



Digitization

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Smithsonian
Institution

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1. Preface

It is imperative that the Smithsonian develop a pan-Institutional approach to the digitization of its research and collections assets. Because of its role in both preserving and providing public access to the national collections and its own scientific research, digitization is crucial to the Smithsonian's future.

For museums, libraries, and other cultural heritage organizations, digitization has become a major issue. At the dawn of the 21st century, Congress appropriated \$100 million to develop a national program for a collaborative collection of important digital materials of educational value, as well as a long-term strategy for the preservation of digital materials.

The White House defined priorities for maintaining excellence and leadership in science and technology in a letter to agency heads dated June 23, 2006. Only two areas requiring special agency focus and attention were highlighted with stewardship of federal scientific collections being first on the list. The letter directed agencies to develop a coordinated strategic plan to maintain collections and to further collections research.

In June 2006, the Smithsonian Board of Regents held its first long-term planning meeting devotedly solely to the content and management of Smithsonian collections. Following guided tours of collections at the National Museum of American History and the National Museum of Natural History, the Board conducted an in-depth discussion with Smithsonian senior management on the current issues facing the Institution's collections, as well as the strategies by which those challenges might be addressed in the future.

The Regents' review concluded that there is an urgent need for resources to support key infrastructure components of collections management. The management and care of Smithsonian collections presents three primary categories of need: collections space, collections staffing, and collections information systems. In addition, the review concluded that the Smithsonian must continue to digitize its collections; and that an effective strategy for addressing Smithsonian collection challenges is dependent upon a coordinated, pan-Institutional approach, as the challenges are inextricably linked.

The digitization of collections information and images is a mammoth task that requires numerous Smithsonian and contract staff to complete. The Smithsonian manages its collections through electronic records that store descriptive, technical, and preservation information about the items. A record may represent more than one object or specimen, as in the case of natural history, archaeological, and archival collections. The size of the Smithsonian collections is 136.9 million objects. Only 13.3 million Smithsonian objects and specimens are currently available in electronic form to scholars and the general public—and for these there are only 821 thousand digital images.

Many collection records are skeletal and lack digital images, or still reside in legacy or manual documentation systems. The erosion of staff and the decrease in funding have impaired the Smithsonian's ability to support electronic collections information systems on a sustainable level, thereby jeopardizing public delivery of digital content and images from Smithsonian collections.

- a. For example, the National Museum of Natural History currently has 5 million records in its collections information system and plans to complete the migration of more than 5.5 million records from over 22 legacy systems and to make most records available on the Web by fiscal year 2009. However, this is only a tenth of the 50 million records needed to adequately represent this single museum's 126 million collection items.
- b. An analysis at the National Museum of American History which was completed in 2006 determined that its collections information system is unstable and continuing to decline due to the lack of sufficient resources. Preliminary results of the analysis indicate that 80% of the data requires substantial editing.

Insufficient centralized infrastructure, particularly in the area of digital storage, is and will continue to be a major constraint on the Smithsonian's creation and management of its digital assets. Other museums and institutes are facing similar challenges. The Institute of Museum & Library Services' (IMLS) January 2006 report titled "Status of Technology and Digitization in the Nation's Museums and Libraries" documents the Institute's 2004 survey results. In which it found insufficient funding and staff time are barriers to implementing technology:

"... almost two-thirds of museums, 31 percent of archives, 50 percent of large academic libraries, and the majority of small public libraries say their technology is less than adequately funded."

In regards to digitization policies the IMLS survey found that:

“... For all museums, the topics that were most likely to have associated policies were access (23.4% of museums have policies related to access), digital format (21.5%), materials to be digitized (21.4%), preservation (19.4%), and security (19.3%). The topics least likely to have associated policies were metadata (7.3% of museums), conversion of digital files to next-generation formats (7.6%), and evaluation (8.6%).”

Currently the Smithsonian lacks pan-Institutional policies. To varying degrees Smithsonian units have policies addressing some of these topics included in the IMLS survey.

Creating and managing digital assets—both collections-based and research-based—is an enormous and expensive endeavor that will engage the Smithsonian for decades to come. Many of the recommendations contained in this report depend on funding. Others depend on changes in structure, attitude, and leadership commitment that we can accomplish now—in preparation for the time when funding and a digital infrastructure are in place.

2.Executive Summary

In August of 2006, Deputy Secretary and Chief Operating Officer Sheila Burke, Under Secretary for Art Ned Rifkin, and Under Secretary for Science David Evans formed a Digitization Steering Committee composed of representatives from across the Institution. They directed the steering committee to initiate a pan-Institutional discussion on digitization that would draw on the collective knowledge and experience of the Smithsonian's staff.

This report not only documents this pan-Institutional conversation on digitization, but also includes specific recommendations voiced by staff from across the Institution as they participated in this discussion.

The recommendations within this report fall under one of the following seven major areas. These recommendations must be followed if the Institution is to make significant progress in developing and protecting its digital assets—both collections-based and research-based.

- A. Fully fund digitization initiatives.
- B. Establish a central Smithsonian digitization office.
- C. Develop a pan-Institutional digitization strategic plan.
- D. Become a trusted digital repository.
- E. Develop and implement standards.
- F. Enhance the centralized information technology (IT) infrastructure and resources.
- G. Improve accessibility to digitized information.



Appendix A lists the members of the steering committee.

3. Introduction

The digitization of the Smithsonian collections will enable us to document rare and inspiring artifacts, making them available to future generations.

Digitization enables the Institution to continue to reach Americans where they live, give students everywhere the chance to interact with Smithsonian treasures, and provide the global science community with unprecedented access to our collections.

Lawrence M. Small
Secretary

Donor thank you letter, 2006

For more than two decades, the Smithsonian has been making incremental progress towards digitization. The majority of these efforts however, have been independent from one another. The time to examine recent progress and to plan for the future growth of digital assets is now. In discussing the future of digitization, we should keep the following points in mind:

- The technology needed to digitize, store, and access this digitized information is readily available in the commercial market. We do not need to invent it.
- Our staff has the expertise to create the digital object and, more importantly, to enhance this object with the descriptive information that gives it meaning. We are the experts.
- Our visitors and colleagues have growing expectations for digital access to our information and collections. If these expectations are not fulfilled, they will go elsewhere.
- Digital assets and digitization of objects do not eliminate collections care and management needs. Digitization improves access to collections.

- Resources must be enhanced when the Smithsonian initiates a major digitization program as digitization will create an additional workload on the collections management staff in the units. Digitization will not replace or eliminate existing work.
- A special challenge in ensuring Smithsonian-wide interoperability will be to maintain the proper balance between unit level responsibility and expertise, and central support and institutional goal setting. Without this balance one or the other will suffer.

This discussion has identified the need for a pan-Institutional digitization strategic plan that ensures we develop *one* digital Smithsonian Institution that encourages information sharing and dissemination. Creating the digital Smithsonian will require tough choices. We must know when to be flexible, allowing for customization to meet the needs of each unit or project. We must search for economies of scale as we secure funding in a period of tight federal budgets.

In short, the strategic plan must leverage the available technology and limited funding in order to ensure that the Smithsonian is relevant to the next generation who will choose to enjoy their museum experience in new and evolving ways.

Here and elsewhere the number of physical visitors to the museums is going down and virtual visits are going up. People are saying that they are going to get their museum experience in a different way. That doesn't mean one or the other is closing down, but it means we need to pay attention and respond to the way people are choosing to experience our objects and exhibits.

David Evans
Under Secretary for Science
Smithsonian's Spotlight on Digitization Conference, 2006

4. Summary of Activities

We want to learn from the experiences that many of you have had around the Institution. It is not simply a question of bringing expertise in from the outside—although we are blessed today in having that opportunity. But also it is quite clear that a number of you have begun these discussions and in fact have a number of things in place where we can learn from one another.

Sheila Burke
Deputy Secretary and Chief Operating Officer
Smithsonian's Spotlight on Digitization Conference, 2006

Survey **Digitization Projects @ SI**

During September 2006, a voluntary survey on the status of digitization at the Smithsonian was announced via multiple Smithsonian-wide messages, promoted by the Deputy Secretary and by members of the Digitization Steering Committee. The steering committee received 268 responses to the survey.

While this survey was not conducted scientifically, it served as a barometer of issues facing our digitization projects. It identified funding and standards as the top two topics of interest, both of which were considered in more detail as part of the follow-on digitization workshop. The top three reported purposes of digitization activities were: to support research (61.4%), a unit's concerted digitization effort (35.1%), and conservation and preservation activities (29.7%).

Responses were received from 29 major units at the Smithsonian with more than 43% of the responses from project teams at the National Museum of Natural History (NMNH). While these NMNH respondents represented both collections-based and research-based digitization projects, the majority of the responses were research-based.



Appendix B includes additional details from this survey including the summary presentation presented at the *Spotlight on Digitization @ SI Conference*.

Conference & Digitization Fair Spotlight on Digitization @ SI

A Digitization Conference and Fair were held on October 30, 2006. Intended to promote an exchange of information, the event was open to all interested Smithsonian staff.

The morning session, conducted in the Meyer Auditorium of the Freer Gallery, included two invited guest speakers: Clifford Lynch, the Director of the Coalition for Networked Information (CNI); and Diane Zorich, a cultural heritage consultant. Both shared their insights into digitization developments and the progress being made by other institutions. The Deputy Secretary and Under Secretaries, at different points throughout the morning session, offered their perspectives on the opportunities and challenges of digital assets at the Smithsonian. Approximately 200 people attended the morning session in person. An additional 75 people participated via a live webcast.

Some 160 people attended the afternoon Digitization Fair in the Ripley Center. Participants could choose to listen to a series of formal 15-minute presentations by unit staff (also available via webcast), or could walk around the fair to discuss digitization projects from across the Institution.

The day's events were structured to provide a forum for sharing experiences, expertise, and best practices. This structure allowed Smithsonian staff who attended this event to absorb the day's information and begin to think about what could be done better as they prepared for the upcoming workshop.

Participants provided positive feedback on the conference and fair.

It was a rare and welcome event at the Smithsonian—a chance to see what other departments are doing and to ask questions.

It's unfortunate that we don't always have the opportunity to understand/see what our SI colleagues are working to accomplish. It's clear to me that there are incredible, wonderful, exciting ideas and projects underway that this fair demonstrated. How do we share our projects more often—annually?

Comments in Post Conference Survey

The webcast portions of the day's events are available on Prism. The webcast includes both the morning session and afternoon digitization fair lectures.



Appendix C includes the day's agenda, a list of the digitization fair presenters, speakers, and participant feedback.

Workshop..... **Digitization @ SI: Challenges & Opportunities**

On November 30, 2006, the Digitization Steering Committee hosted 137 registered workshop participants at the Capital Gallery building. The workshop was composed of four tracks focused on issues concerning: capturing, curating, using, and sharing digital information. Participation was open to all Smithsonian staff who could commit to spending the day at the workshop.

Two Smithsonian subject matter experts organized and led each workshop track. In addition, the Office of Policy and Analysis donated their services as facilitators for each track. Track formats varied depending on the subject and approach of the track leads.

- **Capturing**
Acquisition of asset types now being digitized, the staff and resources used, the use of standards and best practices, and recommended next steps.
- **Curating**
Management of current digitized material, metadata, storage and care of data, identification of essential aspects for such programs, and recommended next steps.
- **Using**
How Smithsonian digitized material and data are being used and reused internally and externally, and recommended next steps.
- **Sharing**
What it means to share digitized material, current obstacles to sharing, the types of systems that facilitate sharing, and recommended next steps.

After a working lunch, the workshop participants reconvened in Baird Auditorium to present a synopsis of each track's findings and recommendations. Those presentations were the foundation for the recommendations contained in this report. A fifth track on funding followed these presentations. It included a panel discussion addressing the current available funding options, past successes, and possible fundraising actions. Fifty people joined the workshop via the live webcast to listen to the afternoon presentations.

The workshop participants expressed many common findings which are reflected in this report's recommendations. Many people stated that their reason for coming was "to learn" rather than to offer expert opinions. As such, many of these recommendations will need to be developed into further detail by subsequent workshops or committees.



Appendices D through H include a summary report for each track along with its afternoon presentation.

5. Recommendations

In a time of change, those of us entrusted with icons face a dilemma: Do we preserve the icon as it has been, rejecting change as too risky? Or do we try to add to the qualities that created the icon in the first place, taking care not to change simply for the sake of change?

L Gordon Crovitz
Publisher, Wall Street Journal

Jan 2, 2007 in explaining a redesign of the newspaper

The recommendations in this section are based on the input from the participants who contributed to this discussion on digitization. Their input was collected, considered, and discussed at length by the members of the Digitization Steering Committee and the workshop track leads.

While still in draft, this report was posted on Prism, the Smithsonian's Intranet, for two weeks to solicit internal review and comment. Fifty people responded. The majority of their feedback was in agreement with the draft report. All comments were reviewed and discussed by the Digitization Steering Committee prompting slight modifications to this final report. For future reference, the complete remarks have been included as Appendix H.

Since its inception, the Digitization Steering Committee has worked to make this process transparent and open to all staff members. The reader may choose to analyze the raw findings included in the appendix for additional thoughts and suggestions. There are several internal organizations, listed in the appendix of this report, which may be helpful in implementing many of these recommendations.

The Digitization Steering Committee strongly suggests that the momentum gained during these months of discussion not be lost and urges senior leadership to demonstrate a sustained commitment to digitization by adopting the recommendations in this report. The committee's recommendations follow.

Fully Fund Digitization Initiatives

The Opportunity	The Smithsonian has a world-renowned collection that can be made more accessible and usable to our visitors, both physical and virtual.
The Challenge	The Smithsonian currently does not have a pan-Institutional digitization strategy that informs and supports funding efforts.
Recommendation	<p>A-1. The Smithsonian must add resources to its base budget for infrastructure and staff to support consistent, continuing digitization efforts centrally and in the units.</p> <p>A-2. By demonstrating a strong commitment to digitization of its collections, the Smithsonian can more successfully seek alternative sources of funding in addition to federal support.</p>

B. Establish a Central Smithsonian Digitization Office

The Opportunity	The Digitization Steering Committee's activity has motivated Smithsonian staff to seek common resources and exchange information. A common request was to form a centralized resource to share existing expertise from across the Institution which in turn will increase efficiencies, skills, and morale, and will bolster the Institution's reputation.
The Challenge	Digitization is in an explosive growth period and digitization technology, trends and best practices are rapidly evolving.
Recommendation	<p>B-1. Create an office that will provide the Smithsonian with a center of excellence for digital initiatives. This office should be headed by a recognized leader in digitization and staffed by people with museum, library, research, and archives expertise. This unit must report to the COO.</p> <p>This office will:</p> <p>B-2. Lead the development of a pan-Institutional digitization strategic plan, and coordinate with units in the development of unit digitization plans.</p> <p>B-3. Maintain a directory of current and planned digitization activities from across the Institution.</p>

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- B-4. Serve as an “information clearinghouse on digitization” to units on standards, metadata, and internal-consultant resources. The office will provide central internal communication and coordination on matters of funding, training (e.g., external sources and onsite training), contracts, internal networking tools (e.g., wikis and web pages), and pan-Institutional exchanges of information (e.g. conferences, workshops, and communities of practice).
 - B-5. Become the central point of contact for promoting Smithsonian digitization activities; provide internal leveraging of digital assets; sponsor Smithsonian representatives at high-level national/international conferences and working groups including standard-setting forums; explore collaborations within the government and museum communities; and respond to external inquiries into the status/issues of digitization at the Smithsonian.
 - B-6. Facilitate the sharing of digitization facilities and equipment.
 - B-7. Establish pan-Institutional metrics to monitor digitization progress.
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C. Develop a Pan-Institutional Digitization Strategic Plan

The Opportunity	The Smithsonian can become an internationally trusted virtual institution, providing meaningful and appropriate digital access to collections, knowledgeable staff, educational programs and resources based on curriculum standards, and compelling interactive multi-media exhibits. This will enhance the Smithsonian's reputation and its positive effect on the daily lives of children, students, scholars, and subject enthusiasts at all levels of expertise.
The Challenge	Sharing knowledge in the 21 st century requires a major coordinated effort across pan-Institutional boundaries, an effort that includes, but is not limited to, scholars, curators, educators, collections managers, archivists, and business partners. Currently most Smithsonian digitization efforts are stove-pipe efforts with little sharing. The Institution will need to balance competing digitization priorities such as preserving collections most at risk, exhibition support, educational programs, research, and worldwide public access.
Recommendation	C-1. The Institution must establish a principled, visionary, and integrated digitization strategy to deliver the Smithsonian's digital resources to the world beyond the physical buildings, public programs, and research centers. In doing so, it must foster an institutional mindset that recognizes that digital assets (including research-based assets) and their derivatives require the same levels of care and intellectual control as physical objects while not

abandoning the original object's care.

C-2. Senior leadership must appoint a group representing the Institution as a whole, across disciplines, to develop a pan-Institutional digitization strategic plan. The audience for this plan should include Smithsonian staff at all levels, Congress, and potential non-federal funding sources. This plan must identify common museum, research, and outreach goals; and leverage their strengths to make collections and information more accessible institution-wide.

C-3. The Smithsonian's digitization strategy must establish high-level priorities and guidelines for the creation and management of digital assets. Broader Smithsonian-wide priorities must be reflected in unit digitization plans. Unit digitization plans will in turn provide more specific priorities that reflect each unit's individual goals and objectives.

D. Become a Trusted Digital Repository

The Opportunity	<p>To improve its reputation as a 21st century scholarly resource, the Smithsonian must develop, implement, and manage the systems necessary to support its digital assets; and establish a trusted digital repository containing the databases of record for digital assets. Systems currently in use at the Smithsonian could provide a solid foundation for this repository. Yet full implementation and interoperability will require concerted effort.</p> <p>Combining a trusted digital repository with best practices in adopting digitization standards and data migration policies, the Smithsonian can maintain the authenticity and integrity of its digital assets and ensure that they will continue to be accessible as technologies change.</p>
The Challenge	<p>Currently we have multiple collections and digital repositories in various states of implementation that are not interoperable and do not support common searches across these systems. In addition, authority files and controlled vocabularies used by different units are not available institution-wide.</p>

Recommendation

- D-1. Provide funding at levels necessary to develop and maintain a robust, secure, trusted digital repository composed of multiple interoperable systems supported by adequate storage and backup capabilities. The project should be governed by a long-term management plan based on best practices. A first priority should be the expansion of the Digital Asset Management (DAM) system to the enterprise level.
- D-2. Form a technical working group to conduct a meaningful survey/study of institutional and unit-supported (in-house) digital infrastructure including storage, collection information systems¹ (CIS), and DAM systems. This group should determine what resources are available to support a major digitization initiative, what interoperability options are possible, and what infrastructure is needed to create a trusted digital repository that complements our existing infrastructure.
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¹ Presently the Smithsonian has implemented the following commercial CISs at the enterprise level: The Museum System (TMS), Electronic Museum (EMu), Multi MIMSY, and SIRIS Horizon.

E. Develop Standards (Digital File and Metadata)

The Opportunity	We have an opportunity to establish core standards prior to a major push in digitization at the Smithsonian. The establishment of standards will reduce the amount of future rework due to incompatible file formats or quality issues. Having core metadata standards will lead to better management, improve cooperation across pan-Institutional boundaries, and facilitate creating interoperable systems.
The Challenge	There are no current Smithsonian-wide standards for creating digital files (e.g., resolution, equipment settings, file formats) and associated technical and descriptive metadata. Because of the wide diversity in digital files (audio, film, video, image, and data), developing and implementing standards will be very time and resource consuming.
Recommendation	E-1. Establish technical working groups to develop “core” digital file and metadata standards for the various categories of digital data. Metadata standards do not need to be created from scratch. It should be a high priority to adopt standards already in existence and widely used by other organizations, while taking cognizance of existing international standards that apply to the disciplines within the Smithsonian community. Standards should be sets of minimum requirements rather than ideal “one-size-fits-all” sets.

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- E-2. While standards are being developed, we must identify “best practices” for file creation, manipulation, and storage, as well as the metadata that supports those assets. Sharing these practices among Smithsonian staff could help pave the way for the adoption of future standards based on real-world experience.
- E-3. Require compliance of future digitization efforts with “minimal” file and data standards in order to be stored and managed as part of a trusted digital repository.
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F ● Enhance Centralized IT Infrastructure & Resources

The Opportunity	The Smithsonian can become known as a cutting-edge institution at the heart of scientific research and cultural heritage in the rapidly changing and expanding digital world by: reducing disjointed expensive individual system acquisitions; by nimbly adapting technologies to meet the Smithsonian's evolving needs; and by attracting endowment funding, financial donations, and creative minds for exciting digital knowledge projects.
The Challenge	Insufficient centralized infrastructure, particularly in the area of digital storage, is and will continue to be a major constraint on digitization. Historically there has been institutional resistance to big-picture surveys and one-size-fits-all solutions. As such, the Smithsonian currently has many different systems in use, from the home grown to the enterprise level. Unit collection information staff, Office of the Chief Information Officer (OCIO) staff, and curators must work cooperatively in order to understand infrastructure issues from each of their different perspectives.

Recommendation	
	<p>F-1. Establish well-funded centralized data storage and data migration policies from which <i>all</i> units with digital assets would benefit.</p> <p>F-2. Increase OCIO staffing to create a core office of academic or research computing staff. The staff might be deployed on unit-driven projects as “internal consultants.”</p> <p>F-3. Increase OCIO staffing to provide application support for the component systems of the Trusted Digital Repository; and to establish a dedicated DAM support staff.</p> <p>F-4. Increase OCIO and unit staffing for efforts to increase access and system interoperability.</p> <p>F-5. Create a focal point in OCIO for coordinating cross-discipline activities within OCIO for CIS, DAM, metadata repository, web, data architecture, etc; and coordination and collaboration with other Smithsonian units.</p> <p>F-6. Adapt IT processes to facilitate innovation and prototyping; loosen restrictions on open source and evaluate models in other academic and cultural institutions.</p>

Improve Accessibility to Digitized Information

The Opportunity

As the Institution's treasure trove of digital assets grows, implementation of contemporary accessibility strategies is essential to realizing the greatest benefit for our diverse user communities.

Through improved accessibility, we can deliver a new paradigm for Smithsonian experiences that spans both the physical and the virtual. By providing new forums for new users, the Institution has an opportunity to improve the user's access to our digitized information.

The Challenge

Websites may be our most public online face, but they function largely as silos of information. Public and staff alike are challenged by the effort necessary to mine their depths. In contrast, today's best websites are highly sophisticated systems involving multiple databases that interact with the visitor.

To date, there has not been a concerted effort to determine the needs and expectations of online Smithsonian visitors. Before metadata strategies for finding digital assets can be developed and before websites showcasing digital assets can be designed, we must learn who will access these assets and how they will use them. This knowledge will help drive our decisions as we prepare for an increased volume of digitized information and the dissemination of this information to the wider public.

Recommendation	
	<p>G-1. Create a strategy to understand the Smithsonian's varied audiences and their needs by employing methods such as data mining, focus groups, tracking web traffic including patterns of behavior, and online visitor profiles.</p> <p>G-2. Develop and establish a cohesive web strategy for the Smithsonian's public websites to serve diverse audience needs, and enable units across the Smithsonian to make their appropriate digital materials available to various audiences.</p> <p>G-3. Create interoperable systems that provide multiple points of access to digital collections in order to support research, publications, new museums, educational initiatives, and commercial products.</p>

6. Corroborating Studies

Several Smithsonian studies done by other committees and groups have touched upon digitization issues. A summary of the main points of agreements between these corroborating studies—published in 2003, 2005, and most recently 2006—and this report are cited below.

The Smithsonian Collections Advisory Committee (SCAC) is a pan-Institutional body that advises Smithsonian senior management on collections issues. The committee assists management in establishing a framework for setting Institutional priorities and meeting defined collections stewardship responsibilities. The SCAC has identified the following as top priorities in its August 2006 report to the Deputy and Under Secretaries, all of which closely align with the recommendations in this report:

- Develop and implement a proactive, Smithsonian-wide strategic plan with priorities for collections space, collections care, preservation and digitization. Assess needs and costs across the Smithsonian, pursuing shared solutions to issues that transcend individual collecting units.
- Invest the resources necessary to meet professional standards for collections care and preservation across the Institution.
- Invest the resources necessary to meet professional standards that ensure collections are physically and electronically accessible.
- Promote a strategic and integrated approach to collecting by each Smithsonian collecting unit.
- Create a pan-Institutional strategy for funding collections care, preservation, and digitization.
- Include SCAC in senior management decision-making on collections-related issues.

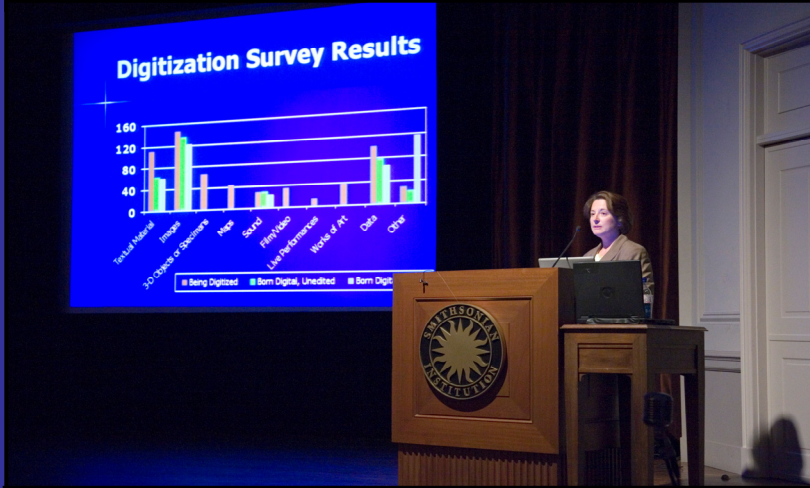
In 2005, the Office of Policy and Analysis collections study titled “Concern at the Core,” included the following recommendations which overlap with this report’s recommendations:

- Assign responsibility to OCIO to develop a central portal for access to collections information across Smithsonian collecting units.
- The Smithsonian will foster collaboration on electronic access, internally and externally. Specific priorities include: creation of a single Smithsonian portal to facilitate: searches across all Smithsonian collections databases; participation in cooperative arrangements with consortia and interagency forums such as biodiversity networks; and linkages with external databases and participation in portals that connect the Smithsonian and external organizations.
- The Office of External Affairs and unit development offices shall raise funds in the private sector for collections management.
- The Smithsonian shall increase the human resources devoted to the management of collections as soon as possible.
- Training for collections management staff shall be aligned with the requirements of unit strategic plans, technology, professional standards, job descriptions, and assigned tasks.

The 2003 report “Science Matters: Priorities and Strategies, 2005-2010” identified the strategy to provide and maintain the information technology tools necessary to enhance the goals and objectives of Smithsonian science. One of the actions listed was to provide digital repository and digital asset management tools. For the Smithsonian to actively participate in future e-science and e-research, it will need the proper digital infrastructure to support the sharing of its data for analysis in new and exiting ways. There are possibilities for new kinds of research, for new kinds of science in ways yet to be imagined through the logical extension of continuing our scientific and scholarly methods by taking advantage of digital infrastructure tools.



Due to their size, the appendices are published in a companion document to this report.



... a conversation