An Overview of InterPARES 3 (2007-2012)

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1. Summary of the Research Project

Digital records and the applications that generate them have affected every aspect of business, research, government and domestic life. E-mail, e-voting ballots, research and survey data, financial company records, and digital art are just some of the materials used in the day-to-day operation of modern society.   The keepers of these records need to maintain them in a way that their reliability, accuracy and authenticity can be demonstrated at any time to support, for example, research and innovation, legal validation, copyright and patent litigation, scientific discovery, issues of ownership and precedence for governments and individuals, and accountability. Long-term authentic preservation also needs to be a primary concern, firstly**,** because generations of digital material have already been lost due to changing technology and inadequate preservation practices, and secondly, because the authenticity of digital materials that have survived is currently difficult, if not impossible, to prove.

These issues have been addressed by several research projects which have developed knowledge essential to the long-term preservation of authentic records created and/or maintained in digital form, thereby providing the basis from which model policies, strategies and standards capable of ensuring the longevity of digital material and the ability of its users to trust its authenticity have been formulated. However, a key finding of the most comprehensive of these projects, InterPARES (an international multidisciplinary research initiative involving twenty-one countries, funded by SSHRC from 1999 to 2006), is that, although the body of concepts, principles and methods developed through scientific research constitutes the essential foundation and framework of best practices, any solution to digital preservation problems is situation specific, and must be devised by preservers taking into account: a) the cultural, administrative, legal, and functional context in which they operate, b) the nature and characteristics of the organizations producing the digital material to be preserved, c) the typology of the material produced and its documentary and technological features, d) the limitations imposed by the available financial and human resources, e) the organizational culture of both the producer of the material and the preserver, and g) access to educated professionals or educational programs and resources. Furthermore, while the conceptual and methodological findings of InterPARES and other research projects are equally applicable to larger and smaller organizations and programs, archives with limited resources, which often have the greatest need for assistance, will find the outcomes of the research difficult to apply without specific directions on how to move forward.

InterPARES 3 will translate the theory and method of digital preservation drawn from research to date into concrete action plans for existing bodies of records that are to be kept over the long term by archives—and archival/records units within organization—endowed with limited resources. In the process, detailed knowledge will be developed on (1) how general theory and methods can be implemented in small and medium sized archives and units and become effective practices; (2) what factors determine the type of implementation that is appropriate for each body of records in each context; and (3) what skills professionals will require to conduct such operations. On this basis, teaching modules will be developed for in-house training programs, continuing education workshops, and academic curricula that will provide Canada with professionals who are competent not only to preserve over the long term its documentary heritage in digital form, but also to ensure the accountability of its organizations and institutions through the protection of the accuracy and authenticity of the digital information they produce.

Governance, law, art, science and scholarship urgently require concrete plans for the preservation of digital materials, so that today's actions, thoughts, achievements and creations will have a future and the future will have a memory.

2. Detailed Description

Problem, Goal, Objectives and Research Questions

Digital records and the applications that generate them have affected every aspect of business, research, government and domestic life. E-mail, e-voting ballots, research and survey data, financial company records, and digital art are just some of the materials used in the day-to-day operation of modern society. The keepers of these records need to maintain them in a way that their reliability, accuracy and authenticity can be demonstrated at any time to support, for example, research and innovation, legal validation, copyright and patent litigation, scientific discovery, issues of ownership and precedence for governments and individuals, and accountability. Long-term authentic preservation needs also to be a primary concern, firstly, because generations of digital material have already been lost, due to changing technology and inadequate preservation practices, and secondly, because the authenticity of digital materials that have survived is currently difficult, if not impossible, to prove. Several research projects worldwide have addressed these problems,[1] but the most comprehensive effort has been made by the InterPARES Project (1999-2006), which—building upon the body of knowledge deriving

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[1] Most notable is the Open Archival Information System (OAIS) Reference Model, available at http://public.ccsds.org/publications/archive/650x0b1.pdf. The information model articulated in the OAIS standard has been the foundation of several other projects, such as CEDARS, PREMIS and Persistent Archives, respectively accessible at http://www.leeds.ac.uk/cedars/, http://www.oclc.org/research/projects/pmwg/, and http://www.sdsc.edu/NARA/. Also, the CAMiLEON and METS projects, accessible at http://www.si.umich.edu/CAMILEON/ and http://www.loc.gov/standards/mets/, as well as the ERPANET project, available at http://www.erpanet.org/, have strongly contributed to the building of a consistent body of general knowledge on digital preservation.

from other projects and creating new knowledge from original research—has developed theory, methods and strategies essential to the long-term preservation of authentic records created and/or maintained in digital form.[2] This body of concepts, principles and methods constitutes an essential foundation and framework for all digital preservation solutions (Duranti, 2005; Bearman, 2006). However, one of the key findings of InterPARES is that such solutions are situation specific and must be devised by preservers in light of: a) the cultural, legal, administrative, and functional context in which they operate; b) the nature and characteristics of the organization or person producing the digital material; c) the typology of the material produced and its documentary and technological features; d) the limitations imposed by the available financial and human resources; e) the organizational culture of both the producer of the material and the preserver itself; and g) their access to educated professionals or educational programs.

InterPARES theory and methods are readily applicable to the strategic and procedural structure of large archives rich in resources, but cannot be directly applied to small or medium sized archival

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[2] InterPARES (International Research on Permanent Authentic Records in Electronic Systems), funded by two SSHRC MCRI grants, is a multidisciplinary international project involving twenty-one countries, public and private sectors, academics and professionals, record makers, record keepers and record preservers. For its products see http://www.interpares.org/ip1/ip1_documents.cfm and http://www.interpares.org/ip2/ip2_products.cfm.

organizations or programs (units within records creating organizations)[3] without 1) the support of their regulating, controlling, and auditing bodies, 2) major adaptations of the recommended methods and strategies, 3) their translation into concrete action plans for each given body of records or data, and 4) the development of appropriate competences and skills in the responsible professionals. Furthermore, InterPARES has concluded its research at the end of 2006 and its collaborative partnership is no longer active; thus, there is no research activity at this time aiming at building on its findings and implementing and testing them at a variety of levels. New international networks have been recently established, especially in Europe, which are operating at a very high level, mostly as clearinghouses of existing knowledge and best practices in digital preservation.[4] Undoubtedly new knowledge will continue to be produced, mostly by smaller, localized and focused research alliances,[5] compounding the requirement to ensure that InterPARES and other research projects' findings be made applicable to the variety of organizations that need them. In addition, the findings of a study of the effectiveness of existing workshops and seminars aimed at increasing archivists' skills in digital preservation and their ability to implement them in their repositories show that very few participants were able to implement the skills once they returned to their work environments (Duff et al., 2006).

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[3] The expression "small or medium sized archival organization or program" refers to the number of records and/or archival professionals it employs (i.e., less than five) and the perceived level of financial and technological resources.

[4] For example, the Digital Curation Centre (DCC), www.jisc.ac.uk/; Digital Preservation Europe, http://www.digitalpreservationeurope.eu/;
and CASPAR, http://www.casparpreserves.eu.

[5] They do not exist in Canada.

The urgency of the problems outlined above is demonstrated by a few examples:

1. State-of-the art complex technologies will produce most of the records and data of the Vancouver Olympic Committee. These records and data will be subject to all relevant legislation, such as privacy and copyright, and will become non-current at the end of the Olympics in 2010, and thereafter transferred to the City of Vancouver Archives. But, unlike those of the City's public offices, the Olympic Committee records are not subject to the records management jurisdiction of the archives from the moment of their creation. Yet, it is a fact that all city archives in Canada acquire records of private individuals and corporations. The digital records of private bodies need to be generated and maintained in a reliable and accurate way and their long-term authentic preservation must begin at the moment of records creation to be successful, but, currently, there is no known practice of collaboration between private records creators and city archives that may serve these purposes. The proposed research aims to build such synergy by direct action.

2. Digital records make up 80% of fraud investigation cases, according to the forensic technology team at Pricewaterhouse Coopers, which analysed the last two years' worth of investigations. The number of cases handled by the firm has tripled in that time and the average case requires the analysis of 500,000 e-mails and user documents.[6] A trusted recordkeeping

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[6] "PWC On Fraud Trail." *Financial Director* (December 13, 2005), 22.

system containing records guaranteed authentic by a trusted custodian would avoid the very high costs in financial and human resources incurred by investigators, but none is in place at this time. This research can help design an affordable system usable by small agencies.

3. The British Columbia Information and Privacy Commissioner reported in April 2006 that the provincial government failed to follow proper procedures for destroying computer tapes containing medical information on thousands of citizens. Last year, when a Vancouver regional office was closed due to a reorganization of the Ministry of Employment and Income Assistance, forty-one computer backup tapes containing confidential information concerning individuals' HIV status, mental illness and substance abuse ended up at a government auction and were taken to a local newspaper.[7] While procedures for proper disposal may exist, intentional or unintentional mishandling occurs too frequently; this research can help embed in a record control system a practice that monitors the way in which procedures are followed.

4. TRIUMF, a national laboratory for particle and nuclear physics located on the University of British Columbia campus, and operated by a consortium of the universities who are partners in this research, will analyze and store data generated by the ATLAS project carried out at the CERN laboratories in Switzerland. These data are expected to fill 4.5 million CDs a year and will have to be

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[7] "B.C. Should Have Destroyed Computer Tapes." (April 2, 2006)
http://www.ctv.ca/servlet/ArticleNews/story/CTVNews/20060402/computer_tapes_cp_060402/20060402?hub=Health

preserved by one of the university consortium small archives.[8] This research can develop an action plan for such an unprecedented endeavour.

5. In 2002, *The Journal of Cell Biology* developed a test that revealed that 25 percent of all accepted manuscripts contained one or more illustrations that had been improperly manipulated.[9] If this test had been implemented earlier, it could have prevented infamous cases, such as Dr. Hwang Woo Suk's concocted images of human embryonic stem cells.[10] A formalised procedure of accurate data transfer and deposit of pictures established by the universities' archives could have prevented the forging of research findings. The problem of research data preservation by a neutral third party was addressed by a study carried out by a SSHRC-appointed committee in 2001-2002. The final report recommended the creation of a national data archives, but no action has yet followed.[11] This research will develop action plans which will offer a solution to the problem for university archives.

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[8] Shaw, Gillian. "Universities here join in massive experiments." *The Vancouver Sun* (April 19, 2006) E3.

[9] Wade, Nicholas. "It May Look Authentic; Here's How to Tell It Isn't." *The New York Times* (January 24, 2006,) F1.

[10] Levin, Steve. "Stem Cell Researcher Admits Phony Data." *Pittsburgh Post-Gazette* (March 8, 2006), A-1.

[11] SSHRC and National Archives of Canada. *We Build Understanding. National Research Data Archive Consultation* (Needs Assessment Report, May 2001); SSHRC and National Archives of Canada. *We Build Understanding. National Research Data Archive Consultation. Final Report* (June 2002).

In light of this situation, the **goal** of InterPARES 3 is **to enable Canada's many small and medium sized public and private archival organizations and programs, which are responsible for the digital records resulting from government, business, research, art and entertainment, social and/or community activities, to preserve over the long term authentic records that satisfy the requirements of their stakeholders and society's needs for an adequate record of its past.**

To achieve this goal, the research team has identified the following **objectives**:

1. to promote an environment supportive of the research goal by demonstrating to regulatory and auditing bodies and to policy makers that it is essential to integrate digital records preservation requirements in any activity that they regulate, audit or control;

2. to collaborate with small and medium sized archival organizations and programs in the development of scalable policies, strategies, procedures, and/or action plans that they can implement in order to preserve the digital materials that they expect to acquire or have already acquired, using the recommendations and products of leading edge research projects;

3. to assess the applicability of the recommendations of InterPARES and other projects about trusted record-making and recordkeeping to the situations of the small and medium sized archival organizations or programs selected as test-beds, and in particular the validity of statements about the relationship between preservers and the records creators;

4. to assess the applicability of these projects' preservation solutions to the concrete cases identified by the test-bed partners as

needing immediate attention, both when the records in question are already in their custody and when they still reside with their creator;

5. to refine and further elaborate the theory and methods, concepts and principles developed by these research projects on the basis of the results of the above activities;

6. to establish when such theory and methods, concepts and principles apply across jurisdictions, regardless of legal/administrative, social and cultural environment; and, in the situation where they do not apply, to identify why, and determine the measures that are required to ensure the preservation of digital records;

7. to assist small and medium sized archival organizations or programs in addressing the legal issues that have been identified by the relevant research projects as providing obstacles to long term digital preservation, and those that could be specific to their situation;

8. to formulate models that, for each choice of preservation methods and of digital objects to be preserved, identify the ethical consequences for individuals and society;

9. to create evaluation models capable of measuring the success of the preservation solutions that have been proposed and implemented;

10. to develop models of preservation costs for various types of records and archives;

11. to develop awareness and educational materials that can a) enable the staff of small archival organizations and programs to plan for and carry out digital preservation, b) assist professional

associations in promoting career development of their members, and c) provide university programs with content and structure for university courses on digital preservation; and to identify effective delivery methods;

12. to ensure transfer of the knowledge generated by this research— including actual examples and success stories—to appropriate local, national and international stakeholders; and

13. to establish a strong network of research and education on digital preservation that is deeply rooted in the various communities served by each of its partners, and that integrates academic work with social and community action.

The **<u>research questions</u>** to be addressed and answered to achieve these objectives are:

1. Which are the regulatory, auditing and policy making bodies that need to be sensitized to the importance of digital preservation, and what are the best ways of influencing them?

2. How can we adapt the existing knowledge about digital records preservation to the needs and circumstances of small and medium sized archival organizations or programs?

3. How and when should these archives or programs prepare themselves for digital preservation?

4. What differentiates the preservation of digital records from that of any other digital entity for which the archives might be responsible?

5. What kinds of digital records, either soon to be preserved by a small or medium sized archival organization or program or already in its custody, are currently most in need of attention, and what

are the most urgent issues and problems associated with their creation, management and/or preservation?

6. What are the nature and the characteristics of the relationship that each of these archives or programs should establish with the creators of the records for which it is responsible?

7. What kind of policy, strategy and procedures should any such archives or program have in place to be able to control the digital records for which it will be or already is responsible from creation to preservation, and on what factors are these administrative devices dependent (e.g. a specific accountability framework and governance structure)?

8. What action plans may be devised for the long-term preservation of these bodies of records?

9. Can the action plan chosen for a given body of records be valid for another body of records of the same type, produced and preserved by the same kind of organization, person, or community *in the same country*?

10. Can the action plan chosen for a given body of records be valid for another body of records of the same type, produced and preserved by the same kind of organization, person or community *in another country or culture*?

11. Can the action plan chosen for a certain type of record or system be valid independently of the creating or preserving organization and its context?

12. What knowledge and skills are required for those who must devise policies, procedures and action plans for the preservation of digital records in small and medium sized archival organizations or programs?

13. How can records professionals keep their knowledge of digital preservation up-to-date in the face of ongoing and increasingly fast technological change?

The **products** that are expected to result from this research are:

1. policies, strategies and procedures for small and medium sized archival organizations or programs, and guidelines for the records creators whose records fall under their responsibility;
2. action plans for the specific case studies carried out in the course of the project;
3. an analysis of the validity, applicability or adaptability of action plans developed in the specific cases studied to different organizations, contexts or countries;
4. a comparison among the action plans developed for the preservation of records at different stages in their lifecycle (i.e. creation, use, maintenance, modification, preservation);
5. criteria to determine "most-at-risk" materials, such as date created, date last accessed, carrier, operating system, software used, equipment required and its availability, etc.;
6. guidelines for addressing preservation requirements that apply to specific types of digital records, but not to others, and may be used in the context of limited resources environments;
7. evaluation models for assessing the degree of success of the chosen preservation action;
8. cost-benefit models for various types of archives or programs, records, and/or systems;
9. ethical models that identify and make explicit the consequences for individuals and society of various types of preservation measures or lack thereof;

10. a web site providing small and medium sized archival organizations or programs world wide with access to the products of this research free of charge;

11. a refined body of theoretical and methodological knowledge on digital preservation, communicated in conference papers, symposia, and refereed publications;

12. training and education modules for archival organizations or programs, professional associations, and university programs; and awareness and education modules for non archivists, such as IT professionals, vendors, and service providers; human resources and financial managers; communities of practice; members of the general public, etc.; and a strategy for delivering them; and

13. position papers directed to key regulating, controlling, auditing and policy making bodies, advocating the vital need of integrating planned digital preservation in the requirements they issue for the activities they regulate, control or audit, and explaining possible ways of doing so.

Structure of the Research Alliance and Governance

The TEAM Canada research alliance comprises, under the direction of Luciana Duranti, academic and professional researchers and collaborators (Canadian and international), and three types of partners: test-bed, resource, and international. The *test-bed partners* are the Canadian archival organizations or programs that constitute the locus and subject of the research, the primary stakeholders. A dedicated team, composed of at least one researcher from academia, one from the community, and one graduate research assistant, will work with the representative(s) of each test-bed. The *resource*

partners are organizations that have an expertise in all or part of the research objectives and are committed to sharing it with all researchers, by providing regular input and feedback through both the web site working spaces and the face-to-face plenary workshops, and by testing preliminary findings and products. Among them, there are two American partners. The *international partners* are national and multinational research teams constituted on the model of TEAM Canada, sharing the same goal, objectives, research questions, methodology, governance, and research, dissemination and mobilization activities; using and reporting to a common research headquarters (at the University of British Columbia); and directed and coordinated by Luciana Duranti, with the support of the headquarters' staff (i.e. a project coordinator and a technical coordinator)[12]. TEAM Canada will be governed by Luciana Duranti, in her role of **Project Director,** and a **Steering Committee,** composed of the Project Director, one academic co-applicant, and at least one representative each from a city archives, a university archives, and a thematic or community archives on a rotational basis, plus the Project Coordinator as ex-officio member. The committee will meet four times a year to provide the intellectual and administrative direction of the research; to set the agendas for the plenary workshops; to formally recruit or accept new partners or collaborators; to assess partial results; and to make any other decisions having an impact on the project as a whole. All co-applicants, test-bed partners' representatives, and collaborators will meet twice a year in a week-long **plenary workshop** with representatives of the TEAM Canada resource partners to discuss the work done, receive input, develop plans of action, review tests, and plan the following steps. The Project

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[12] The other TEAMs are: Africa; Brazil; China; Holland and Belgium; Ireland and England; Italy; Korea; Malaysia; Mexico; Norway; Singapore; and Sweden.

Director will meet once a year with the Directors of the international partners in an **International Summit** for purposes of knowledge sharing, determination of the next steps, coordination of future research, and reconciliation of findings. The dissemination of the research findings and products will be directed by a **Dissemination Committee,** composed of the Project Director, one academic co-applicant, at least one representative each from a city archives, a university archives, a thematic or community archives, a professional archival association, and another type of resource partner on a rotational basis, plus the Technical Coordinator as ex-officio member, in his role of manager of the web site.

Methodology and Evaluation Framework

This type of project calls for action research (McNiff and Whitehead, 2006). Action research is a collection of participative and iterative methods, which pursue action (in this case, the preservation of digital records) and research at the same time. As a matter of course, action research forges collaborations between community members and researchers in a program of action and reflection toward positive change (Greenwood and Levin, 2003). Action research makes extensive use of case study methodology and of direct communication and interaction with the subjects of the research, who are at the same time participants and contributors in the research activity. The stages of research used in this project will be as follows.

Defining the Research Plan and Instruments--The TEAM Canada Director will first meet with the directors of the other national and

multinational TEAMs to coordinate the research schedule to ensure that preliminary findings are comparable across TEAMs and that the research will be at each given stage fully participatory and rigorously shared. At this week-long research summit, the research instruments to be used for the case studies will be defined and refined. There will be three kinds of case studies: 1) the first will focus on bodies of records; 2) the second will study systems that control, contain or should contain records; and 3) the third will analyze the archival environment of test-beds that have no digital records in their custody, but need to prepare themselves for digital preservation. InterPARES developed a set of instruments for conducting case studies that have been proven valid and effective. These will be adjusted to the specific objectives of this project, and an instrument will be constructed for the study of archival environments that is consistent with the existing set.[13] Immediately following this summit, the Director will meet with all TEAM Canada academic and professional Canadian co-applicants to review the schedule and to make the necessary adjustments to the methodological instruments that may be required by the specificity of the Canadian environment. *Establishing the Context and the Specific Research Cycle*--Initially, each Canadian test-bed partner will identify a body of digital material or a system for which a preservation plan will be developed. In the

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[13] See:

http://www.interpares.org/display_file.cfm?doc=ip2_template_for_case_study_analysis.pdf,

http://www.interpares.org/display_file.cfm?doc=ip2_reporting_framework_Dec2003.pdf,

http://www.interpares.org/display_file.cfm?doc=ip2_possible_questions_for_interviewees.pdf,

http://www.interpares.org/display_file.cfm?doc=ip2_23_questions_for_case_studies.pdf.

absence of digital material, it will identify its own policy, strategy, and procedural requirements. This stage represents the context of problem solving with theory, and theory development through solving problems. *Data Collection*--Data will be collected for each test-bed about its context and limitations, the specific body of material, its documentary forms, technological constraints, functional or cultural meaning, etc., or the specific digital system. Where necessary, an ethnographic approach will be used: the researchers responsible for each test-bed will place themselves within the test-bed partner environment (creators of records, their users, and archivists) to gain the cultural perspective of those responsible for records, and will produce extensive descriptive documents about non-written but shared and well understood practices and interactions that create meaning and define values; these descriptions will complement the data collected (Gracy, 2004). *First Iterations: Testing Different Solutions in Different Contexts*--All Canadian co-applicants, and all collaborators and resource partners' representatives (hereinafter "the TEAM Canada researchers") will reflect on the data from each test-bed and, at their bi-annual, week-long plenary workshop, will collectively articulate several possible solutions from which a single action plan will emerge and be tested. This action plan will include a strategy, protocols, functional requirements, procedures, and expected outcomes. If required by the plan, a prototype development method will be used, which is a user-centered prototyping approach that allows for exploration of the interplay between theory and practice, advancing the practice, while also offering new insights into theoretical concepts. It consists of developing a system that can serve as proof-by-demonstration of the underlying theory, while

producing an artifact that can form the basis of ongoing and expanded research. his method comprises three major iterative stages – concept building, system building and system evaluation; all stages of system development reflect this focus on the concept that the system is to illustrate (Evans and Rouche, 2004). The test results will include performance of this plan against benchmarks and baselines established in extant research. *Comparison of First Iterations*--The results of each test will be shared among the TEAM Canada researchers and analyzed. An assessment of these results will then allow us to reflect on this action, and refine the action plans. *Second Iteration: Refining Solutions for Particular Contexts*--After this assessment, the process will begin another cycle. This second iteration will account for anomalies in the test results, and benefit from the insight gained from a comparison across contexts (both organizational and cultural). In so doing, it will refine our plans and performance measures. The second iteration will continue with small mini-iterations, that is, with minor refinements as needed, always keeping the focus on the concept that it was agreed to implement, until a definitive action plan is agreed upon for each context. *Comparisons of Second Iterations*--The data will be compared among cohorts – the partner organizations of the same type (e.g., city archives, university archives) – to establish what are the critical factors that determine the most appropriate solution for these contexts and whether they are linked to documentary forms, technology, organizational culture or function, or other environmental contextual elements. This comparison will allow us to make some statements of a general type. Furthermore, once a year, at the international partners' week-long summit, the results will be compared with parallel research findings produced by the national and multinational TEAMs. This comparison of results will not happen

in a vacuum because all international partners will share the same web site and maintain ongoing communication. *Reflection, Analysis, and Synthesis*--Throughout the research, all researchers will reflect on issues and processes and make explicit their assumptions and biases, thereby giving rise to theoretical considerations. This reflexive and engaged scholarship will allow the researchers a chance to bind critical discourse with mission critical processes. Thus, while the project will start out with theory informing practice, as it will proceed, practice will refine theory, in a transformative cycle.

Evaluation Framework—Performance indicators for this type of research must necessarily relate to the effectiveness and productiveness of the collaboration. In fact, whether the policies, strategies or action plans developed for each test-bed are capable of resulting in the permanent preservation of the materials that are their object is impossible to know within the short duration span of the research project. Thus, the research alliance will assess the test-bed partners' motivation and purposefulness in contributing to the projected outcomes by the established deadlines; the quality, continuity, and effects of the resource partners' advice and support; and the products' effectiveness in establishing appropriate relationships among stakeholders within each archival environment, in addressing the most urgent preservation issues, and in informing and guiding both the staff of each test-bed and the bodies that control and audit them. Another performance indicator will be the number of requests the alliance will receive for the distribution, translation, and teaching of its products, and the number and type of test-bed partners that over time will become part of the project. It is

indeed expected that each year new test-beds will be added to the project, while those who have achieved their objectives might exit after a couple of years. We have planned for this. For example, we have purposely postponed the recruitment of test-beds in the areas of performing arts and scientific research, as they present complex problems that we will be better equipped to deal with after one or two years experience in implementation and testing. It is also expected that more countries will want to join the international alliance. As it regards the effectiveness of the education modules, feedback will be requested from those who deliver them on the basis of the questionnaires that they will submit to their audiences/students, and of their experience as instructors. The ultimate indicator of the success of this research alliance will indeed be the satisfaction level of its stakeholders, both from the community (based on their perception of the ability they have acquired to plan and carry out digital preservation) and academia (based on the body of knowledge produced in the research process). In any case, a more specific and detailed performance measurement plan will be developed during the project.

3. References

Cited in the Detailed Description

2006 – Bearman, David. "Moments of Risk: Identifying Threats to Electronic Records," *Archivaria* 62 (Fall 2006): 15-46.

2006 – Duff, Wendy M., Amy Marshall, Carrie Limkilde, and Marlene van Ballegooie. "Digital Preservation Education: Educating or Networking?" *The American Archivist* 69, 1 (2006): 188-212.

2006 – McNiff, Jean, and Jack Whitehead. *All You Need to Know About Action Research*. London: SAGE Publications Ltd., 2006.

2005 – Duranti, Luciana ed. *The Long-term Preservation of Authentic Electronic Records: Findings of the InterPARES Project*. San Miniato: Archilab, 2005.

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2003 – Greenwood, David J. and Morten Levin. "Reconstructing the Relationships between Universities and Society through Action Research," in Norman K. Denzin and Yvonna S. Lincoln, ed. *The Landscape of Qualitative Research: Theories and Issues*, 2nd. Thousand Oaks: SAGE Publications, 2003, 131-166.

Not Cited in the Detailed Description

Research projects on digital records publish their primary information on dedicated web sites. The web sites that are the most relevant to this project are cited in the footnotes of the detailed description. Some of them contain a very comprehensive list of online resources on digital preservation: see for example the list published on the site of the *Digital Preservation Europe* project http://www.digitalpreservationeurope.eu/resources/. To avoid loading this text with a list of web sites that would span numerous pages, we direct the interested reader to the sites cited in this text's footnotes and to the online resources that these sites list. They are all relevant to this research project.

Also, several standards are relevant to this research, and they have been considered when this project's objectives have been identified. Examples are:

Canadian General Standards Board. *Electronic Records as Documentary Evidence* (CAN/CGSB-72.34—2005)

U.S. Department of Defense. *Draft Design Criteria Standard for Electronic Records Management Software Applications* (DoD 5015.2—STD—2007)

European Commission IDA Program. *Model Requirements for the Management of Electronic Records* (MoReq Specification—2001)

International Council on Archives. Committee on Current Records in an Electronic Environment. *Electronic Records. A Workbook for Archivists* (ICA Study 16—2005)

The most recent literature on the matters we propose to study includes publications produced by the InterPARES project, which of course have been taken into account while designing this project. Examples are:

Duranti, Luciana and Kenneth Thibodeau. "The Concept of Record in Interactive, Experiential and Dynamic Environments: the View of InterPARES," *Archival Science* 1 (2006): 13-68.

Eastwood, Terry. "Appraising Digital Records for Long-term Preservation," *Data Science Journal* 3 (2004): 202-208.

MacNeil, Heather. "Providing Grounds for Trust: Developing Conceptual Requirements for the Long-Term Preservation of Authentic Electronic Records," *Archivaria* 50 (2000): 52-78.

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Moore, Reagan W. "Building Preservation Environments with Data Grid Technology," *The American Archivist* 69, 1 (2006): 139-158.

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