

Unidroit

INTERNATIONAL INSTITUTE FOR THE UNIFICATION OF PRIVATE LAW
=====

ORGANISATION OF A UNIDROIT INFORMATION SYSTEM OR DATA BASE ON
UNIFORM LAW

Unidroit Information Systems Initiative
Concept Assessment, Functional Analysis, System Specification, Budget
(Summary Report presented by Ingenium Software Limited)

Rome, April 1996

UNIDROIT INFORMATION SYSTEMS INITIATIVE

**Concept Assessment, Functional Analysis
System Specification, Budget**

SUMMARY REPORT

**For UNIDROIT
Via Panisperna 28
00184 Rome Italy
by Ingenium Software Limited
April, 1996**

EXECUTIVE SUMMARY

The UNIDROIT Information Systems Initiative describes applications of information technology in four areas: the accountancy of the Institute, the documents of the Institute, the library and a data base on uniform law (UNILAW). Although functionally distinct, the four can be most readily and effectively realised in a computer network environment that lends certain common features and resources. The accountancy, the data base for documents and numerous other applications of computer technology (several appear in this report) can be obtained using ordinary commercial software. This also applies to the library, where various useful projects can be conveniently accomplished. With a certain familiarity gained from training, study and interchange of information, UNIDROIT staff can implement information technology projects successfully. A comprehensive library management system, however, would not be feasible for local development, nor would UNILAW. UNILAW is the largest project of immediate concern, requiring extensive development of programs into a system with advanced capabilities for creating, storing, classifying and making available information.

As specified in this report, UNILAW would be made available primarily on the Internet and secondarily by FAX, CD-ROM or mail. Instruments, cases and bibliographic references could be retrieved over a wide range of subjects in both English and French. When connected to UNILAW by an ordinary personal computer, a user would provide or select information, then examine views presented by the system - which would offer opportunities for further selections or guesses or the typing of descriptions concerning the item(s) sought or topics of interest. The search path followed would be permitted to vary widely due to the underlying data structure, which differs significantly from many data bases now available.

A development period of slightly in excess of one year is proposed to make UNILAW generally available to subscribers. At that time, UNILAW will offer for a range of subjects basic information such as texts of instruments or status of ratifications and reservations classified by common attributes such as date, place or title. For one or a few subjects, the user will be able to use legal concept and other links and references placed within the data base by experts to search for texts, case related information and bibliographic references. After its debut, UNILAW will be kept up to date and expanded in coverage selectively as expert panels can be engaged to address particular subjects in demand by users of the data base.

A budget of approximately Lit. 850,000,000 is forecast. Less than one third is to be expended within the first half year to construct a working system of programs and equipment. In the second half year of development, a large share of the budget will go to a progressive series of evaluations by users. A considerable expenditure is also planned to design and prove the processes by which experts will incorporate into the data base classifications, linkages and written information. Other matters addressed during the second half year of development will be connection to the Internet, data management, quality assurance, computer system operation, keeping track of who uses the data base, what search paths are followed, information that is retrieved and charges that apply (if applicable).

Glossary

The following terms were selected from the report in consideration of their specialised use:

configuration:	data and programs present and control settings and parameters applicable
data base:	information stored to facilitate retrieval
directory:	a categorical designation employed when storing masses of information electronically
hardware:	equipment and (sometimes) low level software used to control equipment
software:	programs which can be used on a particular computer system
link or reference:	an association established with a data base
model:	an abstraction of data
system:	programs, equipment, data and control information interacting in a designed fashion. Related programs, data, or equipment along may be called a system.

Note: Section 3.2.2 contains technical terms pertaining to equipment conventions. In the Summary Report, we wish to limit emphasis on equipment, which is commonly available in well specified categories of performance, widely interchangeable and low in cost. Briefly, RAM pertains to working computer memory. ROM is unalterable computer memory where unchanging instructions and parameters are inscribed. UPS equipment supplies secure electrical power. A CD-ROM is an inexpensive data mass storage device that is easily mailed. SVGA is convention for computer video displays. A "backup" is a copy of all programs and data in a computer. KB and GB are capacities for data, expressed exponentially. OCR is a general means of converting an electronic image of writing to electronic text. The term dpi (dots per inch) refers to the capacity to present a fine image on a screen or printed page using dots as elements.

TABLE OF CONTENTS

1. INTRODUCTION AND BACKGROUND	3
1.1 Introduction to the Summary Report	3
1.2 UNIDROIT Information Systems: Background	3
1.3 Scope of the Consulting Project	3
2. ISSUES AND FINDINGS	4
2.1 Can UNILAW be Implemented?	4
2.2 System Concept	5
2.3 UNILAW Data Model	6
2.4 Links and References within UNILAW	8
3. UNILAW TECHNICAL SPECIFICATION	8
3.1 Overview of Technology to be Implemented	9
3.1.1 Introduction	9
3.1.2 Project Management	10
3.1.3 Method of Deriving the Specification: Matching Functional Requirements with Technologies	10
3.2 Hardware Development	10
3.2.1 Networks	10
3.2.2 Computers, Operating Systems, and Peripheral Equipment	11
3.3 System Operation and Software Development	11
3.3.1 Software Development: Introduction	11
3.3.2 Central Database	12
3.3.3 General Method of Search and Retrieval From the Database	13
3.3.4 Database Structure	14
3.3.5 User Access	14
3.3.6 Provisions for Database Management and the Expert Panel Process	14
3.3.7 Provisions for Accounting and Monitoring	15
3.3.8 Provisions for Computer System Administration	15
3.3.9 Provisions for Security	15
4. UNILAW IMPLEMENTATION STRATEGY & BUDGET	15
4.1 Introduction	15
4.2 Implementation Strategy	16
4.2.1 General Provisions: Software, Data, Computer Systems, Project Management	16
4.2.2 Software	16
4.2.3 Data	17
4.2.4 Computer System	17

4.2.5 Project Management: Milestones and Deliverables	18
4.3 UNILEX and Access to Other Databases	18
4.3.1 UNILEX	18
4.3.2 Connection to Other Databases via UNILAW	19
4.4 UNIDROIT Technological Developments Arising in the Time of UNILAW	19
4.4.1 UNILAW Technology and Developments in the Library	19
4.4.2 Other UNIDROIT Information Technology Projects	19
4.5 Project Schedule and Budget	20
4.5.1 Limited Relationship of Schedule to UNIDROIT Information Systems	20
4.5.2 Continuity of Funding	20
4.5.3 Chart Showing Project Tasks	20
4.5.4 Budget	20
4.5.5 Expenses by Project Period	21
4.5.6 Staff	21
4.5.7 Cash Flow	22
4.6 Summary and Conclusions	22
Attachments	23
Implementation Plan for the UNILAW Project	23
Budget Report - UNILAW Development Project	24
Quarterly Cash Flow as of 4/24/96 - UNILAW Development Project	27

1. Introduction and Background

1.1 INTRODUCTION TO THE SUMMARY REPORT

This report has been prepared by Ingenium Software Ltd. (ISL) to present UNIDROIT with a summary of the technical and operational aspects of developing UNILAW as an information system. Brief mention is made of additional UNIDROIT information technology initiatives in the context of UNILAW. The reader should be familiar with the UNIDROIT document, *Proposal for a Data Bank on Uniform Law*, a prospectus for UNILAW.

A full report has been prepared by Ingenium Software Ltd. and is available from UNIDROIT. That report is intended mainly for use by information systems consultants interested in developing UNILAW. Consultants can benefit from a thorough introduction to the UNILAW concept in information technology terms, as well as additional technical detail.

1.2 UNIDROIT INFORMATION SYSTEMS: BACKGROUND

In the UNIDROIT Information Systems initiative, four systems are envisioned for the following purposes: to make available extensively developed legal information, to automate the catalogue of the library, to locate UNIDROIT study and administrative documents, and to aid in the financial accounting of the Institute. The four purposes would be realised separately:

- a database on uniform law (UNILAW) featuring texts, case law, bibliographical references, analyses of case law and classifications by legal concept in selected instances
- a system for the library of the Institute
- a system for the documents of the Institute
- a system for the accountancy of the Institute

We note the intention of the Institute to take up UNILAW as the first development of the UNIDROIT Information Systems. The Institute views UNILAW as an important service to offer to the international community. The background of UNILAW extends at least to 1985, when setting up such a database was first proposed. Since that time, it has become evident that retrieval of up to date legal information of all kinds can benefit substantially from the use of computer information systems methods, but an electronic facility for uniform law is unlikely to develop outside of UNIDROIT.

1.3 SCOPE OF THE CONSULTING PROJECT

The present project is a formative component of the UNIDROIT Information Systems initiative and was undertaken with the participation of Ingenium Software Limited occupying the interval from January to March, 1996. Although the objective of the current project is to analyse and specify four systems sufficiently to permit a systems consultant to properly design, develop, and implement all four,

the scope of the consultancy has been influenced by the decision of the Institute to implement UNILAW first. The library and documents systems will be considered in the context of UNILAW, with UNILAW furnishing substantial facilities, capabilities, knowledge, and experience that will be instrumental in the development of the other three systems.

Scope of the project:

- analysis of UNILAW as a concept
- functional description of UNILAW as a structured database meeting key requirements
- specification of a system to realise the structured database,
- implementation strategy and budget

The scope of the present project does not extend to designs of equipment, software, and processes of work for UNILAW. The present work will provide results to guide these designs when the overall project is approved. This is an important point. At the beginning of a system creation project, an essential and sometimes neglected step is to methodically assess the feasibility of the proposed system from the points of view of practical value and utility, likely volume of use, types of users, data to be acquired, data structure to be imposed, and the form, schedule, and cost of initial development. Thus the scope of the current consultancy has been made sufficient to evaluate the practical likelihood of success of UNILAW by attention to:

- establishment of a system concept
- demand for the system by a large enough number of users for a long enough period of time to justify development
- a high level view of system functions, including data and processes of work
- a high level specification of technological means to implement the concept
- an implementation strategy and budget

2. Issues and Findings

2.1 CAN UNILAW BE IMPLEMENTED?

A suitable strategy for development has been determined and is characterised by the following:

- at the start, the providing of basic information (for example texts of instruments, status of ratification and reservations) for all subjects addressed
- a few subject areas to develop to full utility. (Later developments will add subject areas)
- initial development interval will be approximately 12 months
- continuous upkeep of completed subject areas will maintain quality and currency
- a joint development effort will involve a systems consultant and UNIDROIT expert panels working in chosen subject areas

Of great importance are the first three points. Taken together they indicate a timely development that will maintain its value by building expectations among users that quality will be upheld as information in the system is expanded. Development as proposed would confer credibility on the project in the eyes of users.

In summary, development of UNILAW will begin with installation of basic information on a variety of subjects, but only one or a very few subjects will be chosen at first for the consideration of panels of experts. Actions of the expert panel or panels will lead to the addition of materials, links among materials and the establishment of classifications by concept in particular subjects. After an area of law is developed by experts and made available to users of UNILAW, it will be kept up to date.

Focusing on use of the database, the sequence of development can be viewed as:

- texts, subject to search by specifying basic information such as title, date, or included words and phrases, will be made available across the board, for all subjects
- analytical materials, linkages and classifications will be added as required with the effect of improving both the information content of the database and options for searching the database
- monitoring of user activities will indicate demands and guide management decisions concerning areas to enhance
- as development takes place, subscribers will establish themselves and patterns of use will become evident because the database will be made available to users as soon as the first materials are installed

In addition to the progressive inclusion of information in UNILAW, other factors may limit the documents that can be provided directly to users. An original document may be made available in some cases as a computer image instead of text. (An image cannot be imported into a word processor, except by the use of optical character recognition, OCR.) In circumstances when a proprietary document is not available in UNILAW, but can be found in another database, UNILAW will serve to make contact with the other database and allow the user to continue the search.

2.2 SYSTEM CONCEPT

The system is diagrammed conceptually in Fig. 1. The illustration does not dissect the UNILAW database, but portrays sources and destinations of information provided or employed by the database.

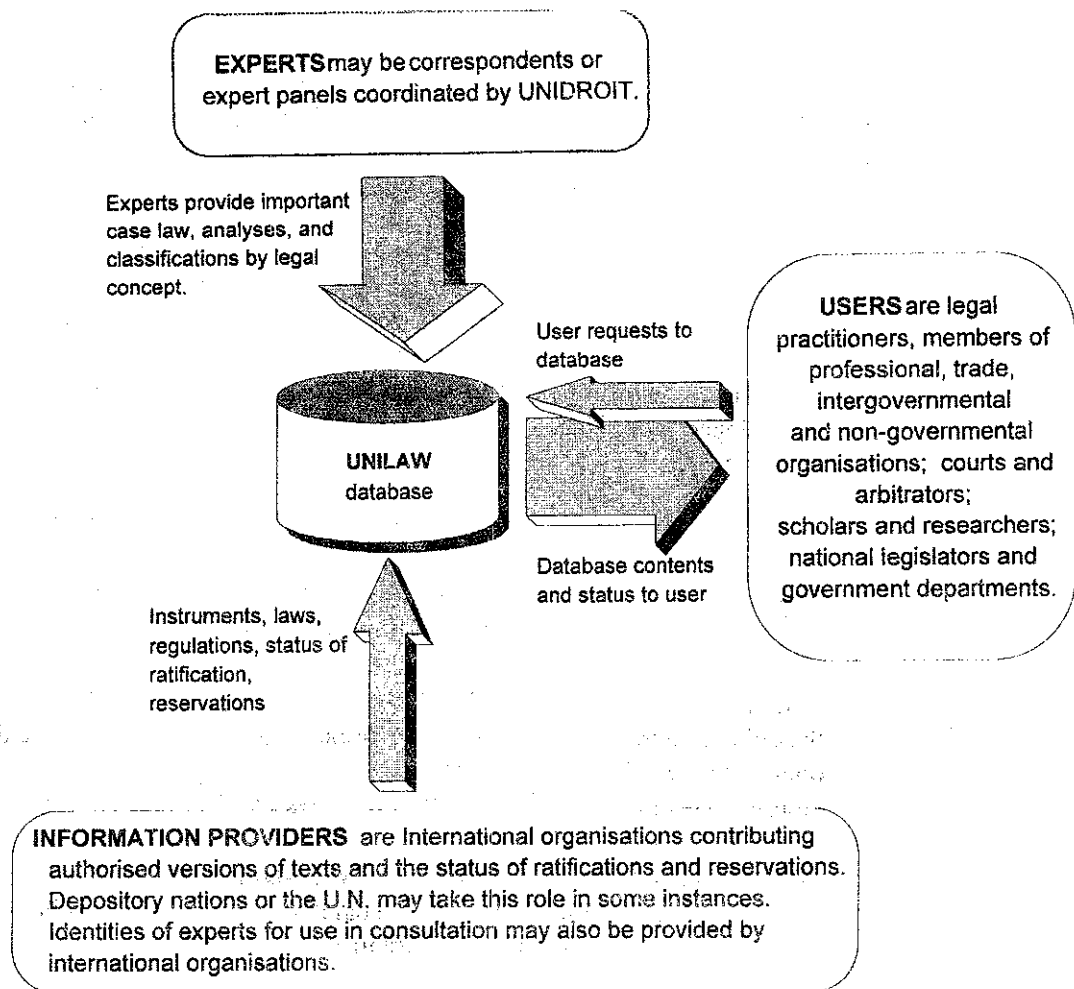


Fig 2.1 UNILAW Concept Diagram

2.3 UNILAW DATA MODEL

In the system concept diagram above the database itself is not detailed. With Figure 2 below, we begin to view the interior of the database. In Figure 2 the basic contents of the database are represented. In general, these are data entities with their attributes and relationships. In the figure, the upper portion marked "LINKS AND REFERENCES" holds the interconnections among data entities. We will hold off discussion of database structure until technical specification and implementation strategy are treated later in this report. Our attention at present is on the data model for UNILAW. The data entities appear are:

- Instruments
- Cases
- Bibliographic references

Example attributes are given under the headings for the case, instrument, or bibliographic reference data entities. For example, status of ratifications is an attribute of instruments and will be expected to hold information regarding

the ratifications of and reservations to a particular instrument. Case has attributes of nation, court and others. Classification by concept may not be represented in the database pending the work of experts who will determine the classifications. Nevertheless, the instrument and some cases and bibliographic references may be made available to users. The attributes shown do not form a comprehensive list. A full entity description, together with all attributes, will be prepared during the design stage of the project.

The data entities will now be summarised with reference to their relationships.

Instruments, such as conventions or regulations, are the fundamental data entities of UNILAW. Attributes may be title, depository, year, status of ratifications and reservations.

Cases arise in association with a given instrument, so that many cases may in time be associated with a particular instrument. Examples of attributes of cases are the court or tribunal where the case was heard, the date of the decision, the outcome, the names of the parties, and the legal concept(s) involved.

Bibliographical references arise as case law accumulates and receives expert attention. Bibliographical references have attributes such as author, title, publisher, pertinent subjects, and classification by concept. Scholarly writings, for example, may span a range of cases, resulting in complex references between the case and bibliographical reference data entities.

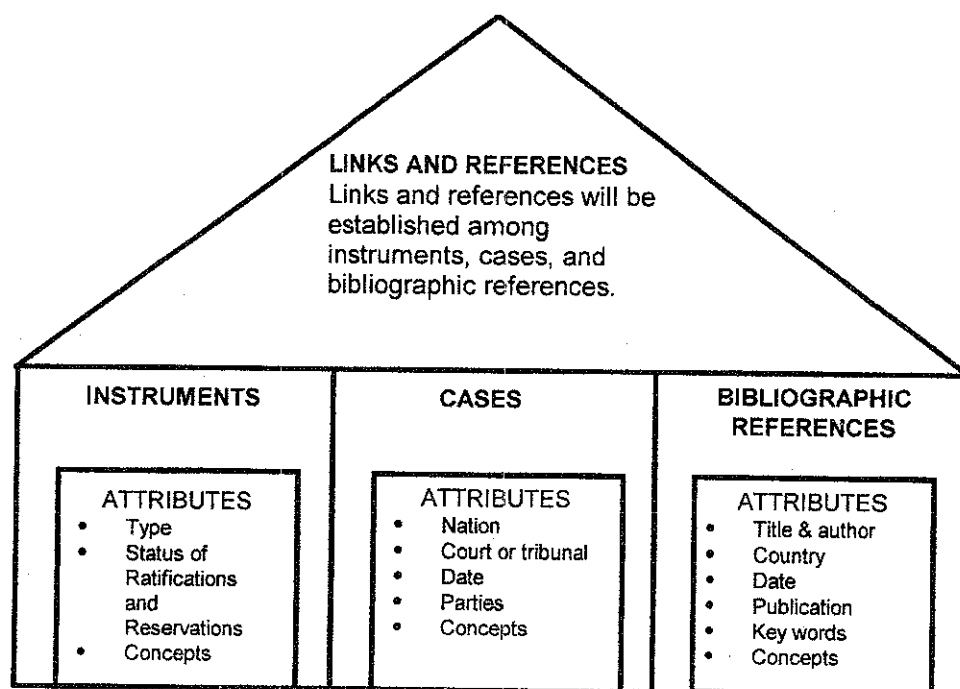


Fig 2.2 UNILAW Data Model

2.4 LINKS AND REFERENCES WITHIN UNILAW

We turn to how the data entities are linked by means of references to their attributes. Links and references are shown at three levels in Figure 3. Links and references provide the means of identifying and retrieving desired materials from the database. Structure enables a user to discriminate in selecting the information to be retrieved. The levels shown are for illustrative purposes and do not represent actual divisions within the database.

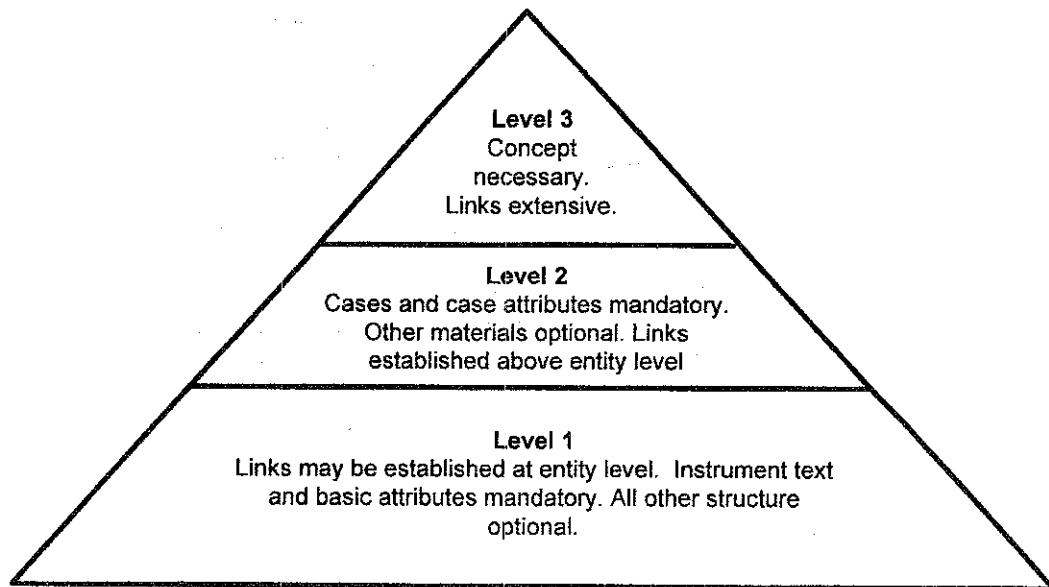


Fig 2.3 UNILAW Links and References

3. UNILAW Technical Specification

This section presents the technological means to implement UNILAW: equipment and software to be acquired, methods to be followed, how software application (program) development will take place and how computer systems and data management capabilities will be realised technically.

Note: Applicability of UNILAW Development to Information Systems within UNIDROIT Generally

The computer equipment and software systems specified for UNILAW can, with the provision of certain connections and added software licenses, support information technology in a variety of settings and circumstances within UNIDROIT, from routine, repetitive work processes to projects requiring multiple participants at different locations. The availability of the computer facilities of UNILAW to UNIDROIT comes at no additional cost in development or operation, and does not detract from the UNILAW.

In a later section, development strategy, schedule and a budget for UNILAW will be set out.

3.1 OVERVIEW OF TECHNOLOGY TO BE IMPLEMENTED

3.1.1 INTRODUCTION

The principal technical components and capabilities to be implemented are:

1. a computer system and networks
2. applications software (programs)
3. database management
4. system management

Obtaining a computer system and networks is a matter of choosing among widely accepted products to be properly installed and operated.

Software applications programs also involve selection among commercial products on which the creation and management of other programs will be based. This widely applied approach to obtaining software combines low cost, time to project completion and proven performance associated with proven commercial products with highly individualised functions coming from custom designed programs. The approach has been used successfully in many projects.

Items three and four, **database management** and **system management**, will warrant critical examination at the time of choosing a consultant for the design and development of UNILAW. The consultant will be responsible for the initiation of data management and system administration. As specified in this section, database management and system management (synonym: system administration) will be specified functionally to indicate the capabilities that must exist when UNILAW first receives genuine documents. A few remarks explaining database and data management and computer system administration will now be given.

Remark: Database management is a technical discipline that will substantially affect UNILAW due to the requirement to keep the database authoritative, current, well defined and available. The quality of a database can be substantially reduced due to inadequate data management because wrong or delayed posting of data, wrong configuration of database linkages, unavailability of the database, incomplete or corrupt data or other breaches of data integrity and security reduce confidence of database users. Fortunately, these threats are subject to control by formal measures applied by a data manager.

Remark: Like database management, administration of the computer network, while representing relatively small development and ongoing costs, is of consequence in the well being of the database. System administration requires training in operating and recovery procedures, security against accidental reconfiguration of the system and the preparation of appropriate documents. Accidental reconfiguration is a frequently encountered hazard to databases. The consequences of a mistake due to insufficient training, procedures or documents can be severe. Availability of UNILAW is critical, with prompt world wide service expected by users. Special attention to system administration is well advised in this project.

3.1.2 PROJECT MANAGEMENT

Progress and final effectiveness of implementation depends to a certain extent on the technological products acquired and installed, but technically skilful, disciplined, and dedicated project management will most likely prove to be of more importance. This aspect will receive attention in sections to follow, with expectations set out for both the systems consultant and client.

3.1.3 METHOD OF DERIVING THE SPECIFICATION: MATCHING FUNCTIONAL REQUIREMENTS WITH TECHNOLOGIES

The requirements and circumstances posed by UNILAW and UNIDROIT were compared with commercial hardware, software and valid practises for the management of technical projects, automated databases and computer networks.

- **Hardware** Computer networks and related equipment and services were compared with a summary of requirements and provisions for UNILAW.
- **Software applications** Technical project management and software engineering practises were selected for compatibility with the personnel, functions and circumstances of UNIDROIT in order to obtain an orderly, timely and economical development.
- **Database management** Computing tasks required for data installation, security against data corruption, and accommodating the work processes of expert panels and system users were identified.
- **System management** Training for system administration and technical resources outside of UNIDROIT were surveyed to meet anticipated support requirements.

3.2 HARDWARE DEVELOPMENT

The system consultant/designer will be responsible for the selection and operation of the networks, equipment, and operating systems software during the interval of development. In this report, computer and network operating systems, while actually programs, will be considered with hardware. Such programs will not be built upon to form UNILAW, and may be regarded as part of the platform on which UNILAW is set up. What follows is intended to guide the selection and installation of the computers and network operating systems.

3.2.1 NETWORKS

Two networks are required: one local area (LAN) and one wide area (WAN).

The LAN will be set up under Windows NT and will be connected using equipment to be chosen and installed by a suitable contractor.

The WAN will be implemented via the Internet and World Wide Web (WWW) from a web server installed and configured so as to provide protection of the database against possible intrusion. Access to the WWW from the UNILAW server will be via a telephone modem to the local public branch exchange (PBX),

then the Internet. A FAX modem and FAX server will provide an alternate route for fulfilment of user requests for users both in and outside of the WWW.

3.2.2 COMPUTERS, OPERATING SYSTEMS, AND PERIPHERAL EQUIPMENT

Server: A true PC server of commercial grade will be required. The server will be Pentium based with clock speed in the upper 25% of the models in production at the time, with at least 32M RAM. A tower case will be used featuring the maximum available number of slots in order to accommodate future expansion. In the server will be installed Windows NT, a network card, two 28.8KB FAX modems, a CD-ROM drive, two 2GB drives configured to mirror one another and a diskette drive. There will be a 15 in. SVGA monitor and a UPS capable of operating the server for at least three hours (monitor not connected).

Workstations will be Pentium based with clock speed of 100MHz or more. Workstation RAM will be at least 16M. The installed hard drive will be at least 1GB. Windows NT client, Windows 95, a network card, and a diskette drive will be installed. Peripheral equipment for each workstation will be a 15 in. SVGA monitor and a UPS.

Peripherals will include two scanners (200 dpi or higher) and an OCR engine. One scanner will be for prototype development and occasional use afterward. The second will be for production. WaterMark is recommended to acquire and manage images. There will be an office model laser jet printer, CD-ROM loader ("burner") and a high speed backup tape drive of at least 2GB capacity.

The Figures 3.1 and 3.2 summarise the LAN and WAN connections.

3.3 SYSTEM OPERATION AND SOFTWARE DEVELOPMENT

3.3.1 SOFTWARE DEVELOPMENT: INTRODUCTION

For purposes of this chapter, "develop" means design, program, test, revise, and submit formally for acceptance software systems as project deliverables. The first three of these activities are expected to be iterative and cumulative in this project. Effective software engineering practice in a project such as UNILAW does not indicate exhaustive design at the start because the project managers (consultant and client - both) will be expected to progress in understanding of how the software to be created will prove most valuable to UNILAW. However, the major software components should be defined and specified to a sufficient extent to demonstrate technical feasibility and utility consistent with the purposes of the project.

Software applications to be developed fall into three main categories based on purpose:

- programs for acquiring, configuring, storing and retrieving legal information within the central database
- programs that interact directly with the database user
- programs for accounting and monitoring database use

3.3.2 CENTRAL DATABASE

The UNILAW database will be written using Lotus Notes Ver. 4.0 or higher. The means of containing all of the source materials: instruments, cases and bibliographic references is the Lotus Notes *form*. All pertinent information concerning the particular instrument, case, or bibliographic reference will be held directly in the form as text, objects, and links. Only text included in the Lotus Notes form may be searched as free text. Objects may be marked for conversion to text within the form. The number and design of forms will be left to the system consultant chosen to develop UNILAW.

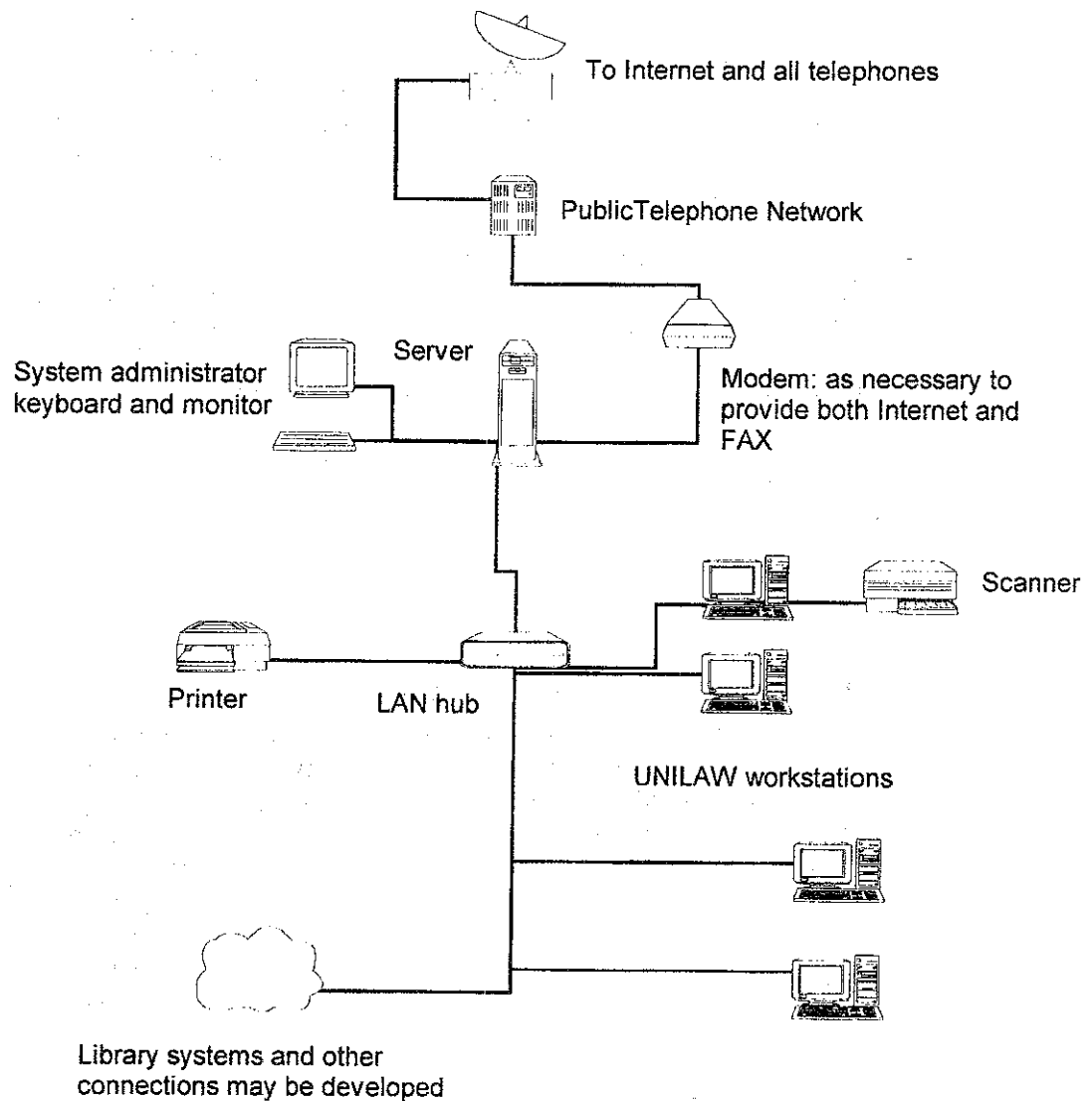


Figure 3.1 UNILAW Local Area Network

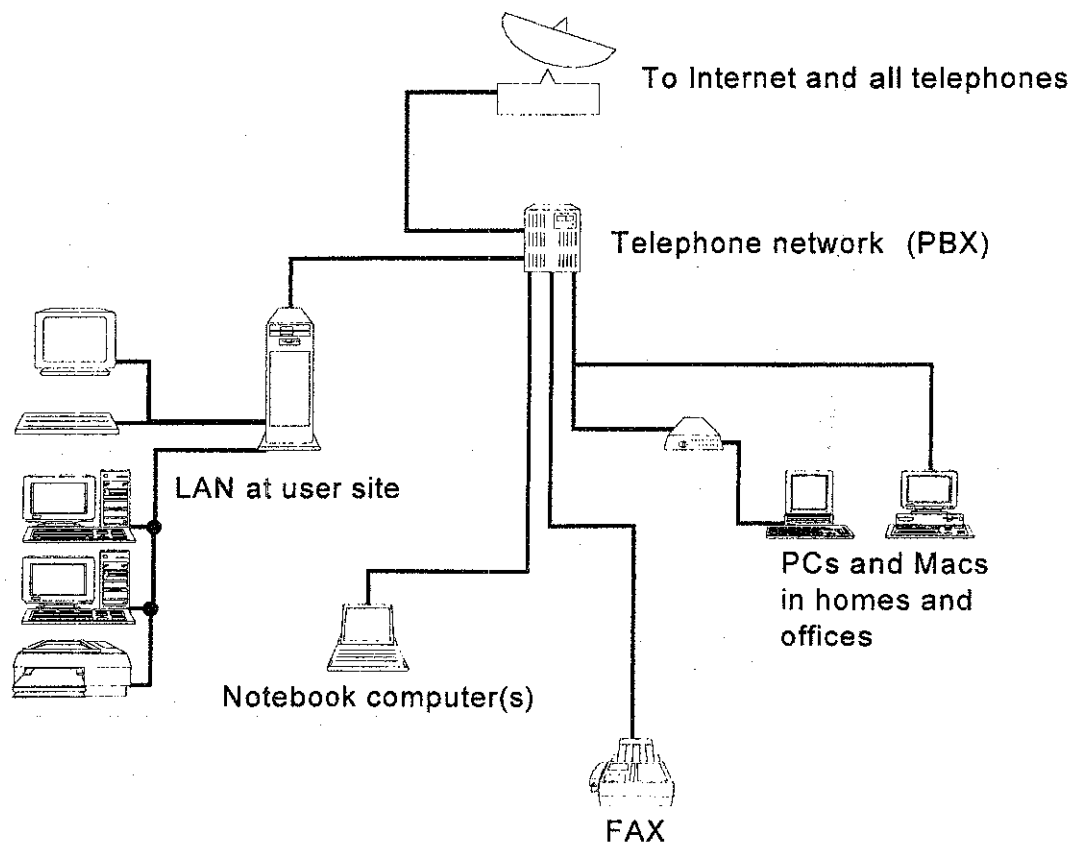


Figure 3.2 Typical UNILAW Wide Area Network for UNILAW Users

3.3.3 GENERAL METHOD OF SEARCH AND RETRIEVAL FROM THE DATABASE

The means of querying the database (search and retrieval) will be to initiate a *search* and receive a *view*. Information obtained by the program from forms in the course of a user search will be based on links embedded in the database by the database manager. A view is thus the response to a search. The design of views will be left to the developer. From a standpoint of information flow, it is the search program that acquires information from the user to enable the assembly of a view containing information from one or more forms.

The initial search will be presented to the user right after the choice of working language - English or French - and selection of a subject area. The search will present a wide range of opportunities to the user. The user will specify or approximate or even guess about the identity and characteristics of instruments, cases and bibliographic references to retrieve. Once the view is presented, it can at once be employed to continue as a search. The sequence: search, view, search, view is central to this technical specification and should be clearly understood. What follows presents the process in narrative form.

User Interaction with UNILAW

After admission to the database and choice of a working language and subject area, the user is presented with a beginning search page containing check boxes (or other means) for selecting the categories of items to be retrieved: instrument, case and bibliographic reference. There are fields (blanks) for information to be entered, but their individual use is optional. The more information entered and closely specified, the greater the likelihood of obtaining a view in fulfilment of the need of the user. Information furnished by the user may be partial at this or any stage. Using a combination of clicking and typing (screens and control sequences to be developed) the user enters whatever is known or supposed about the information sought: where it originated, words or phrases contained, date(s), parties contesting, ratification status, periodical title, concept(s) and others. With each change of search information, clicking brings a new view with lists of applicable cases, instruments, bibliographic references, or perhaps suggestions or other related matter (example: lists of experts and their publications concerned with the concept or instrument specified).

The user may respond to the list in view by clicking any item that appears promising. A new view then appears presenting more information. The user may backtrack to previous screens at any time to make new choices. Successive views will allow the user to see specific texts, images, and summary information concerning a particular legal document. At any time, the user may proceed from any view by clicking highlighted areas. All such areas around data indicate links to other data. Commands (such as return to the previous screen) are provided using "buttons."

As the sequence just explained shows, navigation within the database will not take place exclusively along pathways of hierarchical organisation. Instead, a user may freely move from view to view by selection of linkages set into the database by the database manager. The database manager must be familiar with the ways of research characteristic of a typical user. The software will enable the data manager to obtain a suitable report showing where and when each link was established. Familiar key words, phrases and abbreviations will be entered and maintained by the data manager to facilitate user activities.

3.3.4 DATABASE STRUCTURE

Technically, the database structure is not relational, but linked. Combined with free text searching, the structure becomes a hybrid well suited to designing searches and views well suited to the accustomed patterns of work of the users of UNILAW.

3.3.5 USER ACCESS

Users may access UNILAW by widely available web browsers. User screens will be developed under Visual Basic and placed on the WWW in hypertext language using the Lotus InterNotes web publisher.

3.3.6 PROVISIONS FOR DATABASE MANAGEMENT AND THE EXPERT PANEL PROCESS

A primary design objective is to enable UNILAW data management to be as decentralised as possible, minimising the data related roles of headquarters staff. Designs for database configuration control and quality assurance provisions must be made with this objective in mind. Much of the information to be installed in UNILAW will come from expert panels consisting of a co-ordinator and individual

members located throughout the World. The UNILAW design will provide for an expert panel co-ordinator to use Lotus Notes Client software to place information into working directories. Provision will also be made for an expert panel co-ordinator to remove, replace or revise information already released for general use. Means will be provided for conveying user comments to UNILAW management directly from the view concerned.

Data security will be developed with special consideration for the decentralised data management objective. Batch processes will be developed for use by the UNILAW Data Manager in checking the integrity of the database. Scanning of documents may take place at UNIDROIT headquarters or images be sent to the data Manager electronically.

3.3.7 PROVISIONS FOR ACCOUNTING AND MONITORING

Software provisions will be made for the identification of UNILAW users and the assignment of privileges of access to portions of the database, should this be desired by UNILAW management. Enrolment of users will be accomplished using a database containing information of value for UNILAW planning when combined with records of use. A log will be prepared for each visit to the database by a user and provisions made to deliver management reports and activity statements (with or without invoices) to each registered user.

3.3.8 PROVISIONS FOR COMPUTER SYSTEM ADMINISTRATION

Supervisory control of the computer system and networks will be conventional, with the configuration of hardware, operating system(s), applications software, and service agencies fully documented and easily available in a well laid out format for use in the absence of the Administrator.

3.3.9 PROVISIONS FOR SECURITY

User access to the database will be controlled by the assignment of areas for individual accounts. Protection against unauthorised intrusion will be required. For Notes Clients in the UNIDROIT corporate domain, privileges may be assigned under Notes. In addition, the System Administrator will establish and maintain a structure of privileges under Windows NT in order to protect the UNILAW directories.

Mirrored drives will be employed to permit prompt restoration in the event of loss of a hard disk. Rapid, automatic tape backup will take place on one drive while the other remains in service. Successive backups will be made on alternating drives.

4. UNILAW Implementation Strategy & Budget

4.1 INTRODUCTION

This section shows how UNILAW should be implemented, using the technology described in the previous section. Then a budget will be presented, combined with a schedule of work. Underlying the implementation strategy to be described is the experience of the consultants with projects of this sort, where *how* the information

- directory structures
- assignment and maintenance of privileges
- system security

4.2.5 PROJECT MANAGEMENT: MILESTONES AND DELIVERABLES

Effective project management can be gauged by demonstrable progress in accord with the reaching of milestones on time and within budget. The operative concept in marking a milestone is a "deliverable." A deliverable is a formally and closely described assemblage of demonstrations (for example, witnessed tests), exhibits, documents, materials or other evidence of designated accomplishments which are agreed upon in advance by the client and consultant. The number and frequency of deliverables should vary with circumstances, increasing with the complexity, size and speed of the project. Relaxing the count of deliverables is not a suitable measure to speed progress. The opposite is usually true. The provisions of this paragraph do not preclude agreed upon reports and other means of monitoring the project.

A proven indicator of the effectiveness of project management is that the consultant or project manager can demonstrate to the client representative exactly how far the project has progressed and whether work is ahead, on time, or held back. The consultant or project manager must be able to demonstrate the criteria and results to support the answers given. Such checking does not constitute undue use of time in a well managed database or other information system project because in actual fact the manager will monitor progress on a daily basis by examining and testing the programs developed, documents written, data processed or capabilities realised.

4.3 UNILEX AND ACCESS TO OTHER DATABASES

4.3.1 UNILEX

UNILEX has been mentioned as a possible technological model for UNILAW. While well designed and maintained (notably with a recent adaptation to a Microsoft Windows user environment), UNILEX uses a highly specific relational database (Microsoft Access), which is not suitable for UNILAW because:

- Instruments, cases, and bibliographic references will be retrievable by UNILAW users prior to the analysis by experts which will furnish bibliographic references, classifications by legal concept and links to other information. The evolution of structured information in this way is more difficult to implement in a relational database such as UNILEX than in a hybrid structure as is proposed for UNILAW under Lotus Notes.
- UNILAW will be a larger, more diversified database than UNILEX, with a greater number of users.
- UNILAW will be primarily an on-line database, whereas UNILEX is mainly distributed on portable media such as diskettes.
- UNILAW maintenance requirements will exceed those of UNILEX by a substantial margin, calling for a more economical design for upkeep.

Even if a higher speed, higher capacity, more technologically sophisticated database programming software system (for example Microsoft SQL Server or

Oracle) is substituted for Access in UNILEX on-line, maintaining relations is still more technically difficult and costly than would be the case using the methods offered through Lotus Notes.

4.3.2 CONNECTION TO OTHER DATABASES VIA UNILAW

It is feasible to permit the user to connect to UNILEX on-line (or any other on-line database) through the UNILAW network (Web) server, should this prove desirable. The experience of the user would be as if the other database were contacted independently, except that UNILAW would make a record of the event for use in planning.

4.4 UNIDROIT TECHNOLOGICAL DEVELOPMENTS ARISING IN THE TIME OF UNILAW

4.4.1 UNILAW TECHNOLOGY AND DEVELOPMENTS IN THE LIBRARY

Information systems deployment in the Library has already taken place in the form of registering new cards using File Maker Pro. Projects in the Library can be facilitated by the corporate environment provided by Lotus Notes. A project convenient to implement under Lotus Notes is the tracking of periodicals.

Derivation of a comprehensive card catalogue or another library management subsystem is technically possible using Lotus Notes, but due to the quantity and nature of the data and the well evolved, highly specialised conventions employed in library management, we recommend consideration of commercially or institutionally available computer based management systems dedicated to library use.

4.4.2 OTHER UNIDROIT INFORMATION TECHNOLOGY PROJECTS

At this time, several projects have been put forward. All may be completed under Lotus Notes by UNIDROIT personnel without special training beyond commercially available on-line instruction and publications. Software application development of this sort may be considered routine. Lotus Notes makes available without alteration programs written outside of Notes, for example, a spreadsheet formed using Microsoft Excel.

Some mentioned projects are:

- a database for the contacts of the Institute (addresses, telephone, FAX, locations, associates and affiliations, area of specialisation)
- a system for managing the correspondence and related archives of the Institute
- a database for the documents of the Institute
- a database for the accountancy of the Institute (described in an attachment to the unabridged report)
- a World Wide Web home page for the Institute

The first three should be incorporated in a document managing system under Lotus Notes. The directory of contacts should be made available on-line with direct initiation of FAX, e-mail, or paper correspondence from the screen.

4.5 PROJECT SCHEDULE AND BUDGET

4.5.1 LIMITED RELATIONSHIP OF SCHEDULE TO UNIDROIT INFORMATION SYSTEMS

The proposed development of UNILAW will in all likelihood take place alongside an increase in use of information technology within UNIDROIT. Although the facilities and capabilities of UNILAW will be adequate and well placed to benefit UNIDROIT, the strategy to be employed in developing UNILAW is unaffected.

4.5.2 CONTINUITY OF FUNDING

The times that funds will become available for UNILAW cannot be determined with certainty at present. When funding can be made available, a single, continuous project should be undertaken to develop UNILAW. Substantial risks of project failure will be incurred if work is suspended for very long once underway because continuity of effort and personnel are important in information system projects of all sizes. Alternatives to an uninterrupted UNILAW development project were considered by ISL, but put aside due to high risk of failure.

4.5.3 CHART SHOWING PROJECT TASKS

A Gantt project chart accompanies this section (a Gantt chart is a horizontal bar chart used to depict timed tasks in a project). The chart illustrates the tasks comprising the UNILAW development project. The planned duration of the project is approximately 16 months. Release of the database for general use will occur in 13 months. There are two major stages in the project: prototype and production.

The chart shows four tasks within the *prototype* period:

- hardware installation: obtaining and setting up the computer system and LAN (work done by contractors)
- software installation (software engineering and programming done by consultant)
- prototype of one subject area
- critical review and revision

In the *production* period, seven tasks are shown:

- installation of production hardware
- establishment of UNILAW on the World Wide Web
- development of data management by experts (design and implement methods to decentralise data management to the maximum feasible extent)
- releasing for selected users with review and revision
- establishment of system accounting and the receipt of revenue
- releasing for general use on the World Wide Web
- establishment of data, database and system management (documentation, training and transfer of management from consultant to client)

The project chart shows expansion of UNILAW over additional subject areas following the production stage. The extent of expansion will depend upon use of the database and upon revenues available.

4.5.4 BUDGET

The budget presented in this report represents costs expected at Headquarters during design and implementation, not the costs of information to be installed in

the database. The largest *data* cost will almost certainly result for the expert panel process, which requires co-ordinator and experts for each panel.

Accompanying the project chart are budget and cash flow reports. These reports were developed using Microsoft Project. The dates shown (project beginning in mid 1996) are for purposes of illustration only. The budget totals Lit. 846,350 (all figures are in thousands of Lire). There is a built-in contingency of 10% to cover incidental expenses, price changes, and other such needs. Equipment and commercial software total approximately Lit. 75,100, 8.9 % of the total.

4.5.5 EXPENSES BY PROJECT PERIOD

There are two stages, prototype and production. The prototype stage accounts for 27.6% of the total budget. In the prototype stage, Lit. 41,500 is budgeted for equipment and software. The primary items to be purchased are:

- a commercial quality PC server running Windows NT and Lotus Notes and including two, 2GB hard drives in mirrored configuration
- a suitable uninterruptable power supply
- a laser printer
- two PC workstations running Windows NT and Notes Client software
- Notes Visual Basic
- a basic scanner and OCR engine

Costs in the production stage represent 72.4% of the total budget. In the production stage, Lit. 33,600 is budgeted for equipment and software. The primary items to be purchased are:

- a high capacity scanner
- two modems
- two additional PC workstations
- Lotus Notes Web Publisher and Lotus Notes FAX server
- imaging software
- a CD ROM loader ("burner")

4.5.6 STAFF

Staffing costs account for most (approx. 80%) of the total budget because of projects such as data analysis, programming, system analysis and technical management..

The budget report shows that staffing for the prototype period will be:

- project co-ordinator (1)
- programmer/analyst (1)

During the production period, staff is increased and diversified to:

- project co-ordinator (1)
- programmer/analyst (1)
- communications specialist (1)
- database analyst (1)

4.5.7 CASH FLOW

The cash flow report is presented by quarters and tasks in the attached chart. Possible revenues after the database is released for general use are not considered. As scheduled, portions of the project occur within four calendar quarters.

4.6 SUMMARY AND CONCLUSIONS

The project as planned and budgeted does not feature heavy expenditures for equipment and computer programs. Overall, the largest portion of the budget goes to developing and testing the means and methods of database access and data management. Practical results are obtained early, after consuming only a small portion of the budget. A working database is produced during the first (prototype) period. At the conclusion of the prototype period, three quarters of the budget still remains. Most of the technological issues are dealt with during the prototype period.

During the second (production) period, release to users is progressive and conservative, with review and modification based on experience. Most of the database management issues are dealt with during the production period. A twelve week interval during the production period is allotted for the purpose of instituting effective processes for data management that can be decentralised to the greatest feasible extent. Other matters taken up during the production period are intended to prove the validity, reliability and utility of the database.

INTERNATIONAL INSTITUTE FOR THE UNIFICATION OF PRIVATE LAW (UNIDROIT)

Implementation Plan for the UNILAW Project

ID	Task Name	Duration	Quarter 1		Quarter 2			Quarter 3			Quarter 4			Quarter 5			Quarter 6			Quarter 7			Quarter 8			Quarter 9			Quarter 10			Quarter 11		
			M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30		
1	Approve Development Project	0d																																
2	Prototype Stage	135d																																
3	Prototype HW Installation	9w																																
4	Prototype SW Installation	5w																																
5	Prototype 1 Subject Area	9w																																
6	Review and Revise	4w																																
7	Misc Expenses + Contingency	1d																																
8	Production Stage	200d																																
9	Production HW/SW Installation	4w																																
10	Establish Web Technology & Comms	4w																																
11	Devel. Data Management by Experts	12w																																
12	Release to Select Users	12w																																
13	Establish Revenue Facility	8w																																
14	Start Receiving Revenue	0d																																
15	Release for General Web Use	12w																																
16	Establish Data, Database and System Mgt	24w																																
17	Misc Expenses + Contingency	1d																																
18	Expansion Stage	0d																																
19	Develop Additional Subjects	0d																																
20	Release to Users	0d																																
21	Maintain Additional Subject Areas	0d																																

Project: UNILAW Development Proje

Date: 4/24/96

Task

Progress

Milestone

Summary

Rolled Up Task

Rolled Up Milestone

Rolled Up Progress

Budget Report
UNILAW Development Project

ID	Task Name	Fixed Cost				Total Cost	Baseline		Variance	Actual	Remaining
1	Approve Development Project				Lit.0	Lit.0		Lit.0	Lit.0	Lit.0	Lit.0
2	Prototype Stage				Lit.0	Lit.233,750		Lit.233,750	Lit.0	Lit.0	Lit.233,750
3	Prototype HW Installation				Lit.38,500	Lit.38,500		Lit.38,500	Lit.0	Lit.0	Lit.38,500
4	Prototype SW Installation				Lit.3,000	Lit.50,500		Lit.50,500	Lit.0	Lit.0	Lit.50,500
5	Prototype 1 Subject Area				Lit.0	Lit.85,500		Lit.85,500	Lit.0	Lit.0	Lit.85,500
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	1	Project Coordinator	1	200h	0h	9/2/96	10/4/96	Lit.30,000	Lit.30,000	Lit.0	Lit.30,000
	2	Programmer/Analyst	1	200h	0h	9/2/96	10/4/96	Lit.17,500	Lit.17,500	Lit.0	Lit.17,500
6	Review and Revise				Lit.0	Lit.38,000		Lit.38,000	Lit.0	Lit.0	Lit.38,000
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	1	Project Coordinator	1	360h	0h	10/7/96	12/6/96	Lit.54,000	Lit.54,000	Lit.0	Lit.54,000
	2	Programmer/Analyst	1	360h	0h	10/7/96	12/6/96	Lit.31,500	Lit.31,500	Lit.0	Lit.31,500
7	Misc Expenses + Contingency				Lit.21,250	Lit.21,250		Lit.21,250	Lit.0	Lit.0	Lit.21,250
8	Production Stage				Lit.0	Lit.612,600		Lit.648,600	(Lit.36,000)	Lit.0	Lit.612,600
9	Production HW/SW Installation				Lit.33,600	Lit.87,600		Lit.87,600	Lit.0	Lit.0	Lit.87,600
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	1	Project Coordinator	1	160h	0h	1/6/97	1/31/97	Lit.24,000	Lit.24,000	Lit.0	Lit.24,000
	2	Programmer/Analyst	1	160h	0h	1/6/97	1/31/97	Lit.14,000	Lit.14,000	Lit.0	Lit.14,000
	3	Communications Specialist	1	160h	0h	1/6/97	1/31/97	Lit.16,000	Lit.16,000	Lit.0	Lit.16,000
10	Establish Web Technology & Co				Lit.0	Lit.54,000		Lit.54,000	Lit.0	Lit.0	Lit.54,000
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	1	Project Coordinator	1	160h	0h	2/3/97	2/28/97	Lit.24,000	Lit.24,000	Lit.0	Lit.24,000
	2	Programmer/Analyst	1	160h	0h	2/3/97	2/28/97	Lit.14,000	Lit.14,000	Lit.0	Lit.14,000

Budget Report
UNILAW Development Project

ID	Task Name	Fixed Cost			Total Cost		Baseline		Variance		Actual		Remaining
"Establish Web Technology & Comms" continued													
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost		
	3	Communications Specialist	1	160h	0h	2/3/97	2/28/97	Lit.16,000	Lit.16,000	Lit.0	Lit.16,000		
11	Devel. Data Management by Ex Lit.0 Lit.126,000 Lit.162,000 (Lit.36,000) Lit.0 Lit.126,000												
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost		
	1	Project Coordinator	1	480h	0h	3/3/97	5/23/97	Lit.72,000	Lit.72,000	Lit.0	Lit.72,000		
	2	Programmer/Analyst	1	480h	0h	3/3/97	5/23/97	Lit.42,000	Lit.42,000	Lit.0	Lit.42,000		
	3	Communications Specialist	0.25	120h	0h	3/3/97	5/23/97	Lit.12,000	Lit.48,000	Lit.0	Lit.12,000		
12	Release to Select Users Lit.0 Lit.24,000 Lit.24,000 Lit.0 Lit.0 Lit.24,000												
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost		
	4	Database Analyst	0.5	240h	0h	4/28/97	7/18/97	Lit.24,000	Lit.24,000	Lit.0	Lit.24,000		
13	Establish Revenue Facility Lit.0 Lit.76,000 Lit.76,000 Lit.0 Lit.0 Lit.76,000												
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost		
	1	Project Coordinator	1	320h	0h	5/26/97	7/18/97	Lit.48,000	Lit.48,000	Lit.0	Lit.48,000		
	2	Programmer/Analyst	1	320h	0h	5/26/97	7/18/97	Lit.28,000	Lit.28,000	Lit.0	Lit.28,000		
14	Start Receiving Revenue Lit.0 Lit.0 Lit.0 Lit.0 Lit.0 Lit.0												
15	Release for General Web Use Lit.0 Lit.114,000 Lit.114,000 Lit.0 Lit.0 Lit.114,000												
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost		
	1	Project Coordinator	1	480h	0h	7/21/97	10/10/97	Lit.72,000	Lit.72,000	Lit.0	Lit.72,000		
	2	Programmer/Analyst	1	480h	0h	7/21/97	10/10/97	Lit.42,000	Lit.42,000	Lit.0	Lit.42,000		
16	Establish Data, Database and S Lit.0 Lit.72,000 Lit.72,000 Lit.0 Lit.0 Lit.72,000												
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost		
	4	Database Analyst	0.75	720h	0h	4/28/97	10/10/97	Lit.72,000	Lit.72,000	Lit.0	Lit.72,000		

"Establish Web Technology & Comms" continued

Budget Report
UNILAW Development Project

ID	Task Name	Fixed Cost	Total Cost	Baseline	Variance	Actual	Remaining
17	Misc Expenses + Contingency	Lit.59,000	Lit.59,000	Lit.59,000	Lit.0	Lit.0	Lit.59,000
18	Expansion Stage	Lit.0	Lit.0	Lit.0	Lit.0	Lit.0	Lit.0
19	Develop Additional Subjects	Lit.0	Lit.0	Lit.0	Lit.0	Lit.0	Lit.0
20	Release to Users	Lit.0	Lit.0	Lit.0	Lit.0	Lit.0	Lit.0
21	Maintain Additional Subject Area	Lit.0	Lit.0	Lit.0	Lit.0	Lit.0	Lit.0
		Lit.155,350	Lit.846,350	Lit.882,350	(Lit.36,000)	Lit.0	Lit.846,350

Quarterly Cash Flow as of 4/24/96
UNILAW Development Project

	Qtr 2, 1996	Qtr 3, 1996	Qtr 4, 1996	Qtr 1, 1997	Qtr 2, 1997	Qtr 3, 1997	Qtr 4, 1997	Total
Approve Development Project								
Prototype Stage								
Prototype HW Installation		Lit. 38,500						Lit. 38,500
Prototype SW Installation		Lit. 42,420	Lit. 8,080					Lit. 50,500
Prototype 1 Subject Area			Lit. 85,500					Lit. 85,500
Review and Revise			Lit. 32,300	Lit. 5,700				Lit. 38,000
Misc Expenses + Contingency		Lit. 21,250						Lit. 21,250
Production Stage								
Production HW/SW Installation				Lit. 87,600				Lit. 87,600
Establish Web Technology & Comms				Lit. 54,000				Lit. 54,000
Devel. Data Management by Experts				Lit. 44,100	Lit. 81,900			Lit. 126,000
Release to Select Users					Lit. 18,400	Lit. 5,600		Lit. 24,000
Establish Revenue Facility					Lit. 49,400	Lit. 26,600		Lit. 76,000
Start Receiving Revenue								
Release for General Web Use						Lit. 98,800	Lit. 15,200	Lit. 114,000
Establish Data, Database and System Mgt.					Lit. 27,600	Lit. 39,600	Lit. 4,800	Lit. 72,000
Misc Expenses + Contingency				Lit. 59,000				Lit. 59,000
Expansion Stage								
Develop Additional Subjects								
Release to Users								
Maintain Additional Subject Areas								
Total		Lit. 102,170	Lit. 125,880	Lit. 250,400	Lit. 177,300	Lit. 170,600	Lit. 20,000	Lit. 846,350