

Task Group 16

Draft report on

INTERNATIONAL
HERITAGE
DOCUMENTATION
STANDARDS

3. Introduction

Heritage Documentation is described in the ICOMOS Sofia principles as 'Recording of Monuments, Groups of Buildings and Sites': The processes and products required are described but the *performance* of the process of recording or its products are not. The ICOMOS principles successfully put documentation in a conservation context but do not describe an explicit standard, as this was not the intention of the Sofia principles. It is proposed to explore the adoption of the Sofia principles as the basis for standards in Heritage Documentation by describing the performances (organisational, technical and data) required to meet them.

Background to this report:

Under the direction of Robin Letellier ⁵(CIPA) and Francois LeBlanc (GCI)⁶ the RecorDIM initiative approached the problem at the CIPA/VAST⁷ symposium at Nicosia on 4th November 2006 at an open meeting at which 36 delegates from 12 countries agreed:

- ◆ To work with the definition of heritage documentation :

'Heritage documentation is a continuous process enabling the monitoring, maintenance and understanding needed for conservation by the supply of appropriate and timely information. Documentation is both the product and action of meeting the information needs of heritage management. It makes available a range of tangible and intangible resources, such as metric, narrative, thematic and societal records of cultural heritage.'

- ◆ to prepare this report on Heritage Documentation standards for the 21st CIPA symposium at Athens in October 2007 with a view to developing international standards for heritage documentation.

A task group meeting to develop the report was convened at the British Academy London, hosted by English Heritage on March 29th at which the principal content of the report was defined and subsequently agreed on line by 43 International delegates. The content was developed collaboratively on line between March 29th and July 18th 2007 using a Google Group moderated by Mario Santana Quintero and edited by Fulvio Rinaudo, Jon Bedford and Bill Blake with contributions from Marc Wilhelm Kuster and Minna Lonnqvist at Politecnico di Torino on 18th July 2007. ⁸ The Task Group acknowledged that:

- ◆ Heritage documentation seeks to secure the adequate care of cultural heritage for future understanding and enjoyment.
- ◆ Heritage documentation has a central role in establishing the significance and integrity of cultural heritage.
- ◆ Heritage documentation is a multi-disciplinary activity and requires the application of technical, scientific and analytical skills.
- ◆ Heritage documentation encompasses activities conducted for inquiry and analytical processes (e.g. archaeological), as well as those conducted for curatorial or conservation needs including the processes of recording, inventory, description and archive.
- ◆ The three tasks of measurement, selection and communication common to documentation activities require appropriate understanding, specification and application to be effective.
- ◆ Documentation project design (strategy) must be structured so that resources are used wisely and that tasks are carried out in a timely and appropriate manner.
- ◆ Practitioners need clear, agreed briefs, technical standards and clear statements of information performance
- ◆ Standards for heritage documentation will reflect the need for information that is consistent in its performance across all stages of the conservation process with the aim of enabling protective and preventive maintenance by recording condition and providing a basis for monitoring condition change.
- ◆ Heritage Documentation is the grounds for monitoring and preventive maintenance strategies (it is a cost effective tool, since it helps evaluating the impact of conservation in the heritage fabric)

⁵ Robin Letellier 1944 - 2007

⁶ GCI Getty Conservation Institute

⁷ VAST Virtual and Augmented Reality for Cultural Heritage a sub project of EPOCH (European Centre of Excellence on ICT applications to Cultural Heritage)

⁸ See Appendix 2: Authorship of this report

95 **Identifying the needs for standards:**

96 The recommendations of the report follow from a description of the topics raised by the task group at the London meeting based
97 on the division of:

- 98 ♦ Work practice
- 99 ♦ Technical specifications
- 100 ♦ Data standards

101 and subsequently posted on line by contributing members of the task group. The preparation of the topic list revealed common
102 themes across the subject areas from which the principal topics for concern are described here. This represents the common
103 assertion from the task group that International Heritage Documentation Standards should address the key issues of consistency,
104 continuity and data transparency across all areas of heritage documentation practice.

105 **The topics of concern:**

106 International Heritage Documentation Standards are needed to improve:

- 107 1. Internationalisation
- 108 2. Project Management to integrate documentation into heritage management (including rapid-assessment and monitoring,
109 preventive maintenance programmes), encourage interdisciplinary data accessibility, and to engage specialists
110 appropriately
- 111 3. Skills through targeted training
- 112 4. Copyright, patent and intellectual property rights management
- 113 5. Data Management by specification and brief
- 114 6. Digital heritage accountability & information management

4. Definition of terms used in this report

Archaeology	The study of past human cultures by analysing the material remains (sites, buildings, artefacts and ecofacts) that people left behind.
Authenticity	Those characters that most truthfully reflect and embody the cultural heritage values of a place.*
Base line record	A set of information captured in recognition of heritage value in anticipation of monitoring condition and further detailed recording as resources permit.
Brief	The description of the specific service required, the site, extent, scale, scope, and reasons for the work.
Chemical analysis	Procedure for determining material content, especially the content of deleterious materials e.g. salts carbon, excess acid etc.
Code of practice	A set of written rules that state operating requirements for specified activities. May form a standard against which performance can be assessed.
Condition survey	Description of condition mapped.
Conservation	Preservation or restoration from loss, damage, or neglect.
Data standard	An agreement on what data should be recorded, and how it should be formatted, to meet a specific objective, for example interoperability between different information systems.
Digital heritage records	Information stored in a digital medium.
Guidelines	Documents published by relevant authorities for the purpose of informing working practice. Specifically guidelines may clarify the provisions of a law, regulation or standard.
Heritage, Cultural Heritage	All inherited resources which people value beyond mere utility. Inherited assets which people identify and value as a reflection and expression of their evolving knowledge, beliefs, and traditions and their understanding of the beliefs and traditions of others.*
Heritage asset management	The process required to manage physical assets to maintain their cultural heritage significance.
Heritage conservation community	Specialists working in cultural heritage, including conservators, site managers, archaeologists and allied technicians.
Information Management	The process of identifying, defining, evaluating, protecting, and distributing structured data.
Method & Resource statement	Response to brief explaining how a proposed performance requirement will be met.
Method specification	Description of required performance of a method.
Metric survey	3D geometric survey with a known accuracy and precision carried out by reliable and repeatable methods.
Objective record	A theoretical property of records: captured without influence from human judgements.
Orthophotograph	(A mosaic of) photographic images corrected for scale and perspective errors i.e. a photo-map.
Performance specification	Description of required performance without a specific method.
Photogrammetry	The science and technology of obtaining reliable and accurate measurements from images
Product	Deliverable or outcome.
Project Management	The discipline of organising and managing resources in such a way that the project is completed within a defined scope.
Recording	Information capture.
Significance	The sum of the cultural and natural heritage values of a place including evidential, historical, community and aesthetic values* See also the Nara Document on Authenticity: www.international.icomos.org/naradoc_eng.htm
Specification	Description of required performance.
Standard	Document, established by consensus and approved by a recognised body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context. (ISO/IEC Guide 2:1996)
Technical specifications	Descriptions of technical performance.
Work Practice	Processes, tasks and procedures.

*Definition from English Heritage Conservation principles 2007

116 **5. Internationalisation**

117
118 National standards in heritage documentation are diverse: there is a clear need for convergence because the core principles of
119 heritage documentation are subject to local interpretation according to resource and the variety of responses to cultural heritage.
120 An internationally expressed set of best practices in information capture and information management is needed to reinforce the
121 work of practitioners in heritage documentation with clear templates and goals.

122 Internationally recognised standards for heritage documentation should present:

- 123 ♦ an outline of recommended work practices
- 124 ♦ examples of technical specifications for common recording techniques and products
- 125 ♦ guidance on how documentation fits into heritage project management

126 Heritage documentation standards, which clearly and unambiguously explicates model work practice, will benefit the international
127 cultural heritage conservation community. Such standards must:

- 128 ♦ take into account differences in societies irrespective of language, ethnicity, religion, wealth and nature of political regime
- 129 ♦ should apply work practices based on easily accessible and translatable information norms and formats
- 130 ♦ internationally promote and build awareness of standardised heritage documentation work practices

131 **Recommendation: Documentation practitioners and heritage institutions need an international heritage**
132 **documentation standard framework to enable the sharing of data. The recommendation is that such a framework**
133 **is produced.**

134 **Standard lexicon**

135 A standard lexicon of conservation documentation terms should be established for the translation and dissemination of best
136 practices and standards in specialised approaches, so that they serve the cultural heritage community.

137 This work should aim to overcome barriers to adoption of good practice that arise from language and the difference between
138 cultural heritage and related disciplines. Translation of key documents into an appropriate range of languages will be needed to
139 support their use internationally. In addition, documents aimed at related disciplines (for example civil engineering) will need to be
140 considered and provided with an introduction to allow cultural heritage specialists to understand the language and approaches used
141 in the related discipline.

142 **Recommendation: To develop a multi-lingual; standard lexicon of terms used in Heritage Documentation to**
143 **define unambiguously those terms that aid translation and dissemination of best practices and standards using**
144 **specialised terms and to achieve clarity and consensus.**



The only way to understand selection issues in data capture is to get hands-on experience. Training pays back its costs many times over in terms of effective information capture and transmission. Once skills have become mature in practice it is vital to develop teaching to pass the skills on. Simply investing in technology is not enough: there must be an investment in people too! The balance between understanding information needs and technical competence is best learned from those who have wide-ranging experience.

178 **7. Training**

179 In line with the ICOMOS Colombo 1993 *Guidelines for education and training in the conservation of monuments, ensembles and sites*⁹
 180 standards for heritage documentation seek to establish and maintain both a minimum educational achievement and the specialist
 181 technical skills required for practitioners.

182 Standards for heritage documentation, which includes recommended work practice, acknowledge that:

- 183 ♦ long-term planning is part of sustainability in documentation
- 184 ♦ long-term planning concerns standardisation of data capture, performance, dissemination and storage
- 185 ♦ Shared data standards are essential for long-term planning

186 Therefore qualification, experience and training in heritage specific skills is required for practitioners in documentation.

187 In addition to basic literacy, numeracy and IT skills, basic training is needed in the following areas:

- 188 ♦ Fundamentals of surveying
- 189 ♦ Site capture and field drawing
- 190 ♦ Awareness of archaeological inventory, prospecting, excavation and investigative skills
- 191 ♦ Understanding of national, local and regional cultural styles and their development (e.g. history of architecture)
- 192 ♦ Information in use in conservation practice and preventative maintenance
- 193 ♦ Information management
- 194 ♦ Digital archiving
- 195 ♦ Robust and reliable capture methods
- 196 ♦ Rapid assessment survey
- 197 ♦ Preparation and performance of ante-disaster records
- 198 ♦ Disaster recovery techniques
- 199 ♦ Cultural resource management
- 200 ♦ Conservation practice and preventative maintenance

⁹ Appendix 3 ICOMOS Training initiatives in Heritage Documentation

201 **Recommendation: That training is made available for basic heritage documentation skills.**

202 **Recommendation: That the contribution of documentation experts to training initiatives needs to broadcast the 3**
203 **core principles of heritage documentation:**

204 ♦ *respect for heritage significance and value*

205 ♦ *transparency of data provenance*

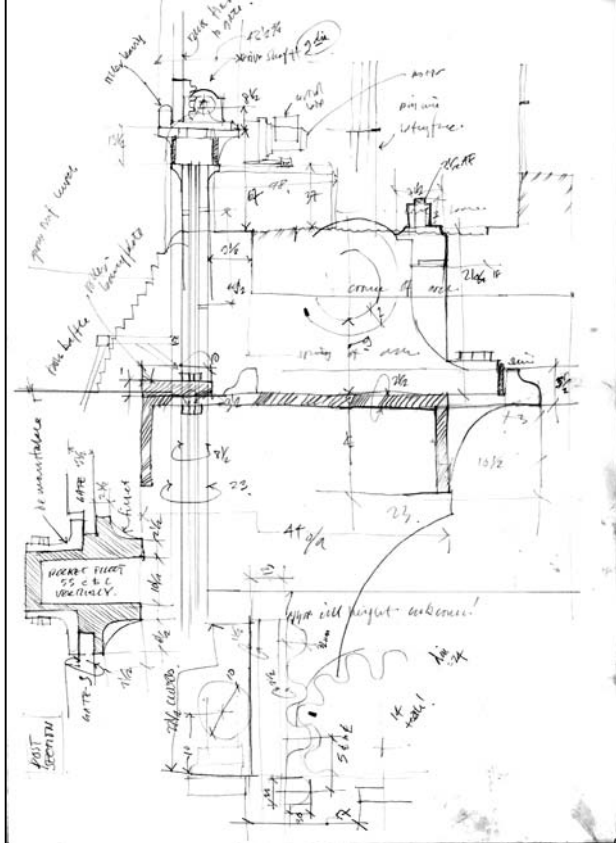
206 ♦ *meeting heritage management needs*

207 National heritage laws vary with regard to the technical performance of documentation therefore an understanding of common
208 base levels of record and of fields such as surveying, excavation and material conservation need to be included in training for
209 heritage documentation.

210 Understanding heritage values (e.g. respect of ownership and patrimony of cultural heritage), whether in reference to landscapes,
211 monuments, sites or artefacts, is a basic requirement for all the parties involved in heritage documentation and should to be
212 included in training for heritage documentation. Training in the use of international codes and charters¹⁰ concerning cultural
213 heritage is a key requirement for understanding and applying an effective standards for heritage documentation.

214 **Recommendation: That a summary list of current international heritage conservation conventions and charters**
215 **be made available for teachers**

¹⁰ listed at Appendix I



Successful documentation projects rely on the integration of information from many disparate sources: we have no consistent standard on ownership and rights of use for the components, their products and findings.

A site sketch may be the most valuable record of lost fabric but it may not be formally archived in the same way as a completed survey project.

216 8. Copyright, patent and intellectual property rights management

217 Legislation of copyrights, patents and intellectual property rights varies between national and geographical areas.

218 The principle outlined in the Venice charter that heritage records should be *disseminated and shared* subject to contractual, national
 219 and international legal constraints needs to be supported by guidance on the matter of the rights of the originators of
 220 documentation. The obligation to ‘assert the moral right’ as author is not explicit for drawings, collaborative or derivative work:
 221 clarification is needed.

222 The separation of original work from technical format is a concern as digital information is inseparable from the technical formats
 223 it uses, proprietary or otherwise.

224 Work practice requirements in heritage documentation standards include:

- 225 ♦ adherence to applicable laws protecting intellectual property (applied to published work, programs, software, imagery,
 226 audiovisual data and digital data in general)
- 227 ♦ adherence to patent laws (e.g. documentation software)
- 228 ♦ intellectual property rights, i.e. use of cultural heritage for industrial and commercial purposes; documentation publication
 229 rights etc.

230 **Recommendation: That a best practice guide is prepared which will examine common principles with regard to**
 231 **copyright, patent, moral and intellectual property rights, and that a list of appropriate agencies to contact is**
 232 **compiled.**

234 **9. Data management by specification and brief**

235 **Specifications**

236 Specifications must be established to protect data suppliers and users from misapplied data capture. The performances of capture
237 technologies must be controlled by a description of the expected data and the standard it must reach. The specification for the
238 performance of data capture must respect the requirement for archive and its future re-interpretation.

239 **Performance/Method specifications**

240 The emphasis on either product performance or technique performance must be made clear in using specifications to control
241 documentation outcomes¹¹. The deployment of both method and performance specifications requires practical experience of both
242 techniques and products. By making reference examples available along with a technical description of both method and
243 performance the balance between economical and technical performances can be demonstrated.

244 Cultural Heritage managers must make informed choices when commissioning documentation so that the most effective
245 techniques are selected for use, not only to meet immediate information needs but to act as a basis for long term records of
246 condition and as controls for long term site management.

247 **Recommendation: Guidance for using specifications is needed**

248 **The Brief**

249 Getting the right information to the right person at the right time is a key responsibility of the practitioner; this is not possible if
250 there is no agreement between the parties on the exact project specific requirements. A brief explains to all what is agreed to be
251 done, why, and when. International Heritage Documentation Standards can offer standard clauses and descriptions of services.

252 **Recommendation: Provide examples of model briefs by way of guidance as to how to write a brief.**

253 **Method & resource statement**

254 The response to a brief needs to make consistent use of task descriptions with clear descriptions of the skills and duties of the
255 team, the equipment to be used (and its condition, calibration etc.), the project time table and the deliverables.

256 **Recommendation: Provide guidance on how to produce a Method and Resource Statement with examples.**

257 **Research project planning**

258 Heritage documentation work is often undertaken for research and educational projects. Documentation is devalued without
259 planning outcomes beyond immediate research needs. A standard is needed to ensure consistency of documentation produced
260 across research institutions.

261 **Recommendation: That a minimum of 3 research institutions identify common documentation standards for** 262 **testing that will demonstrate international interoperability and exchange of research data.**

¹¹ An example is: *Metric Survey Specifications for English Heritage* (ISBN 1873592 574 published in 2000, revised 2003 and 2007) which provides a description of the products required for the supply of base metric data for heritage asset management in England. The specification is both method- and performance-based as photogrammetric products are considered a baseline record determined by method. The requirements for control, line selection (including illustration by example), CAD layering is described

263 **Role of technical standards in best practice**

264 In the scientific and technical sector (geomatics, geodesy, geophysics, chemistry, etc.) international and national bodies (e.g. CEN¹²,
265 ISO¹³, DIN¹⁴ etc.) have approved many standards governing the performance of metric capture. The function of such technical
266 standards in heritage documentation is the underpinning of information selection with robust measurement and data recovery
267 performances. The harmonisation of the existing standards and the setting up of manuals (best practices etc.) in order to translate
268 existing accepted standards into the cultural heritage documentation process is needed to improve the application of the sciences
269 in the heritage sector.

270 **Data acquisition and technique selection**

271 Guidance is needed to offer the user community informed advice on the range of techniques available and their appropriate
272 application. Cultural heritage documentation experts usually define the required outcomes as useful in assisting the comprehension
273 of an object; but the methods required are not usually specified. In some cases there is insufficient knowledge of the different
274 approaches available to produce a given outcome. In the past this has allowed 'uneconomic' approaches to the problem. Despite
275 the relatively few techniques available today their misapplication is all too common. Matching end user data requirements with the
276 correct capture method needs an understanding of the selection, or 'analysis and filtering', of captured data which is an essential
277 process in making data effective for a given conservation outcome. The potential of multi-use data that meets the needs of more
278 than one project stage or discipline needs careful collaboration in the project team and rigorous specification to achieve. Post-
279 capture feature selection and interpretation is dependant on the capture methods deployed (for example metric data can be
280 recovered from historic photography whereas historic drawings have their selection aspect frozen in time) requiring careful
281 evaluation of the anticipated data performance and its use by the heritage conservation community. Data integration and
282 interdisciplinary working benefit from carefully managed digital techniques; making the right choices has an impact on workflow and
283 data flexibility. Data from different sources can be used in different ways and each way allows different integration paths with other
284 techniques.

285 By using the body of published knowledge (books, manuals and best practices etc.) it is possible to build up a schedule of possible
286 solutions achievable by current techniques and offer clear advice on the performance of the data outputs for each technique.
287 Similarly it should be possible to list the information requirements for classified cultural heritage documentation types and show
288 how they describe existing standards for cultural heritage documentation. By indicating data types that can guarantee maximal data
289 re-use the risks and benefits of a given technique can be understood (e.g. the potential of re-use and repeatability of the
290 measurement cycle can be demonstrated for a given technique).

Recommendation: Guidance for technique selection is needed

291 The minimum requirements for the correct use of capture techniques (in terms of accuracy and usability of the data) are variable
292 according to the subject and the recourses available, but the consistency of some capture techniques over others (for example

and definitions of 'outline' and 'detailed' survey are given. Descriptions of survey products for topographic surveys, building plans & sections, orthophotography, and laser scan (added 2007) surveys.

¹² CEN European Norm committee; the European Committee for Standardisation, was founded in 1961. CEN contributes to the objectives of the European Union and European Economic Area with voluntary technical standards which promote free trade, the safety of workers and consumers, interoperability of networks, environmental protection, exploitation of research and development programmes, and public procurement.

¹³ ISO The International Organisation for Standardisation is an international standard-setting body composed of representatives from various national standards organisations. The organisation promulgates world-wide industrial and commercial standards.

¹⁴ DIN Deutsches Institut für Normung the German Institute for Standardisation. It is the German national organisation for standardisation and is that country's ISO member body.

293 photogrammetry) needs to be made clear. The frequent need to use a combination of techniques to achieve a required outcome is
294 poorly understood and guidance is lacking on the different techniques and their integration.

295 **Technical specifications require integration of data capture and information management**

296 The data from physical and chemical analysis techniques can be considered as “objective” data, however, descriptions of geometry
297 tend to be selective. This means different kinds of procedural controls are needed to achieve geometric and analytical consistency.
298 Finding the right mix of specifications to integrate geomatic and physical or chemical analysis so that repeated capture cycles can be
299 achieved for condition monitoring is vital for successful conservation practice.

300 **Data Quality assessments: base line records**

301 A method of ranking information quality and a better understanding of base line record performance is needed. Being able to add a
302 quality ‘score’ to technical data, which can be managed inside GIS, needs a standard method of weighting from base line upwards in
303 order to achieve comparability between GIS data sets. The variability of GIS data quality needs a set of quality measures to enable
304 quantifying the value of derived information.

305 **Integration of Work Practices and Information Management**

306 Technical specifications, guidelines and standards should integrate with work practices so that properly informed use of the most
307 appropriate practices and techniques available is made. Work practices should integrate with information management standards to
308 ensure that data created by a particular technique can be archived in a documented, stable and accessible format to support future
309 research work.

310 For example:

- 311 ♦ where work practice requires a specific technique to be deployed its performance can be clearly stated
- 312 ♦ where a documentation outcome is described it can be in a standardised form and language
- 313 ♦ when a task is described in terms of skill, the skill can be clearly defined using standard language for tasks
- 314 ♦ the performance of materials described in the brief meets the technical standard for its purpose

315 The conservation specific information requirements (e.g. condition, mineral content, monitoring etc) must be included in the data
316 performance requirement. The density of points and the selection of information from data sets should be specified according to
317 the conservation requirement. The use of selected or interpolated information to describe aspects of cultural heritage (e.g. art
318 historic in wall painting, architectural history in buildings) must be based on clear traceable input from the relevant expertise. Data
319 structure and terminology (e.g. GIS, data base asset register) should be organised to meet the needs of the heritage conservation
320 community.

321 **Recommendation: A reference guide to technical standards is needed to translate existing accepted technical**
322 **standards into the Heritage Documentation process.**

323 **Recommendation: To produce a checklist of requirements for compliance with the technical standards with**
324 **accompanying explanatory notes. To explore the issue of a certification of compliance with recommended**
325 **technical standards by a panel comprising members of ICOMOS, CIPA and a representative from an appropriate**
326 **standards organisation.**



A record of architectural form, condition and personal witness is worthless without knowing who took the photo, why and how the image has been altered since capture: questions like 'Is this half of a stereo couple? Is there a known calibration for the camera and lens? Can the image be recovered from the photographers archive? Who has the right to reproduce it? Does the building owner need to assent to the publication of the image?' can be answered if an appropriate set of metadata is transmitted with the image.

10. Digital heritage accountability & information management

327 Background: what do we mean by 'digital heritage'

328 For the purposes of this report *digital heritage* is taken to mean the digital products of heritage documentation. The issue of
329 documenting our digital culture as a whole is considered beyond the remit of this report. Digital data presents its own challenge
330 both as a tool and as a record: it is transient in format, volatile in archive and costly to maintain. Guidance is needed to achieve
331 the obvious benefits of digital data.

332 We have relatively short experience of the long-term performance of digital data and its behaviour is different from paper
333 equivalents. Some digital records (e.g. GIS) can only exist in a digital medium, whereas others may have hard copy equivalents that
334 respond to traditional archive management. For the purposes of this report, formats and products are considered on an 'as
335 existing' basis so that standards may be proposed that are based on actions that can be taken with the data we have now.

336 The principal needs of international heritage documentation standards with respect to digital data performance are identified as:

- 337 ♦ Digital archiving standards to enable managing the digital data lifecycle: including migration strategies, and long-term
338 accessibility
- 339 ♦ Definition of data curation and stewardship responsibilities
- 340 ♦ Ensuring data interoperability and transparency of provenance
- 341 ♦ Defining appropriate standards that support empirical, interpreted and visualised data
- 342 ♦ Disaster recovery, security, authenticity

- 343 Topics of concern for heritage documentation practitioners are:
- 344 ♦ The need for an open, tolerant, adaptable metadata standard
 - 345 ♦ How to embed metadata throughout workflow, from field to archive
 - 346 ♦ Need to influence research and development to provide tools that are easy to use and adapted to heritage community
 - 347 ♦ Digital fingerprinting of heritage assets: UUID: (Universally Unique Identifier) Persistent identifiers for heritage and digital
 - 348 assets
 - 349 ♦ Alternatives to information management in the absence thereof
 - 350 ♦ Long-term storage guarantees

351 Digital archiving standards for cultural heritage documentation can be subdivided into three principal groups:

- 352 ♦ Archiving of textual data (e.g. verbal site descriptions, reports of digs)
- 353 ♦ Archiving of digital data (e.g. photography, CAD drawings etc.)
- 354 ♦ Archiving of empirical, interpreted and visualised data

355 **Using common formats**

356 For digital data formats one format of choice will have to be selected for each individual type of record to be archived (e.g. photography, vector drawing, CAD drawing, 3D model, film etc.). Preference should be given to openly standardised, non-proprietary formats where possible.

359
360 For textual data XML-based formats and notably those conformant to the guidelines of the Text Encoding Initiative (TEI)¹⁵ are an obvious choice. It is necessary to define a profile of the TEI for the core elements that are needed for reliable archiving of data.

362 For empirical, interpreted and visualised data, specific data formats need to be defined.

363 **Data Interoperability**

364 Data interoperability is closely related to data archiving, but not identical. Whereas data archiving standards are chosen with the paramount goal of long-term data accessibility, data interoperability can take into account factors such as ease of modification, current tool availability etc. Whenever possible, however, both formats should be identical and in the mid-term tools should be developed to ease the handling of data archiving formats.

368 **Metadata Standards**

369 Metadata standards cover the description of data objects through explicit annotations either inside the data objects themselves (embedded metadata) or referencing them (external metadata). The former can be found e.g. in the case of metadata inside a JPEG 2000 image, the header of a TEI file or RDF¹⁶ triplets inside a text file, the latter e.g. through external topic maps (cf. ISO/IEC 13250)¹⁷, a suitably configured registry or with OWL (Web Ontology Language)-based ontology. Metadata standards within the cultural heritage arena and more specifically for cultural heritage documentation will build on these existing metadata specifications and describe both a suitable ontology and vocabularies. In the case of cultural heritage objects themselves the former is specified in

¹⁵ <http://www.tei-c.org/> The Text Encoding Initiative (TEI) Guidelines are an international and interdisciplinary standard that enable libraries, museums, publishers, and individual scholars to represent a variety of literary and linguistic texts for online research, teaching, and preservation.

¹⁶ Resource Description Framework (RDF) is a family of World Wide Web Consortium (W3C) specifications originally designed as a metadata model but which has come to be used as a general method of modelling information, through a variety of syntax formats.

¹⁷ <http://www.jtc1sc34.org/repository/0008/draft27.htm>

This International Standard provides a standardised notation for interchangeably representing information about the structure of information resources used to define topics, and the relationships between topics. A set of one or more interrelated documents that employs the notation defined by it is called a Topic Navigation Map (TNM). In general, the structural information conveyed by TNMs includes: groupings of addressable information objects.

375 ISO 21127: CIDOC¹⁸ Conceptual Reference Model (CIDOC CRM), cf. <http://cidoc.ics.forth.gr/>, and pertinent vocabularies exist
376 in considerable numbers. However, it will be necessary to give guidance on their actual use in embedded and external metadata.
377 For the documentation data objects it will be necessary to complement the metadata relating to the cultural heritage objects
378 themselves with metadata on the documentation objects. This includes technical metadata, e.g. for photographic data typically
379 contained in the EXIF header¹⁹, archiving and bibliographic metadata, e.g. in Dublin Core²⁰ and / or FRBR²¹, administrative metadata
380 etc.

381 **Recommendation: A working group must consider metadata for heritage documentation in detail and elaborate a**
382 **map of existing standards and vocabularies together with a gap analysis. In a second step concrete standardisation**
383 **activities should be identified and discussed with suitable standardisation forums.**

384 **Digital Fingerprinting**

385 Digital fingerprints can function as a special type of metadata in uniquely associating (a version of) a heritage documentation with a
386 specific originator. It can also make sure that this version is unaltered.

387 In relation to long-term data archiving, digital fingerprinting as digital signatures pose significant problems, though (e.g. the problem
388 of refreshing the protection). It may be necessary to monitor the standardisation scene e.g. in eGovernment and in archival
389 practice, where similar problems are tackled, until a clear state of the practice emerges.

390 **Tools for the Heritage Community**

391 While not part of the standards themselves, it is important to influence research and development to provide supporting tools that
392 are easy to use and adapted to the heritage community. For textual data such tools are currently under development e.g. in the
393 TextGrid²² project (<http://www.textgrid.de>) or in projects such as EPPT²³ (<http://beowulf.engl.uky.edu/eppt/>) or Tapor
394 (<http://portal.tapor.ca/>)²⁴, in the case of TextGrid in cooperation with archives and libraries. Digital library resources are becoming

¹⁸ CIDOC (Le Comité International pour la DOcumentation des musées) is the forum for the documentation interests of museums and related organisations. It has more than 450 members in 60 countries. Established in 1950 as one of the international committees of the International Council of Museums (ICOM) it is dedicated to the documentation of museum collections. CIDOC has produced several international standards for museum documentation, most recently the CIDOC-CRM (accepted as ISO 21127 in September 2006).

¹⁹ Exchangeable image file format (Exif) is a specification for the image file format used by digital cameras. It was created by the Japan Electronic Industries Development Association (JEIDA). The specification uses JPEG, TIFF, and RIFF WAVE file formats, with the addition of specific metadata tags. It is not supported in JPEG 2000, PNG, or GIF.

²⁰ The Dublin Core metadata element set is a standard for cross-domain information resource description. It provides a standardised set of conventions for describing things in ways that make them easier to find. Dublin Core is widely used to describe digital materials.

²¹ Functional Requirements for Bibliographic Records. <http://www.frbr.org>

²² TextGrid is a platform for distributed and co-operative scientific text data processing: a community grid for the arts and humanities: it establishes a workbench for joint philological treatment, analysis, listing of publications, editing and publication of text data for philology, linguistics and adjacent sciences. TextGrid creates an interdisciplinary, international and interlaced virtual research platform in collaboration with e-Humanities initiatives in the study of arts and humanities

²³ Edition Production & Presentation Technology is an integrated set of XML tools designed to help humanities editors prepare image-based electronic editions. Following emerging standards (XSLT, XPath, XQuery), EPPT is testing its broad application to external projects that preserve texts in Old English, Middle English, Old French, Old Slovene, ancient Assyrian, Greek and Latin, on parchment, vellum, paper, papyrus, clay and stone.

²⁴ TAPoR (Text Analysis POrtal for Research) is a gateway to tools for sophisticated analysis and retrieval, along with representative texts for experimentation

395 available and structures enable interoperability emerging e.g. Bricks (<http://www.brickscommunity.org/>) which works for the
396 creation of the BRICKS²⁵ Cultural Heritage Network or 'European Digital Cultural memory'.

397 **Recommendation: Specific heritage documentation research applications using the developing data analysis tools**
398 **should be investigated. By identifying missing tools for data interoperability and finding solutions it will be possible**
399 **to address selected projects and plan the handling of heritage documentation, e.g. in the data format specified for**
400 **joint research applications.**

401 **Recommendation: That guidance be produced on “good housekeeping” for archiving, description and storage of**
402 **digital data.**

²⁵ The BRICKS (Building Resources for Integrated Cultural Knowledge Services) project researches and implements advanced open source software solutions for the sharing and the exploitation of digital cultural resources. The BRICKS Community is a world-wide federation of cultural heritage institutions, research organisations, technological providers, and digital libraries services. The Community orientates and validates the project results, and co-operates towards the creation of the BRICKS Cultural Heritage Network that will provide access to and foster the European digital memory.

Appendix I: International Heritage Charters

CHARTERS ADOPTED BY THE GENERAL ASSEMBLY OF ICOMOS ²⁶

- 403 ♦ International Charter for the Conservation and Restoration of Monuments and Sites (The Venice Charter)
- 404 ♦ The Florence Charter (Historic gardens and landscapes)
- 405 ♦ Charter on the Conservation of Historic Towns and Urban Areas
- 406 ♦ Charter for the Protection and Management of the Archaeological Heritage
- 407 ♦ Charter for the Protection and Management of the Underwater Cultural Heritage
- 408 ♦ International Charter on Cultural Tourism
- 409 ♦ Principles for the Preservation of Historic Timber Structures
- 410 ♦ Charter on the Built Vernacular Heritage

RESOLUTIONS AND DECLARATIONS OF ICOMOS SYMPOSIA

- 411 ♦ Resolutions of the symposium on the Introduction of Contemporary Architecture into Ancient Groups of Buildings
- 412 ♦ Resolution on the Conservation of Smaller Historic Towns
- 413 ♦ Tlaxcala Declaration on the Revitalization of Small Settlements
- 414 ♦ Declaration of Dresden
- 415 ♦ Declaration of Rome
- 416 ♦ Guidelines for Education and Training in the Conservation of Monuments, Ensembles and Sites
- 417 ♦ The Nara Document on Authenticity (Nara Conference on Authenticity in Relation to the World Heritage Convention, held at Nara, Japan, from 1-6 November 1994)
- 418 ♦ Declaration of San Antonio at the InterAmerican Symposium on Authenticity in the Conservation and Management of the Cultural Heritage
- 419 ♦ Principles for the recording of monuments, groups of buildings and sites (The Sofia principles 5 to 9 October 1996)
- 420 ♦ The Stockholm Declaration : Declaration of ICOMOS marking the 50th anniversary of the Universal Declaration of Human Rights (adopted by the ICOMOS Executive and Advisory Committees at their meetings in Stockholm, 11 September 1998)

CHARTERS ADOPTED BY ICOMOS NATIONAL COMMITTEES

- 425 ♦ The Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (The Burra Charter) (Australia ICOMOS)
- 426 ♦ Charter for the Preservation of Quebec's Heritage (Deschambault Declaration) (ICOMOS Canada)
- 427 ♦ Appleton Charter for the Protection and Enhancement of the Built Environment (ICOMOS Canada)
- 428 ♦ First Brazilian Seminar About the Preservation and Revitalization of Historic Centers (ICOMOS Brazil)
- 429 ♦ Charter for the Conservation of Places of Cultural Heritage Value (ICOMOS New Zealand)
- 430 ♦ A Preservation Charter for the Historic Towns and Areas of the United States of America (US/ICOMOS)

OTHER INTERNATIONAL STANDARDS

- 431 ♦ Athens Charter for the Restoration of Historic Monuments (First International Congress of Architects and Technicians of Historic Monuments, Athens, 1931)
- 432 ♦ Normas de Quito, Final Report of the Meeting on the Preservation and Utilization of Monuments and Sites of Artistic and historical Value held in Quito, Ecuador, from November 29 to December 2, 1967
- 433 ♦ Declaration of Amsterdam (Congress on the European Architectural Heritage, 21-25 October 1975)
- 434 ♦ European Charter of the Architectural Heritage (Council of Europe, October 1975)
- 435 ♦ UNESCO Conventions and Recommendations

²⁶ http://www.international.icomos.org/e_charte.htm

Appendix 2: Authorship of this report

440 Robin Letellier convened the RecorDIM initiative in 2002 to address heritage documentation issues and supported the work of this
441 Task Group.

The content collated and edited by Jon Bedford (who was also recorder at the editorial meeting hosted by Politecnico di Torino) and Bill Blake from content prepared by 3 contributing subject editors:

- 442 ♦ Work Practice: Minna Lonquist
- 443 ♦ Technical standards : Fulvio Rinaudo
- 444 ♦ Data standards: Marc Wilhelm Kuster

445 The access to content was moderated by Mario Santana Quintero who facilitated and recorded the Nicosia meeting. Michael
446 Ashley compiled the content headings from contributions at the London Task Group meeting. The content has the assent of the
447 following who either attended and agreed to the proceedings of the two meetings or registered as members of the Heritage
448 Documentation Standards Google Group ²⁷ with access to the report content between November 2006 and August 2007:

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Trelogan	Jessica	University of Texas	USA
Vandenberg	Jack	Public Works and Government Services Canada	Canada

²⁷ <http://groups.google.com/group/heritagedocstand>

Appendix 3: ICOMOS guidelines for education and training in the conservation of monuments, ensembles and sites ²⁸

The General Assembly of the International Council on Monuments and Sites, ICOMOS, meeting in Colombo, Sri Lanka, at its tenth session from July 30 to August 7, 1993; Considering the breadth of the heritage encompassed within the concept of monuments, ensembles and sites; Considering the great variety of actions and treatments required for the conservation of these heritage resources, and the necessity of a common discipline for their guidance; Recognizing that many different professions need to collaborate within the common discipline of conservation in the process and require proper education and training in order to guarantee good communication and coordinated action in conservation; Noting the Venice Charter and related ICOMOS doctrine, and the need to provide a reference for the institutions and bodies involved in developing training programmes, and to assist in defining and building up appropriate standards and criteria suitable to meet the specific cultural and technical requirements in each community or region; Adopts the following guidelines, and Recommends that they be diffused for the information of appropriate institutions, organizations and authorities.

AIM OF THE GUIDELINES

1. The aim of this document is to promote the establishment of standards and guidelines for education and training in the conservation of monuments, groups of buildings ("ensembles") and sites defined as cultural heritage by the World Heritage Convention of 1972. They include historic buildings, historic areas and towns, archaeological sites, and the contents therein, as well as historic and cultural landscapes. Their conservation is now, and will continue to be a matter of urgency.

CONSERVATION

2. Conservation of cultural heritage is now recognised as resting within the general field of environmental and cultural development. Sustainable management strategies for change which respect cultural heritage require the integration of conservation attitudes with contemporary economic and social goals including tourism.

3. The object of conservation is to prolong the life of cultural heritage and, if possible, to clarify the artistic and historical messages therein without the loss of authenticity and meaning. Conservation is a cultural, artistic, technical and craft activity based on humanistic and scientific studies and systematic research. Conservation must respect the cultural context.

EDUCATIONAL AND TRAINING PROGRAMMES AND COURSES

4. There is a need to develop a holistic approach to our heritage on the basis of cultural pluralism and diversity, respected by professionals, craftsmen and administrators. Conservation requires the ability to observe, analyze and synthesize. The conservationist should have a flexible yet pragmatic approach based on cultural consciousness which should penetrate all practical work, proper education and training, sound judgement and a sense of proportion with an understanding of the community's needs. Many professional and craft skills are involved in this interdisciplinary activity.

5. Conservation works should only be entrusted to persons competent in these specialist activities. Education and training for conservation should produce from a range of professionals, conservationists who are able to:

- a. read a monument, ensemble or site and identify its emotional, cultural and use significance;
- b. understand the history and technology of monuments, ensembles or sites in order to define their identity, plan for their conservation, and interpret the results of this research;
- c. understand the setting of a monument, ensemble or site, their contents and surroundings, in relation to other buildings, gardens or landscapes;
- d. find and absorb all available sources of information relevant to the monument, ensemble or site being studied;
- e. understand and analyze the behaviour of monuments, ensembles and sites as complex systems;
- f. diagnose intrinsic and extrinsic causes of decay as a basis for appropriate action;
- g. inspect and make reports intelligible to non-specialist readers of monuments, ensembles or sites, illustrated by graphic means such as sketches and photographs;
- h. know, understand and apply Unesco conventions and recommendations, and ICOMOS and other recognized Charters, regulations and guidelines;
- i. make balanced judgements based on shared ethical principles, and accept responsibility for the long-term welfare of cultural heritage;
- j. recognise when advice must be sought and define the areas of need of study by different specialists, e.g. wall paintings, sculpture and objects of artistic and historical value, and/or studies of materials and systems;
- k. give expert advice on maintenance strategies, management policies and the policy framework for environmental protection and preservation of monuments and their contents, and sites;
- l. document works executed and make same accessible;
- m. work in multi-disciplinary groups using sound methods;
- n. be able to work with inhabitants, administrators and planners to resolve conflicts and to develop conservation strategies appropriate to local needs, abilities and resources;

²⁸ http://www.icomos.org/guidelines_for_education.html

AIMS OF COURSES

6. There is a need to impart knowledge of conservation attitudes and approaches to all those who may have a direct or indirect impact on cultural property.
7. The practice of conservation is interdisciplinary; it therefore follows that courses should also be multidisciplinary. Professionals, including academics and specialized craftspersons, who have already received their normal qualification will need further training in order to become conservationists; equally those who seek to act competently in historic environment.
8. Conservationists should ensure that all artisans and staff working on a monument, ensemble or site respect its significance.
9. Training in disaster preparedness and in methods of mitigating damage to cultural property, by strengthening and improving fire prevention and other security measures, should be included in courses.
10. Traditional crafts are a valuable cultural resource. Craftspersons, already with high level manual skills, should be further trained for conservation work with instruction in the history of their craft, historic details and practices, and the theory of conservation with the need for documentation. Many historic skills will have to be recorded and revived.

ORGANIZATION OF EDUCATION AND TRAINING

11. Many satisfactory methods of achieving the required education and training are possible. Variations will depend on traditions and legislation, as well as on administrative and economic context of each cultural region. The active exchange of ideas and opinions on new approaches to education and training between national institutes and at international levels should be encouraged. Collaborative network of individuals and institutions is essential to the success of this exchange.
12. Education and sensitization for conservation should begin in schools and continue in universities and beyond. These institutions have an important role in raising visual and cultural awareness - improving ability to read and understand the elements of our cultural heritage - and giving the cultural preparation needed by candidates for specialist education and training. Practical hands-on training in craft work should be encouraged.
13. Courses for continuing professional development can enlarge on the initial education and training of professionals. Long-term, part-time courses are a valuable method for advanced teaching, and useful in major population centres. Short courses can enlarge attitudes, but cannot teach skills or impart profound understanding of conservation. They can help introduce concepts and techniques of conservation in the management of the built and natural environment and the objects within it.
14. Participants in specialist courses should be of a high calibre normally having had appropriate education and training and practical working experience. Specialist courses should be multidisciplinary with core subjects for all participants, and optional subjects to extend capacities and/or to fill the gaps in previous education and training. To complete the education and training of a conservationist an internship is recommended to give practical experience.
15. Every country or regional group should be encouraged to develop at least one comprehensively organized institute giving education and training and specialist courses. It may take decades to establish a fully competent conservation service. Special short-term measures may therefore be required, including the grafting of new initiatives onto existing programmes in order to lead to fully developed new programmes. National, regional and international exchange of teachers, experts and students should be encouraged. Regular evaluation of conservation training programmes by peers is a necessity.

RESOURCES

16. Resources needed for specialist courses may include e.g.:
 - a. an adequate number of participants of required level ideally in the range of 15 to 25;
 - b. a full-time co-ordinator with sufficient administrative support;
 - c. instructors with sound theoretical knowledge and practical experience in conservation and teaching ability;
 - d. fully equipped facilities including lecture space with audio-visual equipment, video, etc. studios, laboratories, workshops, seminar rooms, and staff offices;
 - e. library and documentation centre providing reference collections, facilities for coordinating research, and access to computerized information networks;
 - f. a range of monuments, ensembles and sites within a reasonable radius.
17. Conservation depends upon documentation adequate for understanding of monuments, ensembles or sites and their respective settings. Each country should have an institute for research and archive for recording its cultural heritage and all conservation works related thereto. The course should work within the archive responsibilities identified at the national level.
18. Funding for teaching fees and subsistence may need special arrangements for mid-career participants as they may already have personal responsibilities.

