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Procuring medium-large systems in the public sector — the experience of the English Heritage Record of Scheduled Monuments

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13.1 Introduction

A simple definition of the objective of procurement is to obtain what is needed at the right time at the best value for money over project life (CCTA 1989). The procurement process is the first segment of a life-cycle of a system from 'cradle to grave' or to replacement. With a certain humility from a computing perspective, we should also recall that in a heritage context it is quite common for the information or records stored in a system and the processes it serves to have a much longer life cycle than the relatively ephemeral life-cycle of the computing vehicle designed and built to accommodate it.

The process of scheduling monuments and the consequent requirement to retain records of that statutory process began in 1882, while the first computerisation project began in 1980. In this time-scale of statutory control, normal concepts of computer system life from between, say, three years for personal computing and seven years for a very large system seem relatively insignificant. Even for more recent enterprises, experience of the Greater London Sites and Monuments Record, (Jones 1989), helps to show how a mainframe based system implemented in 1985/6 appeared old-fashioned almost as soon as it was designed.

This paper looks at the procurement of a computer system for the English Heritage (EH) record of scheduled monuments (RSM), a medium-sized project with setting up costs estimated at £250,000.

The paper is concerned with the management of the procurement rather than the requirement and design of the system itself which is discussed in another paper in this volume, (chapter 14). Nevertheless, the issue of procurement is one of several aspects of the management of computing which collectively should enjoy at least equal importance as technical skills in the successful implementation of projects, (except in the possibly decreasing number of systems which are genuinely 'bespoke').

13.2 Background

The background to the RSM project (and its predecessor the scheduled ancient monument record or SAM record) is well referenced elsewhere, including the documentation of the first eight years' computerisation, (Booth 1989), the issues involved in terminology control, (Chadburn 1988), and the related computer-based mapping system, (Clubb 1988).

The major developments in the English Heritage Records Office are being introduced in connection with the Monuments Protection Programme (MPP) — a review and evaluation of information on monuments so that those of national significance can be identified and recommended to the Secretary of State for scheduling. Two additional objectives of the new programme are to ensure that the records of scheduled monuments are compiled in ways which will help those engaged in case-work at English Heritage and to improve the information provided to owners and occupiers of scheduled monuments and all those concerned with consent procedures.

The first major new development in the English Heritage was the computer-based mapping system introduced in 1987 and cited above. The RSM system dealt with in this paper will reorganise the textual information relating to scheduled monuments in order to deal with the increased and improved data arising from MPP. The new system will computerise scheduling procedures and facilitate machine-based systems for recording and monitoring what happens to monuments, including the reports of the Field Monument Wardens who visit monuments regularly to comment on condition and management needs.

13.3 From strategy to implementation — the procurement process

There are a number of different approaches to the procurement process, all of them have validity according to the organisation and the stage of development reached. The particular route taken for the RSM between 1987 and 1989 took the following path;

1. Analysis of current systems
2. Preliminary analysis of functions and data
3. Integration with Information Technology Strategy
4. Decision on software environment
5. Functional specification
6. Investment appraisal and financial approvals
7. Draft of Migration Strategy from existing to new systems
8. Consideration of international obligations and standards
9. Issue of Operational Requirement and invitation of proposals
10. Evaluation of proposals and meetings with proposers
11. Short-listing of suppliers
12. Memoranda of Acceptance discussions with two suppliers
13. Hardware platform decision
14. Invitation of tenders against memoranda of Acceptance
15. Tender acceptance

In addition, English Heritage has system development standards (unpublished) drafted with the assistance of Peat

Marwick McLintock (KPMG). These outline the major outputs required by phase from Feasibility Study to Post-Implementation Review.

13.4 Analysis of current systems

The starting point was an investigation and analysis of existing systems carried out in the first half of 1987 by the then Computing officer in the Records Office, Ben Booth, using methodologies based on the Structured Systems Analysis and Design method (SSADM), one of a number of methodologies evolved for systems analysis and design covering data and process which makes extensive use of models depicting data, data flows and processes.

13.5 Preliminary analysis of functions and data

Later in 1987, external consultants, DWH Associates Ltd, were appointed to make a preliminary assessment of the strategic plan required to plan for new information systems to support the MPP and the scheduling procedures, having due regard to the interactions with other users, including county-based Sites and Monuments Records and the systems of the Royal Commission on the Historical Monuments of England, (RCHME). DWH Associates used a pragmatic combination of functional analysis and data analysis techniques.

13.6 Integration with information technology strategy

The preliminary DWH report acted as a feasibility study and provided the replacement project with the evidence needed to start the process of seeking approval.

In the last quarter of 1987, the English Heritage Information Technology Committee (a senior body chaired by the Chief Executive), asked Peat Marwick McLintock (KPMG) to assist with the development of an IT strategy. The outline data flows identified by KPMG showed two major groups of systems, i.e. (i) central services and all finance related systems and (ii) the heritage management and specialist and technical databases in the conservation group. The main area of interface identified between the two groups was that of grants processes which at that time were to be developed on the English Heritage central computing facility. The new RSM project was a major component in the heritage area, the other main elements being a computerised list of historic buildings, if developed, and the Greater London Sites and Monuments Record. Computer-based mapping systems were seen as a common base for all three records.

13.7 Decision on software environment

In the winter of 1987/8 one of the elements of strategy requiring decision in relation to conservation group computing was considered to be software environment. This was partly because it was expected to influence decisions on other heritage and specialist databases, but also because of the strategic decision on whether to centralise all English Heritage computing on the central Systems Branch.

The main software candidates were RPG III running on the existing IBM System 38 in the Central Finance Branch and Oracle already in use in RCHME on Digital equipment. DWH Associates had concluded that a number of computing environments could satisfy the requirement, but recommended that strong consideration be given to an Oracle/Digital system in view of the potential benefits to both organisations in having staff resources with similar skills and experience, a view endorsed by RCHME itself. It was also felt that data exchange with the county Sites and Monuments Records would be easier if both English Heritage and RCHME adopted the same computing environment.

The IT Committee assessed the costs and benefits associated with the options and the implications for IT Strategy and it was decided to develop the RSM on Oracle with Digital hardware.

13.8 Functional specification

During 1988, DWH Associates developed the functional specification in the detail required to make submissions to the Department of the Environment, the sponsoring department for English Heritage, and the Treasury.

13.9 Investment appraisal/business case and financial approvals

The investment appraisal/business case was prepared in the Summer of 1988. The detailed submission is discussed in a previous paper (Clubb 1989) and described very briefly here.

The main objectives were to identify the preferred solution based on a full analysis of the options available and to ensure that the project represented a sound investment.

The appraisal looked at the costs and benefits of alternative manual options and a whole range of computer-based solutions from limited micro-computer support for word-processing and monitoring progress to the full project. The analysis teased out the additional staff costs of other options and Discounted Cash Flows (DCF) were projected forward over a period of seven years. Overall, the DCF was sufficiently positive to justify the project.

The appraisal also incorporated an analysis of risk and sensitivity testing around the central assumptions of the project in order to explore the levels of risk and speculation and the levels of probability associated with them.

The Treasury also required an implementation plan to ensure that those planning the project had considered the main implications, including definitions of:

1. Main outputs
2. Main users
3. Configuration options
4. Locations
5. Project phasing and implementation

6. Technical support
7. Training
8. Project management and post-implementation review
9. Accommodation, ergonomics and health and safety
10. Policy re: open systems and standards

13.10 Migration strategy

In discussions with users by November 1988, it was becoming evident that there was a vacuum at the centre of the planning process. An analysis of existing systems had been carried out and there was a draft functional specification of the future requirement but there was no plan for moving from one environment to another.

The existing environment was mainly a manual one with some computerised records which existed alongside the operational activities as reference systems and the data management largely maintained the view of the data appropriate to its initial capture. The new environment was to be a set of related systems integrated with the operational activities.

The migration strategy had to handle change in both the way data is organised within systems as well as their use. The solution adopted was to move all current records activity on to a set of interim systems, the objective being to make the eventual migration to the RSM primarily a technical matter rather than a conceptual one. The interim migration strategy, therefore, involved cultural change rather than operational change.

13.11 International obligations and standards

Obligations to international obligations are governed by the General Agreement on Trade and Tariffs (GATT) and EC Supplies Directives refer to methods of procurement including advertisement in the EC Journal. The GATT threshold is £92,000 and the EC threshold is £142,000. Since hardware, software and software customisation are included in project price for this purpose, a project does not have to be very large to come under the threshold. Where hardware is to be leased or rented, the cost over four years is included.

For the RSM, Oracle software and Digital hardware had been mandated on grounds of significant existing investment by RCHME and the competitive element in the procurement was the provision of application software services.

Open Systems Interconnection (OSI) standards come into effect on projects with a threshold of £71,000 and are governed by EC Decision 87/95. The EH derogation statement from EC/GATT procedures cites Oracle and Digital standards on their commitment to OSI and the intention of EH to produce an OSI migration strategy.

In the future, as and when IT standards become an operational reality, it will be increasingly difficult to justify the specification of particular hardware and software in all but the most specialised of requirements.

13.12 Issue of operational requirement and invitation of tenders

DWH Associates were requested to draw up a short-list of six software houses with experience of Oracle and Digital systems with large bases within easy travelling distance of London.

The Operational Requirement (OR) was issued to the six suppliers in July 1989 with formal proposals required by 25 August 1989. The content of the OR is described elsewhere in this volume, (chapter 14). The purpose of the OR was to ensure that potential suppliers could understand the requirement, size it, decide whether to bid and determine how their services could be put to best use.

Five of the suppliers sought meetings with EH to gain further clarification and all five submitted proposals by the due date.

13.13 Evaluation of proposals and meetings with suppliers

The scope of the evaluation was to assess the degree of fitness of the proposals with the OR, including the extent to which suppliers had dealt with the mandatory requirements. Furthermore, the capabilities of the suppliers and the ability of EH staff to work with them had to be addressed as well as the relative costs and benefits of the proposed solutions.

Detailed discussions were held with each supplier invited to provide a formal presentation and an evaluation team was established to scrutinise each proposal. a number of key areas for decision emerged at this stage, including the choice of operating system, (VMS or UNIX), and hardware platform where the options ranged from a larger Microvax to 6000 series machines. There was also a choice between C or Fortran for the 3GL needed to interface with the 4GL.

Software development costs were a primary area to be evaluated in terms of the respective number of days and levels of staff proposed by each supplier.

13.14 Memorandum of agreement discussions with suppliers

Two of the suppliers were selected for detailed memorandum of Agreement (MoA) discussions. These two had not only shown the greatest understanding of the OR but also appeared to be the most competitive.

The MoA is a document signed on behalf of the client and the prospective supplier as the basis of the invitation to tender and as an integral part of the contractual documentation. The key element is that the purchaser agrees that the services and goods detailed meet the OR. Hence, from this time forward in the procurement process price is the deciding factor in the procurement. A tender based on an agreed MoA cannot be rejected on grounds of technical or operational unsuitability.

Apart from the OR, the MoA discussions are probably the most important guarantee of success of a medium to large-scale computer procurement. For the RSM, EH spent two-three days with the final two suppliers. The discussions

were tough and hard-headed and there were several occasions when it appeared that discussions might have to be terminated, although MoAs were successfully signed at the end of the day.

13.15 Hardware platform and operating system

After the MoA discussions, two issues were still outstanding, (the hardware platform and the operating system), and EH took its own decisions on these. ULTRIX was chosen as the operating environment in view of the use of Sun UNIX for the computer-based mapping system and the potential for OSI. The timely availability of the DEC system 5400 on the UK market solved the hardware decision since it filled the product gap between the MicroVax series of machines which were below the requirement and the 6000 machines which were well above the likely financial provision.

13.16 Invitation of tenders against the memoranda of agreement

Tenders were invited from the two suppliers on the basis of the signed MoAs. Hardware and software costs for the two solutions were identical and the decision to award a contract was taken on the basis of the application software development costs. In the event, a contract was awarded to Oracle UK in December 1989 for the supply of an integrated system, i.e. the supply of hardware, software and consultancy for the software development.

13.17 Conclusions

The methods used in the public sector to procure large computer systems can be lengthy and time-consuming, although they should also aid in the discipline of justification, analysis and choice of supplier.

It is still too early to assess the extent to which the procurement process has affected the success or otherwise of the system. Currently, (March 1990) it is only just reaching the end of the detailed design phase and system is not scheduled to be implemented before September 1990. In terms of the overall procurement process, however, there will have been a period of nearly three years from the preliminary analysis to the full implementation. Some of this time-scale is due to formal procedures and the delays arising from initial uncertainties about the computing environment and the IT Strategy which only began to evolve during the procurement process. Even if these constraints had not existed, it seems probable that the specification and procurement could not have been completed in under two years, largely because of the complexity of the system rather than its size.

Future trends in public sector procurement of information technology are likely to streamline certain elements of the process, but the analysis of the requirement, the specification of the solution and the negotiations with the supplier should never be eliminated.

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