LASSI: the Larger Scale Systems Initiative

Introduction

LASSI is a consortium of UK museums that formed, together with the UK Museums & Galleries Commission (the MGC), to specify and procure collections management software that would meet all their various needs. They wished to take advantage of their joint purchasing power to benefit themselves and (as far as practicable) other museums. The consortium membership varied over time; it has included both large national museums and also regional and local museums, and covered the total range of museum collection types.

The LASSI project is significant in a number of ways. Most important, the software specification is built on the UK's well-established success in developing standards for documentation. It incorporates the various important UK and other standards, such as the Museum Documentation Association (MDA)'s SPECTRUM and the MGC's Standards in the Museum Care of Collections (1). It encompasses the needs of the whole variety of museum collections without compromising specialist requirements. Types of collections range from easel paintings to natural history; from science and industry to decorative arts; from photography to transport collections, and more. The specification covers not only collections cataloguing (already available through several software packages) but also the data requirements for actually managing museum collections: processes such as loans, object location and movement, conservation, reproduction and copying. The software contract that has been negotiated is based on a standard UK government model (2), and details a sound individual contractual relationship between the supplier and any museum purchasing the software. Not least, it is a tribute to cooperation among museums that the eight museums in the final consortium jointly achieved the highly complex business of software specification and contractual negotiation.

The project concluded successfully on 5th March 1996, when a five-year Framework Enabling Agreement was made between the UK Museums & Galleries Commission and Willoughby Associates from the USA. The Agreement enables any UK museum to purchase Willoughby's software, SNAP! or Multi MIMSY, and associated services, without competitive tendering and to the Consortium terms and conditions .

The project organisation

The project was run throughout by committees of representatives from each of the museums. It is commendable that an enterprise requiring agreement from so many different parties reached success under this type of management arrangement.

Project stages

The project went through four distinct stages. It began with an informal scoping study, undertaken by museums themselves. This demonstrated that the various museums, different though they were, had enough information technology requirements in common to be likely to be able to use at least a common core of software.

Feasibility study

The informal scoping study was followed by a detailed feasibility study, jointly funded by consortium members, with a welcome contribution from the DNH, and undertaken by software consultants. The consultants produced a high-level analysis of the museums' joint information requirements. This confirmed that a very large proportion of requirements was common to all the member museums. The study included a survey of the museum collections software then available, and found that while none met the complete specification, several packages went a long way towards doing so. A cost-benefit analysis showed that the favourable route to procuring software was for between four and seven museums to act as a group to produce a more detailed specification, and to negotiate for one of the existing collections software packages to be used as the basis for extension to a full system.

Specification stage

A period of reflection and regrouping followed, during which a new set of nine museums coalesced, including many of the founder members. A more formal constitution was drawn up, including procedures for voting on decisions, financial control, and a formal management structure (Figure 1). A high-level Project Board, in control of policy and strategy, consisted of the directors of the museums or their direct delegates. A lower-level Project Team was intended to take operational decisions; it consisted of senior managers, but from some of the museums only. A Project Assurance Team mirrored the Project Team but took an independent quality assurance role. It included greater technical

expertise. This overall arrangement broadly conformed to the PRINCE (Projects in Controlled Environments) project management method promulgated by the CCTA (the UK government Central Computing and Telecommunications Agency) [3]. However, PRINCE is primarily designed for I.T. projects within a single organisation. Translated to a consortium, several roles and lines of responsibility were unclear.

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PROJECT MANAGEMENT:
SPECIFICATION PHASE

LASSI Board:
Chairman of LASSI
+ 9 museum directors + MGC

Project Team:
Role: run project
Not representative
Chair + 5 reps. + Chair
of PAT

Project Manager:
Role: manage project
Status: employee

Project Assurance Team:
Role: independent check
Chair + reps. for:
Business
Users
Technical

PROJECT MANAGEMENT: TENDERING PHASE

LASSI Board
Chairman of LASSI
8 museum directors + MGC

Chair of the Project Team

Project Team:
Role: advise Board
Fully representative
8 museum managers
+ MGC

Executive Panel:
Chair of Project
Team
2 joint Project
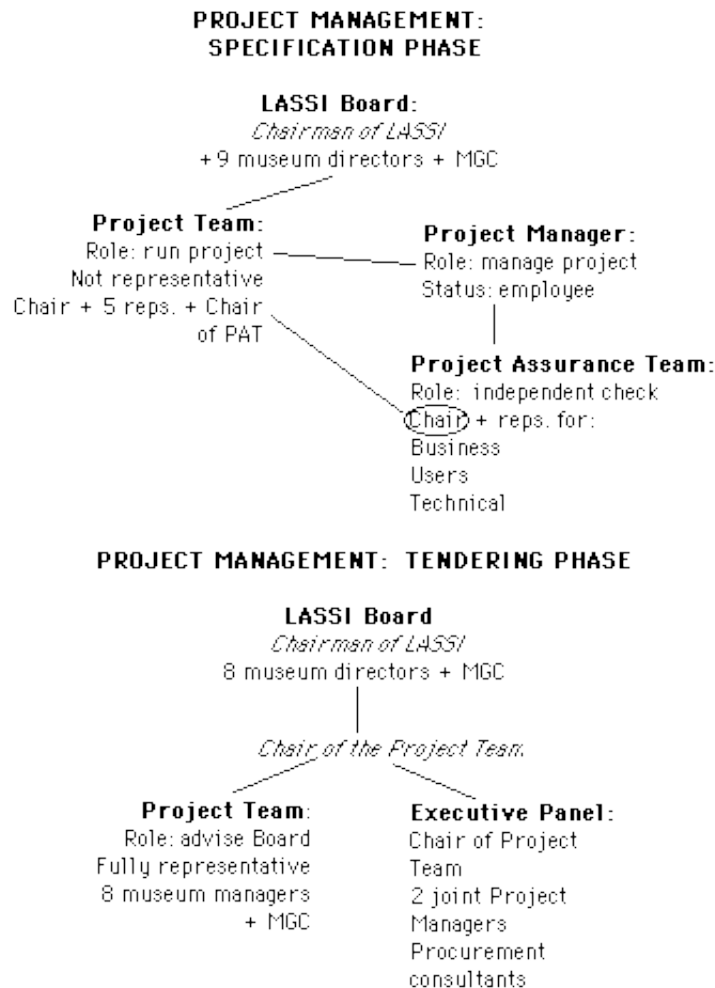Managers
Procurement
consultants

Figure 1. Project management arrangements in LASSI

The consortium also employed a full-time Project Manager, with temporary administrative assistance. The MGC acted as legal employer and provided financial services.

This semi-final project stage was the production of the JLSS: the Joint Logical System Specification. This was at first intended to be a highly detailed systems analysis, using SSADM (Structured Systems and Design Methodology) [4]. It would also produce the various tendering documents and seek and evaluate responses from system suppliers. A firm of software consultants was employed to undertake the analysis and produce the tender documents.

The nine LASSI museums undertook to input to the analysis by providing sufficient time from staff with appropriate skills. A complex network of museum users was defined, to ensure that all major specialist collection disciplines and procedural areas, such as registrars, conservators and stores personnel, were represented.

UK government endorsement

The blessing and support of the UK government, from the Department of National Heritage (DNH), was sought and obtained. The DNH again provided financial support so that museums could undertake the additional work necessary to make the software more widely available. This necessitated the formal adoption of CCTA procurement processes and contractual arrangements.

Although these processes can seem costly and cumbersome, our experience was that they were on the whole well justified. We also benefited from the depth of experience of CCTA consultants in negotiating information technology contracts for the public sector. The software tendering and procurement processes had to conform to EC and GATT regulations, and here too the CCTA have laid out detailed routes to follow that would be useful to use whatever the tendering regulations in force [5].

The specification process

Detailed information systems analysis with input from so many different museums proved extremely demanding, for consultants, museums, and the project management arrangements alike. It was difficult for the consultants to assimilate and reconcile the breadth and depth of detail supplied and incorporate it into the formal SSADM analysis products, and it was difficult for museums to find sufficient staff time and expertise from their best people, to work with the consultants and to check the accuracy of the voluminous analysis products. The complex management arrangements, with no single museum formally in the lead, only worked because of the great goodwill of member museums.

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System scope

These different factors were put to the test when it came to defining the scope of the system, which would form the entire basis for tendering and selection. Each representative naturally had his or her own pet requirements, and in turn the various standards documents [1] reflected a multitude of views. A series of all-day meetings resulted in a comprehensive "wish list".

The project consultants advised that the first scoping definition was far too inclusive. At first, museum representatives resisted any reduction in scope. Eventually, the Project Assurance Team, which included several people with practical experience of selecting and implementing software systems, asserted their independent view and insisted that a more realistically scoped system definition be presented to the LASSI Board. The Board supported the more realistic view, and reaffirmed their policy that it was overwhelmingly likely that the eventual software would be an extension of an existing system.

The upshot of this was that the detailed analysis could be much curtailed, since it was now extremely unlikely that the consortium would wish to develop new software from scratch. Another unexpected benefit was that no-one had any wish subsequently to revisit the discussion of system scope. Although at the time the process had seemed excessively protracted, no-one had been overridden without fully exploring the issues. This was very important, as one of the commonest reasons for consortium failure is disagreement on what the software must do.

Contractual arrangements and intellectual property rights

An intense discussion on the exact contractual arrangements then ensued. While some museums wished to have a single central contract covering all of them, others felt that the only workable arrangement would be for each museum to have an individual contract direct with the supplier. Again, there were deeply held views on whether the consortium would have any intellectual property rights to the software, and on whether it was worthwhile trying to negotiate royalty payments. Eventually, thanks to advice from an independent I.T. strategy consultant, the arrangement that has now been adopted was agreed. In this, the supplier agrees to supply software and services to any authorised museum according to standard terms and conditions, but each museum has its own separate but standard contract, with identical conditions, which it signs individually with the supplier. Benefit from the original museums' investment was obtained through the pricing structure.

The specification products

The specification stage has resulted in products that we hope will be of great assistance to the museum community. There are four major formal systems analysis products, that incorporate the collections cataloguing and procedural input from all the museums and the various standards documents. These are: a data flow model, an entity-relationship model, a requirements catalogue and a data catalogue. Three definition and tendering documents are derived from these: a Business System Option, a Statement of Requirement, and an Operational Requirement. Finally, there are the LASSI Framework and Ordering Agreements for both software and services. These contracts incorporate detailed Acceptance Criteria to test that each of the requirements has been met. The products have been offered to the MDA to use as the basis for developing a UK Model Requirement for collections software.

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The software selection and contract negotiation stage

Figure 2 shows the overall tendering and selection process. During the specification phase the two initial steps in the tendering process were taken. The LASSI contract was advertised formally to suppliers by placing an advertisement in the European Commission Journal. A few months later, a Statement of Requirement (a short tendering document with a high level summary of the LASSI requirement) was issued to suppliers selected from those expressing interest, and a shortlist was drawn up from the responses.
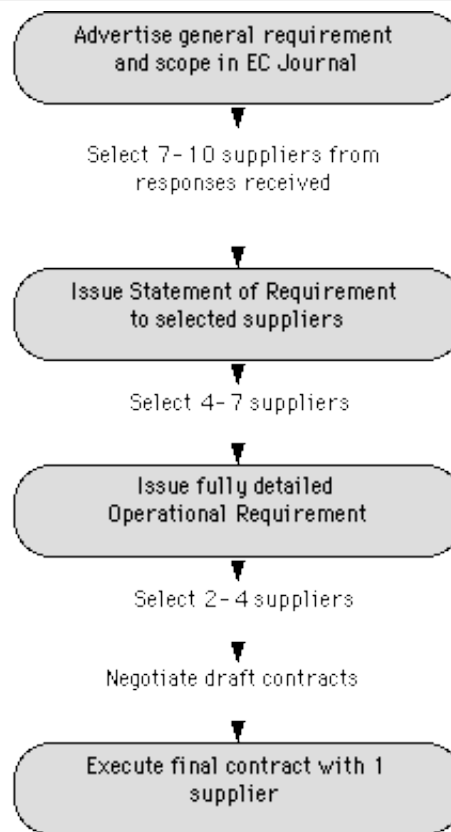

Figure 2. The stages in procurement under EC and GATT legislation (restricted procedure)

Eight of the previous nine museums continued with the final project stage. In this, the consortium issued its Operational Requirement to suppliers short listed from the previous stage, evaluated their responses, and negotiated and agreed a contract. For this stage, the project management arrangements were revised and streamlined (Figure 1). The high-level Project Board of museum directors continued, but a three-person Executive Panel was appointed to be directly accountable to it, consisting of the Chair of the Project Team and two joint Project Managers. The Project Team of senior museum managers continued, but was fully representative of all museums.

Roles and responsibilities were more clearly and sharply defined. The Board continued to determine general policy and to take all final decisions on selection and procurement. The Chair of the Project Team directed the project. Headed by her, the Executive Panel were responsible directly to the Board and took all operational decisions. One joint Project Manager was responsible for dealings with suppliers, contract drafting and negotiation; the other was responsible for dealings and communication with museums. The fully representative Project Team had an advisory role to the Board, but no management powers. For this stage, formal project quality assurance was provided through review by museums and from the Project Team, and by independent consultancy from the CCTA.

Software evaluation

As soon as the Operational Requirement had been issued, a detailed Evaluation Model was developed. Table 1 shows the four major headings for the criteria that were used to evaluate suppliers' responses. The model was presented to the Project Team, which recommended to the Board that it adopt the model. The Board did so, and the model was lodged formally with the CCTA before the deadline for responses.

Table 1. Criteria used to evaluate suppliers' proposals from responses to the Operational Requirement.

1. Likelihood that the supplier will be able to deliver with time scales to quality standards, short and long term, as judged by:

- Track record
- Technical, support, and project management resource
- Team membership
- Financial and institutional stability

2. Judgment of suppliers' ability to deliver Phase 1 and Full LASSI System to contractual timetable

3. Extent of compliance of proposal with requirements, and support for data items

4. Cost of ownership of the systems, including the budgetary cost, cost of training, hardware and network costs

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The decision making mechanism

The procedure for agreeing the Evaluation Model illustrates this important part of the project. Had the Board not agreed the model, it would have been referred back to the Executive Panel for them to resubmit it to the decision making process. These new organisational arrangements meant that the Executive Panel could employ their professional experience and expertise to the full, draft their recommendations to the Board, and discuss these with the senior managers who were the members of the Project Team. Each member of the Project Team could take their individual view back for internal discussions within their own museum before the Board took the final decision. This arrangement worked very well, as it allowed time for consideration both communally and within museums.

In this way, a simple overriding principle was applied: technical advice was not to be overruled; if managers disagreed with it or wished to question it it was to be referred back to its authors and re-presented. This avoided a problem invariably found in I.T. projects: how can senior managers without technical expertise take strategic decisions, when these have to be based on technical considerations? Normally, managers are rightly suspicious that the technical tail is wagging the business dog, while technical professionals despair that strategic decisions are being taken without an appreciation of the technical issues that will spell success or failure.

To draw up a final shortlist of suppliers for contract negotiation, two Evaluation Panels were set up, each led by one of the joint Project Managers. The two panels evaluated the suppliers' proposals in parallel. The results of their two evaluations corresponded closely, and were presented first to the Project Team, and then to the Board, which concurred with the panels' recommendation. A copy of the draft contract, a standard one used in public service procurement in the UK [2], was then sent to each of the final short listed suppliers to be used as the basis for negotiation.

Contract negotiation

Contractual matters receive little attention in the museum I.T. literature, yet they can be more crucial to success than any other feature of software, for both supplier and museum. Contractual negotiation is highly specialised and can be very expensive both in time and in lawyers' fees. The availability of the standard LASSI contract will establish good business relationships between the supplier and the supplier's UK agent, and museums, and save vast amounts of time, anxiety and expense. (Altogether, seventeen lawyers from different practices were involved in LASSI, including ones acting for museums, suppliers, the CCTA, and the consortium itself.)

The LASSI contracts (the Framework, Ordering, and Services Agreements) each have about thirty main clauses and seventeen schedules containing detail. These are listed in Table 2. The overarching Framework Agreement has the same general structure as the standard individual contract that any authorised museum can use. In essence, the Framework Agreement is an undertaking by the supplier to supply the specified software or services to any museum that is authorised to purchase, within stated time limits and for a maximum price, and warrants that the software or services will meet specified standards and criteria. Each museum's Ordering Agreement is a stand-alone contract between the museum and the supplier. It agrees the museum's specific requirement for user licences and services, the hardware the software is to run on, and the exact cost, and contains the same warranties and limits to liability as the Framework Agreement.

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Table 2. Some of the headings covered in the Agreements

Clauses	Schedules
Ordering procedure and agreeing changes to the contract	Definitions of terms used
Implementation plan	Available software and documentation
Licences to the software and to third party software	Available services
Software acceptance	Preparation + performance of acceptance procedures
Title and risk	Acceptance procedures + criteria
Charges	Implementation plan
Payment of value added tax	Costs and charges
Warranties that the software will run as specified	Software and hardware operating environment
Limitation of liability	Copies of third party licences
Intellectual property rights infringement indemnity	Invoicing + payment profile
Confidentiality	Ordering procedure
Termination of agreement	Orderer's responsibilities
Recovery of sums due	Change control
Software documentation	Museums authorised to order
Publicity	Specification of enhancements
Enforcement of rules by the MGC	Sub-contractors
Corrupt gifts	Escrow agreement
Contractor's personnel	
Racial discrimination	
Force majeure	
Transfer of agreement and sub-contracting	
Amendments to the Agreement	
Addresses for communications	
Severability	
Waiver	
Loss of data	
MGC's property	
Dispute resolution and English law	
Entire agreement	

The Services Agreements put in place a permanent arrangement for software services. This will ensure that museums can continue to be assisted and helped to make the best use of Multi MIMSY. The service level agreement sets the terms to ensure that any problems are solved within specified time limits.

The software is being delivered in two phases: Phase 1, the software package as offered, with a subsequent delivery of it after the package has been extended to meet the full specification. For both parties, this makes for minimal risk that the full specification might not be met. Each short listed package was checked against the requirements in detail, to establish exactly which requirements were already met and which would have to be developed for the full software. The Joint Project Managers also visited the premises of short listed suppliers and their reference sites. Detailed Acceptance Criteria for Phase 1 and the Full Software were drawn up and agreed with the supplier, as were the form of acceptance tests. Acceptance tests are being run centrally to establish that the software functionality is met, with a minimal test on each ordering museum's site to check that it will run on the agreed hardware platform. This again drastically reduces costs for both supplier and museums.

Although the contractual arrangement had been designed to be as direct as possible, the contracts are very complex documents, covering as they must the software specification, the development of the full system, acceptance testing, intellectual property rights, delivery dates, payment arrangements, and many other aspects of the contractual relationship. After a considerable period of negotiation, terms and conditions were agreed, and the Framework Contract was signed by the President of Willoughby Associates and the Director of the Museums & Galleries Commission, to the great pleasure and satisfaction of all of the LASSI consortium members. The Phase 1 Acceptance Tests have been successfully run, and Phase 1 software has been installed in the first three museums.

Future organisations

The supplier

The LASSI consortium museums agreed that it was important that support should be readily available in the UK. Willoughby Associates is a USA company, based near Chicago. Willoughby have many years' experience of museum

software. They are the contractor for LASSI, and continue to undertake, in particular, international marketing, the development of Multi MIMSY, and the conversion of museum data. Willoughby have appointed a company, Lusis (now named Hyder), as their UK agent. Lusis provide software installation, training, maintenance and a help desk for the UK. Hyder have previous experience of UK heritage software and are based in Glamorgan. *Organisations for museums* The organisations have also been put in place to ensure that museums in general derive the full benefit from LASSI. The MGC is administering the Framework Agreement. Any UK museum wishing to purchase Multi MIMSY under this must apply to the MGC to become an Authorised Demander. The MDA has been offered the full analysis and specification, to use in developing a UK Model Requirement. Eventually, any suppliers' software will be able to be checked against this standard, which will express the full requirements of UK museums. Multi MIMSY is thus the first LASSI compliant software, but other packages may be developed to meet the specification in future. A Multi MIMSY Users' Group has been formed, for information exchange between museums and to assist in communication with the supplier and Hyder, Willoughby's UK agent. As museums want further features developed for Multi MIMSY, they will be able to form groups to commission or encourage such enhancements.

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Evaluation of the projectNews of unsuccessful attempts by consortia to obtain software are all too common, especially in the public sector. The LASSI participants were uncomfortably aware of this fact throughout. Various studies have been made of how projects succeed or fail, including information technology projects, which seem to attract particular risks. Among the factors that made for success were:

Intrinsic to museums

- Belief in the common goal
- The interest and active involvement of the directors of nearly all the museums
- The hard work and dedication of many museum people, and their refusal to be defeated
- In particular, the expertise, talent and commitment of the Joint Project Managers
- The increasingly urgent need of member museums for their new systems
- The expense and difficulty of procuring software independently
- The willingness of member museums to accept substantial input and leadership from the Science Museum, the largest of the museums, and the one that most urgently required new software
- The willingness of the consortium to reevaluate their strategy and tactics
- At the same time, the fact that the goal posts were not moved, but reestablished at intervals firmly in the same place
  Extrinsic factors
- Positive support from the UK government
- The involvement throughout of the Museums & Galleries Commission
- The existence of the CCTA and its system of a standard basis for public sector I.T. contracts
- The marketing opportunity for suppliers
- The existence of more than one very good software package that was suitable for enhancement
  Had any one of these factors not been present, the risk of failure might well have been overwhelming.

CCTA standard processes

The CCTA has developed a whole range of processes and procedures for managing I.T. specification, contracts and development. Some of these were found more helpful than others. The use of the SSADM methodology [4] requires, as many others have found, to be very carefully tailored to the precise purpose of the exercise. In LASSI's case, it offered too much temptation to go into far more detail than was appropriate for a package-based solution, which led to "analysis paralysis".

The PRINCE project management methodology [3] needs considerable adaptation for use by a consortium. Within a single organisation the normal line and senior management mechanisms should provide a sufficiently strong management perspective; these are much weakened if all management is by committee.

On the other hand, the detailed procurement routes that the CCTA has set out were found invaluable and highly applicable [5].

It is difficult to comment on the CCTA standard contracts [2]. Some of the lawyers involved found them over-complex, but one does suspect an element of "not invented here". They do seem to cover the many requisite contractual points, and they embody the contractual conditions that are currently generally agreed between UK suppliers and government. They are in the public domain and anyone anywhere can use them as a basis for negotiation.

Conclusions

The point of the exercise was to provide state-of-the-art software for museums. The first Multi MIMSY installations have been very successful. Willoughby have already converted 300,000 object records converted from one museum's old system - an hierarchical library database. The value of the data input time alone for creating the original records was calculated at 2.4m; it had begun in 1981. The curators are delighted that their original data have now been reincarnated in 1990's form in Multi MIMSY. Figure 3 (*Not available in this version*) shows two of the Multi MIMSY main screens. Users are being trained to use the new software, and the museum is planning the demanding process of completely overhauling its collections management procedures to take advantage of it, once the fully extended software has been installed in mid 1996 (3).

Figure 3. The Multi MIMSY front cataloguing screen, with one of three images, and an activity screen for Acquisition. (*Not available in this version*)

It was always intended that a major benefit would be better access to collections information for the public and researchers, and to this end the specification included the ability to store and display images of objects. Already, several projects to make use of this capability are under way in the first museum. An example of the sort of ultimate end use may be found on the World Wide Web, in the Science Museum's (http://www.sciencemuseum.org.uk)

An important objective was to ensure that the software would be future proof. One selection criterion was that any system should be as compatible as possible with other museum applications such as finance and booking systems, and with new technology such as the Internet. LASSI specified that the software must run equally well in a Novell Netware operating environment or a Unix one, on PCs or Macintoshes, and be TCP/IP compatible (the industry software communications standard). Multi MIMSY is based on the database management system Oracle . There are numerous additional applications that can be "bolted on" to this system, such as hypertext applications for creating World Wide Web pages, free text search software, image handling, and public access screens software.

We hope, of course, that our efforts will be useful to museums world wide. The needs of UK museums will assuredly be those of museums in other countries, too. Many important standards for documenting and managing museum collections have originated in the UK, and software that meets the LASSI specification will help museums to meet these standards. The standard Multi MIMSY package that is marketed internationally will be that produced to meet the LASSI specification. The existence of this exacting specification, and the use of compliant software by a number of UK museums, will give impetus to the availability and quality of museum collections software, at the precise moment when this is becoming crucial to museums' development in the future.

Acknowledgements

A remarkable number of people are to be congratulated and thanked for contributing to the success of the LASSI project. Some individuals I should myself particularly like to thank are: Sir Neil Cossons, Director of the National Museum of Science & Industry and Chairman of LASSI; the Joint Project Managers, Fiona Marshall of Leicestershire Museum Service and Alice Grant of the Science Museum; at the CCTA, Stephen West, then Director of Procurement Services, Dave Perry, our account manager, and Ian Robertson, for assistance with earlier contractual negotiations; Peter Longman, former Director of the MGC, and current members of the MGC; Tim Schadla Hall, Director of Leicestershire Museums, Archives and Records Service; Phil Phillips at the National Museums & Galleries on Merseyside; and at the Science Museum, Dr Thomas Wright, for always invaluable advice and support. Mick Stanley of Hull City Museums, who chaired the Project Team during a particularly difficult time.

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