

CASE 7

Standards and Standards Development: The Development of Digital Records Conversion Process (ANSI/ARMA 16-2007)

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ISSUE: Standards and best practices have been identified as critical resources in the management of electronic records. What is the role of standards and best practices in RIM? If standards are critical to managing electronic records, how can archivists and records managers better participate in the process? Are current standards development processes collaborative in nature? How well does the process bring together the right expertise and technical skills to effectuate a standard that reflects current theory and practice? This case study examines the development of the DRCP in response to these questions.

KEYWORDS: Data format issues, Data integrity issues, File format issues, Implementation planning, Metadata, Recordkeeping systems, Standards

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The Digital Records Conversion Process: Program Planning, Requirements, Procedures (ANSI/ARMA 16-2007) is the most recent standard developed by ARMA International's Standards Development Committee (SDC).¹ With the rapid changes in information technology, professionals recognize that records born digitally will need to be converted from one medium, format, or information system to another in order to maintain their accessibility over time. The challenge is to insert recordkeeping requirements into a technical process in order to ensure that electronic records remain authentic before, during, and after the conversion process. The Digital Records Conversion Process Standard (DRCP) provides a resource for records professionals on the planning considerations, requirements, and necessary procedures to ensure authentic records. The development of the DRCP provides an opportunity to examine the role of standards and the standards development process within the records and information management, or RIM, community. This case study focuses on the process of standards development. It discusses the role of—and need for—RIM standards, the challenges inherent in the current process, and the need for a more collaborative approach to standards development.

Background

In 2001, the ARMA SDC approved the creation of the Conversion / Migration Criteria for Recordkeeping Systems Task Force. Both archivists and records managers were part of the task force in recognition that the conversion process is vital to the practices of both professions and that a collaborative strategy to develop standards in this area would be beneficial.

After two years of struggling to get the project off the ground, work ceased for two major reasons. First, the project lacked a focus. As originally conceived, the scope of its work was too broad, which made it difficult for task force members to break off logical pieces of the topic and work on them. Secondly, it was clear that standards development projects relating to electronic records management issues were complex and needed someone who could become immersed in the topic and work on it with some consistency. Not wanting to totally drop the conversion process initiative, the ARMA SDC in 2003 discussed strategies to secure funding for the project. One of the potential funding sources identified by the SDC was the National Historical Publications and Records Commission (NHPRC) Electronic Records Research Fellowship Program. The author of this case study submitted an application to that program and was awarded a fellowship for 2004–2005.

With the awarding of the NHPRC fellowship, the DRCP standards development project began anew. The intention of the conversion project was the same as the previous project—the development of a potential ARMA/ANSI standard. The project was approved by the ARMA SDC, a task force manager was named—normally a member of the Standards Committee fulfills this role—and a Project Initiation Notification System

¹ In November 2007, ARMA International submitted the Standards to ISO TC46/SC11 for consideration as an international standard. ARMA anticipates a response in May 2008 when ISO TC46 meets in Stockholm, Sweden.

(PINS) form was initiated. The PINS form was completed by the task force manager and submitted by ARMA International to ANSI.² Essentially, the PINS form notifies ANSI of the intent to create a potential standard. A formal “Call for Participation” was then issued. The call was posted on the ARMA International website. It was also circulated to several list serves and related organizations. In addition, brief articles were written for professional newsletters seeking task force participants. The purpose of the call is to solicit members to participate on the task force that will do the actual work of developing the draft standard. Those interested in formally participating in the work of the project were required to complete a participation form. The form asks prospective participants about their professional background, the type of involvement they seek (research, writing, review and comment, etc.) and the industrial sector that they represent. This is done to build a balance of viewpoints on the task force and to incorporate a variety of expertise into the standards development process.

A working outline was crafted, and writing teams were created for each major section in the outline. With NHPRC funding, the task force manager secured the services of a part time graduate student who assisted greatly in managing the project. The task force relied heavily on listservs, email, and conference calls to do its work. The work of the conversion project was conducted largely over a 12–15 month period, and by the end of 2005 a working draft of the standard had been created. Following the compilation of text and significant editing, the working draft was distributed to all task force members as well to the ARMS SDC for review and comment. In 2006, the draft standard was ready for public review and comment. Staff at ARMA International headquarters compiled all the comments and the task force manager responded to them. In March 2007, the draft was approved by ANSI as an official standard.

Forces Driving Standards Development

The rapidly changing information environment is spawning much of the activity in standards. Electronic records, the Internet, and a host of new technological tools are changing the way organizations do business. Therefore, our professional standards must address how these technological tools and records integrate with each other. Some of the current drivers include:

- 1) *Changing roles and responsibilities.* The roles we play inside our organizations have changed. Electronic records and electronic recordkeeping are forcing archivists and records managers to redefine who we are and what we do. Functions once considered part of one profession now must be addressed as part of an automated information system that makes no differentiation between the two disciplines. Further, working with electronic information systems means that

² The PINS (Project Initiation Notification System) provides notification to ANSI (the American National Standards Institute) that a standards initiative is being created. The PINS form is used to place announcement in *Standards Action* as broad notification for the opportunity to participate by all directly or materially affected individuals. The PINS announcement includes a statement of need for the project and identification of potential stakeholders. See: *ANSI Essential Requirements: Due Process requirements for American National Standards.*

records professionals need to communicate and interact with a variety of other program and technical staff.

- 2) *Redefining practices.* Basic practices relating to record identification, classification, retention, and preservation, and other functions must be redefined within an increasingly complex technical environment.
- 3) *More tools and more rules.* Recent legislation at both the federal and state levels has authorized and, in some cases, mandated the use of a variety of electronic technologies and processes. For example, the Department of Education has issued standards for use of electronic signatures for loan transactions and more recently issued a statement with regard to the use of electronic signatures for certain types of student academic records. Many states have enacted electronic records management laws or administrative rules. Many of these legislated mandates include the phrase “and promulgate rules and standards” or “must meet electronic record keeping requirements,” but little direction is provided as to what those phrases mean. Similarly, many colleges and universities are developing electronic records management programs and initiatives that include standards and best practice development as a component of those programs. Records professionals are being asked for, and will likely be expected to provide guidance on, compliance criteria and interpretation of record keeping requirements.
- 4) *Leveraging knowledge and skills.* Certainly, one of the basic realizations by archivists and records managers is that managing electronic records requires partnering with others. We need to bring together expertise from all RIM players within an organization in order to accomplish program objectives. Similarly, in the standards field we need to leverage our knowledge to create awareness of records issues within a variety of professional communities.

Overview of Standards Development Processes

RIM standards development presently occurs in one of two ways: informally through professional associations or groups of concerned individuals and organizations or formally using the procedures of a standards authorizing body such as the American National Standards Institute (ANSI) or the International Standards Organization (ISO).

Informal Standards Development. Often, a standard will emerge as a result of some type of issue or problem that is broadly felt within a profession from the need to clarify and form an official professional position on a basic concept. The development of Encoded Archival Description (EAD), for example, began as a project at the University of California-Berkeley Library in 1993 to investigate the feasibility of nonproprietary encoding standard for machine readable finding aids. By 1999, it was viewed as an emerging standard as archival programs increasingly began to employ computer technology as access to the Internet became more pervasive. Though no formal standards process was followed, it is considered a standard in the archival community. The EAD

Working Group of the Society of American Archivists (SAA), an arm of SAA's Technical Standards Sub-Committee, has become responsible for this standard's ongoing maintenance and development.³ Similarly, the development of the Trusted Digital Repository has led to documents that are understood within the information field as recognized best practices that eventually could emerge as a standard. These projects have not followed any formal standards development process, but rather they grew to the standing of standards by their informal use and adoption across the field. Some informally developed standards such as Open Archival Information System, while not initially developed as a standard, was eventually vetted through the ISO process and is now an official ISO standard. It is important to mention these informal standards development processes because their products have influenced the development of formal standards in the area of electronic records.

Formal Standards Development. A more formal standards development process requires that certain procedures and practices must be followed from the inception of the standards project through its ultimate approval and publication.

Key points of the process include:

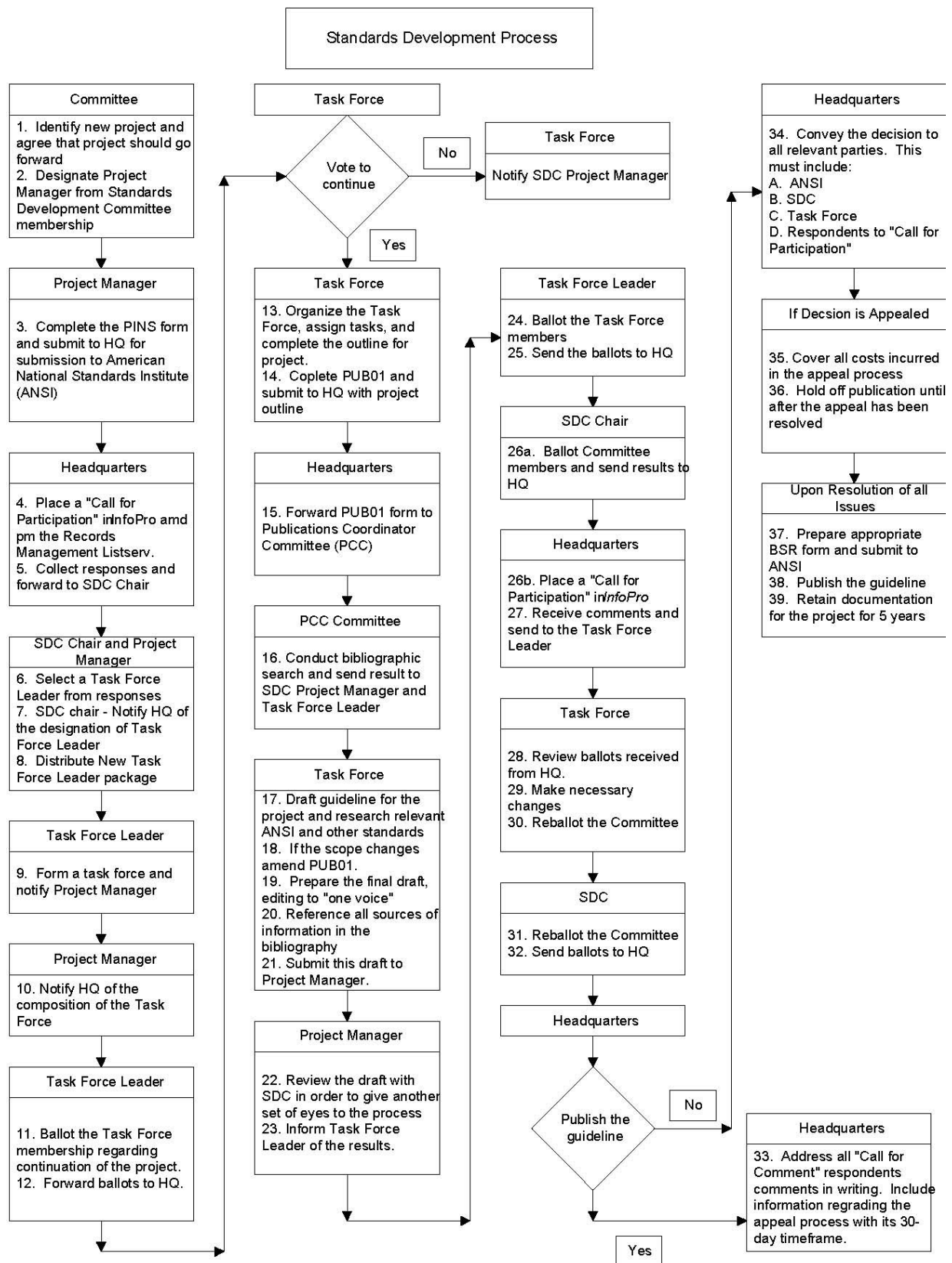
- *Openness.* Participation is open to all interested parties within the United States who are directly or materially affected by the activity in question. An attempt must be made to identify and seek out all professional communities that may have an interest in the potential standard.
- *Balance.* Every effort is made to recruit a balanced team; public and private sectors, government, as well as vendor and professional communities should be represented.
- *Consensus.* Consensus building is emphasized throughout the process. There is not an attempt to achieve unanimity of opinion but certainly every effort is made to achieve a strong majority of opinion.
- *Due process.* Standards are made available for public review and comment and there is an appeals process.⁴

The ARMA SDC process is reflected in the flowchart on the following page.

³ Pitti, Daniel V., "Encoded Archival Description: An Introduction and Overview," *D-Lib Magazine* Vol. 5, No. 11, November 1999.

⁴ Standards and Best Practices, ARMA International website, <http://www.arma.org>.

ARMA International's Standards Development Committee Flowchart.



Analysis

The DRCP project did result in a formal standard. The process followed for this particular project was the same process that the ARMA SDC follows for all of its standards development projects. While all formal standards development projects are collaborative to the extent that the task forces and reviews are broad based and involve all those with an interest in the particular subject, a focused attempt was made with DRCP to involve particularly the archival community and to obtain their direct participation in the project. This was accomplished to some extent. The following is listing of the major issues addressed by the project and some concluding comments about each.

Digital preservation and its relationship to the conversion process. The digital conversion process is a technical one. The digital *records* conversion process is both a technical and a procedural process. Archival and records management literature discusses conversion as a preservation strategy, but does not say much about the technical process of doing it. Similarly, the computer science literature discusses the process but not the procedural elements necessary to guarantee records authenticity.

Terminology. Terminology remains a critical issue in electronic records management processes and initiatives including standards development. The project reviewed terminology from a variety of published resources as well as recent and current electronic records projects such as InterPares and other official standards and models. Ultimately, it relied heavily on the new SAA Glossary as well as terms from the OAIS international standard.

Development of a methodology that would weave together recordkeeping requirements and the conversion process. A major hurdle for the work of the project was the need to develop a methodology for integrating the components of the technical process of digital conversion with the conceptual issues of recordkeeping. An extensive template was developed by task force members. While it is difficult to speculate about the applicability of such a tool to other standards development projects that relate to electronic recordkeeping, the template did prove to be invaluable both in terms of understanding the issues and in crafting the draft standard. The following page contains a portion of the template that was developed for the DRCP project.

Source	Control	Risk/Driver	Procedural Element	Order	Contributor	Data Type Exceptions	Conversion Type	Conversion Triggers	Comments /notes-US Evidence
CGSB-72.11-93, III, 1.1	Meet legal requirements	Loss of authority	Authorized retention of converted records	Planning	JS	N/A	All	Business-related	Suggests evidence set be developed. Set includes: enterprise policies, how system design and system rules map to policies, training, rules enforce controls, rules audits and inspections, accesses to controlled information, copies made of controlled information (for whom, what purposes), deletion destruction of controlled information
	Preservation of Integrity	Loss of integrity						Record-related	
	Meet legal requirements	Loss of authority							
CGSB-72.11-93, III, 1.1	Preservation of Integrity	Loss of integrity	Authorized disposal of source records	Planning	JS	N/A	All		
ISO14721 s.3.2.2	Preservation of Integrity	Loss of authenticity	Check to ensure that data migrator has authority to migrate the data. If it is only a data custodian it may be necessary to seek additional authority from data owner	Planning	VL	N/A	All		AIIM Draft -Chain of custody essential to document trustworthiness of records
ISO 14721 s. 4.1.1.3	Preservation of Integrity	Loss of integrity	taking into consideration the expected and actual rates of errors encountered in various media types, their performance, and their costs of ownership.	Planning	VL	N/A	All		
	Technical feasibility	Loss of data							
	Business feasibility	Affect on rendering/presentation	All						
ISO 14721 s. 4.1.1.6	Transparent conversion implementation	Develop migration plan, and have it duly authorized		Planning	VL	N/A	All		
	Meet legal requirements								
	Business feasibility								
ISO 14721 s. 4.1.1.6	Technical feasibility	Loss of authority	Employ data structure, file, series what parts of the data represent 'content information' and what parts represent 'representation informaition'. This step is critical to understanding what is to be preserved. This can be done through a series of steps, as follows: 1. identify bits	Planning	VL	N/A	All		metadata: means of finding evidence, understanding evidence,indicates
ISO 14721 s. 4.1.1.6	Completeness of Content	Loss of integrity		Planning	VL	N/A	Repackaging	Format-related	
		Loss of authenticity					Reversible transformation	Platform-related	
	Preservation of Integrity	Loss of data					Non-reversible transformation	Record-related	
CGSB-72.11-93, III, 1.1	Preservation of Integrity	Loss of integrity	Authorized definition of records to be converted	Planning	JS	N/A	Repackaging	Business-related	
	Meet legal requirements	Loss of authority					Reversible transformation	Record-related	
		Loss of authenticity					Non-reversible transformation		
Adrian Brown	Transparent conversion implementation	Affect on rendering/presentation	Support migration with a database for tracking		VL	N/A	All	All	
Jan Danielsen/Julian Bescos	Technical feasibility	Loss of data	Development or Identification of conversion tools/software.	Planning	VL	N/A	All	All	
Julian Bescos	Preservation of Integrity	Loss of integrity	Analysis of destination data models.	Planning	VL	N/A	Repackaging	Format-related	
		Loss of authenticity					Reversible transformation	Platform-related	
		Loss of access					Non-reversible transformation	Record-related	
		Affect on rendering/presentation						Business-related	
ISO 14721 s. 4.1.1.6	Transparent conversion implementation	Loss of integrity	Test and approve migration plan and software	Testing	VL	N/A	All	All	
		Loss of access							
		Loss of data							
Adrian Brown	Preservation of Integrity	Loss of integrity	Develop test file.	Testing	VL	N/A	All	All	
Adrian Brown	Completeness of Content	Loss of integrity	Test conversion approaches on test file.	Testing	VL	N/A	All	All	

Application of conversion requirements. The application of the conversion requirements rests on a series of decisions including, for example: appraisal of records, legal compliance, costs, risk levels and risk tolerance, and technology requirements. These decisions are part of the organizational business and risk assessment processes. Thus the TF felt that the standard should place the conversion procedures within the context of organizational decision-making. It was recognized that not all conversion requirements will be applied in every situation. Even in those instances in which conversion is done for digital preservation, it may be necessary and cost effective to think of levels of conversion depending upon the type of record and the technical application that is involved.

As other electronic records management standards and best practices are developed, it will be necessary to place them within their specific context and organizational infrastructure so that recordkeeping requirements begin to be seen as necessary and routine, and therefore, deserving of support.

Standards development process. The RIM standards development process increasingly will need to be more collaborative, flexible, and placed within the context of organizational decision making with regard to information technology planning and infrastructure. Recordkeeping needs to be a sustainable activity. Only when it is incorporated into the infrastructure of the organization will that objective be accomplished. Records professionals should get involved in the process, but they must be prepared to discuss technical issues. While they may not need to function as information technology specialists, they should possess enough technical knowledge to comfortably address technical processes to suggest ways in which recordkeeping integrates with those processes.

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