



The Art Institute of Chicago  
Department of Architecture

**Collecting, Archiving and Exhibiting  
Digital Design Data**

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# Executive Summary

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## Background

The curatorial Department of Architecture of The Art Institute of Chicago contains one of the foremost collections of architectural drawings in the United States. The Department's *Unbuilt Chicago* exhibition opened in April 2004, presenting drawings, renderings and physical models from this permanent collection. Today, unbuilt projects leave little physical evidence. Documentation is purely digital: onscreen drawings, renderings, animations, and digital collages.

To address this issue, the Department of Architecture undertook in 2003 the *Collecting, Archiving and Exhibiting Digital Design Data* study to identify requirements for creating and maintaining an archive of born-digital objects. Kristine K. Fallon, FAIA, was principal investigator. The Schiff Foundation and the Graham Foundation for Advanced Studies in the Fine Arts provided funding. The study's Advisory Committee consisted of senior representatives of leading archival institutions, universities with advanced programs in computer-aided design, and technology vendors, as well as architects and industrial designers, many of whose work is already included in the Department of Architecture's permanent collection.

It is hoped that this study will provide useful guidance, not only for The Art Institute of Chicago, but also for other museums and architectural archives facing similar challenges.

## Current State of Digital Design Tools and Data

The first step was to understand how design firms are currently using digital design tools, what types of digital design data are being produced and how central digital design data are to an understanding of the design process. To accomplish this, we conducted in-depth case studies of projects ranging in scale from industrial design to urban design at nine design firms. All nine case studies are documented in detail in this report. We discovered that digital design tools have become an essential part of the design process and that digital images are central to design decision-making. Many digital images that document key design ideas are never committed to paper, particularly if they are created very early in the design process, or if they are created for a project that is never completed or for an unsuccessful competition entry. If museums and archival institutions cannot preserve this digital data, society will lose these important cultural records.

The next step was to validate that our findings in the case studies could be extrapolated to the broader design community. To do this, we conducted an international survey, asking design firms how they used digital design tools, how important the tools were to their practices and which products they used. Over one hundred design firms responded. Although our case study participants were somewhat more aggressive in the adoption of digital design tools, the survey confirmed the trends identified in the case studies. The survey findings are detailed in the report as well.

These efforts provided a critical insight: although designers use many, many digital tools in producing their work, it is possible to identify "outputs"—images or other digital artifacts that the designer chose to communicate to his/ her team or client. Despite their varied parentage, these outputs can be completely described in a handful of data formats. We suggested a "two-tier" collection, with these outputs comprising the accessioned tier and the related native data from which the outputs were derived as a secondary study collection.

## Archiving Practices and Technology

With this background information in mind, we conducted research into prior archiving projects and existing standards, methodologies and products for collecting and archiving digital design data. We found that no museum or archival institution had solved the key problem in archiving born-digital design data: ensuring long-term preservation of the numerous and rapidly changing data formats. The two-tier collection, described above, is a feasible solution.

Based on the Open Archival Information System (OAIS) reference model for a long-term data repository system (ISO 14721:2002), we identified six distinct stages of the workflow for bringing digital design data from design office to museum archive and for making it accessible to the public. These six stages are: *Preparing, Collecting and Processing, Cataloging, Storing, Preserving, and Accessing* digital design data. In this report there is a chapter devoted to each topic. Available technology permits long-term functional (i.e., the data can continue to be used as intended) preservation of outputs and bit-level (i.e., the sequence of bits in the data file) preservation of the native data. Coupled with metadata that provide a complete description of the hardware and software environment in which the data were created, bit-level preservation allows for downstream digital archaeology of the native data: A researcher would be able to resurrect the data in an emulated environment, if the content were of sufficient interest.

## Implementation

This report contains recommendations on procedures and technology for each of the six stages, as well as resource requirements and a start-up plan. Most importantly, outputs, digital tools and archiving technology can be expected to change. New archival formats for outputs are already emerging. An institution beginning a digital design collection must realize that there will be a need to review and revise on a periodic basis the technical details of collecting, archiving and preserving new generations of digital design data. This is especially imperative within the Museum setting where the mission is to preserve documentation indefinitely.

## Looking Forward

New technologies are emerging for both producing and exhibiting digital design data, and this report includes a survey of some of the more promising and provocative. It also documents the study's culminating design charette at which the members of our Advisory Committee spent a day developing concepts for a museum exhibition incorporating digital design data.

## Additional Useful Information

In addition to an annotated bibliography, the appendices contain a useful *Glossary* of the terminology used in the report. The *Digital Design Tools Directory* describes the large number of digital tools mentioned in the study. Although these descriptions are based on information provided by the vendors and does not represent independent evaluation, we believe the descriptions are useful.

## Acknowledgements

Finally, we draw readers' attention to the *Acknowledgements* in the introductory section. This study would not have been possible without the thoughtful input of literally hundreds of participants.