Digital Technologies and the Management of Conservation Documentation

A Survey Commissioned by the Andrew W. Mellon Foundation

Undertaken by

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I. EXECUTIVE SUMMARY

1. Introduction
In June 2008, the Museums and Art Conservation Program of the Andrew W. Mellon Foundation commissioned an online survey of conservation practitioners worldwide, in order to gather information about the impact of digital technologies on the management of conservation documentation. The goal of the study was twofold: to better understand the range of current documentation methods in museums, other cultural institutions, and in private practice; and to discover promising methodologies that successfully integrate information technology across the complex requirements of the broadly defined field of conservation. The central goals of the study were to explore examples of technological and organizational innovation, and to explore particular solutions to local problems that could be adapted to a larger community. The survey is part of a larger Mellon digital documentation initiative to review and to encourage efficiency and openness in the sharing of knowledge within the conservation and broader scholarly community as well as with the public. Information on Mellon’s initiative is available online at: http://mac.mellon.org. For a copy of the survey, see Appendix B.

The survey gathered information about:

- Basic departmental and institutional characteristics
- Documentation procedures and the comparative use of digital versus analog formats
- Digitization of current analog and legacy conservation documentation
- The use of digital asset management (DAM) systems for managing digital images and metadata
- The use and integration of collections management systems (CMS) with conservation and science documentation, (with or without the use of additional software)
- An exploration of commercial and non-commercial software and systems currently in use or under development by conservation and scientific departments
- User satisfaction levels with various aspects of their systems.
2. Participant Profile

Two hundred and six individuals responded to the survey (80% of whom work in the United States), representing conservation activity at 156 institutions in 15 countries in departments averaging seven staff members. Most institutions had two or three departmental specializations, the majority of which were Books and Paper, Objects and Sculpture, and Paintings, roughly reflecting the specialization demographics in the field.


Most conservation practitioners use some type of digital documentation. Overall, three-quarters use digital text (i.e. word processing - with one-quarter using digital text exclusively), although the type of project often determines the format. Paper and pencil still has its place and is indeed seen to be more convenient for traveling or loan condition reports, some survey work, memos, and supplemental notes. The nearly universal use of digital methods makes the small amount of analog material manageable. However, if portable digital tablet devices became broadly affordable, many would adopt them; several conservators have begun experimentation in this area. Thus, most users are still “hybrid,” although the dynamic of using and creating more digital documentation appears inexorable.

The biggest analog-to-digital shift can be seen in image production: 98% of respondents employ digital imaging (including ultraviolet and infrared photography) though 66% still use color hardcopies (predominantly print-outs of digital photographs). These figures naturally reflect the general shift in the photographic industry toward digital as well as hybrid working methods and the continuing practicality of hard copy images for conservation practice. The study suggests that at this stage, the management of digital images is proving to be both the most difficult and the most neglected aspect of conservation documentation. However, owing to the prevalence of digital images and the urgency of finding solutions for their management, many practitioners are creating their own (albeit non-standardized) methods or systems for their management.
4. Archiving/Backing-up Information

Most respondents back-up their digital data. Sixty-six percent do so by printing it out or having it copied onto a back-up server by an IT department. Most do both: 40% back-up daily, 21% weekly. However, 25% did not know whether or how their material was being backed up. Almost half (101) of the 206 respondents digitize legacy documentation. Of these, 20% digitize systematically, 62% digitize opportunistically, and 18% do both coincident with other activities such as publications, lectures, or requests to share information with colleagues. Virtually all of the 206 respondents keep original material, but there was wide disparity in preservation practice, from professional archiving in climate-controlled environments, to “the file cabinet next to my desk.” One-quarter of those who do not digitize legacy material responded that they would digitize all materials were funds available; half would do so selectively. Even though the question was not posed in the survey, one-third of those who were digitizing legacy material volunteered that they would digitize all of their material if they had the funds.

5. Management of Conservation Documentation

A primary requirement for a digital documentation system is the capacity to manage all the information that is generated by conservation, preservation, and scientific activities, including texts of examination records, treatment reports, analytical results, and accompanying images in digital format. No single system currently exists that can successfully accommodate the full scope of requirements for the broad range of media and institutional workflows represented by the entire conservation profession. However, the survey responses captured a representative overview of software solutions currently employed to try to meet individual needs, including collection management systems (CMS’s) as well as other commercial and non-commercial software. Such solutions are outlined below.

6. Collection Management Systems (CMS’s)

Many museums, cultural institutions, and private conservators are seeking effective means to integrate conservation documentation into their existing CMS, which is likely to use established data structures and to be fully supported. Many conservators and scientists also rely on a CMS to supply object information such as date, country of origin,
and history. Integration of the two systems also clearly facilitates access to and the addition of new information regarding media, loans, exhibition history, environmental requirements, and storage.

Sixty-two percent (101) of the respondents with a CMS actively use the conservation module but the method (and to what degree) was not parsed by the survey. Many conservators and scientists reference data in the CMS as part of their daily work but do not necessarily use it to document their work. However, 66% of the 101 respondents who actively use the conservation module of their CMS in some manner, and 70% of all respondents, use additional word processing and data management software to create and manage their documentation. Just over 38% of all respondents reported using the comparatively new digital asset management (DAM) systems to handle images and associated metadata.

The Museum System (TMS)
Among the survey cohort, The Museum System is the most extensively used CMS for the management of conservation documentation: 45 of the respondents actively use it, half in combination with additional software (including FilemakerPro, Microsoft Word, Excel, Access, Adobe products, and various scientific analytical software). The data illustrates that only through combining software tools is it possible to achieve the required functionality for organization, word processing, image manipulation, and scientific data processing.

In the dialectic between consistency and standardization on one side and flexibility and responsiveness on the other, many respondents described “wrestling with TMS,” describing a “non-intuitive interface” and a system that is difficult to customize in such a way as to obtain the forms and reports that individual departments, disciplines and museums require. Some respondents have been able (with significant resources) to customize fields and screens, whereas others have found the system difficult or impossible to change.

Of the few institutions reporting high satisfaction with the capabilities of TMS, two stand out. The Brooklyn Museum of Art’s conservation department, in close collaboration with an IT specialist, has (within the last two years) adapted TMS to their working methods in
such a way as to generate their examination and treatment reports, as well as to store and reference them without the use of additional software. The Museum of Fine Arts, Boston, through major investments of staff resources and a commitment to a unified enterprise, has developed a suite of modules, supported by Microsoft Access, Word, and Excel, that bring a large body of conservation documentation into TMS both to manage conservation documentation and to allow its use by other museum departments.

**Other Commercial Systems**

More than 10 other commercial systems were identified, but not strongly differentiated in the survey responses. KE EMu is the next most actively used system after TMS, with ten respondents (at eight institutions); three of the eight were preparing to actively use it for conservation purposes at the time of the survey. Many existing CMS products include a section or module entitled “conservation,” however, few were designed or developed within institutions for this purpose, creating frustration among conservators and scientists as they attempt to “shoehorn” their documentation into an inhospitable system. KE Software (makers of KE EMu software) recognized this problem in 2006 by establishing a small working group of conservators, charged with producing a universal template that could then be customized easily by individual museums, depending on their needs. Most of these new modules had not been implemented by the time of the survey, so results could not be broadly gauged. The one active user, however, reported positive results. Five participants reported using MultiMIMSY, though for some this was recently purchased or still being implemented so the capabilities were unclear at the time of the survey. Others reported it “cumbersome” or having “limited flexibility,” but one conservator found it easy to configure and was impressed that “all information about an object (curatorial, conservation, transit, loans, registration, provenance, etc.) could be accessed on the same database and searched by unique number.”

**Non-commercial CMS’s**

Non-commercial collection management systems are used by 15 respondents for conservation purposes. Some are robust legacy systems built by larger institutions before commercial systems were available. Notable here is the British Museum’s Merlin, used, with some drawbacks, by all conservators and curators. Merlin is currently in active development (under a Mellon pilot grant) to ensure the creation and smooth integration of the Conservation Merlin database and a Scientific Access database. Owing to budgetary
constraints, the Art Institute of Chicago’s CITI CMS (established in 1992, with substantial upgrades every few years) still does not possess the functionality and interweaving of conservation documentation that would provide the centralized repository of information required by conservators and scientists.

7. Other Software and Systems

Three-quarters of respondents use software for conservation documentation (whether commercial or non-commercial that is independent from whatever CMS their institution uses. In many cases, a high proportion of reporting, organizing, and sequencing data is accomplished with ancillary software applications, with results – in full or in summary form – entered into the CMS, for use by appropriate museum staff and to enhance the museum’s objects records. Some institutions, notably the Philadelphia Museum of Art and the Harvard University Art Museums, have developed separate software applications that can utilize data already entered in TMS and that emphasize robust workflow tracking and reporting capabilities. Some survey participants reported the emphasis on workflow comes at the expense of ease of use by the conservators and scientists when entering information and writing reports. However, both of these systems are under review with plans to address some of these issues.

Of the seven conservation documentation systems built by outside developers, two are of particular interest for their scope and ambition. The Museum of Fine Arts, Houston, is at an early stage of developing a new open-source system for conservation documentation under the guidance of an international advisory committee and with support from the Institute of Museum and Library Services (IMLS). The Philadelphia Museum of Art’s established “Conservation Tracker” system, designed as a freestanding complement to TMS, is used to assemble documents, images, and information, to track projects, create a variety of specialized reports, and provide thorough conservation documentation material linked to TMS for use by other museum departments.

8. Conclusions

In general, commercial non-CMS products have been vital in the development and advancement of digital conservation documentation and have made the sometimes mandated or desired use of a CMS possible. They offer flexible solutions that address the
needs of specific departments and disciplines. However, there are still limitations in marrying good database principles with all the needs of conservation documentation. For example, only half of those respondents using additional non-CMS software are able to “edit, annotate or comment on imported documents or images.” Many products offer flexibility, but they can rarely achieve an overall integration of functions and capabilities with those of other museum departments.

Seventeen survey respondents indicated that they were “very satisfied” with the overall performance of their conservation documentation system; 10 were also “very satisfied” with three other measures: their abilities to retrieve and use text-based documents, image-based documents and to generate reports. These results represent 5% of the 206 respondents. The fact that only 5-8% of the respondents were “very satisfied” demonstrates that much work remains to be done to provide robust tools that successfully meet the user requirements of the profession. This also explains why so many methods are being employed or developed. As the digital “steamroller” continues, there is a great deal of experimentation and research underway which must take into account the complexity of the information, the variability of the work, institutional and professional culture, skill sets, and resources of the users, as well as the need to balance the plusses and minuses of commercial, non-commercial, and open source solutions.

While most survey respondents are looking for a shared enterprise solution to help in managing documentation and related workflow, it is apparent (and should be stressed) that conservators and scientists working in different disciplines and in different museum or institutional structures have different documentation needs. The frustration expressed by respondents with existing tools (in particular with CMS’s that are widely installed and have become the application of choice for nearly all other documentation of works and collections) reflects the desire to increase digital activity in an environment that increasingly favors greater access to and interchange of information. One participant accurately summed up this conflict: “individual solutions created within local conservation departments meet the needs of those conservators more precisely than might be possible with a standardized solution. However, the drawback of a lack of integration and common standards among individual departments is rapid obsolescence, endangerment of the data contained in the systems and, in the case of many homegrown database designs, poor understanding and execution of database design principles.” In the
concise analysis of a participating scientist, “we need a unified system that would actually allow us to display and manipulate data and text information without having to resort to multiple programs.”

While several of these systems are too specific or customized to be adopted wholesale, the examples of the Brooklyn Museum of Art, the Museum of Fine Arts, Boston and the Philadelphia Museum of Art provide important models for the field. The British Museum’s Merlin system, currently undergoing considerable redevelopment also serves as an important example. Common to each is an institutional understanding of the impact that well-documented and integrated conservation information has on the quality and depth of a museum’s knowledge about its collections.

It is clear from the survey results and from supplemental in-depth information gathered from selected institutions (see Appendix A) that the most successful digital conservation documentation systems are flexibly designed, usually with significant input from conservators and scientists, have strong technical support, and have dedicated funding and staffing. Not only does a smart, flexible, and standards-based conservation documentation system have implications for individual practitioners, conservation departments (or a collection of units within a larger department), it could also broadly affect institutional practice, the conservation field, and, eventually, the general public’s understanding of conservation and technical study.
II. INSTITUTIONAL INFORMATION

A total of 206 respondents completed the survey.¹ They represented 156 institutions in 15 countries (see Figure 1 for distribution). The large majority of participating institutions are museums, 19 are libraries (all in the U.S., except for the British Library), and 15 are private companies, all based in the U.S.

1. Staffing

Conservation departments and units represented ranged in size from one to over 100 staff.² Taking into account the overlap of figures given by respondents from the same institution, and the possible inexactness of estimates, the numbers offered below, Figure 2 serves as a rough guide to the pattern of human resources available in conservation and science departments.

Within these 156 institutions, some 1,031 full-time conservators or scientists work as part of a workforce of 2,341 full and part-time staff, fellows and interns. The median number of staff overall is seven, and all but six institutions have at least one full-time conservator. The 11 conservation science departments reported a range of between one and 20 full-time scientists, also with a median of seven.

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¹ Twenty-one partially-completed surveys were also submitted. Results from these surveys have occasionally been included and are clearly marked.

² Those institutions with total conservation staff of more than 50, include the British Library, the British Museum, the Metropolitan Museum of Art, the National Gallery of Art, the Smithsonian Institution's Museum Conservation Institute and the Tate Gallery.
2. Specializations

While 14 (6%) of respondents indicated that their institution had 10 or more areas of specialization, most had two or three. These were most likely to be Books and Paper (60%), Objects and Sculpture (55%), or Paintings (40%). Beyond these, other specializations mentioned included Ethnography (9) and Frames (5).
III. Documentation and Digitization

1. Digital versus Analog Documentation

a) Text-Based Documentation

Virtually all respondents (205) use some form of digital text to document their conservation activities: 159 (77%) use free-text word processing and 154 (75%) enter data into a spreadsheet or database. Half use both digital text and data entry.

While virtually everyone uses some form of digital documentation, two-thirds use an analog method. Just over half of all respondents (51%) use free-text, manual entry (i.e. paper-and-pencil), while just under half (48%) use a paper form with text and pre-defined fields. Forms with only checkboxes and no space for comments (PF2 in Figure 6), were used by just 10% of survey respondents.

![Figure 5: Users of Digital Text-Based Documentation](image)

![Figure 6: Users of Paper-Based Documentation](image)
The average ratio of analog to digital text-based documentation material among the respondents was 27% to 73%. Thirty-seven (18%) were all-digital; only one department was all-analog.

With currently available technology and systems, paper-and-pencil still has its place. For making loan condition reports, typically at a remote location, handwritten notes on a paper pad or a computer-generated paper form remains the most practical method to record observations. Similarly, for large surveys, checkboxes on a printed form may be more appropriate. Examples of this practice included: the Düsseldorf Restaurierungszentrum, where “[loan] condition reports for incoming works (for temporary exhibitions) [are] currently on paper, but all reports for works owned by the Düsseldorf museums are in TMS;” the Indianapolis Museum of Art, which uses “paper forms with text and pre-defined fields only for survey work;” and the Phillips Collection, which uses “a paper form for traveling condition reports.”

At the Metropolitan Museum of Art, where 95% of current text documentation in Photography Conservation, is in digital form, “free-text outside of the database is more for additional information such as memos or notes, while the main recording is done by direct digital entry into the database.” In Paper Conservation, “handwritten forms [are used only] for loan condition reports (not related to conservation treatment), [while] free-text digital entry into a FileMaker Pro database is done for examination and treatment reports.” In Paintings Conservation, paper forms with pre-defined text, are “used for loan check forms and exhibition condition check forms.” It was similarly noted in Objects

<table>
<thead>
<tr>
<th>TEXT-BASED DOCUMENTATION (Analog &amp; Digital)</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free-text, manual (i.e., paper and pencil)</td>
<td>106</td>
<td>51%</td>
</tr>
<tr>
<td>Paper form with text and pre-defined fields</td>
<td>100</td>
<td>48%</td>
</tr>
<tr>
<td>Paper form with only check boxes</td>
<td>21</td>
<td>10%</td>
</tr>
<tr>
<td>Digital text, (Word, PDF documents)</td>
<td>159</td>
<td>77%</td>
</tr>
<tr>
<td>Direct digital entry into spreadsheet or database</td>
<td>154</td>
<td>75%</td>
</tr>
<tr>
<td>Both Digital Text &amp; Digital Entry</td>
<td>107</td>
<td>52%</td>
</tr>
<tr>
<td>Only Digital</td>
<td>58</td>
<td>28%</td>
</tr>
</tbody>
</table>

*Figure 7: Respondents Using Different Forms of Text-Based Documentation*
Conservation that free-text, manual analog documentation was only used for outgoing loans.

Most institutions typically convert handwritten notes into digital form, usually by typing a selection of those notes into a computer. Most, 82 (or 40%), convert “some” of their current analog documentation into digital form (25% convert all or almost all of it; 20% converted none – and for 13% this was not applicable). Staff at the Midwest Art Conservation Center commented that they “generally use free text for on-site work, which is then transferred [to digital text] and expanded upon for finished reports.” Similarly, the Field Museum uses almost all forms (paper and digital) “to generate data, depending on the format of the project. Most data are subsequently typed into the conservation records database or archived as digital files,” resulting in a final tally of 5% of documentation in analog form and 95% in digital. The Barnes Collection completed its collection survey using pencil-and-paper, elements of which were then transferred to TMS.

Many institutions are still in the early stages of capturing documentation information in digital form. Australia’s Artlab, while documenting material in all formats (with a current 80:20 split) and converting “some” analog into digital, notes that material is “often hybrid (i.e. print and digital),” as they “increasingly move more to digital.” Others, however, have a determination to digitize as fast as they can: while “there may still be paper and pencil used, it is discouraged and officially converted into digital” (Victoria & Albert Museum).

b) Image-Based Documentation

The form of analog image-based documentation most used by far is prints of color photographs, including print-outs of digital photographs. Such prints are used by two-thirds (67%) of respondents, while 38% use slides or transparencies, and 20% use silver gelatin black-and-white photographs (see Figure 8 for summaries of the use of analog image formats). In comments, five respondents added digital micrography to the mix of formats used (which some may have considered equivalent to color photographs). Overall, most respondents remarked on the shift to digital image documentation, which can be seen in comparing Figures 8 and 9.
While color photography is the most common of analog outputs (used by 67%), digital photography is not only the most common format for digital image output, it is virtually universal. With 202 (98%) users, digital photography vies only with digital text (with 205 users) as a universal medium. It is used by far more staff than use analog color photographs (137, or 67%), even though that figure includes hard-copy print-outs of digital photographs. While digital analytical equipment output surpassed analog analytical equipment output (analog, 34%; digital, 46%) and digital infrared reflectograms were overtaking analog infrared analysis (analog, 21%; digital, 25%), digital x-radiographs were not yet well established (analog, 42%; digital, 16%).
The figure for analog color photographs is somewhat inflated as it includes digital photographs that are printed out. Such print-outs are common for two reasons. First, because the typical CMS does not enable the digital annotation of images, many conservation staff print images in order to add comments to them. However, there are experiments in using digital annotation, such as one by a research scholar at the Metropolitan Museum using PDF images. Others are using some of the simple tools that come with MS word programs or Adobe Photoshop.

The second reason for a high print-out rate of digital photographs is that until the American Institute for Conservation of Historic and Artistic Works (AIC) published its *AIC Guide to Digital Photography and Conservation Documentation*, in 2008, there have been no profession-wide standards in the US for digital photograph documentation. Thus, images have been printed out and filed as a way of maintaining standards without worrying about digital protocols.

Overall, 23% of image-based documentation was in analog form and 77% was in digital form, showing a slightly higher shift to digital in images than for text (which stood at 27:72).

### 2. Digitization of Legacy Documents

a) *Current Practice*

All the above information concerns current documentation. When it comes to actively digitizing text- or image-based scientific or conservation documentation from the past, respondents were remarkably evenly split. One-hundred-and-one (49%) digitized text or image-based scientific or conservation documentation from the past, while 98 (48%) did not, with seven not knowing. Of the 101 who did so, 37% did it systematically, while 80% did it occasionally (and 18% did both).

Comments on practice ranged from model statements to those reflecting very real constraints. The Arizona State Museum, for example, digitizes legacy material, “to provide both the archived original, as well as a searchable digital copy, [which] maintains continuity in records and provides a more complete record of treatments and analysis conducted on the museum's collections,” and the Opificio delle Pietre Dure does so, “to
ease research in the archives; and to allow sharing with the learned public (i.e. scholars, students, etc.).”

Universal limitations of staff, time and resources are frequently met by acting more opportunistically: “analog legacy documentation is only digitized when an object is the subject of a current curatorial or conservation research project or exhibition” (Cooper-Hewitt); and, “We would like to do more to get all documentation into digital format, but the present workloads and ambitious exhibition and loan programs prohibit retroactive reformatting with our limited staff” (Getty Research Institute). At the Metropolitan Museum, “slides are scanned and saved digitally” (Paper); “selective digitization of material is carried out as needed: for specific projects, lectures, publications, sharing with colleagues” (Paintings); and “as objects come up for conservation, past treatments and images in analog records are digitized” (Objects).

University College, London, recognizes how grants can help systematized legacy digitization, although only up to a point: “A grant-funded project enabled the majority of our conservation treatment records to be digitized in 2002-3. However, many other conservation records remain in analog format. These are occasionally digitized with the help of volunteers but we have no regular program in place for this at the moment.”

The Philadelphia Museum of Art systematically digitizes image-based documentation (for example, all color slides are being scanned), but its digitization of text-based documentation is rather more “episodic.” A considerable amount of OCR scanning of reports was done for an earlier database and staff anticipates more PDF scanning of printed and handwritten object file contents for their new “Tracker” database. The scans would be stored outside the database but would be accessible from within the database by accession number.

b). Preservation of Original Documents.

Of the 101 who digitize legacy documents, only three did not keep the originals. Including the two who did not know whether material was kept and preserved or not, this leaves 94 who do keep and preserve original documents.
How are documents being preserved and what is the general level of cooperation with archivists or librarians? The selected comments below reflect the range of current practice, from returning material to file folders in desk drawers to sending it off for professional conservation and archiving.

- I archive the originals myself in a filing cabinet next to my desk.
- Paper files and images continue to be stored in filing cabinets as they have been since they were generated.
- Of course they are preserved; but not in an archival manner since there are NO resources for this.
- All the analog records are still being kept in the original filing system; preservation storage remains in the conservation lab at this time but future collaboration with the archivist and librarian has been discussed.
- While there has been no direct collaboration with the museum archivist in the past, I understand that they are engaged in a project to assess file storage and archiving throughout the museum and that the conservation department will be included.
- Our recently established archive has resulted in a new order that now calls for a general records management plan.
- Negatives are placed in cold storage for x-radiographic material. I am not for sure about color transparencies or black-and-white negatives that may or may not have been digitized.
- We are in the process of trying to establish a custom built archive centre for the storage and exploitation of conservation and related records.
- All digitally-produced text is printed out, filed with appropriate treatment documentation and stored in archival materials in a climate controlled storage facility.
- We do have a museum archivist. Object related documentation is held both in conservation and in a central museum documentation file, which is archival.
c) Legacy Digitization Planning
If resources became available, the majority of those not currently digitizing legacy documentation would do so. One-quarter replied that they would want to digitize all such material, should resources become available, and a further 40% said they would want to selectively digitize some legacy material; 26% said that even with additional resources, digitization of legacy material would not be a high priority; and just 5% said they would not want to digitize any legacy material.

Although they were not asked the question, 31 of the 101 who had digitized some of their legacy material said that if they had the resources they would want to digitize all their remaining legacy material and one volunteered that they would want to selectively digitize a greater amount of legacy material.

3. Backing Up
a) Methods and Formats
Overall, two-thirds of respondents said that their digital documentation was backed up by their Information Technology (IT) department (67%) and was printed out onto paper (64%). Almost all of those who did one of these did the other. The number being backed up by IT corresponds closely to the number of those having access to an IT department (140). Just over half (117, or 57%) backed up onto a departmental hard drive, while over one-third, 81 (39%), backed up onto CDs and 44 (21%) onto DVDs. Of the 133 backing

![Figure 10: Comparison of Back-Up Methods for Digital Documentation](image)

Ten respondents (5%) reported backing up using all formats discussed. Of the 40 (20%) who backed up using only one method, only three printed out only onto paper; 24 were backed up by their IT department, 13 used their departmental hard drive, two used CDs and none backed up onto DVDs.

b) Frequency

Almost two-thirds backed up daily or weekly (see Figure 12), but a surprising number (53, or 26%) indicated they did not know how or how often their data was backed up. Others had variable schedules and protocols, although generally those with IT departments backed up daily (“some back-ups are daily (network), others (hard drives) are on a random basis;” “while data stored to IT servers is backed up daily, individual spectra may not be backed up more than once a week;” “backup varies widely by lab and by individual within the lab. There is no common routine employed”).

### Figure 12: Frequency of Back-ups

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Daily</th>
<th>Weekly</th>
<th>Bi-Weekly</th>
<th>Monthly</th>
<th>Other/Variable</th>
<th>Don’t Know</th>
<th>No Answer</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>84</td>
<td>43</td>
<td>3</td>
<td>5</td>
<td>16</td>
<td>53</td>
<td>2</td>
<td>206</td>
</tr>
<tr>
<td>Percentage</td>
<td>41%</td>
<td>21%</td>
<td>1%</td>
<td>2%</td>
<td>8%</td>
<td>26%</td>
<td>1%</td>
<td>-</td>
</tr>
</tbody>
</table>
**IV. DIGITAL ASSET MANAGEMENT SYSTEMS**

Collections Management Systems until recently have not been able to manage images successfully. Images are often managed separately, sometimes accessed by a link from the CMS. Increasingly, institutions are adopting sophisticated Digital Asset Management systems (DAMs) to manage digital images and other materials. Of the 206 respondents, 79 (38%) said they had such a system (i.e. a digital image or media database), 82 (39%) said they did not, and 43 (21%) didn’t know.

Systems claimed as DAMs range from sophisticated, commercial asset management systems, through in-house systems, to simpler databases that keep track of images.

Of the more sophisticated systems

- **Interwoven’s MediaBin** is used at the Australian War Memorial (where an in-house DAM system is still being used until MediaBin is fully deployed), the Indianapolis Museum of Art, the Metropolitan Museum of Art and the San Francisco Museum of Modern Art.

- **Open Text Corporation’s Artesia TEAMS** is used across the Getty (Getty Museum, Research Institute and Conservation Institute) and the Smithsonian Institution (including the National Museum of the American Indian, the Archives and the Museum Conservation Institute, but not yet by the Smithsonian American Art Museum) and by the Museum of Fine Arts, Boston.

- **Extensis Portfolio** is used by five: the Autry National Center of the American West; the National Center for Preservation Technology and Training, the National Gallery (UK) (“Extensis, Amaxis and custom made systems”); and The National Gallery of Art (US) (“a temporary solution while the institution plans for the implementation of an enterprise DAMS; it is not implemented outside of the institutional imaging department”).

- **ContentDM** is used by the Georgia Archives and the Glenbow Museum.

- **Luna Insight** is used by the Brooklyn Museum (“although not up and running yet”) and the Toledo Museum of Art.
**DSpace** is used by MIT Libraries and Johns Hopkins University - Sheridan Libraries.

**MediaBeacon** is used by the Guggenheim.

Microsoft Access and FileMaker Pro are used either directly or as the basis for in-house digital asset management systems:

- **Access** is used by the Conservation Centre Vejle, Denmark (“Access database made for the purpose”) and by the Hamilton Kerr Institute at the Fitzwilliam Museum, Cambridge University, (“using an in-house custom design...with an interest in integrating with the University’s DAM”); and

- **FileMaker** is used by the Syracuse University Library and by hudson+salah art conservation studios (“FileMaker with custom formats, IView media Pro, and Adobe Lightroom”).

Lastly there are a number of in-house systems including those built for:

- Victoria & Albert Museum (VADAR)
- National Museum of Iceland (Sarpur)
- University of the Arts, London
- Tate Gallery (“We use Ibase manager, a system to capture images internally and externally for the web-site. It has the capacity but we do not use it as a full digital assets management system at this moment. It is still in development.”)
- Emory University Library (“An in-house system called Digital Masters Database”)
- Harvard University Art Museums (“use several, designed in-house”)

Several claimed their CMS also contained and managed images: CITI (The Art Institute of Chicago), TMS (Museum of Fine Arts, Boston), and MuseumPlus (the Doerner Institut’s, Zetcom, Switzerland), which “provides a link for access to digital images or media.”
V. COLLECTIONS MANAGEMENT SYSTEMS

1. Introduction

Four-fifths of survey respondents work for institutions that own or license a Collections Management System. A CMS is a sophisticated database, designed specifically for museums and capable of pulling together the many strands of information on the history and current state of a given artwork and its relationships with other works, as well as information and workflow for exhibitions, loans and many daily activities such as photography, crating and storage. Ideally, the documentation of scientific analysis and conservation treatment of works should be an integral part of the CMS record of any work. However, the specific, detailed information required by conservators, and produced by them in the treatment of works, is often not easily integrated with the requirements of registrars, collections managers and curators, whose use of a CMS is most intense and whose requirements historically have shaped most existing systems. Conservators often do rely upon a CMS for information on works, including artist and object history. It can also be a useful interface for conservators to add and verify information on media, environmental requirements, and loan and exhibition history.

All but 6% of survey participants whose institutions have a CMS, have some degree of access to it. Just over half have access to some parts, while almost 40% can access all of their institution’s CMS.

Most collections management systems have specialized modules for managing specialized data and carrying the core of that data into the main body of the system. Four-fifths of respondents with a CMS have a section designed for scientific or conservation documentation and 101 (76% of those whose institutions had a CMS and 49% of the total survey respondents).

2. Commercial Systems

Four-fifths of the systems used are commercial. The most popular is The Museum System (TMS). In the survey, it was claimed by 34% of all respondents and by 43% of those whose institutions license a CMS. TMS was followed by KE EMu, MultiMIMSY and 18 other systems. Non-commercial, in-house systems were used by only 33 institutions.
(16%). Figure 13 shows the overall picture of CMS ownership: the 21% who do not own or lease a CMS, or who don’t know; the 16% that own non-commercial systems and the 63% that use a commercial system.

Figure 14 shows in greater detail the distribution of individual commercial systems among the institutions that own or lease a CMS. Other commercial systems used include: Argus (6), EmBark (4), Adlib (2), PastPerfect (2), Re:Discovery (2), Conservation Data Systems CDS (3), Ex Libris’ Aleph Integrated Catalog (2), MuseumPlus (2), SIRSI Dynix (2), and Vernon (2). Others with single users included ANCS+, Mint, Modus Operandi, Prime, Specify 6.0, STAR, and TRIMContext.

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**Figure 13: Overall Share of the Collections Management Systems Landscape**

**Figure 14: Collections Management Systems Used by Respondents’ Institutions**
Readers should note that 22 staff from 19 libraries responded to the survey (14 university libraries, two major public libraries, two private libraries, and the Smithsonian Libraries). Most use turn-key library systems for cataloging and library services, and commercial applications, such as FileMaker Pro, to track other collection activities: conservation, imaging, exhibitions, etc. Libraries' growing interest in managing unique objects in

<table>
<thead>
<tr>
<th>Name of CMS</th>
<th>Numbers</th>
<th>% of all Respondents</th>
<th>% of those with a CMS</th>
<th>Access: All</th>
<th>Access: Some</th>
<th>Access: None</th>
<th>Have a Conservation Section</th>
<th>Actively Use</th>
<th>Use Other Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMS</td>
<td>70</td>
<td>34%</td>
<td>43%</td>
<td>19</td>
<td>47</td>
<td>4</td>
<td>55</td>
<td>45</td>
<td>42</td>
</tr>
<tr>
<td>Non-commercial</td>
<td>33</td>
<td>16%</td>
<td>20%</td>
<td>14</td>
<td>14</td>
<td>5</td>
<td>22</td>
<td>15</td>
<td>32</td>
</tr>
<tr>
<td>KE EMu</td>
<td>14</td>
<td>7%</td>
<td>9%</td>
<td>6</td>
<td>8</td>
<td>0</td>
<td>14</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>MultiMIMSY</td>
<td>11</td>
<td>5%</td>
<td>7%</td>
<td>5</td>
<td>6</td>
<td>0</td>
<td>11</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Other Commercial (single users)</td>
<td>8</td>
<td>4%</td>
<td>5%</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Argus</td>
<td>6</td>
<td>3%</td>
<td>4%</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>6</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>EmBark</td>
<td>4</td>
<td>2%</td>
<td>2%</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Conservation Data Systems (CDS)</td>
<td>3</td>
<td>1%</td>
<td>2%</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>AdLib</td>
<td>2</td>
<td>1%</td>
<td>1%</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>PastPerfect</td>
<td>2</td>
<td>1%</td>
<td>1%</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>ExLibris Aleph</td>
<td>2</td>
<td>1%</td>
<td>1%</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Museum Plus</td>
<td>2</td>
<td>1%</td>
<td>1%</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Re:Discovery</td>
<td>2</td>
<td>1%</td>
<td>1%</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>SIRSI Dynix (library catalog)</td>
<td>2</td>
<td>1%</td>
<td>1%</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Vernon</td>
<td>2</td>
<td>1%</td>
<td>1%</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>163</td>
<td>100%</td>
<td>63</td>
<td>90</td>
<td>10</td>
<td>130</td>
<td>101</td>
<td>115</td>
<td></td>
</tr>
<tr>
<td>Don't Know</td>
<td>8</td>
<td>4%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>No Answer</td>
<td>3</td>
<td>1%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>32</td>
<td>16%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>206</td>
<td>100%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>142</td>
</tr>
</tbody>
</table>

*Figure 15: Comparisons of Use and Access among Collection Management Systems*
special collections brings them close to museums' interest in developing more sophisticated applications for conservation documentation.

The Museum System (TMS)

Of the 70 respondents at the 39 institutions that have TMS, 55 agreed there was a section intended or designed for scientific or conservation documentation, and 45 said they used it for conservation documentation. Of these, 14 used it extensively across their department or unit, 12 used it “widely - by some conservation/science departments or specialties,” seven used it in “limited” ways, ten used it in “very limited” ways, and two did not respond. For these users, conservation documentation was represented as above in Figure 16. For a comparison of TMS against other formats in detail, see Figure 17.

Only a few were satisfied with TMS as a conservation management system. Of the 45 actively using TMS for conservation purposes, four reported being “very satisfied.” Of the four, The Brooklyn Museum stands out for not using any supplemental software; its Conservation Department uses TMS Conservation Records actively throughout the museum. In 2007, the department transitioned out of three separate FileMaker databases established in 1990 (for paper, objects, and paintings departments) alongside a separate

<table>
<thead>
<tr>
<th>Conservation Documentation Represented</th>
<th>Number of Active TMS Users</th>
<th>Percentage of Active TMS Users</th>
<th>Percentage of all other CMS Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>As summary information in limited text boxes</td>
<td>27</td>
<td>60%</td>
<td>73%</td>
</tr>
<tr>
<td>As full records in unlimited text boxes</td>
<td>18</td>
<td>40%</td>
<td>61%</td>
</tr>
<tr>
<td>In fields, defined by the system, that you can change</td>
<td>25</td>
<td>55%</td>
<td>55%</td>
</tr>
<tr>
<td>In fields, defined by the system, that you cannot change</td>
<td>29</td>
<td>64%</td>
<td>61%</td>
</tr>
<tr>
<td>As imported Word documents</td>
<td>19</td>
<td>42%</td>
<td>46%</td>
</tr>
<tr>
<td>As imported Excel documents (or other spreadsheets)</td>
<td>9</td>
<td>20%</td>
<td>27%</td>
</tr>
<tr>
<td>As imported PDFs</td>
<td>16</td>
<td>36%</td>
<td>30%</td>
</tr>
<tr>
<td>As other imported documents</td>
<td>9</td>
<td>20%</td>
<td>25%</td>
</tr>
</tbody>
</table>

*Figure 16: How Conservation Documentation appears in TMS Compared with all other Collections Management Systems Represented.*
database of images (not linked to the Filemaker databases). A clear goal was established: to create a single, integrated database for collections information, conservation data and images, that would be completely accessible to all staff across the museum, and that would streamline workflow through the use of a data dictionary and standard templates, eliminating duplicate data entry. Working from historic conservation reports going back to the 1930s, and using the different data and data models from the three departments, staff identified appropriate target TMS fields, renamed some fields and so customized the system that today the museum has already achieved its goals. Today the head of the department is “very” satisfied with the system’s ability to retrieve text documents and image-based files, and produce survey, examination, treatment, load and analytical reports, with which they are “very” satisfied. The system is used mostly to record and archive completed analysis/treatments and also to document the collection’s condition. The whole process has been helped along by a dedicated records manager who works exclusively with TMS.

The other stand-out is the Museum of Fine Arts, Boston, which has invested significant funds and staffing into making TMS work for their conservation needs. Conservation staff have variable access to the different TMS modules, as explained by the Head of Collections Management, who also oversees the conservation department: “Research access is granted by departments. For instance, only the registrar sees the shipping records, many users do not need to see the Loan records to do their job. Everyone can see the records in the objects, exhibition, bibliography, sites, and events modules; but not everyone sees all data in all modules. For instance, values and curatorial remarks are restricted.” Museum staff have developed their own suite of plug-in modules from non-commercial software to use with TMS to add extra material, functionalities and a number of survey-specific fields, stored in separate tables but linked to the TMS system. Access and Excel are used extensively to get material into the system and to add functionality that give conservation staff require. Conservation Science uses a separate FileMaker Pro-based database independent of TMS. The process of conservation documentation overall requires extensive staff support, including a group of excellent report writers who, working with capacious Crystal Report capabilities, generating many kinds of reports. Overall, conservation staff are most pleased with their “ability to link images and other file types to conservation documentation” and in the future most want to improve the layout of the system. For a more detailed report, see Appendix A.
The **Barnes Collection**, also uses TMS with no other software. Conservators at the Barnes began with a manual survey of the collection, writing out reports on pre-printed forms. Each form included an image of the object, annotated by the conservator. The hard-copy forms were filed in binders; basic information on objects was entered into TMS, with the detailed forms cited, but not transcribed. Barnes staff found entering information difficult because of what they found to be the inflexible nature of TMS fields and screens. For example, conservation treatment information was placed in the “Remarks” field on the Survey screen. Also, because TMS cannot link related documents in a pre-determined “workflow-related” sequence, Barnes staff adopted file-naming conventions using alphabetical sorting to get conservation files to appear in the correct sequence.

While the successful cataloging and representation of conservation processes is still a continuing issue for the conservators, the Barnes Archives found TMS very amenable to cataloging its collection of Barnes letters and manuscripts and linking them to scanned representations of the objects in the collections. Archives now has an extensive set of finding aids, many connected to object images, accessible via TMS and increasingly available online via e-Museum. The Barnes has had great success, working in TMS, in linking and cross-referencing archival and art-object information. For example, within TMS, the record for an Egyptian statuette may be linked with the record for the correspondence documenting the provenance of the object. In this application, TMS has been used very successfully by the archivist, reflecting not only many years of planning and hard work but also the successes of TMS for finite parameter work, where some minor changes to TMS can make it a useful tool.

Unlike the Brooklyn Museum and the Museum of Fine Arts, Boston, where there is strong, unified use of TMS by all conservation staff, most institutions had mixed responses from different conservation units, with typically partial, unintegrated use of the system. Examples among many include the Freer Gallery, the Metropolitan Museum of Art, the Museum of Modern Art, and the National Gallery of Art.

At the **Freer**, while a registrar considered TMS to be used widely, a painting conservator reported that the conservation module “has had limited use over the past eight years, with
basic conservation information added sporadically.” Several object survey interfaces have been developed to facilitate data input for the database, partly “to make object data more readily available to curatorial and collections management.” Other software (MS Word, FileMaker, Access, and the proprietary scientific instrument software) is widely used but all software functions separately and overall the institution is only somewhat satisfied with the results (see discussion under section VI. Other Software and Systems).

While the eighteen curatorial departments of the Metropolitan Museum of Art use TMS as an integral part of their workflow, conservation staff use TMS in a less consistent and more varied fashion. The five conservation departments (Objects, Painting, Paper, and Textiles Conservation, together with Scientific Research) and seven conservation laboratories within curatorial departments have access, generally, only to the curatorial sections of TMS related to specific work. Almost all use it to research objects in the collection, and to assess and make recommendations for loans, etc. All use the TMS “tombstone” information on a given work to seed their own, further documentation. In Paper Conservation, staff adds a condition summary to TMS for all new acquisitions, as well as information on recommended light levels, packing, shipping and other environmental factors used by registrars and collection managers for loan decisions and logistics. Some conservators also consult the loan information on works in the TMS.

Each department has a separate system for logging and tracking conservation work and for producing reports. Paper Conservation, for example, has a Filemaker Pro database it has maintained for the last five years, for creation of and detailed management of conservation documentation, which includes thumbnail reference images, masters for which are kept in separate files. Objects Conservation, while atypically using TMS to generate outgoing loan reports, mostly uses a file system using MS Word for documenting its conservation work. The Photography Conservation Department, also with a Filemaker Pro database (which is used “for viewing past records but not to add new information”) is now, exceptionally, using TMS to produce survey, examination, treatment and analytical reports. However, because of the system’s limitations, imaging and image-annotation are still necessarily undertaken separately.

It should be noted that the Metropolitan Museum initiated a 2004 survey of conservators to elicit an understanding of the overall scope of the immense amount of conservation
documentation and cataloging that takes place at this institution. In 2006 this was followed by a Mellon-funded inventory of the conservation documentation associated with three curatorial departments, as a first step towards creating documentation standards and best practices across the museum, especially in relation to format, cataloging and storage of documentation.

The National Gallery of Art is in the middle of a major transition from an earlier CMS to a revised version of TMS, introduced in April 2008. Access was still somewhat limited but is expected to be rolled out to more staff than had access to the earlier CMS. That earlier system, for a conservation scientist, “was not user-friendly and contained little information/documentation relevant to scientific/conservation.” This was echoed by an object conservator, who suspected that the conservation module had not been developed, and “may not be a priority.” While a painting conservator was withholding judgement, a paper conservator felt strongly that “TMS is not adequate for conservation records [and that the] Conservation Division is investigating a different system for our permanent records.” The upshot appears to be that, as a visiting consultant commented, “in examination of the TMS software, conservators felt that it was wholly inadequate for their needs. All documentation is produced currently in the department using standard office productivity software, primarily FileMaker Pro, Microsoft Word and Excel and some proprietary applications tied to scientific instrumentation.” Only one of six respondents to the survey, a textile conservator, thought TMS was being used for conservation purposes, in conjunction with FileMaker Pro, and thought that, “importing information from TMS to our documents will improve speed and accuracy of reporting.” Overall, three were “somewhat,” one, “quite,” and one “not very” satisfied with the whole system. (See further comments under “Commercial Software” in “VI. Other Systems and Software.”)

At the Museum of Modern Art, New York, TMS was available (although conservators had limited access to TMS fields related to “provenance, insurance values, etc.,”) but there was no concerted approach to its use by conservation: one conservator felt she had to make her reports "fit" into the available fields of the conservation module and another declared that TMS “seems complicated. We need training....I don't like the format, the lack of flexibility. It is entirely undeveloped and useless.” Although museum policy states that paper records are the official archival record, narrative documentation has been
produced electronically since 1990, although another commented that, “it is awkward and slow using MS Word.”

Institutions that had TMS but did not attempt to use it for conservation documentation, included Colonial Williamsburg, the Detroit Institute of Arts, the National Gallery, London; the New York Public Library; the North Carolina Museum of Art; the Walters Art Gallery and the Whitney Museum. Comments from these institutions included the following:

- “The conservation facilities…appear insufficient for documentation of complex objects”
- “The TMS module that we have does not have usable conservation fields at this time, [although] integrating conservation documentation into TMS is being examined”
- “Alternative systems are being explored for future use as functionality provided by TMS does not fit expected needs”
- “We are waiting for the DAMS and other support functions, and watching other institutions’ decisions on the topic. Compatibility is an issue internally and externally” and
- “We have yet to determine a format for entry of all the information into the system, given the limited fields.”

Other Commercial Collection Management Systems
Chief of the other commercial collections management systems in place at our respondents’ institutions were KE EMu (14 users) and MultiMIMSY (11). Others included Argus (6), EmBark (4), Conservation Data Systems CDS (3), Adlib (2), PastPerfect (2), Re:Discovery (2), Ex Libris’ Aleph Integrated Catalog (2), MuseumPlus (2), SIRSI Dynix Horizon (2), and Vernon (2). Others, with single users, included ANCS+, Mint, Modus Operandi, Prime, Specify 6.0, STAR, and TRIMContext.
KE EMu
KE EMu is one of the more recently adopted systems. In 2006, KE established a working group of museum conservators to refine the conservation module, including conservators and IT staff from the National Museum of the American Indian (NMAI), United States Holocaust Memorial Museum (USHMM), Winterthur Museum and Gardens, the Field Museum, and the Smithsonian Museum of Natural History. Their charge was to produce a universal template that could then be customized by individual museums, dependent on their needs. Of the 14 respondents at the ten institutions that had KE EMu, 10 (at eight institutions) were actively using it, and others were preparing to use it (Indianapolis, The Smithsonian Institution, USHMM). Unfortunately, the modules had not been implemented by most departments at the time of the survey, and only the NMAI was able to comment.

The National Museum of the American Indian uses the KE EMu conservation module, noting that, “there are other sections that we can add to for materials and parties.” Overall, conservators were “quite” and “very” satisfied with the system, liking the retrievable reports, images and access to catalog information from other departments. The fact that the module could be customized was very attractive: “We can continue to upgrade it in some ways ourselves and with others helping us - such as devising new reports. We can modify in-house and for larger issues, we can modify through the vendor.”

Conservation staff at the Amon Carter Museum use KE EMu extensively, while also using FileMaker Pro for surveying the collection (with data subsequently imported to the CMS). All other documentation is entered directly into the system. Overall, staff were “quite” satisfied with the system.

Seven of the 10 active KE EMu users also used commercial software, but mostly in “very limited” ways; the Minnesota Historical Society used Climate Notebook (non-commercial Windows-based environmental analysis software) and ACR Trend for Windows, for data logger records and reports.
MultiMIMSY
Eleven respondents at nine institutions reported that their institutions had MultiMIMSY. Two had the latest version, Mimsy XG and another was transitioning to TMS. Five respondents had complete access and six had access to some sections. All but one agreed that MultiMIMSY had a conservation or science module. Five respondents actively use it for conservation documentation (the Australian War Memorial and Smith College, “exclusively;” Indiana State Museum, “widely;” Ackland Art Museum, “in limited ways;” and the Autry, in “very limited ways”). Although five conservators at four institutions indicated that they did not use it (Phillips (2), Shelburne Museum, National Museum of American History and the National Maritime Museum), in fact they all did use it for conservation documentation in limited ways.

The Indiana State Museum had not yet fully implemented the MultiMIMSY conservation module (“the decision was made not to link all conservation documentation to CMS because of server issues”). Digital photographs are stored separately in folders, and can be embedded in linkable PDF files “at the conservator’s discretion.” The objects conservator, in a department of just three, though only “somewhat” satisfied with the system so far, is eager to move forward (“I want to be able to create reports....I believe I will be able to archive information and retrieve individual records as well as utilize database applications for multiple records”), but admits “there is limited flexibility in the conservation window. I will need to create a cheat sheet of standard terms that must be incorporated into the text fields to effect database applications.”

The conservator at the Ackland Art Museum, with two part-time assistants, reported that the museum was switching from MultiMIMSY to TMS, “based on the registrar's strong preference.” She commented that she could currently “access and make changes to all parts that are useful to me. It is unclear whether this will be as true if we get TMS. I generate simple examination and treatment reports through MultiMIMSY. Longer reports are generated in Word, then summarized and/or referred to in MultiMIMSY.”

Two conservators at the Phillips Collection had access to some sections of MultiMIMSY, and used it minimally: “to look up location information and accession numbers.” Acknowledging that MultiMIMSY had conservation fields that could be customized, one
commented, “I have not found time to do this nor is it a priority for database management… The database is too limited to warrant the time involved to organize, and we don't currently have authority to input data. Also, I'm not sure if the current system could store the number of images we produce on a regular basis.” Mostly they use MS Word exclusively, feeling frustrated by the lack of support: “It is probably possible to do many of these things, but we do not have the database support personnel in the museum to assist us/teach us to do these reports.”

With access to all of MultiMIMSY, the Head of Paper Conservation at the UK’s National Maritime Museum commented: “I am not aware of the reasons why we don't use it. We don't have a scientific department and we work in collaboration with other national museums or with contract scientists or university departments as required. MultiMIMSY seems to cover our needs at the moment, specially now that is being adjusted to our work structure.” She noted that, “Mimsy has certain flexibility for re-configuring the original conservation documentation section. We are currently working on this.” The department was not using any other software. She expressed frustration at not being able to edit images within the system: “Mimsy reads and opens the file, stored in a folder in the main drive of the museum. Once the images are linked to Mimsy, they cannot be altered. The original file is still kept and modifications can be made to this one. The link to Mimsy in those cases has to be created again (and the previous one deleted).” Overall, this conservator was “quite” satisfied with as much of the system as they were using: “All information about an object (curatorial, conservation, transit, loans, registration, provenance, etc.,) can be accessed on the same database, which is searchable by unique number.”

Argus

Four out of the six institutions that own the Argus CMS use its conservation module: the Strong Museum of Play uses it extensively and was very satisfied by its performance; the others were not. At the Strong Museum, “curators and conservator alike use only Argus,” and use no other software. The conservator was “very satisfied” with the Argus report capability and with its overall performance, but gave no further information. The Rhode Island School of Design conservator had access to some sections, using it “widely,” with MS Word, mostly to “record and archive completed analysis/treatments,” but was only “somewhat” satisfied with reports, and wanted a system that could help more with workflow. Overall, she was only “somewhat” satisfied with the system, which
was relatively easy to use, had “customized field building, and good work flow in many instances,” and it was good “to be able to centralize information.” However, she wanted better “reporting, control of terms, and importing and exporting capability.” While all four institutions produced survey, examination, treatment and loan reports, three were “not very” or “not at all” satisfied, with the Alaska State Museum frustrated that all reports “print out hopelessly misformatted, with text cut off, font errors and more.” The Alaska State Museum, which had been using Access to organize material, was phasing out Access, in favor of documenting everything in MS Word and simply “making a note of it in the CMS.” (For more information, see below: VI. Other Commercial Software).

Of the two not using Argus, the University of Pennsylvania Museum of Archaeology and Anthropology was moving to KE EMu (“The Argus system was not suitable for our recording purposes. Once the Museum has completed our transition to KE EMu, we hope to be able to use that system for all our documentation needs”), and the Textile Museum found it too inflexible and is beginning to use FileMaker (see “VI. Other Commercial Software”).

**Embark**

Four institutions license the Embark CMS. The San Francisco Museum of Modern Art (SFMoMA) and the Jan Suberman Art Conservation Studio use it “exclusively,” the Peabody Museum at Yale uses it “widely” and the Frick Collection, although not using it, was determining how best to work with it.

Conservators at SFMoMA use FileMaker Pro with Embark, appreciating “the reliability that comes with the direct transfer of data from the densitometer to the database.” They were only “somewhat” satisfied with the quality of the reports and with their overall system. Jan Suberman, on the other hand, uses Embark in conjunction with Word, (“We prefer to document all our work both in photographic form and Word form for our records”) and was “very” satisfied with results. At Yale University’s Peabody Museum of Archaeology and Ethnology, the Embark database is used by almost every department but is restricted to full time staff who have been trained in its use, partly to assure an adherence to standards. Some fields/pages are for exclusive use by specific departments and individuals (Registrar, Conservation, Publications, etc.). Peabody staff
use no other software and were “somewhat” satisfied with the results, but found it troublesome that text fields have either limited text entry and/or are unmodifiable.

Most commentary came from an institution trying to determine how to use a system. The Frick Collection recently upgraded to Embark 7, and a new team of conservators is developing a protocol for using this system. Previous conservation information entered into Embark (mostly condition and treatment notes) had been “spotty,” and this new team would like to have a more consistent information available without “spend[ing] a lot of time retyping information.” They have started to create Filemaker Pro databases designed for easy importation to Embark and they are also looking into how to import existing MS Word documents and PDFs. The ability to import information into a system is critical for the Frick conservators and others. See discussion in “VI. Other Software and Systems” below.

Other systems were used by just one or two museums.

PastPerfect
Two institutions use PastPerfect. The head conservator and her interns at The Kelowna Museums Society manage conservation at four museums in the Okanagan region of British Columbia. They use the society’s PastPerfect CMS for documentation together with extensive use of MS Word documents: “a detailed form that I have developed in Word and a Quick Assessment Condition Report, done in Word, that I have the curatorial interns conduct to help them recognize various types of damage.” All objects in the database have their condition assessed, and conservation and collections departments share all necessary documentation on an external drive: “the registrar is required to do a more detailed condition report and if treatment is done all information is entered and there is a note relating to the paper file.” Prior to 1994 the museum used an Access database (although with no associated condition report) and, on the few occasions when older items are imported from that database, there’s a lot of clean-up as, “the information was not placed in the correct categories or lines.” Although the system can generate many kinds of reports, with which they are “very” satisfied, staff also comment that they didn’t use this feature often. They most appreciate their system’s “flexibility,” but note as a drawback, that it “can be complicated for those not familiar with the terminology.” See
V. Collections Management Systems

discussion in “VI. Other Software and Systems” below.

The Western Center for Archaeology & Paleontology has PastPerfect but uses it in very limited ways: “multiple systems are in use; much data comes in as Excel spreadsheets or Access data files and some is transferred to PastPerfect as appropriate or needed; but lack of staffing prohibits incorporation of all digitized data.” The Center is working on developing the conservation documentation capabilities of PastPerfect, but it is not a priority, “given limited staffing & other departmental goals.”

AdLib
Two institutions have the AdLib CMS. The Rijksmuseum staff, not knowing whether AdLib had a conservation module or not, were using another commercial product, but gave no further information. On the other hand, Museums and Collections at University College London commented that while they currently only had read-only access, they would be able to add and edit records, print reports, and more on an upgraded version by the end of 2008. In addition, they have a dedicated in-house AdLib database expert, shared across museums and collections within the institution, who is able to adapt the system as needed.”

CDS
Conservation Data Systems (CDS) is licensed by three institutions and a private company, one using it exclusively, one in limited ways, and one in very limited ways. All use additional commercial software products.

Fallon & Wilkinson use it extensively, and even though “in large reports, image size needs to be small for the report to print,” they were quite satisfied with the system. They wanted “more flexibility in which fields will be displayed, and in the order of the photographs” in reports, but CDS on the whole produced “good looking reports, that contain mostly all the information we want.”

At John Hopkins University, the Sheridan Libraries Preservation and Conservation Department uses CDS in limited ways, in conjunction with Access. However, they are generally not very satisfied with the results and the system is also limited to a single desktop and “should be capable of being networked so it can be more widely accessed.”
The U.S. Army Heritage & Education Center uses CDS for documentation, although only in limited ways. “Conservation Data Systems maintains the conservation information. Once a record is converted to a PDF file, the PDF is linked to the registrar's material property accountability system.” For some surveys, which are shared with the museum staff and budget committee, it also uses Excel. Conservation only produces survey reports but staff likes the system: “The fields in CDS are extensive, so records are very thorough, yet easy to use for simple projects.” However, as Fallon & Wilkinson noted, the program crashes when a large number of large color photographs are attached: “Digital photos have to be copied and altered to be attached to records which are shared. A second copy of large, unedited photo files have to be also maintained and this needs to be streamlined as it is very time consuming to edit each one in Photoshop.”

Re:Discovery

The Virginia Museum of Fine Arts conservation staff uses Re:Discovery, in limited ways, in tandem with an Access database developed in-house. Staff found the Re:Discovery screens too limiting (“field names can be altered but field types are very limited”) as well as the search options (“you can search by work request ID and due date, but not by accession number”). In addition, the report writer is not user friendly (not allowing the insertion of digital photographs, or footnotes, and with limited editing capabilities). Exporting data is difficult, and importing and linking is not an option, “limiting compatibility with applications such as Excel, Access, or Photoshop.” Faced with a mass survey in preparation for reinstallation of the collection in expanded facilities, the department created its own Access database. All relevant records were exported from Re:Discovery as delimited text records, cleaned and imported into Access. Both databases are now used: Re:Discovery to initiate and report on work requests and to record and archive completed exams, analysis and treatments; the Access database for recording/archiving condition survey data and the most recent treatment history in order to plan for reinstallation of the collection. The Re:Discovery conservation module is good for entering conservation object data and to print reports, especially on activities during a specified period. Access is better for entering, managing and reporting on survey data for large groups of objects and has proven to be essential tool for planning surveys and treatments for these groups. See discussion under “VI. Other Commercial Software,” below.
ANCS+
The USDOI/National Park Service/Springfield Armory uses the Automated National Catalog System Plus (ANCS+, soon to be replaced by a version created specifically for USDOI) as its CMS. The Conservator uses a basic FileMaker Pro database, from which information can be imported into ANCS+. Reporting is an issue: “I would like to see this developed in ANCS+ or the new system, but I am in the minority.” The conservator likes the system: as it is “easy and concise, and I can get the information imported into the supplemental files of the main system fairly easily.” However, he dislikes the fact that it is a separate system, “It should be integrated, but that takes money, which we do not have.”

Museum Plus
Zetcom’s Museum Plus is a fully configurable and modular Swiss CMS with a conservation module that both conservation and scientific departments use at the Doerner Institut (of the Bavarian State Painting Collections) and both conservator and scientist responded to the survey. The conservator liked the structure of MuseumPlus and how it helps “organize and standardize the documentation,” but needed more institutional support and funding for it. The scientist saw the system as a link for checking the extent of technological information available at the scientific department. “We feed information on the types of technological or analytical examinations available for the objects from our collection into MuseumPlus (e.g. Project Number, XR, pigment analyses). This allows the curators and conservators to check easily, what material is available in the scientific department”). The scientific department still uses an older dBase-database system, which allows extensive searches and statistical comparisons on pigment results, although data entry is time-consuming and rather complicated. The database has been designed to allow pigment comparisons and enables useful printouts on the pigment findings on certain objects, or statistics on pigment use. However, on the system, not unusually, “conservators only have direct access to linked PDF files of the analytical reports.”

Aleph
The head of the The British Library’s Department of Collection Care (Conservation & Preservation) uses the conservation module of ExLibris' Aleph, which is a “specifically designed, parallel Preservation & Conservation Management System.” The department enjoys the fact that this is “a single system able to be used by all conservators,” although
“running reports is not locally controlled and there are difficulties in obtaining the required details.”

**Modus Operandi**

**Opificio delle Pietre Dure**, in Florence, is beginning to use Modus Operandi, a system it is developing with Culturanuova, and which was being configured and installed at the time of the survey. Previously, individuals used Word, Access and other commercial...
products as they saw fit. The new system looks as if it has potential for integrating formerly disparate information sets, “allowing links to any file type,...importing files, and saving them in .docx format that MS Word can read.” They are “very satisfied” with the system to date: “it allows great interaction among different professionals; it eases the sharing of data; it increases the relationship between the scientific field and the conservation department; it improves the attitude of people using it; the technical survey is automatically created in the process of registering all the data and importing all the examinations results.” The only criticism is that implementation is taking a long time: “The creation, configuration and installation process has been very long, due to the fact it is a pioneer project according to the Italian experience.”

Specify
The Sam Noble Oklahoma Museum of Natural History has Specify, a CMS designed for natural history collections with a conservation module being developed to its specifications for the museum’s conservation department. The museum is actively migrating all collections (previously on separate databases) and departments to Specify. In the future, “all standard conservation data will be able to be input directly into fields, as with digital images, but additional information can also be attached (sound files, movies, spectra, associated documents).”

Other systems include:
- **STAR**, used by the Glenbow Museum, where fields can only be changed by the database administrator, although a conservator does have access to the Collections Catalogue module to input basic information about artifacts not currently in the database;
- **The SIRSI Dynix Horizon** Information Portal, which is a library system used in limited ways by The Smithsonian Libraries and by Hampton University Library, with Excel and Word, but there is a “lack of integration of conservation records with collection records;” and
- **Vernon**, used extensively by both the Cincinnati Art Museum (generating full treatment and condition reports that can be linked to an objects identification record) and New Zealand’s Christchurch Art Gallery, where it disappoints as “it is overly complicated and images cannot be added.”
3. Non-Commercial Systems

The thirty-three (16% of all respondents) who indicated that their institution had developed a “non-commercial or in-house system” for managing collections were asked the reasons why such systems had been developed and just under half responded with comments.

Some had particular needs: the Byzantine and Christian Museum in Athens, developed its system, “primarily because of the particularities and complexity of the collection (mixed archeological and historical)” and its need to create particular fields for the management of the objects. “Conservators use a copy of the CMS...to visualize the object and have a detailed description of it,” but it serves little other purpose. The museum as a whole is now creating a new CMS “that will include also the Conservation Management System as well as the Management of the Historical Archives and the Photographic Archives.

The Smithsonian Archives developed a non-commercial system (1998-2000), based on Access, because “there was no off-the-shelf product that sufficiently addressed the variety of activities and records we wanted to track.” Australia’s Heritage Victoria similarly developed an Access-based in-house CMS, designed by a conservator in 1996 to manage the archaeological collections as well as the documentation of the conservation treatment of batches of archaeological material. However, the system is still only used in limited ways. Though they like its “ability to batch update the treatment records for a group of objects,” they still “can't use the system to document work flows or do surveys or analyze data.”

Some institutions had developed systems before any commercial products were on the market. The Art Institute of Chicago, for instance, was still happy with those early systems, which have been substantially upgraded and updated, and which now can run on Mac OS X, Windows 2000 and XP. However it doesn’t handle conservation material well (see below). Some within this group are now considering transitioning to a commercial system, like the Arizona State Museum, with a system that is “old, predating any commercial products, and efforts are underway for conversion to replace it,” and the Field Museum, whose “in-house system was originally developed in 1973 to track
collections movement, was expanded, converted to FileMaker to incorporate conservation record keeping, but is now proving insufficient and the whole museum is moving to Ke-Emu.”

Others had developed systems for collections and conservation management from the start. Although the British Museum’s Merlin was developed as a curatorial tool, to which the Department of Conservation and Scientific Research had complete access, it also included conservation sections where documentation could be recorded, fully and flexibly. Although documents and images cannot be edited or annotated within the system, and report-generation is still under development, Merlin is now being reworked to improve its conservation section, include scientific documentation and more fully integrate both into the Museum’s collection information. The Keeper of the Department of Conservation and Scientific Research declared he was “quite” satisfied with the system, especially for its providing “a single system able to be used by all conservators.” On the downside, “running reports is not locally controlled and there are difficulties in obtaining the required details.”

Unlike the British Museum, the Art Institute of Chicago, with its legacy in-house CMS, CITI, never had a fully workable conservation module and budgetary considerations still prevent one from being implemented. While the Director of Conservation pointed out that there were spaces designed for conservation information, they only allow summary information in limited text boxes, and unchangeable system-defined fields. Frustrated by the lack of required features and flexibility, conservators and scientists have devised other methods (see discussion in “VI. Other Software and Systems,” below).

The Hamilton Kerr Institute is rather a special case as it is a service agency with no collection, working within the Fitzwilliam Museum at Cambridge University. As part of its role as a teaching institute, it strongly encourages “thorough and effective documentation of conservation work” and has its own FileMaker-based, in-house CMS (still under development) that tracks works as they pass through the Institute. Although as a small department, the Institute has specific needs differing from those of the Museum and the University, it still aims to integrate its smaller systems with those of the two parent institutions, and some of the objects conserved by the Kerr appear in the Fitzwilliam’s AdLib system. Currently, only content summary reports and search result
summaries are produced: “the database informs, but most reports are formatted individually in MSWord.” A conservation research assistant observed that reporting needs improvement: the CMS and the databases still only serve as a reference to documentation that exists elsewhere. They are working toward “a more integrated system where reporting will retrieve these documents or embed them within the databases - this will lead to the requirement for much improved reporting functionality to be delivered for both information retrieval and digital preservation needs.” Overall, however, the research assistant was satisfied with the system, finding it “a simple and effective submission of information,” even though “not all documentation is systematically located.” A conservation scientist was also quite satisfied, appreciating its ability to effect “routine management of studio work,” though looking forward to better “image handling and wider (web-based) dissemination.”

At the National Palace Museum, Taiwan, a conservation research assistant reported that the IT department wrote the CMS for the Museum and that it has a conservation module in which conservation documentation could be given as full records, in unlimited text boxes. In addition, the Museum uses a non-commercial conservation system developed in-house, built by outside developers, but our respondent did not specify the kind of software used. She was very satisfied with the reports generated and with the overall system, but did not elaborate.

4. Summary

Close to 80% of all respondents reported their institutions owned a Collection Management System, four-fifths of which were commercial, one fifth non-commercial, mostly in-house, systems. Most of the non-commercial systems were developed before commercial systems were available, while in a few cases (such as the British Museum’s Merlin) they were developed to provide more comprehensive and flexible services than most commercial systems offered.

The predominant software in the landscape is Gallery Systems’ The Museum System (TMS) with 43% of the market share of those respondents’ institutions that own a CMS. This was more than all the other commercial systems combined (37%) and double the non-commercial systems in place (20%). This same proportion is reflected within the two-thirds of those respondents with a CMS actively using it for conservation
V. Collections Management Systems

documentation management: 45% use TMS, 40% other commercial systems and 15% non-commercial systems. See Figure 18 for a representation of the share of all collections management systems owned by participating institutions that are actively used for conservation documentation (and compare against Figure 13, showing the deployment of all collection management systems).

Conservation departments at the Brooklyn Museum and the Museum of Fine Arts, Boston, were the rare ones among the survey respondents indicating that they were “very” satisfied by their use of TMS for conservation management, though for rather different reasons. Brooklyn includes among its 18 conservation staff members one full-time records manager, who works exclusively with TMS and who has designed and helps maintain the conservation module. The Brooklyn Museum has a relatively small collection together with historical conservation records all in narrative form and still intact. With these advantages, it managed a smooth transition from separate FileMaker Pro databases to a single system, used to the satisfaction of all disciplines. Boston, with a staff of 38 currently working in conservation laboratories, has invested immensely in insuring that TMS works as part of its centralized CMS Artemis. Among many other programs, Artemis includes numerous in-house plug-ins that add extra material, functionalities and survey-specific fields, stored in separate tables but linked to TMS. Four database specialists assist with report writing, a dedicated programmer maintains the plug-ins, and a photographer maintains and manages documentation as well as trains the staff in using the system.

While most institutions with TMS use it partially or minimally for conservation documentation, because of its “non-intuitive interface” and the difficulty of customizing it to produce the required forms and reports, others, notably the Philadelphia Museum of Art and the Harvard Art Museum, have been developing systems that pull material from TMS but essentially ignore the conservation module. These custom-built systems have workflow tracking and reporting capabilities. They are relatively new and are still being iteratively improved: they have web-based interfaces and are being developed so that they might interface with any CMS.

There was little significant differentiation among the other commercial systems. Most used other software, in addition to the CMS, and most shared the general complaint about
their inability to edit images within systems or to integrate their conservation information with central collections information.

European systems of interest include the Swiss MuseumPlus, which has a fully configurable and modular CMS including a conservation module that both conservation and scientific departments use at the Doerner Institut; and the Modus Operandi system recently developed by Culturanuova, working with Opificio delle Pietre Dure.

Fifteen respondents indicated that they use non-commercial CMS systems for conservation. The most substantial of these include the Art Institute of Chicago’s CITI (established in 1992, with a significant series of upgrades) that still does not have the “interweaving of conservation documentation with the CMS,” so desired by conservators and scientists, although plans are afoot to create a digital asset management system to link digital records with object records in CITI. The British Museum’s Merlin system, established in 2000 to replace the earlier Magus collections database, is used “by all conservators and curators.” Separate but linked databases are maintained for images (Digital Asset Database) and conservation documentation (Conservation Merlin). The Mellon Foundation has funded a pilot project to assist in the development of a module for conservation scientists (currently not included) and for the further integration of all components aided by the development of a data dictionary to ease the assembly of all information on an object from across the museum.

A few institutions are transitioning from in-house systems to commercial systems. The Field Museum, for example, had a legacy system developed in 1973. This was subsequently re-organized as a FileMaker database incorporating some conservation
documentation, and with which a conservator was “very” satisfied, is now converting to KE EMu.

Many others are developing new systems. The Byzantine and Christian Museum of Athens is developing a new comprehensive CMS that will include a Conservation Management System, and the National Palace Museum, Taiwan, reports both an in-house CMS that includes a module in which conservation documentation is given “full records in unlimited text boxes” as well as a specialized non-commercial conservation system, developed in-house but built by outside developers. Several conservation departments not using their institutional non-commercial systems, are also developing non-commercial conservation systems. These include the Conservation Centre Vejle, Denmark (that had tried unsuccessfully to adapt the national Danish REGIN CMS) and the conservation departments of the National Museum of Art, Architecture and Design, Norway, The National Museum of Fine Arts, Sweden, and the Victoria and Albert Museum.

Even more so than with commercial systems, non-commercial systems usually require additional software to achieve a satisfactory set of functions for including conservation material. Conservation staff often expressed frustration at the lack of support for integrating their information with the rest of the institution’s: “the [conservation database in the CMS] is too limited to warrant the time involved to organize it, and we don't currently have authority to input data. Also, I'm not sure if the current system could store the number of images we produce on a regular basis.”
VI. OTHER SOFTWARE AND SYSTEMS

Just over two-thirds of survey respondents use software, other than a CMS, to manage scientific or conservation documentation. Of the 145 who use other software:

- 118 use “a commercial product like MS Word, FileMaker Pro, Access”
- 20 use “a non-commercial system developed and built entirely in-house”
- 7 use “a non-commercial system developed in-house, but built by outside developers.”

1. Commercial Software

Almost one-third of those employing commercial software products use them in combination with one another (most frequently, MS Word - here by 28% of those using commercial software). FileMaker Pro is used by itself most frequently (by 22), followed by Access (10), MS Word (6), and Excel (3). Ten used other commercial software, while thirty-two who use commercial software did not specify the product names.

Two respondents at the National Gallery of Art (while transitioning to the new version of the institutional TMS) report using FileMaker Pro extensively in the process of scientific analysis: by conservation departments to request analyses and by the Scientific Research Department to track analysis requests and to summarize the results. It is not used to manage data or images obtained from analyses. Edits and comments are made directly on the documentation itself (MS Word, PDF, images) rather than in the FileMaker database. Final reports of the analyses are made in PDF, including the output from scientific instrumentation - graphs, charts, spectra, chromatograms, etc. A conservation scientist thought the FileMaker system tracks workflow well and gives good

Figure 19: Commercial Software used in Conservation Documentation
reports of past activities, but does not record or archive the completed analyses very well:
“We need a unified system that would actually allow us to display and manipulate data and text information without having to resort to multiple programs.” As a consultant summarized it, the positive side of not using a standardized solution was that, “individual solutions created within local conservation departments meet the needs of those conservators more precisely than might be possible with a standardized solution. However, the drawback of a lack of integration and common standards among individual departments is rapid obsolescence, endangerment of the data contained in the systems and, in the case of many homegrown database designs, poor understanding and execution of database design principles.”

The Paper Conservation Department at the Metropolitan Museum of Art uses FileMaker Pro in the conservation documentation of works in all 18 curatorial departments of the Museum. The program is used to produce a small variety of reports, including short reports, long reports, records of analytical testing and art historical information, where relevant. The department can also integrate small images for identification. Documentary images are taken in both digital and analog form and stored separately, with a record stored on the FileMaker database. Paper Conservation relies heavily on TMS for “tombstone” information and for loan and exhibition data.

The conservator at the Huntington Library, where there is no CMS, (while there is one at its sister institution, the Huntington Art Collections) uses FileMaker Pro to manage documentation. She is quite satisfied with her ability to import and display documents and images and, although she cannot edit or annotate them, to use them in creating examination and treatment reports. Overall, “it’s a streamlined way of creating reports in a quick and efficient manner. It’s easy to search and measure workflow, and keep track of completed treatments for any one conservator.” However, it’s quite labor intensive to “set up functions that will allow us to insert images. If too many people are given permission to make changes, the layout can become disorganized with too many fields.”

The National Museum of Iceland, created its own CMS in 1996, “because no suitable solutions were available on the market at that time.” However, even though they “would prefer not to use a separate database,” they created a FileMaker Pro system, that they are “quite” satisfied with, because “our main database is not as flexible as the one we made ourselves with FileMaker Pro.”
The Cooper-Hewitt Museum’s conservation staff, frustrated with the inability of TMS “to upload annotated photographs and create specific fields,” developed their own FileMaker Pro system and now “cut and paste limited information from FileMaker to TMS, entering a note in TMS that the full report is found in the FileMaker data base.”

Similarly at the Shelburne Museum, while staff await their MultiMIMSY conservation module, they use “MS Word for treatment reports, and an Access database to track reports.” “Quite” satisfied with their present system, they still “anticipate inserting reports and photographs into the CMS as PDF or Word documents once the collections management records are all in the system.”

The Phillips Gallery, Indianapolis Museum of Art, and Jan Suberman Art Conservation Studio all use MS Word extensively. The Phillips conservators do so mostly because their MultiMIMSY conservation module is still not fully implemented, so a preference can not be determined at this time. At Indianapolis, while they wait for access to the recently installed KE EMu, “Word documents are produced by every conservator and filed/stored according to each conservator's own personal filing system.” The advantages are that this is “easy to use and there is maximum freedom to write extensively and record whatever is deemed important.”

Conservation staff at the United States Holocaust Memorial Museum, while awaiting full implementation of their KE EMu conservation module, use FileMaker Pro, MS Word, and Excel, “depending on the project and on which department initiated it.”

The two conservators at the State Archaeologist's Office of the Virginia Department of Historic Resources have built a Conservation Record Tracking system, using Access and MS Word which they use “exclusively” for documentation. The tracking database is limited “to one 200 x 150 ppi image,” with all other images and charts imported into an MS Word document. Able to edit “anything that can be imported into MS Word,” they produce survey and examination reports. The tracking database “contains initial descriptive and condition information as well as tracking information.” They like its flexibility, with no limits to the amount of text or images they can include in condition or treatment reports. With a large body of Word auto-text statements used for “marking down treatment statements at the bench, they “only have to write additional free-text at the bench, [yielding] very quick production of reports.” In terms of improvement: the
tracking system is “not yet integrated with the collections management database, although it is all Access code and the site numbers overlap.”

Conservation staff at the Guggenheim Museum, finding TMS non-intuitive and inflexible, use MS Word, FileMaker Pro and the asset manager Media Beacon. They import, display, edit and annotate documents and images, but are only “somewhat” satisfied with their ability to use those retrieved items. Using FileMaker and Word gives them an intuitive interface that is “easy to customize for our needs (any user can make changes)” and gives them great flexibility in creating forms and reports specific to their needs.

Using their TMS in a “limited” way, two conservators at the Freer Gallery of Art, commented on the proprietary programs used by scientific instruments for storing data and images, and noted that conservators use MS Word, FileMaker Pro, or Access, depending upon the person using it or the project being done. “Most records are still generated with systems separate from the TMS database. As we work toward integration, it should be easier to manage related data, generate reports, etc.”

At the Art Institute of Chicago, conservators, still awaiting the features and flexibility required for effective conservation management from the CITI CMS, have devised other methods. FileMaker Pro and Excel are used to manage large science projects, and in conservation, Word and image files are stored in organized folders on a server, allowing documents and images to be shared, retrieved, displayed and backed up by the IT Department. Both the conservator and scientist responding to the survey were somewhat satisfied with their ability to use retrieved documents and images, but they couldn’t move data between the conservation database and the CMS. Analytical reports, created as Word documents can be “used to enable efficient comparative evaluation of large numbers of analytical data,” but then, “no-one outside the science group has access to the scientific documentation, unless specific servers have been created for selected projects.” The only way of knowing if analysis has been done on a work is to ask the scientists. The conservator wasn’t pleased by the fact that, “only loan-related reports” can be generated and that the “documents on the server are not associated with object records in CITI.” As in many institutions, the lack of integration of records is a main stumbling block to the free flow of information and streamlining records management.
The National Museum of Fine Arts, Sweden has a 10-year-old in-house CMS that the conservators do not use (see “Non-commercial collection management systems,” above). They therefore have patched together a variety of programs to take its place: “we try to save Word documents and Excel spreadsheets systematically for easy access.” They also use Elsec, Easyview, Powerpoint, Photoshop, and a documentation program called Dinspector 2.0 for condition reports for loans. Using a tablet PC laptop, conservators keep a history of edits and image annotations. Although “there is no communication possible between the in-house CMS and the limited databases or the Dinspector 2.0,” they are “quite” satisfied with the result. Overall: “Access database: it has worked well for the purpose. Dinspector: there is only one file per object created - this file keeps an archive or history of activities and annotations (dated and signed).” But, “neither of the two systems are integrated with a CMS.”

Smaller, private establishments often devise unique systems that appear to work well for their own situations. For example, the co-owner of MPF Conservation, combinations documentation written in MS Word, digital images into a PDF file with a table of contents. She is very satisfied with it, even though she dislikes the limitations of MSWord. Another example is Westlake Conservators, built in-house system that incorporates a QuickBookPro database, MSWord files, and FileMaker Pro. Images are stored on portable hard drives. Reporting admittedly might be improved with direct entry of examinations into a searchable database but they like the ease of having all documentation on one object in one folder.

Although the Virginia Museum of Fine Arts uses Re:Discovery as its CMS, it discovered that it was particularly inadequate for mass surveys. Access was used for this survey work and now the museum uses both. While Re:Discovery is used to initiate and report on work requests and to record and archive completed exams, analysis and treatments, the Access database is used for recording/archiving condition survey data and the most recent treatment history in order to plan for reinstallation of the collection. Access has proved to be better for entering, managing and reporting on survey data for large groups of objects and has proven to be essential tool for planning surveys and treatments for these groups. However, the Access database is currently non-relational and is not integrated with Re:Discovery, “thereby creating data integrity and workflow issues.”
The two conservators at the **Frick**, both new to the institution, are determining how best to use the museum’s Embark CMS by developing a protocol for importing files and data from other applications: MS Word and PDF documents and FileMaker Pro. They have FileMaker databases for individual collections, designed so that certain fields can be imported into Embark (FileMaker is also used by the IT department, and the Library).

“For FileMaker we record condition history, treatment history and treatment priority (in the past Embark was used for condition and treatment notes).” They are “quite” satisfied with the reports they can produce and “somewhat” satisfied with their system, but are clearly in transition: “We really like the ease and versatility of FileMaker. We can design our own report template for our needs, and make it consistent throughout the department.”

There were ten institutions that had a non-commercial or in-house CMS, but did not use it for conservation documentation. Most of these have developed or used other software to take the place of the noncommercial or in-house CMS for their conservation documentation.

These include:

- The **Conservation Centre Vejle, Denmark**, which, after trying to adapt the national Danish REGIN CMS system for conservation purposes, has now custom made an Access-based conservation database.

- Conservators at the **Norwegian National Museum of Art, Architecture and Design** are replacing Primus, a non-commercial CMS, developed to serve most of the Norwegian museums, (without a conservation module), with another non-commercial system, based on Access and Visual Basic.

- The **National Museum of Fine Arts, Sweden** is replacing its 10-year-old, non-commercial CMS, which neither painting nor paper conservators use because of internal workflow issues, with a system it is developing, using commercial software products.

- Conservation staff at the State Archaeologist’s Office of the **Virginia Department of Historic Resources** do not use the Department’s non-commercial CMS for their conservation documentation, building instead their own conservation record tracking system, that uses Access and MS Word.
2. In-House, Non-Commercial Software Systems

Of the 20 using “a non-commercial system developed and built entirely in-house,” 6 reported using it exclusively; 6, widely; 5, in limited ways and 3 in very limited ways. Four use open source software (including, MySQL, Mediawiki, Drupal, and others), while others use FileMaker, Access, Advantage Architect, Dbase, and various combinations. These systems range from the Courtauld Gallery’s “combination of unlinked databases using Filemaker Pro and Access,” in place of any CMS, through the Museum of Fine Arts, Boston’s set of separate applications for collecting conservation and storage information when conducting surveys, Westlake Conservators’ use of a QuickBookPro database and MS Word files to Harvard’s complete conservation management system built on SQL Server.

The Harvard Art Museum’s Straus Conservation Management System, was still under development at the time of the survey and this report, but it is already being used “exclusively” across the institution. The interface consists of pre-defined checklists, pull-down lists and text fields with unlimited text entry, it integrates with TMS, to retrieve “live” tombstone information on objects for tracking and report generation. Proposal, treatment, invoice and condition reports can be generated. Although the system is still under development, staff is still overall “quite” satisfied with progress, planning to improve the report design, and to create modules for scientific information and photography (see Appendix A for a more detailed description).

The Australian War Memorial, which uses MultiMIMSY “exclusively,” also uses a non-commercial system developed and built entirely in-house using MySQL. The documents and images are stored on drives, where they can be edited, while the in-house Web-based DigiCons system allows users to upload images onto the MultiMIMSY system. Staff are quite satisfied with the system, liked the condition reporting and the use of images in reports, but felt that “conservation treatment activity is cumbersome in places, particularly when entering keywords from pop-up lists.”

The National Gallery, London, uses a combination of solutions in an experimental system it is developing that would eventually replace the current “tripartite system of curatorial, conservation and scientific files.” Although it has TMS, the conservation department does not use it for conservation purposes, using instead an evolving package.
of different software solutions, including Access, mySQL, and Mediawiki: “Different data types are used by different groups of people. General documentation systems are currently experimental. Environmental data management systems are used by multiple departments.” The experimental conservation system is able to import, edit and annotate documents and images (although, “the exact process depends on the file type. For example, if you can search for Word documents you can always open and edit them.”) “Very” satisfied with their abilities to use retrieved documents and images, staff are able to import and export back to the CMS, with no size limits. “Only environmental reports and files lists are currently available in the experimental system” although others are planned. Staff are very satisfied with the reports they can generate, even though they are currently custom made, and “could be improved with the definition of further requirements.”

**University of the Arts, London**, has no CMS but a research fellow in the Ligatus Research Unit reported that they use a non-commercial system developed and built entirely in-house, using mySQL, php and Drupal. Although it only contains “pre-defined checklists,” it can import and display documents and images, although they cannot be edited or annotated. “Quite” satisfied in using retrieved documents and “very” satisfied in using retrieved images, they can only produce survey reports and are “quite” satisfied with them. They use the system to evaluate collection condition, are overall “quite” satisfied, enjoy the online accessibility, but regret the limited ability to edit online.

**The National Museum of Art, Architecture and Design, Norway** is developing a non-commercial system, based on Access and Visual Basic, that it says is used widely in the museum. With pre-defined checklists, pull-down lists, text fields with limited text entry, and text fields with unlimited text entry, it can import and display documents and images that can be edited and annotated. The system produces treatment and loan reports, but the conservator did not indicate how satisfied staff is with the system.

### 3. In-House, Non-Commercial Systems, Built By Outside Developers

Seven respondents reported using non-commercial systems developed in-house, but built by outside developers. Three used them “exclusively,” two, “widely,” one, in “limited”
ways, and one didn’t know. They used Access (three), Oracle MySQL, and Microsoft SQL; two didn’t know.

The Conservation Centre Vejle, Denmark, having attempted with no success to adapt the national Danish REGIN CMS system for conservation purposes, has had a custom-made Access-based database built. With pre-defined checklists, user-defined checklists, pull-down lists, text fields with limited text entry, and text fields with unlimited text entry, the system can import and display documents and images, which can be edited and annotated. However, to date, staff are still only “somewhat” satisfied with this system, including their ability to use retrieved documents and images, and with the survey, treatment and loan reports.

Artlab Australia, uses a non-commercial CMS, built by outside developers. It is “essentially an Access database that is now used by all conservators.” The system is mostly used to “initiate, implement, measure and report on conservation activities,” specifically, for tracking job summaries (“title, organization, owner, treatment summary, completed cost, etc”) across the organization, and identifying the job number that triggers access to analog copies of condition reports, images, etc. Quite satisfied with the system, and appreciating the all-important job tracking function, staff still would like the ability to integrate other data, especially images.

The Victoria & Albert Museum developed CONCISE, a non-commercial system for conservation documentation management (and its offshoot Projecxs, “an Oracle-based conservation condition information system resulting from a late-1990s project about ten years ago to re-do the British Galleries”). CONCISE is managed by the conservation department, with some support (but no training) from the information systems department. It is meant to be used across Conservation, but “until very recently, some studios did not use it, particularly for core collection work, instead using it if a project called specifically for its use.” The system produces survey, examination and treatment reports, but there are no images in the system. “Treatment recording is the priority, however there is immense frustration at being unable to use the system more for workflow monitoring.” The Head of Information Management & Conservation Administration, is “not at all” satisfied with what they have; least so with: “reporting, documentation, filtering, interface with other systems (including Windows), flexibility,
lack of space in free text, lack of flexibility in dates and object number fields, lack of training and support.”

The Philadelphia Museum of Art is developing “The Tracker,” an in-house system, built by outside developers, to work with the museum’s collection management system. TMS is currently used by the conservation department in very limited ways (“two large surveys in furniture, and costume and textiles, and for limited conservation information related to collections moves”) but is generally regarded as lacking the “flexibility, functionality and detail” needed. Tracker uses Microsoft SQL Server as the database backend, with the user interface programmed in MS Visual Studio 2008, using VB.Net. Although it is in continuing iterative development, it is already being used “widely” by conservators, although not yet by conservation scientists. It uses “pull-down lists, text fields with limited text entry, and text fields with unlimited text entry.” Users can import, edit and annotate imported documents and images and are “very satisfied” with their ability to use those materials. The developers are working on a way to export one or two fields, including the list of past conservation reports for each object, with notes on fragility or special handling requirements, so this can be viewed on TMS by curators, registrars, art handlers, etc. Staff can produce exhibition, treatment and loan reports (and are working on building survey screens and reports). They also produce analytical requests and summaries, a log of photo requests, lists of objects in the lab, objects treated for the annual report, etc. While the main focus of the system is to record and archive completed analysis and treatments, the system is used substantially for work flow (“paper and sculpture/objects conservation units use the work flow functions more than the other sections”). They also use it to search and access information in existing reports.

Staff is very satisfied with report generation and with work flow processes, although, with many minor issues that need to be resolved, the main thrust of current development is creating a more contemporary user interface and “to implement a survey function so that all conservation documentation can occur within the single system.” See Appendix A for a more detailed report.
4. Conclusions: Other Software and Systems

*Figure 20* shows the distribution of the use of collection management systems for conservation documentation: 79% of all respondents’ institutions (163) have a CMS, of which 101 actively use them for conservation purposes. Two-thirds of those actively using their CMS (67) also use other software to assist with managing conservation documentation. Of the 62 not using their CMS, 47 use other software. Of the 32 that didn’t have a CMS, 18 used other software.

*Figure 21* shows the breakdown of those using other software within the entire group of respondents. Of the 206 respondents, 57% use a commercial product (like MS Word or FileMaker Pro); 10% use a non-commercial system, developed and built entirely in-house; and 3% use a non-commercial system developed in-house, but built by outside developers. 18% use no other software other than a CMS, 7% use no software at all and 4% either did not know or did not answer. Of the 145 who use other software, 46% also use their CMS for conservation documentation, and 32% do not; leaving 12% who do not have a CMS and 10% who did not respond.
VI. Other Software and Systems

Table: Uses and Capabilities of Software Used in Addition to a CMS

<table>
<thead>
<tr>
<th></th>
<th>Commercial Products</th>
<th>Non-Commercial In-House</th>
<th>In-House Non-Commercial +Outside Developer</th>
<th>TOTALS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exclusive</strong></td>
<td>32 27%</td>
<td>6 30%</td>
<td>3 43%</td>
<td>41</td>
</tr>
<tr>
<td><strong>Widely</strong></td>
<td>25 21%</td>
<td>6 30%</td>
<td>2 29%</td>
<td>33</td>
</tr>
<tr>
<td><strong>Limited</strong></td>
<td>32 27%</td>
<td>5 25%</td>
<td>1 14%</td>
<td>38</td>
</tr>
<tr>
<td><strong>Very Limited</strong></td>
<td>26 22%</td>
<td>3 15%</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td><strong>No Answer</strong></td>
<td>3 3%</td>
<td>1 14%</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>118 100%</strong></td>
<td><strong>20 100%</strong></td>
<td><strong>7 100%</strong></td>
<td><strong>145</strong></td>
</tr>
<tr>
<td><strong>Pre-defined checklists</strong></td>
<td>48 41%</td>
<td>14 70%</td>
<td>4 57%</td>
<td>66</td>
</tr>
<tr>
<td><strong>User-defined checklists</strong></td>
<td>54 46%</td>
<td>7 35%</td>
<td>3 43%</td>
<td>64</td>
</tr>
<tr>
<td><strong>Pull-down lists</strong></td>
<td>67 57%</td>
<td>12 60%</td>
<td>6 86%</td>
<td>85</td>
</tr>
<tr>
<td><strong>Text fields with limited text entry</strong></td>
<td>67 57%</td>
<td>13 65%</td>
<td>6 86%</td>
<td>86</td>
</tr>
<tr>
<td><strong>Text fields with unlimited text entry</strong></td>
<td>68 58%</td>
<td>12 60%</td>
<td>4 57%</td>
<td>84</td>
</tr>
<tr>
<td><strong>Import and Display documents and images?</strong></td>
<td><strong>Yes</strong></td>
<td><strong>No</strong></td>
<td><strong>Don’t Know</strong></td>
<td><strong>No Answer</strong></td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>88 75%</td>
<td>16 80%</td>
<td>5 71%</td>
<td>109</td>
</tr>
<tr>
<td><strong>No</strong></td>
<td>16 14%</td>
<td>4 20%</td>
<td>2 29%</td>
<td>22</td>
</tr>
<tr>
<td><strong>Don’t Know</strong></td>
<td>12 10%</td>
<td>0 0%</td>
<td>0 0%</td>
<td>12</td>
</tr>
<tr>
<td><strong>No Answer</strong></td>
<td>2 2%</td>
<td>0 0%</td>
<td>0 0%</td>
<td>2</td>
</tr>
<tr>
<td><strong>Word documents</strong></td>
<td>68 58%</td>
<td>12 60%</td>
<td>3 43%</td>
<td>83</td>
</tr>
<tr>
<td><strong>Excel documents</strong></td>
<td>41 35%</td>
<td>8 40%</td>
<td>4 57%</td>
<td>53</td>
</tr>
<tr>
<td><strong>PDFs</strong></td>
<td>50 42%</td>
<td>11 55%</td>
<td>3 43%</td>
<td>64</td>
</tr>
<tr>
<td><strong>JPEG/TIFF/RAW files</strong></td>
<td>82 69%</td>
<td>13 65%</td>
<td>4 57%</td>
<td>99</td>
</tr>
<tr>
<td><strong>Flash/moving-image files</strong></td>
<td>15 13%</td>
<td>3 15%</td>
<td>2 29%</td>
<td>20</td>
</tr>
<tr>
<td><strong>Proprietary analytical spectra</strong></td>
<td>19 16%</td>
<td>3 15%</td>
<td>1 14%</td>
<td>23</td>
</tr>
</tbody>
</table>

**Figure 22: Uses and capabilities of the software used in addition to a CMS**

*Figure 22* shows the capabilities of the software used in addition to a CMS, organized between commercial products and non-commercial systems. Whether use across departments was “exclusive,” “wide,” “limited,” or “very limited,” was fairly evenly distributed between all four. In terms of display formats for conservation documentation (pre-defined or user-defined checklists, pull-down lists and limited or unlimited text-entry fields), commercial products delivered an average of around 50% of each of these, fairly evenly. In-house, non-commercial systems delivered roughly the same proportion of formats (except for a much higher proportion of pre-defined checklists - 70% had them -
and a slightly lower proportion of the more-desirable user-defined checklists). A disproportionately smaller number of in-house, non-commercial systems built completely by outside developers, offer a larger proportion of pull-down lists and limited-text entry fields (86% for both). All systems were in the same range (70-80%) in their capability to import and display documents and images. Although the systems built by outside developers did better in displaying Excel documents and Flash/moving image files, commercial products and systems held their own, especially in displaying image files.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Don't Know</th>
<th>No Answer</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can you import and display documents and images on your software or system?</td>
<td>109</td>
<td>22</td>
<td>12</td>
<td>2</td>
<td>145</td>
</tr>
<tr>
<td>Can you edit, annotate or comment on imported documents/images</td>
<td>75</td>
<td>23</td>
<td>26</td>
<td>21</td>
<td>145</td>
</tr>
<tr>
<td>Can you import data from the CMS into your conservation database/software?</td>
<td>49</td>
<td>34</td>
<td>40</td>
<td>22</td>
<td>145</td>
</tr>
<tr>
<td>Any size restrictions?</td>
<td>21</td>
<td>16</td>
<td>69</td>
<td>39</td>
<td>145</td>
</tr>
<tr>
<td>Can you export back to the CMS?</td>
<td>30</td>
<td>45</td>
<td>42</td>
<td>28</td>
<td>145</td>
</tr>
<tr>
<td>Any size restrictions?</td>
<td>10</td>
<td>18</td>
<td>73</td>
<td>44</td>
<td>145</td>
</tr>
</tbody>
</table>

*Figure 23: Capabilities of all software, other than CMS, to import, export and edit materials.*

Continuing the consideration of software’s ability to import and display files, *Figure 23* shows the capabilities of software, other than a CMS, to import, export and edit materials. The chart shows that 75% of the 145 respondents using additional software can import and display documents and images. However, only 52% could “edit, annotate or comment on imported documents or images,” 33% could move data between the CMS and conservation database/software (28% didn’t know whether they could do this) and just 21% could export material back to the CMS (29% didn’t know). Most didn’t know whether there were size restrictions in importing or exporting from the CMS.

When it came to satisfaction with using non-CMS software, the majority of respondents were “quite” or “somewhat” satisfied (see *Figure 24*). One-third (33%) were “quite satisfied” with their ability to use retrieved text, while just 25% were “quite” satisfied with their ability to use retrieved images. The difficulty of successfully using and integrating images into conservation documentation appears one of the major currents of this report. Almost three-quarters (70%) of the 145 software users could generate
examination and treatment reports; 56% produce survey reports; 34% create loan reports and 27% analytical reports. Of the five types of reports, 14% of respondents create all five reports; 20% produce four; 18%, three; 21%, two; 13%, 1; and 14% produce no reports using the documentation system.

<table>
<thead>
<tr>
<th>Satisfied with your ability to use retrieved text-based documents?</th>
<th>Very</th>
<th>Quite</th>
<th>Somewhat</th>
<th>Not Very</th>
<th>Not at All</th>
<th>No Answer</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17</td>
<td>49</td>
<td>33</td>
<td>15</td>
<td>8</td>
<td>23</td>
<td>145</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Satisfied with your ability to use retrieved image-based documents?</th>
<th>Very</th>
<th>Quite</th>
<th>Somewhat</th>
<th>Not Very</th>
<th>Not at All</th>
<th>No Answer</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17</td>
<td>37</td>
<td>40</td>
<td>19</td>
<td>8</td>
<td>24</td>
<td>145</td>
</tr>
</tbody>
</table>

| Satisfied with the reports you can generate?                     | Very | Quite | Somewhat | Not Very | Not at All | No Answer | TOTAL |
|                                                                  | 18   | 44    | 42       | 15       | 9         | 17        | 145   |

<table>
<thead>
<tr>
<th>Satisfied with performance of this conservation documentation system?</th>
<th>Very</th>
<th>Quite</th>
<th>Somewhat</th>
<th>Not Very</th>
<th>Not at All</th>
<th>No Answer</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15</td>
<td>47</td>
<td>43</td>
<td>23</td>
<td>7</td>
<td>10</td>
<td>145</td>
</tr>
</tbody>
</table>

**Figure 24a: Satisfaction with capabilities of non-CMS software used in conservation documentation**

<table>
<thead>
<tr>
<th>Satisfied with usability of retrieved text-based documents.</th>
<th>Very</th>
<th>Quite</th>
<th>Somewhat</th>
<th>Not Very</th>
<th>Not at All</th>
<th>No Answer</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Satisfied with usability of retrieved image-based documents.</th>
<th>Very</th>
<th>Quite</th>
<th>Somewhat</th>
<th>Not Very</th>
<th>Not at All</th>
<th>No Answer</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Satisfied with the reports you can generate?</th>
<th>Very</th>
<th>Quite</th>
<th>Somewhat</th>
<th>Not Very</th>
<th>Not at All</th>
<th>No Answer</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Satisfied with overall performance of system?</th>
<th>Very</th>
<th>Quite</th>
<th>Somewhat</th>
<th>Not Very</th>
<th>Not at All</th>
<th>No Answer</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 24b: Satisfaction with capabilities of non-CMS software used in conservation documentation**
VI. Other Software and Systems

Figure 25: Number of reports by type generated by respondents
VII. Conclusion

Commercial non-CMS products have been vital in the development and advancement of digital conservation documentation and have made the sometimes mandated or desired use of a CMS possible. They offer flexible solutions that address the needs of specific departments and disciplines. However, there are still limitations in existing application functionality. For example, only half of those respondents using additional non-CMS software are able to “edit, annotate or comment on imported documents or images.” Many products offer flexibility, but they rarely achieve integration with the functions and capabilities of other museum departments.

Seventeen survey respondents indicated that they were “very satisfied” with the overall performance of their conservation documentation system; 10 were also “very satisfied” with three other measures: their abilities to retrieve and use text-based documents, image-based documents and to generate reports. The ten institutions are as follows:

<table>
<thead>
<tr>
<th>Institution</th>
<th>Staff</th>
<th>CMS</th>
<th>Other Software</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brooklyn Museum of Art</td>
<td>18</td>
<td>TMS</td>
<td>None.</td>
<td>No complaints</td>
</tr>
<tr>
<td>Cooper-Hewitt Museum</td>
<td>4</td>
<td>TMS</td>
<td>FileMaker Pro</td>
<td>Lack of integration</td>
</tr>
<tr>
<td>Jan Suberman Studio</td>
<td>6</td>
<td>Embark</td>
<td>Word</td>
<td>No complaints; little detail</td>
</tr>
<tr>
<td>Kelowna Museums Society</td>
<td>3</td>
<td>PastPerfect</td>
<td>Word</td>
<td>Rarely use reports</td>
</tr>
<tr>
<td>Museum of Fine Arts, Boston</td>
<td>38</td>
<td>TMS</td>
<td>Extensive</td>
<td>No complaints</td>
</tr>
<tr>
<td>National Palace Museum, Taiwan</td>
<td>9</td>
<td>NonCommercial CMS</td>
<td>NonCommercial</td>
<td>No detail</td>
</tr>
<tr>
<td>Philadelphia Museum of Art</td>
<td>30</td>
<td>TMS</td>
<td>NonCommercial</td>
<td>No complaints</td>
</tr>
<tr>
<td>Strong Museum of Play</td>
<td>3</td>
<td>Argus</td>
<td>None.</td>
<td>No detail</td>
</tr>
<tr>
<td>U.S. Army Heritage &amp; Education Center</td>
<td>8</td>
<td>CDS</td>
<td>Excel</td>
<td>Limited; survey reports only; no large images; not robust</td>
</tr>
<tr>
<td>Virginia DHR - State Archaeologist's Office</td>
<td>2</td>
<td>NonCommercial CMS</td>
<td>Access</td>
<td>Awkward; limited; not integrated with Dept’s CMS</td>
</tr>
</tbody>
</table>
The fact that only 5-8% of the respondents were “very satisfied” demonstrates that much work remains to be done to provide robust tools that successfully meet the user requirements of the profession. This also explains why so many methods are being employed or developed. As the digital “steamroller” continues, there is a great deal of experimentation and research underway which must take into account the complexity of the information, the variability of the work, institutional and professional culture, skill sets, and resources of the users, as well as the need to balance the plusses and minuses of commercial, non-commercial, and open source solutions.

While most survey respondents are looking for a shared enterprise solution to help in managing documentation and related workflow, it is apparent (and should be stressed) that conservators and scientists working in different disciplines and in different museum or institutional structures have different documentation needs. The frustration expressed by respondents with existing tools (in particular with CMS’s that are widely installed and have become the application of choice for nearly all other documentation of works and collections) reflects the desire to increase digital activity in an environment that increasingly favors greater access to and interchange of information. One participant accurately summed up this conflict: “individual solutions created within local conservation departments meet the needs of those conservators more precisely than might be possible with a standardized solution. However, the drawback of a lack of integration and common standards among individual departments is rapid obsolescence, endangerment of the data contained in the systems and, in the case of many homegrown database designs, poor understanding and execution of database design principles.” In the concise analysis of a participating scientist, “we need a unified system that would actually allow us to display and manipulate data and text information without having to resort to multiple programs.”

While several of these systems are too specific or customized to be adopted wholesale, the examples of the Brooklyn Museum of Art, the Museum of Fine Arts, Boston and the Philadelphia Museum of Art provide important models for the field. The British Museum’s Merlin system, currently undergoing considerable redevelopment also serves as an important example. Common to each is an institutional understanding of the impact that well-documented and integrated conservation information has on the quality and depth of a museum’s knowledge about its collections.
It is clear from the survey results and from supplemental in-depth information gathered from selected institutions (see Appendix A) that the most successful digital conservation documentation systems are flexibly designed, usually with significant input from conservators and scientists, have strong technical support, and have dedicated funding and staffing. Not only does a smart, flexible, and standards-based conservation documentation system have implications for individual practitioners, conservation departments (or a collection of units within a larger department), it could also broadly affect institutional practice, the conservation field, and, eventually, the general public’s understanding of conservation and technical study.
Site visits were made to three institutions with different software responses to the challenges of creating a software architecture for the management of conservation documentation. All were built in some relation to TMS: the first created modules to enable TMS to work more flexibly; the other two created stand-alone databases and systems that pulled material from TMS, or linked to it and, to a certain degree, returned some information to TMS.

Museum of Fine Arts, Boston.
May 16, 2008

1. Introduction
TMS was introduced at the MFA, Boston, in 2000 as the result of a continuing effort to unite and unify formerly disparate collections information from across the museum (including conservation documentation). Now TMS is the core database within the more capacious ARTEMIS, which is the museum’s CMS, and is part of the museum’s intranet, which among many other things includes access to conservation and scientific request forms, conservation photography request order forms, and CAMEO (the Conservation and Material Encyclopedia Online, (also on the Museum’s public website). At the time of writing, TMS includes some 113,980 conservation surveys, with 169,144 sub-reports (of which 18,223 are treatment reports linked to 75,191 object records and 57,586 conservation image files linked to 10,337 treatment reports.

2. System Design
The native TMS conservation module (five tables of 45 fields) is amplified by a number of plug-in modules that add extra material, functionalities or survey-specific fields, stored in separate tables but linked to the TMS system. Plug-ins include a 10,000-item textile survey (not part of TMS but drawing tombstone information from it); an “Image Saver,” allowing conservators to download images to their desktop, either individually or in “object package” batches; an “Archive Card” format (replicating the appearance of traditional cards, but rarely used today); and a Batch Fixer (more specific and flexible than the one that comes with TMS) for editing batches and object packages.
3. Data Entry
Since TMS was brought online, an enormous amount of data has been entered from many formats, either directly into TMS, or as media files linked to object records. Data entry is a shared responsibility of the collections management staff and individual conservation department staff (who initially resisted but now accept doing it).

Auxiliary tools, mostly Excel spreadsheets and Access databases are frequently used to get data into and out of TMS. Image files, stored as media objects that can be linked to objects in the object module, are prepared and loaded onto the system through a batch-loading program using Excel spreadsheets. “Curatorial snapshots” (reference-only thumbnails with notes) are allowed, but staff have to follow extensive procedures to ensure images are not accidentally viewable on the Web (they have to complete a spreadsheet and drop in a folder for Collections Management to upload).

Controlled Fields, Survey Types and Line Items
The Museum has developed a controlled list of 24 Survey Types, each with its root (yellow) folder in TMS. Within each folder, surveys are dated, each containing “line items” – 44 designated activities carried out in that survey (e.g., Treatment Report, Installation/Deinstallation) - with objects described by a set of predetermined “Overall Conditions” (from “Excellent” to “Should Not Travel”).

4. Reports
According to several of the conservators, one of the system’s best features are its Crystal Report capabilities that allow for a large variety of custom forms to organize display and print data. These reports are crucial to the work of the conservators and are constantly being run. The Museum has two report writers on staff and a very large collection of Crystal Report formats. The Crystal Report templates are very clear and readable and the reports very effectively pull material together from all modules. “A lot of our organizational strength comes from being able to run reports.” They are quite satisfied with their report capabilities which allow for a large variety of custom forms to display and print data. To simplify report writing, twenty “F” function keys can be assigned standardized phrases by users, to enable rapid insertion of frequently used text.
5. Images
Individual conservators cannot upload images. The Collections Management staff has this capability, working in close consultation with conservation staff to determine accurate location and links. All sizes of images are available within the system, including large TIFF images, although the default is to display a small JPEG. Any kind of file can be attached, even CADs can be viewed. A database of X-rays is included in TMS and currently X-rays are being scanned and included as images with that database.

Conservators can “annotate” images when necessary by drawing on them in Photoshop, but that information will not be searchable. Conservation images are secure; if curators need a conservation image they have to make a request of the conservation department that made the image.

6. Scientific Reports
The Scientific Research Laboratory is not as fully controlled and integrated with other collections documentation. Its Filemaker Pro database was established in 1999 and registers an average 200 projects a year, each with its own report. Earlier reports from the 1980s are scanned in as Word documents. The database stores the summaries of the lab’s research and the locations of physical samples and datasets, so it’s relatively easy to go back and look at the original data. These summaries are pasted into TMS object records.

The data from the instruments used in research in most cases can be interpreted only by the proprietary software on those machines. Questions arise about what happens to the raw data when the machines or their computers attached are replaced, and how important is it to save that data as well as the interpreted results (graphical or numerical reports from the original analysis).

7. Other Information
The Museum is very committed to ensuring the information systems work effectively and to provide extensive support: four database specialists assist with report writing; a dedicated programmer maintains plug-ins; Keith Lawrence, a trained photographer, trains conservation staff in using the system and is available for maintaining and managing conservation documentation.
Philadelphia Museum of Art

March 28, 2008

1. Introduction
The PMA’s Conservation Tracker System, or “Tracker” was conceived in 1997 as an electronic means to create a comprehensive conservation record-keeping system that would integrate or at least interface with TMS, purchased that year. The goal was to allow conservators to enter, store, search and retrieve conservation records, with supportive media, such as photographs, x-radiographs, and IRR results, and to enable them to become an integral part of the Museum’s information on every object - linked to TMS so that key object information could be imported and key conservation-related material could be exported back to TMS for general museum use. Tracker was designed to be flexible and adaptable, so that other institutions could adapt and customize it with or without TMS.

The version of Tracker observed on the site visit in March 2008 was Version 3, Phase 1, due for completion in June 2008. Plans for Phase 2 included a web-based user interface, and well-developed and documented Application Programming Interfaces to allow the system to interface easily with many other systems. Phase 2 is now complete.

2. System Design
The system is designed to work on the Windows based operating system (2000, XP or Vista). The system uses Microsoft SQL Server as the database backend but could easily use Oracle, MySQL or some other database type. The user interface was programmed in Microsoft Visual Studio 2008 using the VB.Net programming language along with third party controls from Developers Express. The system integrates with MS Word, for formatting, spell checking, etc., and a report design and printing feature from Developers Express.

One compelling aspect of the system’s design is the use of a data dictionary that enables the customization of screens, without complicated programming. Information in Tracker can be filtered by the departments’ areas of specialization (Analytical; Furniture; Objects; Paintings; Paper; Photography; Textiles). Much of the system is report-oriented: standard
conservation reports (Examination, Treatment, Loan Exams; Technical Report Summary) and workflow reports (Photography Log; In/Out Log; Technical Request). A “Project” feature groups reports around an organizing event – such as a survey, exhibition or loan. “Tasks” allows conservators to track pending object-specific tasks by due date. The Conservation Summary Screen is a completely automated screen that extracts selected information from reports. A valuable feature for high-volume labs is the extraction of notes about condition checks and very minor treatments into a chronological conservation history in the Conservation Summary screen. Flexible filtering and sorting of yearly records help produce more accurate statistics for annual reports.

3. Data Entry

Static “tombstone” information is imported from TMS into each report screen (Artist/Maker; Accession Number; Title/Object Name; Object Date) and can be edited (but intentionally is not updated from TMS in order to “archive” information in reports at the time of their creation). The Conservation Summary screen will be used to export select
information to TMS to export including the list (with abstracts) of past conservation reports for each object, project history, as well as notes on fragility or special handling requirements, technical descriptions, and condition checks so that this information can be viewed on TMS by curators, registrars, art handlers, etc.

Version 3 eliminates the tight coding of conservation sections that characterized the previous version of Tracker and implements a common code-base allowing lab sections to be added or pulled from the system with comparative ease. The design should also make it much easier to modify the system for conservation departments with configurations that differ from PMA’s.
A new interface has been developed that allows multiple forms to be opened at once using a tabbed presentation. The user clicks on virtual index card tabs to bring different forms to the foreground. This allows users to quickly navigate among many different records and data types and to view information at a summary level with immediate access to detailed information.

4. Reports
Reports are generated with the Report Designer from Developers Express that is embedded in the end user application, thus enabling non-programmers to design and add new report options for use by conservators. Standard reports have been developed for each lab, and reports can easily be customized using a set of Tracker templates. Phase 2 added a standard report approach that allows minor format modifications for different labs, without having to rewrite the format for every lab. The new system also allows different modules to be developed that can be added or pulled from the system with comparative ease. The new version of the software also allows searching across all reports for all divisions and filtering, based on criteria that can be selected from a drop-down list (original record source; report type; date; whether signed). All reports on a given object will also be able to seen together (either on different tabs or different windows).

5. Images
All color photographic documentation is digital, while black-and-white is still done chemically (this includes X-radiographs). All digital images are stored on a separate server (in folders by year and sub-folders by accession number), and staff has developed a nomenclature normalizing the accession/loan number for an object by zero-filling and standardizing on length [date/treatment stage/view 1/view 2/light/image number/frame status/accession number]. Color images may be viewed through Tracker. In the case of X-rays, black-and-white images of the original x-rays can be viewed.

Reports automatically include a thumbnail image of the object. Conservators can also embed images in reports, attach diagrams stored within the database and image files stored on the external server.
6. Scientific Reports

Scientists have their own database(s) for their analyses, the results of which they summarize and post on the Technical Reports Summary Screen of Tracker. Report Filename and Report Pathname fields allow reference to analytical results and more detailed reports. There is also a Technical Request Screen that allows conservators to enter requests for technical analysis, which are printed and submitted in hard copy to the conservation scientists.

7. Other Information

Among future features being developed is a survey function with a customizable survey screen and the ability to access survey material in external databases.

Currently the system works with several external software applications including MS Word (fields throughout Tracker can use MS Word’s formatting and Spellchecker functions), as well as Word’s drawing tools for annotating diagrams. Individual, rich text fields or an entire report can open up in MS Word for easy viewing or text entry, or
Report Designer from Developers Express, for printing in customizable, defined templates and for exporting to MS Word, Excel or RTF files. One of the next steps is to develop the ability to calculate light exposure based on exhibition history.

Figure 4. Tracker: Technical Report Summary Screen
Straus Conservation Center, Harvard Art Museum

May 16, 2008

1. Introduction
The Straus Conservation Management System (SCMS) is used to manage conservation activities at the Straus Center for Conservation, at the Harvard Art Museum (which incorporates the Fogg Museum, the Busch-Reisinger Museum, and the Arthur M. Sackler Museum).

2. System Design
Built with Java, and using Ajax, the Straus System is a modular, web-based system, accessible from any online computer. The Harvard Art Museum has developed its own conservation database schema, hosted on SQL Server, the underlying relational database management system (RDBMS), but could run on Oracle, MySQL, or other RDBMS servers. This simplifies future integration with many other systems.

3. Data Entry
The system is linked directly to TMS but, unlike Tracker, doesn’t import any TMS data. Tombstone data viewed in the screen is live from TMS and if it is changed (in TMS), this will be reflected in the Straus system as well. Data that appears in reports, which are produced as XML documents that can be generated as PDFs, are stored in the conservation database (in XML format), and can be regenerated when the underlying data is modified.

The Straus system has the ability to update the conservation fields in TMS (in a way that Tracker is planning to do) for viewing by curators or other departments). While this feature means that the object information is as current as that in the CMS, it also means that the conservation database is dependent on the CMS: a record must be created there before a record can be created in the conservation system. One solution might be that a placeholder record be created with the standard TMS system number as the key and, as this value is used as the key field linking the system to TMS, the link would not break when accessioning information is added.

4. Reports
Four reports are produced: Proposals, Treatments, Invoices, and Condition Reports. In addition “Data Mining” reports (standardized tabular format reports) are generated from
ad-hoc queries created with a query building tool. Reports are fully incorporated into the database in a variety of structured and free-text fields. Output can be generated by creating a PDF report using IText, an Open Source library for manipulating various format files in Java. In this case, data resulting from a query is exported as XML file and formatted as PDF. The PDF may be saved as a permanent report or regenerated as needed. Crystal Reports, one of the most popular SQL search utilities that formats output and is used by many conservation departments, is also supported.

5. Images

The system is now capable of associating images with projects as part of a larger Museum-wide project to implement digital asset management.

It also allows the user to annotate digital images by placing a text box anywhere on the image. The areal location (x, y coordinates) of the annotation is stored in a separate database so that annotations can be indexed and searched in a standard database query and can retrieve the marked-up images. Although this is a powerful concept, reviewers felt that free-hand markings should also be possible. The system also allows zooming of particular area of the image by hovering mouse cursor on the target area.

6. Scientific Reports

Modules for conservation scientists are being refined. However, with the Analytical Document Search Engine, the system is now capable of attaching analytical PDF documents to a particular project and to enable advanced search within the documents. Users are able to search for documents within a single project or in all projects in the conservation database.
7. Other Information
All work done on the system is defined as a “project,” either a treatment, consultation or investigation. A given project can contain multiple services (consultations, investigations or treatments) for a given artwork or group of related artworks. On the Project screen choosing a project activates a different set of choices on drop-down menus.

The Straus system now provides the ability to check the spelling of text entered by conservators when describing an artwork, treatments, investigations or consultations. It also incorporates a sophisticated means for tracking supplies and expenses, necessitated by the amount of contractual work the Straus conducts for outside organizations and individuals. While not critical to most institutions, this feature deserves examination for modeling a general conservation system, since, by some accounts, most conservation is carried out by independent contractors.
IX. APPENDIX B: Survey Instrument

Mellon Foundation Museum Conservation Documentation Survey

1. Introduction

The Andrew W. Mellon Foundation has launched a study of the ways in which institutions use digital technology to record conservation documentation. Some museums do this within a collections management system (CMS) or are developing systems or modules that work with the CMS. Others may not have a CMS; some manage the documentation independently, whether by design or circumstance. While this study is set within the context of a larger Mellon Foundation project assessing the opportunities, challenges, and implications of digital documentation, this survey of conservation departments worldwide is designed to discover what tools and procedures are being used to manage conservation and associated scientific documentation in digital form.

Further details on the Mellon Foundation's Conservation Documentation in Digital Form initiative can be found on the Foundation's Issues in Conservation Documentation webpages.

GOAL OF THE SURVEY

The goal of our study will be to use the information gathered to encourage and assist in the development or improvement of systems that can be more responsive to the needs of conservators; and to inform the community about any such developments already under way. Please contact me if you have any questions.

WHO SHOULD TAKE THIS SURVEY?

We invite all who document objects, analysis, treatments and other processes in museum, library, or archive conservation and science departments, or who use such documentation in their work, to complete this survey. We estimate that it should take 20-25 minutes to complete.

Responses from several individuals within a single conservation department are welcome, particularly if the department is divided into specializations (e.g., objects, paintings, paper, etc.). For individuals in larger conservation operations, we ask that you approach the questions from the local perspective of your most immediate division or unit rather than try to give a global overview of institutional practice.

NOTE: The deadline for completion has been extended to Noon (Eastern; 5pm GMT) on Friday June 20.

Thank you very much for your participation.

David Green
Principal, Knowledge Culture Consulting
On behalf of the Museum Program of the Andrew W. Mellon Foundation

2. Institutional Information

We begin with some initial information about the conservation or science department or unit in which you work. Please be assured that all identifying information will be kept strictly confidential to the staff conducting the survey.

* 1. Name of institution (this response is required in order for you to proceed to the next page of the survey)

2. Your title

3. Name of the specific department or unit in which you work.
Mellon Foundation Museum Conservation Documentation Survey

4. Principle function of the department or unit in which you work.
- Conservation
- Science
- Other (please specify)

5. Number of staff in the department or unit in which you work.
- Full-time Conservators or Scientists
- Part-time Conservators or Scientists
- Fellows
- Administrators full-time
- Administrators part-time
- Technicians full-time
- Technicians part-time
- Interns
- Other

6. Professional specializations within your department. Please check ALL that apply.
- Architecture
- Archaeology
- Book and Paper
- Electronic and Time-based Media
- Furniture
- Objects/Sculpture
- Paintings
- Photography
- Research/Technical Studies
- Textiles
- Modern and Contemporary Materials
- Biology
- Chemistry
- Physics
- Materials Science
- Other specializations, or comments on your selections.

3. Conservation Documentation Formats

In this section, we ask about the formats of the materials used to generate and store documentation of scientific or conservation activities. Questions 1-3 ask about text-based documentation; questions 4-7 ask about image-based materials.
Mellon Foundation Museum Conservation Documentation Survey

1. Which text-based formats are used for current scientific or conservation documentation? Please check all that apply.

- Free-text, manual (i.e., paper and pencil)
- Paper form with text and pre-defined fields (e.g., check boxes)
- Paper form with only check boxes
- Digital text, (e.g. Microsoft Word documents, PDF documents)
- Direct digital entry into spreadsheet or database
- None

Other, or Comments

2. Is any of your department's current analog (i.e. non-digital) text-based documentation subsequently converted into digital form?

- All
- Almost all
- Some
- None
- Not applicable (all text-based documentation is in digital form).

3. Of the text-based documentation currently produced in your department, what overall percentages would you estimate are in the following formats:

- analog %
- digital %

4. Which image-based, analog formats are currently produced within your department for scientific or conservation documentation? Please check all that apply.

- Silver gelatin black-and-white photographs
- Color photographs, or printed hard copies (whether from analog or digital originals)
- Slides/transparencies
- Video tape
- X-radiographic film
- Infrared reflectogram assemblies
- Analytical equipment output (data, spectra, etc.)

Other analog material (please specify)

Page 3
Mellon Foundation Museum Conservation Documentation Survey

5. Is any of your current analog, image-based documentation subsequently converted into digital form?

- All
- Almost all
- Some
- None

Any comments on digitization of current image-based documentation?

6. Which image-based digital formats are used within your department for scientific or conservation documentation? Please check all that apply.

- Digital photographs (visible light, ultraviolet, infrared, etc.)
- Digital X-radiographs
- Digital infrared reflectograms
- Analytical equipment output (data, spectra, etc.)

Other digital formats (please specify)

7. Of the image-based documentation currently produced in your department, what overall percentages would you estimate are in the following formats:

- analog %
- digital %

8. How are the digital files used in your department backed up? Please check all that apply.

- Printed out on to paper
- Backed up onto CD
- Backed up onto DVD
- Backed up onto departmental hard-drive
- Backed up by Information Technology department
- Don’t Know

Other (please specify)
Mellon Foundation Museum Conservation Documentation Survey

9. How frequently are the backups made?
   - Daily
   - Weekly
   - Don't Know
   Other (please specify)

4. Digitization of Conservation Information - Legacy Information

In this section, we ask questions about whether your department digitizes legacy documentation (i.e., from an earlier period) or is considering doing so.

1. Does your department or unit currently digitize text or image-based scientific or conservation documentation from the past (i.e. legacy documentation)?
   - Yes
   - No (then please go to question 5 below, on this page)
   - Don't Know

2. If so, is it one or both of the following?
   - Systematic
   - Occasional

Please comment or explain, especially if you checked both options

3. Please briefly explain the policy or the basis for decisions to digitize legacy documentation.

4. Are the original documents preserved and/or archived?
   - Yes
   - No
   - Don't Know

If so, please tell us what you know about the preservation effort. For example, whether the department collaborates with museum archivists or librarians.
8

**Mellon Foundation Museum Conservation Documentation Survey**

5. This question is for those not currently digitizing legacy documentation. If resources became available, would you develop or expand a plan to digitize legacy documentation?

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<tbody>
<tr>
<td>1.</td>
<td>Yes: we would want to digitize all legacy material</td>
</tr>
<tr>
<td>2.</td>
<td>Yes: we would want to selectively digitize some legacy material</td>
</tr>
<tr>
<td>3.</td>
<td>Maybe: even with additional resources, digitization of legacy material would not be a high priority</td>
</tr>
<tr>
<td>4.</td>
<td>No: we would not want to digitize any legacy material</td>
</tr>
</tbody>
</table>

Please comment on your selection, especially if you selected No.

5. **Using A Collections Management System (CMS)**

In this section we ask questions about the collections management system (CMS) used by curatorial and other departments of the institution, and to what extent the conservation and science departments have access to it. We open with two questions on whether your institution uses a Digital Asset Management system (DAM), to store and manage digital images and other materials.

1. **Does your institution use a Digital Asset Management (DAM) system (i.e. a digital image or media database)?**

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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Yes</td>
</tr>
<tr>
<td>2.</td>
<td>No</td>
</tr>
<tr>
<td>3.</td>
<td>Don't Know</td>
</tr>
</tbody>
</table>

2. **If so, what is it (e.g., MediaBin, Canto Cumulus, Artesia TEAMS, DSpace, etc.)?**

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<th></th>
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</thead>
</table>
Mellon Foundation Museum Conservation Documentation Survey

3. Does your institution use a Collections Management System (CMS)? If so, what is it?
   - No (then please go to next page, click "Next" at bottom of this page)
   - Don't Know (then please go to next page, click "Next" at bottom of this page)
   - Adlib
   - Argus
   - EmBark
   - KeEmu
   - MultiMimsy
   - PastPerfect
   - The Museum System (TMS/CEMS)
   - A non-commercial or in-house system

   Another commercial system (please specify)

4. If you checked the box for "a non-commercial or in-house system" above, why was it developed?

5. If your institution has any kind of Collections Management System, how much access to it do you and the colleagues in your department have?
   - All of it
   - Some sections
   - None

   Please tell us more:

6. Does the Collection Management System contain any sections intended or designed for scientific or conservation documentation?
   - Yes
   - No
   - Don't Know
### 7. If so, in what form? *Please check all that apply.*

- As summary information in limited text boxes
- As full records in unlimited text boxes
- In fields, defined by the system, that you can change
- In fields, defined by the system, that you cannot change
- As imported Word documents
- As imported Excel documents (or other spreadsheets)
- As imported PDFs
- As other imported documents

Other (please specify)

---

### 8. Do you use the Collections Management System for scientific or conservation documentation in your institution?

- Yes (see question 9)
- No (see question 10)
- Don't Know

### 9. If so, is it used:

- Exclusively - throughout the institution by all conservators/scientists
- Widely - by some conservation/science departments or specialties
- Limited - by your department or unit only
- Very Limited - by you and/or only a few others

Please comment further on your answer above.

---

### 10. If not, please elaborate on the reasons why you and/or your department decided not to use the CMS?

---

### 6. Managing Conservation Documentation: Other Systems

In this section we ask if your institution uses any software, modules or systems, other than the CMS, to manage scientific or conservation documentation.
Mellon Foundation Museum Conservation Documentation Survey

1. Do you use any software, database or system, other than the CMS, to manage scientific or conservation documentation?
   - No (if no, please go to the next page)
   - Yes, a non-commercial system developed and built entirely in-house
   - Yes, a non-commercial system developed in-house, but built by outside developers
   - Yes, a non-commercial system developed and built entirely by outside developers
   - Yes, a commercial product like MS Word, FileMaker Pro, Access? (If so, please go to question 3.)
   - Don't Know

If you use a commercial product (like MS Word, FileMaker Pro, Access, etc.,) which one is it?

2. If you use a non-commercial system, was it built using commercial or open-source software?
   - Commercial: please state which kind (Filemaker Pro, Access, Don't know)?
   - Open-Source: please state which kind (e.g. mySQL, PostgreSQL, db.*, wiki, Don't know)?

3. Is the software or system used:
   - Exclusively - throughout the institution by all conservators/scientists?
   - Widely - by some conservation/science departments or specialties?
   - In limited ways - by your department or unit only?
   - In very limited ways - by you and/or only a few others?

   Please comment further on your answer above.

4. If you use a database or system to manage scientific or conservation documentation, which of the following does it contain? Please check all that apply.
   - Pre-defined checklists
   - User-defined checklists
   - Pull-down lists
   - Text fields with limited text entry
   - Text fields with unlimited text entry
**Mellon Foundation Museum Conservation Documentation Survey**

**5. Can you import and display documents and images on your software or system?**

- Yes
- No
- Don't Know

**6. If so, in which formats?**

- Word documents
- Excel documents
- PDFs
- JPEG/TIFF/RAW files
- Flash or other moving image files
- Proprietary analytical spectra

Other (please specify):

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Don't Know</th>
</tr>
</thead>
</table>

**7. Can you edit, annotate or comment on those imported documents/images?**

- Yes
- No
- Don't Know

Comments?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Don't Know</th>
</tr>
</thead>
</table>

**8. Are you satisfied with your ability to use those retrieved documents?**

<table>
<thead>
<tr>
<th>Very</th>
<th>Quite</th>
<th>Somewhat</th>
<th>Not Very</th>
<th>Not At All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documents</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**9. Are you satisfied with your ability to use those retrieved images?**

<table>
<thead>
<tr>
<th>Very</th>
<th>Quite</th>
<th>Somewhat</th>
<th>Not Very</th>
<th>Not At All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image-based files</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
VIII. APPENDIX B: Survey Instrument

Mellon Foundation Museum Conservation Documentation Survey

10. Can you move data between the CMS and your conservation database or other software?

<table>
<thead>
<tr>
<th>Can you import data from the CMS to your software?</th>
<th>Yes</th>
<th>No</th>
<th>Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are there import size limitations?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can you export back to the CMS?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there export size limitations?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If there are any size limitations, what are they?

11. What kinds of reports can you generate from the database? Please check all that apply.

- Survey
- Examination
- Treatment
- Loan
- Analytical

Other (please specify)

12. How satisfied are you with the reports you can generate?

<table>
<thead>
<tr>
<th>Satisfied?</th>
<th>Very</th>
<th>Quite</th>
<th>Somewhat</th>
<th>Not very</th>
<th>Not at all</th>
</tr>
</thead>
</table>

How could reporting be improved?

13. Which of the following is most relevant to how you use your conservation documentation database/system? Do you use it primarily to:

- Initiate, implement, measure and report on conservation workflow activities, or
- Record and archive completed analysis/treatments?

Other (please specify)

14. How satisfied are you with the performance of this conservation documentation system?

<table>
<thead>
<tr>
<th>Satisfied?</th>
<th>Very</th>
<th>Quite</th>
<th>Somewhat</th>
<th>Not very</th>
<th>Not At All</th>
</tr>
</thead>
</table>
### Mellon Foundation Museum Conservation Documentation Survey

15. With which aspects of your current system are you most satisfied?

16. With which aspects of your current system are you least satisfied?

17. Do you have access to IT staff?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

If not, how is the system managed?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>

### 7. Contact Information

*Privacy Notice:* All material will be kept strictly confidential. Unless you agree otherwise, your name and your institution will not be shared or mentioned beyond the administrators of this survey in correspondence or in the final report. However, we hope you will agree to be part of this ongoing international discussion. Supplying your email address and telephone number is optional. This information is only requested for follow-up contact and will not be shared with any other entity.

1. Please indicate your

<table>
<thead>
<tr>
<th>Name(s) (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Email Address (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Telephone Number (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

2. Are you willing to be contacted for further information?

<table>
<thead>
<tr>
<th>Yes</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>No</th>
</tr>
</thead>
</table>