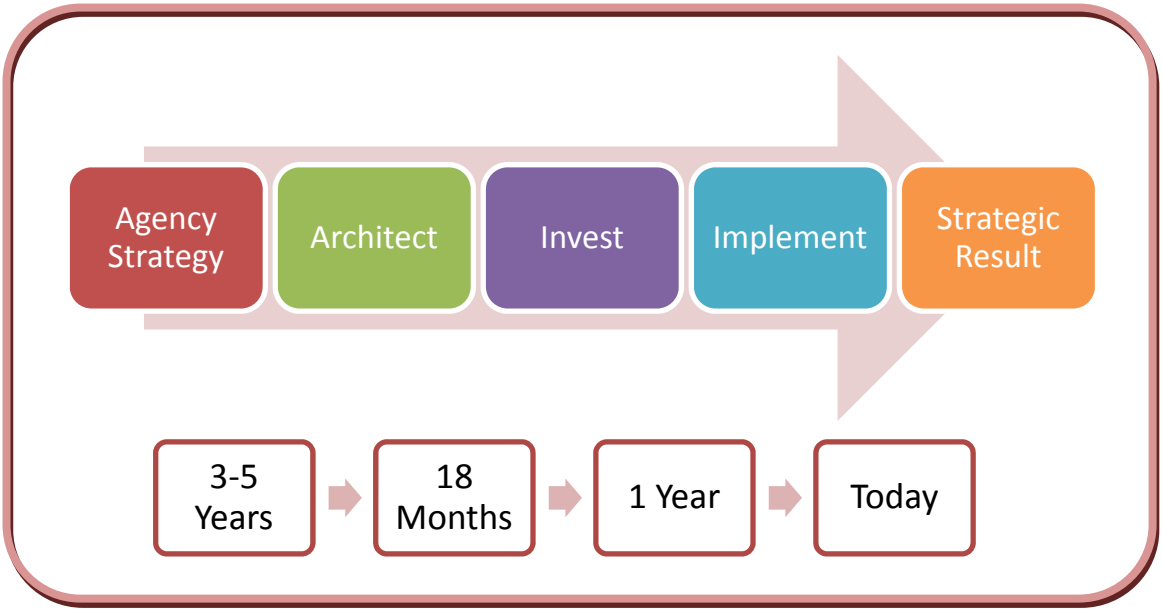


Figure 2: IT Planning Process & Timeline

The Smithsonian has implemented the following four-stage iterative approach for information technology planning, budgeting, and performance management.

1. **Plan [Strategy/Architect]**—define Institutional and program area IT strategies, the framework of the planning process.

2. **Select [Invest]**—Capital Planning Board selects IT projects for inclusion in the investment portfolio.

3. **Control [Implement]**—the Technical Review Board monitors interim results of IT projects and takes action as necessary to ensure achievement of benefits through the life cycle management process.

4. **Evaluate [Strategic Result] —**assess results of each major IT project by conducting post-implementation reviews to determine whether the system delivered what was expected.

The Smithsonian is required to report, via OMB-300, how the major IT investment satisfies federal security and privacy requirements. In making funding decisions, OMB assesses how well security/privacy details of the investment are documented and budgeted for the proposed investment life cycle. Starting in FY 2010, the Smithsonian is planning to increase visibility for ensuring the Capital Planning Board (CPB) requires systems budgets to more clearly identify support for IT Security and Privacy Controls. IT security/privacy costs are expected to include:

- Design and implementation of required Management, Operational, and Technical security controls based on NIST SP 800-53;
- Creating and Updating System Certification and Accreditation (C&A) artifacts and documents;
- Independent Security Assessment Reports (SAR);
- Plans of actions and milestones (POA&Ms);
- Contingency / Disaster Recovery planning and testing;
- Continuous Monitoring Controls (e.g. Security log file reviews, account management, incident reporting, etc.).

Security costs may also include the products, procedures, and personnel (Federal employees and contractors) to support IT security controls (e.g., support for the system configuration management /change control process, personnel security, user account management, privacy safeguards, etc.). New unit and OCIO IT investments must initially identify adequate IT security/ privacy costs in their system acquisition plans.

D-3. Plan

In February, the Chief Information Officer (CIO) typically reviews the Institution's IT strategies and outlined goals, initiatives, and activities for achieving Smithsonian commitments. The primary drivers for IT planning include the following objectives:

- Maintain a robust, reliable, and secure IT infrastructure;
- Enhance financial, human resources, and facilities systems;
- Establish a digital infrastructure needed to preserve and leverage digital assets;
- Enhance scientific computing;
- Consolidate application servers and commodity IT resources;
- Establish a world-class web presence.

The CIO works closely with the Chief Financial Officer (CFO) to implement an Institution-wide IT planning process that supports strategic objectives, integrates requirements across the organization, and ties closely to the budget formulation process. The Director of the Office of Planning, Management & Budget (OPMB), who reports to the CFO, issues planning guidance for the budget formulation process including specific information related to IT initiatives. In the spring,

the Capital Planning Board meets to discuss priorities for IT investments to be considered in the upcoming Federal budget request. The CIO presents the portfolio of IT projects by program area: collections, finance and administration, scientific research, IT infrastructure, and public Web, education, and outreach.

For the FY 2010 budget cycle an increase of more than $21 million was needed to meet all submitted IT requirements, either new or expanding. The CIO proposed the following prioritization scheme which was adopted by the Capital Planning Board:

1. Maintenance of current day-to-day IT support and service levels
2. Digitization support
3. Web support
4. OMB or NAPA[4]-Driven Projects
5. Enterprise solutions benefiting multiple units
6. Scientific computing support

The IT budget requests were subsequently mapped against the Regents' priorities for the Institution of: non-discretionary costs which include mandatory hardware and software system maintenance and licenses; stewardship of National collections; increased diffusion of knowledge; governance and management operations; and new museum support.

D-4. Select

The Capital Planning Board meets to review the proposed IT initiatives, prioritize them for inclusion in the budget request. For the FY 2010 budget request, the Budget Committee approved an overall increase of $12.4 million which was incorporated in the Smithsonian's FY 2010 budget request submitted to the Office of Management and Budget (OMB) in September 2008 for informational purposes given that it was a Presidential election year.

The Institution subsequently received the budget passback from OMB only funding the mandatory increases for $1.613 million, and the Smithsonian submitted an appeal. For this budget cycle there were two passbacks. OMB's response to the appeal the second time provided an additional increase of $2 million for digitization and Web support for enterprise solutions. The total budget increase approved for FY 2010 is $3.613 million plus pay increases.

D-5. Control

The Smithsonian has established formal mechanisms through the automated information system (AIS) and IT infrastructure life cycle management (LCM) process to monitor interim results of IT projects and take corrective action when needed. These mechanisms provide visibility into IT projects and establish management control points for assessing project cost, schedule, and quality.

Project plans are developed to support major projects identified in the *Smithsonian Information Technology Plan*. They contain the greatest level of detail on day-to-day requirements for achieving the scope and objectives of the Institution's IT program. They also contain specifics on system development life cycle (SDLC) tasks such as design, development, training, testing, telecommunications, facilities, implementation, disaster recovery support, and other activities

[4] NAPA – National Academy of Public Administration

affecting the transition of projects from initiation through system operation. They also identify IT Security Architecture / Standard for IT Security Requirements, IT Security artifacts and deliverables required for systems to obtain accreditation and an Authority to Operate (ATO) in the Smithsonian's production environment.

The Smithsonian's Technical Review Board (TRB) reviews major IT projects to ensure that they are progressing on schedule within budget and satisfying stated needs. These reviews assess projects with an eye towards:

- Improving the quality of intermediate work products, correcting defects as early in the life cycle as possible, and preventing long-term problems.
- Ensuring that the IT system being produced can be supported by the current and planned IT infrastructure.
- Ensuring that the projects conform to system development methodology and supporting tools, standard data, and adhere to the Institution's Technical Reference Model (TRM).
- Monitoring the impact of a project on other automated systems, related projects, and the IT infrastructure.
- Optimizing IT Security, by conforming to the Smithsonian's IT Security Architecture and standards, and ensuring that IT security controls and risks are understood prior to moving to a production environment.

The CIO also conducts in-process reviews of cost, schedule, and deliverables for major IT projects. The project management control system tracks schedules and performance against project plans in order to help managers identify problem areas and take corrective actions when actual results deviate significantly from plans.

D-6. Evaluate

The key to evaluating IT projects is identifying performance measures for determining whether the system delivered what was expected. The SDLC management process at the Institution requires that performance measures be identified during the concept phase of the life cycle and that post-implementation reviews be conducted during the operational phase to determine whether those objectives have been and continue to be achieved.

IT performance measures fall into two categories. First, program-area-related measures are considered when making investment decisions. Second, measures associated with operational performance of the IT system or infrastructure component are identified for the production environment. The operational performance measures become service standards that are incorporated into service-level agreements, operational support plans, or the customer service handbook.

D-7. Key Stakeholders

IT policy at the Smithsonian centralizes program-related IT planning, technical direction, oversight, policy formulation, acquisition, and day-to-day operational management of the Smithsonian Institution network and portions of the IT infrastructure under the Chief Information Officer. Some individual Smithsonian units develop and operate specialized automated information systems, and provide desktop support services.

IT Committees & Boards

In support of the IT planning efforts, the Office of the Chief Information Officer has initiated a year-round perspective on IT planning and budget formulation through the use of tools such as IT strategy and in-process reviews, implementation of project management and control processes, and coordination of planning and budget activities. Institution-wide committees and boards involved in IT planning and oversight include:

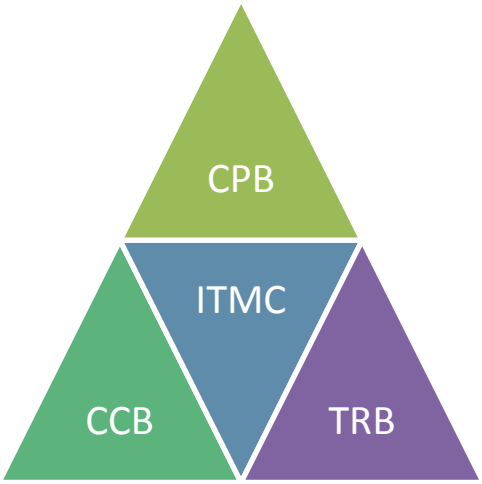


Figure 3: IT Planning & Oversight Committees

- The **Capital Planning Board (CPB)** provides strategic direction and sets priorities for all capital programs—including all major information technology projects.

- The **Information Technology Management Committee (ITMC)** advises and assists the Chief Information Officer (CIO) in establishing and implementing IT management policies, procedures, practices, and enterprise architecture, as well as standards governing the IT infrastructure and IT security—including the acquisition, development, maintenance, and operation of the Smithsonian's automated information systems.

- The **Technical Review Board (TRB)** evaluates the progress of each major IT project and assesses the quality of project deliverables. Its primary objectives are to: (1) improve the overall level of project success, system quality, and productivity; (2) ensure that risks are managed at an acceptable level by completing assessments and IT Security artifacts and deliverables at key project milestones.

- The **Change Control Board (CCB)** reviews requests for hardware and software changes to the IT infrastructure. In considering the potential impact of proposed changes on production schedules, the CCB verifies that users will receive appropriate notification, suggests changes in timing to reduce disruption in work or conflicts in schedules, and denies requests that may have negative effects on day-to-day IT operations or justified increases in IT security risks.

This Institutional perspective allows new technology to be introduced and fosters consistency throughout the Smithsonian by standardizing hardware, software, data, and IT security.

Consistency will be implemented to the extent required to balance the benefits of reduced IT costs and enhanced technical capability associated with a homogeneous IT infrastructure, against the heterogeneity required to meet unique objectives and ensure responsive support. The framework also provides the flexibility needed to encourage innovation, while ensuring that new capabilities can be expanded easily beyond a developer's desktop and supported by the IT infrastructure.

Program Areas

Individual program areas define what needs to be done in terms of IT support functions and their performance goals. Working with a program area sponsor, the CIO identifies how IT can be applied to help achieve desired results, while maintaining efficient and effective IT operations throughout the Institution. The program area sponsor and the CIO also work together to determine project costs and schedules, and to prioritize IT projects and support.

Project Sponsors

The successful development, deployment, and operation of IT systems require close collaboration and partnership between the CIO and IT project sponsors within the program areas of the Institution: finance & administration, museums, libraries, archives, pan-Institutional & National programs; collections; scholarly research; science; and Smithsonian Enterprises.

- The **Secretary of the Smithsonian** determines policies, directs the programs of the Institution, and is responsible for all of its activities.The Secretary is responsibile for approving all IT strategies and initiatives, although he may delegate approval authority to the Capital Planning Board.

- The **Under Secretary for Finance and Administration** has responsibility for Institution-wide support functions including the Office of the Chief Information Officer, Office of the Chief Financial Officer, and the Smithsonian Institution Archives.

    - The **Chief Financial Officer** assists the Secretary and Under Secretaries by providing oversight of the activities of the Office of Planning, Management & Budget, the Office of the Comptroller, the Office of Contracting, and the Treasurer of the Institution.

    - The **Chief Information Officer** assists the Secretary and Under Secretaries in modernizing the Institution's information systems and sets the strategic vision for leveraging IT to help achieve Smithsonian goals and objectives. The CIO directs the:

        - Development, implementation, maintenance, enhancement, and operation of selected automated information systems;
        - Development of strategic and operational information technology plans and operating budgets;
        - Architectural design and acquisition of supporting automated information systems and the underlying IT infrastructure;
        - Operation of the Institution's central computer facilities, equipment, and voice and data networks;
        - Development of the enterprise architecture and IT standards
        - Development of the IT Security Enterprise Program

- The **Under Secretary for History, Art and Culture** has responsibility for the Institution's history, art, and cultural museums, research, public programming and outreach activities; for National Programs that focus on traveling exhibitions, education programs, and affiliations with museums across the country; and the Smithsonian Associates' programs of lectures, performances, classes, and travel that take the Institution beyond the Mall.

- The **Under Secretary for Science** provides oversight and coordination of activities of the Institution's scientific research units and Smithsonian Institution Libraries. Smithsonian Science is engaged in research and discovery focused on understanding the origin and evolution of the universe, earth and planets, life's diversity, and human cultures.

- The **Chief Executive Officer, Smithsonian Enterprises** is responsible for the revenue-generating operations of the Institution. These include restaurants, museum shops, mail order, travel tours, product licensing, and the magazines.

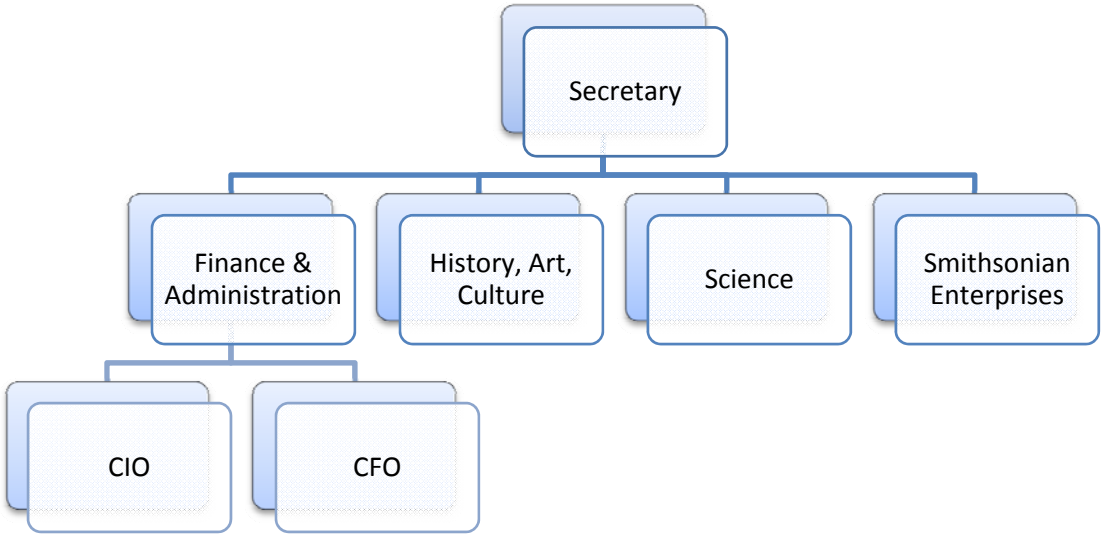


Figure 4: Placement of OCIO & Key Stakeholders

E. Infrastructure Analysis

In early FY 2009, the Institution's Information Technology Management Committee met and developed the Strength, Weakness, Opportunity and Threat (SWOT) Analysis for the Institution's managed IT infrastructure. This analysis informed the development of the FY 2009 SITP Strategic Overview.

Objective 1: Implement a Managed IT Infrastructure	
Strengths	**Weaknesses**
• Server Consolidation • Service Consolidation • VOIP • Help Desk • Mobile Technology • Desktop Replacement • Email/File Services • Backup • Standard Configuration (Desktops and servers) • Virus Scanning • Remote Desktop Management • Data Center Services • Web Infrastructure	• Enterprise Storage Requirements • Enterprise DAM • Data Silos • Collaboration Spaces (Internal and External) • New IT Staff and Skills for the future • Enterprise Backups (keeping pace with storage) • Duplicate Web services across the Institution • Enterprise Electronic Records Management
Opportunities	**Threats**
• Desktop Video Conferencing • Social Networking/Web 2.0 • Mobile Technology/Wireless • Collaborative Space with External Entities (e.g. Sharepoint) • Scientific Data • Web Shared Services (event calendaring, registration, ticketing, e-commerce, etc.) • Software as a Service • Open Source Software • Centralized Printer Management • Distance Learning • Enterprise Electronic Records Management	• Social Networking (storage, security) • Flat Budget • Rapid evolution of file formats and storage media

Objective 2: Establish an Optimal Organization for Providing IT Services	
Strengths	**Weaknesses**
• Existing dedicated IT Staff • Service Consolidation • VOIP • Help Desk • Mobile Technology • Desktop Replacement • Email/File Services • Backup • Standard Configuration (Desktops and servers) • Data Center Services • Decentralized IT Support • Provide custom yet standardized customer service • Address local unique scientific and unit IT needs	• Decentralized IT Execution • Lack of Collaboration Spaces • Depth and breadth of IT Staff • IT Skills for future requirements • Timeliness and execution of new IT contracts
Opportunities	**Threats**
• Training • Standardize position descriptions and titles • Institutional contract vehicles for IT products and services	• Lack of IT funds • Decentralized IT Management & Budget Execution

Objective 3: Improve IT Security	
Strengths	**Weaknesses**
• Computer Security Awareness Training • Centralized Infrastructure Security Controls (WAN, LAN, Wireless VPN, CITRIX, FDCC Workstation Compliance, Physical & Environmental Controls) • Security Operations Center (SOC) & Automated Tools Alerts • Skilled SOC resources supporting IT Infrastructure • Adherence to government security standards on desktops and servers	• Off hour/weekend Security Operations Center (SOC) coverage is limited to on-call support • Duties not adequately segregated • Infrastructure security procedures and security controls documentation • Limited ability to cross-correlate alerts for greater situational awareness
Opportunities	**Threats**
• Payment Card Industry (PCI) Compliance • Shared Web Services and Security • OS / Server hardening • Centralization of IT Security Logs • Security control descriptions in IT Infrastructure Security Plan • Security procedures • Improve management engagement on IT Security	• Complex network architecture, multiple PoPs, multiple trust zones, etc. • Increasing PCI DSS[5] threats with Distributed Units & Outsourced Services • Increasing Web Application Vulnerabilities Increasing COTS software vulnerabilities & requirements to keep patches & versions up to date • Increasing demand for Collaborative Services • Inadequate staffing for areas of New technologies including virtualization and wireless • Increasing usage of Portable Processing Devices • Increasing threats targeting sensitive primary data, e.g. credit cards, Social Security Numbers • Increasing security requirements may impact public accessibility

[5] PCI DSS – Payment Card Industry Data Security Standard

F. Transition Framework

The Office of Management and Budget sponsors and/or endorses cross-agency initiatives in one place for easy reference, review, and assessment relative to their applicability to individual agencies. While the Smithsonian is not an executive branch agency, the Board of Regents recommends that the Institution should follow federal best practices. In this light, e-government and line of business initiatives are evaluated and considered as components of the Smithsonian's enterprise information technology architecture.

Often times the Smithsonian is limited in its participation in that many of these initiatives do not fit the unique requirements of the Smithsonian as a wholly-owned Trust instrumentality of the United States of America, whose mission is for the increase and diffusion of knowledge, versus the traditional government role of providing a defined statutory service to the citizens. In particular the composition of its staff being made up of federal employees, trust employees, and a significant number of volunteers and visiting scholars would result in federal solutions requiring significant customization at increased costs. Funding of Smithsonian efforts extend beyond federal appropriated dollars to include trust revenue, grants, donations, and partnerships which is not typical of most Federal agencies also adds to the complexity.

F-1. E-Government Initiatives

The Smithsonian Institution, as a Trust Instrumentality of the United States, is not subject to the E-Government Act. As stewards of the Trust, Smithsonian management has committed to evaluating each E-Government Initiative and adopting them where it is both feasible and beneficial to the mission of the Institution. In many cases, the initiatives put forth under the E-Government umbrella simply do not apply to or support the business of the Smithsonian. The level of participation in each initiative is further defined in the Smithsonian's Information Technology Plan.

Smithsonian Participation in E-Government Initiatives

Government to Business	Government to Citizen
• Federal Asset Sales	• Recreation One Stop
Government to Government	**E-Authentication**
• E-Vital (minimal)	• HPSD-12
Internal Efficiency & Effectiveness	
• E-Clearance • E-Learning • E-Payroll	• E-Government Travel • Enterprise HR Integration • Integrated Acquisition Environment

F-2. Federal Transition Framework Lines of Business

During the periodic evaluation of existing systems and the planning for new systems, the Federal Transition Framework (FTF) Line of Business initiatives are evaluated as alternative for satisfying the functional requirements in the modernization and enhancement of the Smithsonian's enterprise architecture.

With thoughtful consideration, the Smithsonian has evaluated and continues to monitor the following lines of business: Financial management, human resource management, Geospatial, and IT Infrastructure.

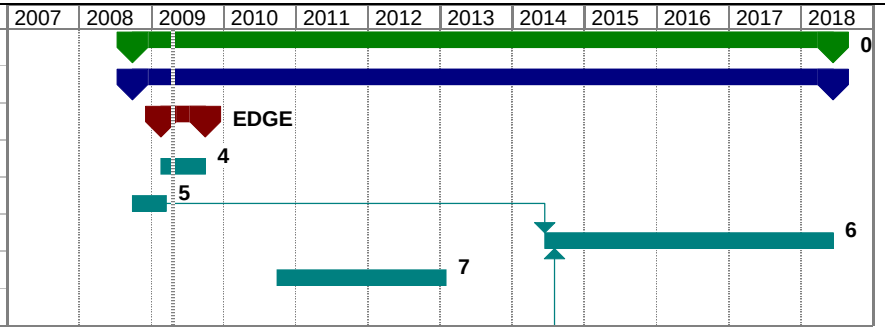
G. Transition and Sequencing Timeline

The following charts summarize key milestones for the FY 2009–FY 2014 planning period organized by enterprise architecture (EA) segments, and links each of them to the Smithsonian's strategic IT initiatives taking into account any dependencies between them and across segments. Enterprise architecture segments are a subset of the entire enterprise architecture based on varying mission areas with the long term goal of implementing shared IT solutions that replace redundant systems with agile enterprise solutions which continuously adapt to meet emerging Institutional requirements. At the Smithsonian we have the following EA segments defined for the planning period. Each segment can have one or more of the Federal EA line of business codes.

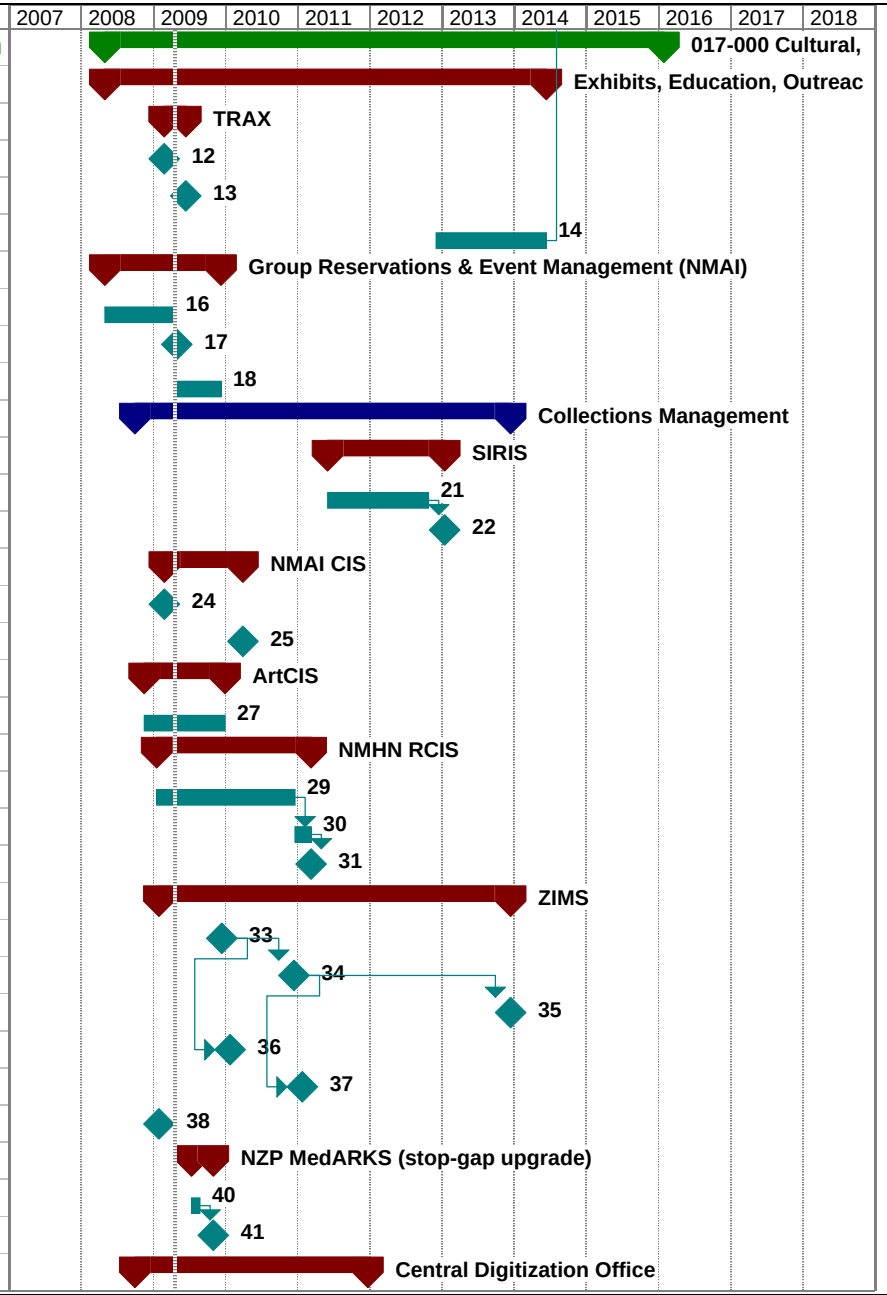
Smithsonian EA Segments

Name	Description	Segment Code
Education	Development, performance and evaluation of Smithsonian Institution educational programs.	015-000
Cultural, Artistic and Historic Preservation & Exhibition	Managing the increase and diffusion of knowledge internally and externally through the development and maintenance of Smithsonian physical and virtual collections and exhibitions.	017-000
IT Management & Planning	Provides the enterprise architecture, strategic Information Technology planning and technology infrastructure services for the Smithsonian Institution	404-000
Facilities & Security	Ensures the safety of Smithsonian staff, collections, property, and visitors.	401-000
Finance and HR	Management of personnel and financial resources across the Institution, including both Federal and Trust funds.	402-000
Scientific Research	Providing the scientific computing infrastructure to support Smithsonian science, and the data curation to meet stewardship responsibilities of this data	109-000

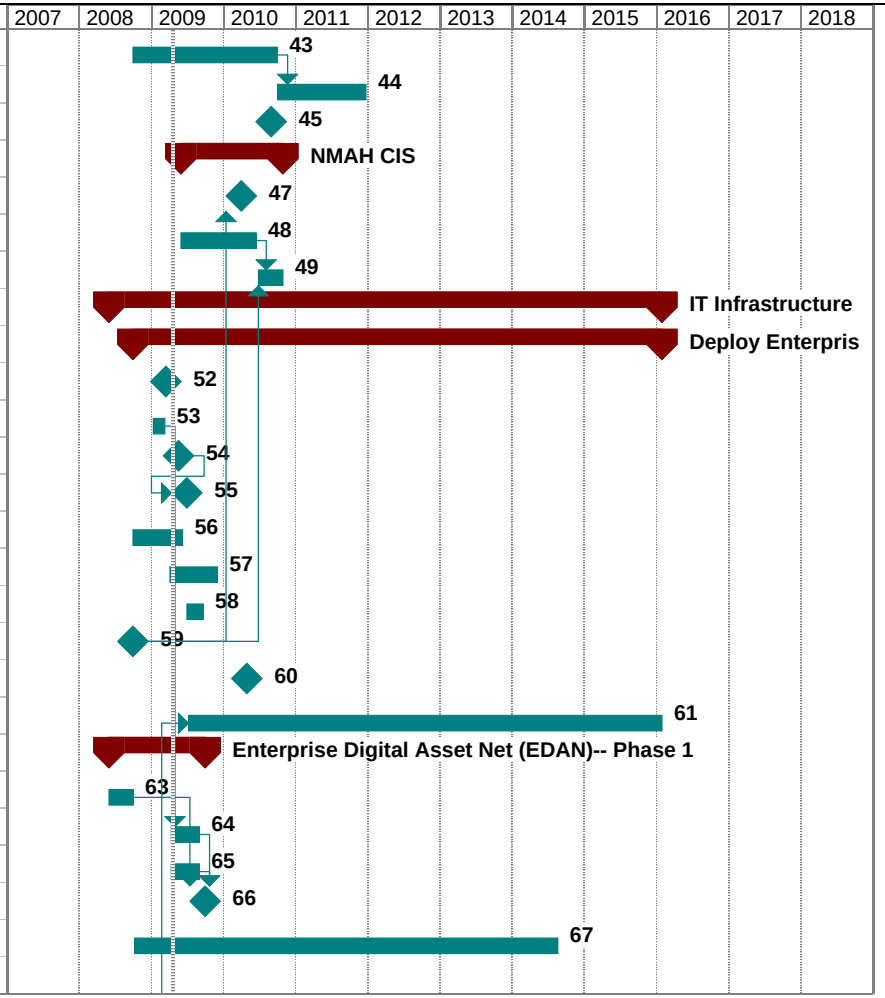
ID	Task Name
1	**015-000 Education Segment**
2	**Exhibits, Education, Outreach & Web**
3	**EDGE**
4	Audience Outcomes
5	**Pan-Institutional Calendaring**
6	**Educational Portal**
7	**Expand SOLAA functionality**
8	



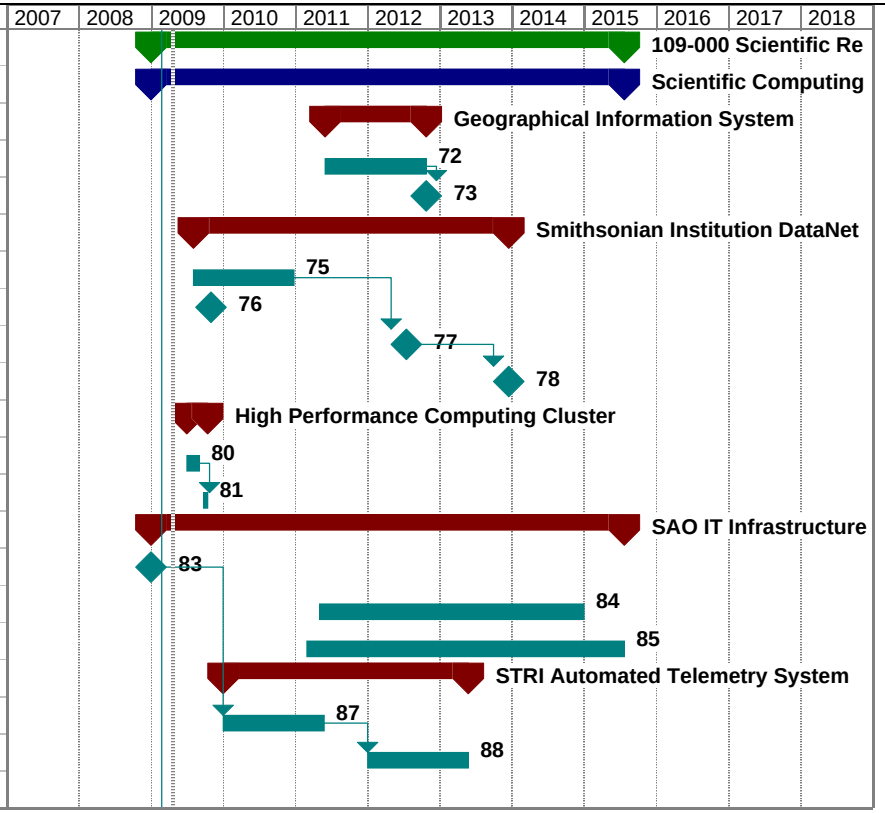
ID	Task Name
9	**017-000 Cultural, Artistic & Historic Preservation and Exhibition Segm**
10	**Exhibits, Education, Outreach & Web**
11	**TRAX**
12	Integrate SITES Poster Shows into TRAX
13	Upgrade TRAX to release 17
14	**Group Reservations & Event Management (SI-wide)**
15	**Group Reservations & Event Management (NMAI)**
16	Phase 3: Expand User Base
17	Implement iEBMS internally
18	Phase 4: Expand User Base
19	**Collections Management**
20	**SIRIS**
21	Acquire New System
22	Deploy SIRIS Replacement
23	**NMAI CIS**
24	Public Web Access
25	Exhibition content for museum initiatives uses CIS
26	**ArtCIS**
27	Integrate into EDAN cross search
28	**NMHN RCIS**
29	Migrate Legacy Databases
30	Combine EMU and TMS
31	Retire TMS
32	**ZIMS**
33	ISIS deploys ZIMS Phase 1: basic animal records
34	ISIS deploys ZIMS Phase 2: animal records enhanced for medical data
35	ISIS deploys ZIMS Phase 3: scientific & conservation research functions
36	Retire ARKS
37	Retire MedARKS
38	Retire SPARKS
39	**NZP MedARKS (stop-gap upgrade)**
40	Data Migration
41	Deploy System
42	**Central Digitization Office**



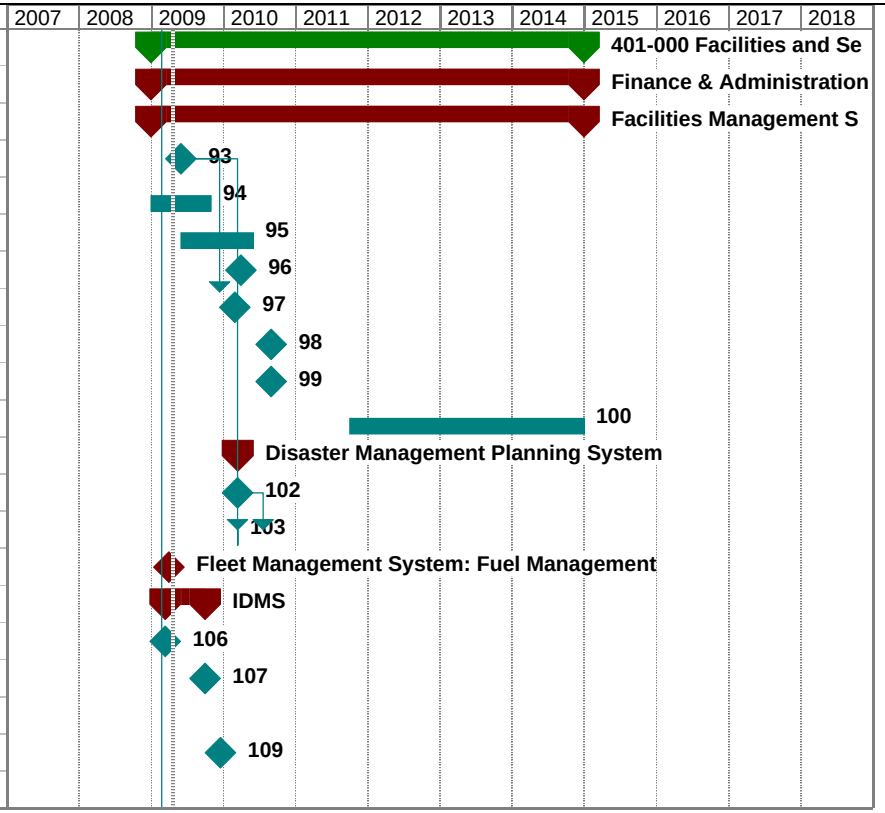
ID	Task Name
43	Establish Office with 2-year detail
44	Digitization Strategic Plan
45	Permanent Office Staffing
46	**NMAH CIS**
47	Bridge SI DAM and MIMSY XG
48	Metadata Cleanup for Enterprise DAM, 2 TB
49	Migrate files to SI DAM
50	**IT Infrastructure**
51	**Deploy Enterprise DAM**
52	Artesia 6.8 SP 2 Upgrade
53	Modifications to support EDAN IDS development
54	Upgrade production server
55	Consolidate NMAI DAMS server
56	Clean-up Pilot Data
57	Metadata & Vocabulary Definitions
58	Defined DAMS Enterprise Architecture
59	Deploy Enterprise-wide (storage restricted)
60	Artesia 7.x Upgrade
61	Expand number of digital assets / units in the DAM
62	**Enterprise Digital Asset Net (EDAN)-- Phase 1**
63	Metadata Model
64	Image Delivery Service
65	Solr/Lucene Cross Search Capability
66	Deploy EDAN
67	**EDAN -- Continue Phased Development**
68	



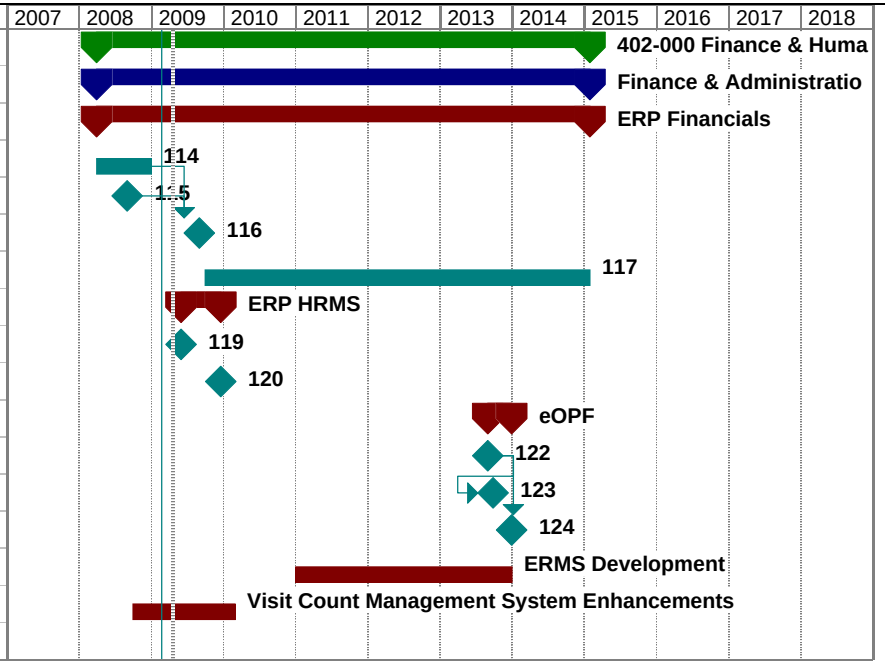
ID	Task Name
69	**109-000 Scientific Research Segment**
70	**Scientific Computing**
71	**Geographical Information System**
72	Integrated Implementation
73	Retire Stand-Alone Implementations
74	**Smithsonian Institution DataNet**
75	Archival Storage (Science)
76	Migrate Data Sets with minimal metadata
77	Mirrored Site
78	Implement Trusted Digital Repository Policies & Procedures
79	**High Performance Computing Cluster**
80	Relocate SOA Hydra HPCC to Smithsonian Data Center
81	Expand Hydra to 14 blades
82	**SAO IT Infrastructure**
83	5-yr replacement cycle for switches and routers
84	4-year replacement cycle for file and compute servers
85	Large-scale network storage upgrade
86	**STRI Automated Telemetry System**
87	Phase 3
88	Phase 4
89	



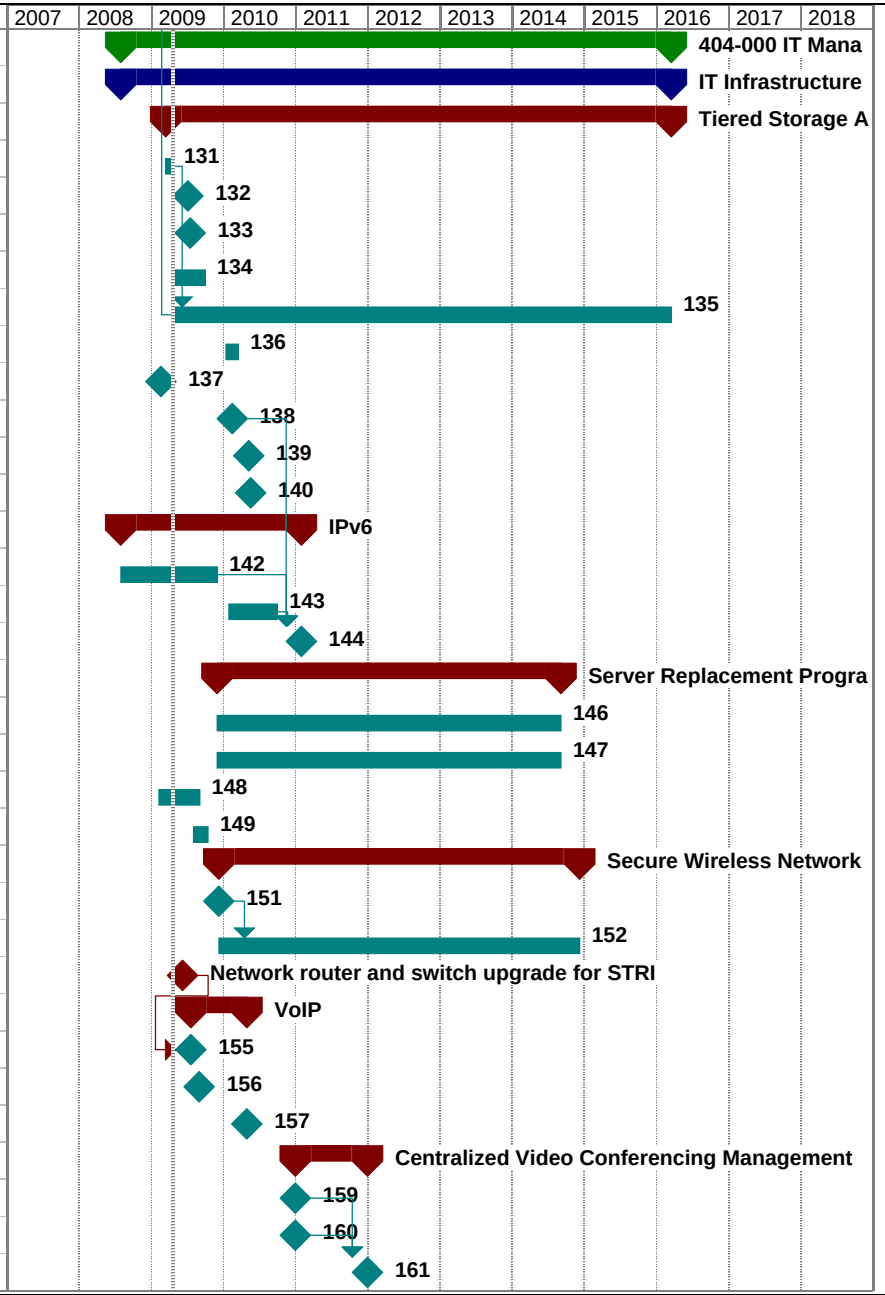
ID	Task Name
90	**401-000 Facilities and Security Segment**
91	**Finance & Administration**
92	**Facilities Management System**
93	Implement Hazardous Materials
94	Upgrade to Tririga 9i
95	Handheld Device
96	Implement Move Management Module
97	GIS Integration with Hazardous Materials
98	Implement Data Warehousing
99	Integrate Energy System
100	Continue to Enhance & Expand Functionality
101	**Disaster Management Planning System**
102	Deploy DMPS
103	Integrate PMPS with FMS
104	**Fleet Management System: Fuel Management**
105	**IDMS**
106	Implement New IDMS & scanning systems
107	Interface IDMS with ERP HR
108	**SIRS**
109	Implement Dispatch Log
110	



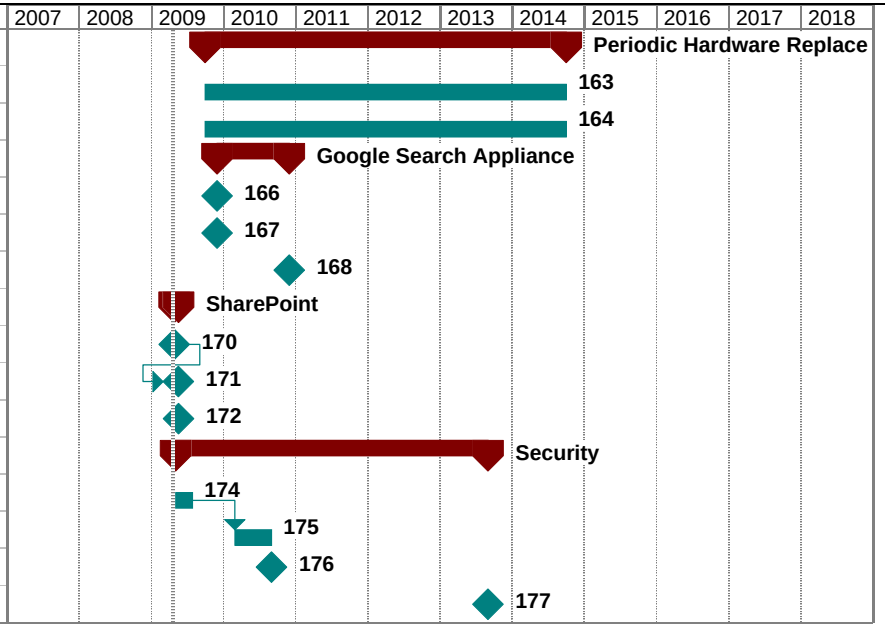
ID	Task Name
111	**402-000 Finance & Human Resources Segment**
112	**Finance & Administration**
113	**ERP Financials**
114	Upgrade
115	Deploy Time & Labor Front End
116	Deploy Time & Labor Back End
117	Continue to enhance and expand functionality
118	**ERP HRMS**
119	Deploy pilot for automated workflow for Performance Management
120	Deploy 9.0 PeopleSoft HRMS
121	**eOPF**
122	eOPF Operational
123	Interface eOPF with Retirement Management System
124	Retire Accu-Trax
125	**ERMS Development**
126	**Visit Count Management System Enhancements**
127	



ID	Task Name
128	**404-000 IT Management & Planning Segment**
129	**IT Infrastructure**
130	**Tiered Storage Architecture**
131	Implement Capacity Planning Tool
132	ILM Architecture Defined
133	Tiered Storage Solution for Office Automation
134	Implement Enterprise Email Archiving Solutions SI-wide
135	Expand Storage for Digital Assets
136	Storage Virtualization Architecture
137	**NZP 2nd Point of Redundancy on SInet**
138	**DNS Upgrade for IPv6 and DNSsec**
139	**FTP Redesign**
140	**List Server Upgrade and Redesign**
141	**IPv6**
142	Server Transition
143	Workstation Transition
144	Fully functional IPv6 Environment
145	**Server Replacement Program**
146	Replace oldest servers
147	Retire/Consolidate oldest servers
148	**Server Virtualization Pilot (XEN Platform)**
149	**Upgrade Remote Access to SInet**
150	**Secure Wireless Network**
151	SI-wide Port Level Authentication
152	Additional Access Points
153	**Network router and switch upgrade for STRI**
154	**VoIP**
155	STRI
156	NZP-CRC
157	SERC
158	**Centralized Video Conferencing Management**
159	Integrate Meeting Place Scheduling with Exchange
160	Integrate Meeting Place Audio Server and Call Manager
161	Implement Decentralized Administration & Scheduling



ID	Task Name
162	**Periodic Hardware Replacement**
163	Desktop workstations and printers
164	Scientific Workstations
165	**Google Search Appliance**
166	Implement Universal Search
167	Develop Centralized Tools and Failover Architecture
168	Integrate new Google Search technology
169	**SharePoint**
170	MOSS 2007 Upgrade
171	Migrate replaced WSS version content
172	System fully operational
173	**Security**
174	Replace Firewalls
175	Install Firewall Reporting System
176	Deploy SI Enterprise anti-virus at SAO
177	Deploy IPS/IDS in SAO and SE Environments



Information Technology Resources Summary

The table below summarizes Federal IT resources at the Smithsonian for the previous and current budget years, as well as those anticipated for FY 2010 as submitted to the Office of Management & Budget (OMB) in the Exhibit 53.

LOB*		FY 2008	FY 2009	FY 2010
TOTAL ($ in millions)		**61.15**	**64.42**	**69.07**
Part 1: IT Systems by Mission Area		**28.82**	**28.35**	**30.36**
Financial & Administrative Management		**15.44**	**14.42**	**14.82**
402	Enterprise Resource Planning System	11.41	11.80	12.01
401	Facilities Management System	1.67	1.04	1.07
106	Smithsonian On-Line Academic Appointment System	0.33	0.20	0.20
401	Security Management System	0.84	0.09	0.24
401	Other Administrative Management Systems	1.19	1.30	1.30
Collections Management		**11.92**	**12.28**	**13.90**
106	Art Collections Information System (ArtCIS)	1.77	1.89	1.95
106	American Indian CIS (NMAI CIS)	4.03	4.11	4.03
106	American History CIS (NMAH CIS)	0.71	0.49	0.77
106	SI Research Information System (SIRIS)	0.62	0.68	1.04
106	CIS Pool	0.91	0.94	0.94
106	NMNH Research & Collections Information System (RCIS)	3.62	3.92	3.93
106	Zoological Information Management System (ZIMS)	0.15	0.15	0.15
106	TRAX	0.11	0.10	0.10
106	Enterprise Digital Asset Net (EDAN)	0	0	0.52
106	Central Digitization Office	0	0	0.47
Scientific Research		**1.44**	**1.62**	**1.62**
109	SAO Scientific Computing	1.27	1.35	1.35
109	Scientific Application Software	0.17	0.27	0.27
E-Gov Initiatives		**0.02**	**0.02**	**0.02**
403	E-Learning System	0.02	0.02	0.02
Part 2: IT Infrastructure & Office Automation		**31.74**	**35.41**	**38.02**
404	Managed IT Infrastructure	31.33	34.99	37.60
404	IRM Pool	0.40	0.42	0.42
Part 3: Enterprise Architecture & Planning		**0.59**	**0.66**	**0.68**
404	IT Architecture & Planning	0.59	0.66	0.68

* Federal Enterprise Architecture Line of Business Code