# MINISIS version H: a suitable library information system

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# MINISIS Version H
## A Suitable Library Information System

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IN 1976, The international Board Of Governors of International Development Research Centre (IDRC) approved the proposal to develop a computer software named MINISIS, a multipurpose information management system. This decision was consistent with IDRC's efforts to explore ways of strengthening the information management capabilities of developing countries. This seems to have been a sound decision, as the MINISIS software is now used by approximately 360 organizations in 58 countries of the world. The applications of the software range from bibliographic databases to project information systems to germ plasm databases to inventory systems. These organizations currently receive the MINISIS software, training and support from a network of five MINISIS Resource centres, six commercial distributors and IDRC itself. There are at least five regional MINISIS user's groups: Arabic, Netherlands, Washington, Australia and Latin American.

MINISIS is a computerized textual database management system that can be used to create formats for the organization and maintenance of textual information. The strengths of MINISIS are in the organization of text and relationship between different text rather than the manipulation of numbers for statistical purposes although MINISIS is capable of some statistical operations.

Researchers in developed countries can barely stay abreast of developments in information; researchers in developing countries need a

system which allows them to gain a controlled access to a flood of potentially valuable information. Documentation centres using MINISIS are able to search their own catalogues and catalogues shared by other documentation centres; copies of the catalogue, or search results, (sorted on any number of attributes) can quickly be distributed to interested parties. As MINISIS develops, these facilities improve.

Adaptation of MINISIS will provide access to International information networks and collating and indexing of our own important science and technology documentations.

Before the development of MINISIS, the IDRC used ISIS successfully to manage its own library operations. In addition, IDRC with the cooperation of ILO made the system available to institutions in several developing countries including Chile, Costa Rica, Egypt, Kuwait and the Philippines. There were, however, certain drawbacks to ISIS, one of which was that ISIS could not easily manipulate the AGRIS (International Information System for the Agricultural Sciences and Technology) and DEVSIS (DEVelopment Sciences Information System) databases which were of interest to institutions in developing countries.

The library's functional requirements were, for the most part, improvements to the existing system. Although they were based on the IDRC library's needs, none of them was limited only to the IDRC library situation. They were potential requirements of any library or documentation centre that would be using MINISIS.

The previous experience with ISIS contributed greatly to the development of excellent designer-user rapport. Because the principle designer has adopted ISIS to the IDRC library situation, she was already familiar with the idiosyncrasies of automated bibliographic systems. Likewise, the librarians had some knowledge of, and experience with, automation. Thus, the group was able to work effectively and efficiently

without being hampered by communication problems, due to lack of understanding by either party.

MINISIS was developed for Hewellet Packard system HP3000 (a mini computer). The software was originally developed for the management of bibliographic databases, library and scientific collections of published information, but with a flexible design that would permit it to have several other applications. The system, then, combines indexing and storage abilities and management facilities with information retrieval in one package. It is "user-friendly", that is, easy to learn and operate, even for people with little or no experience with computerized information systems. MINISIS also includes a set of programs to support library management and information handling in small to medium size libraries. There are processors for entering and retrieving data, for performing arithmetic computations and for producing a variety of reports. It has powerful information retrieval capabilities being able to use several search descriptors, and supports the use of online multilingual thesaurus. In other words, it allows the user to consult directly and continuously (the later is what is meant by "interactive") with the list containing thousands of terms used to store and file information.

One of the most exciting development of MINISIS has been the translation of its language into Arabic, an absolutely vital step in its acceptance and use throughout North Africa and the Middle East. And the Arab countries, India, Israel and the Soviet Union have succeeded in conforming their languages to international coding standards (ASCII) which yield 128 possible characters.

The MINISIS group with IDRC provides support for installations around the world. This includes not only the maintenance of the system, but also the addition of new features to enhance its flexibility and power. Licensees become members of the MINISIS User's Group (MUG) that pools information on new applications and common problems and advises IDRC on future developments. This is in keeping with IDRC's principle of making

MINISIS available to developing countries and that any MINISIS software program be available for free.

It is the system's low cost and multiple uses which make it an unusually attractive proposition for developing countries eager to have their own computerized information system. But it is what the countries themselves have been able to accomplish with this information tool that is behind the MINISIS success. They have been able to preserve their own documents, make these available to national researchers, and at the same time given researchers access to the same information enjoyed by scientists elsewhere.

- One of the most important MINISIS developments has been the decentralization of the dissemination and support of software.

- Interfacing MINISIS Version G with COBOL is possible as HP3000 system programming language, SPL provides programmers with access to hardware level instructions as well as higher level language constructs. The programmers can interface COBOL with MINISIS by writing a SPL interface routine that is responsible for mapping parameters between the caller and the called routine.

- MINISIS/Mini-Micro CDS/ISIS data transfer is possible using ISO-2709, as this is the only external input format supported by ISIS. There are some problems that have to be overcome:

  ** The two systems handle subfields differently. MINISIS uses field tags to indicate the relationship of subfields to a primary field (e.g.; A251, A252 and A253 are subfields of A250). ISIS uses internal character strings to separate and identify the subfields (e.g.; ^n, ^l and ^c would precede data for field 250 subfields). Example of how the same data would be maintained in both systems is as follows:

  MINISIS: A251: University of Ottawa

A252: Ottawa, ON
A253: CA.

ISIS: 250: ^nUniversity of Ottawa^lOttawa, ON^cCA.

** ISIS can only accept unblocked physical records of 80 bytes (with the last physical record in a logical record being shorter, as required by the data). So, record restructuring is required.

** ISIS adheres strictly to the ISO-2709 (1973) field and record delimiter standards. Therefore ISIS expects two delimiters at the end of a logical record (a field and record separator). MINISIS only provides one (the record separator).

IDRC has no experience in trying to transfer MARC records from MINISIS to MICRO-ISIS, or vice versa. However, questions raised by MINISIS users indicate there is some interest in doing just that. Unfortunately, there is no direct support for MARC in MICRO-ISIS. For example, the user has no access to the ISO-2507 record header. Therefore, it is the best to consider that MARC records cannot be exchanged between the two systems, unless one has access to a computer programmer, or uses imaginative means to pass information that does not actually conform to MARC standards.

**MINISIS Version H**

MINISIS has developed through a great deal of interaction and association with its constituency (community of members). This relationship has allowed MINISIS to reach a plateau of maturity. From that plateau a bold step is being tak ı to bring MINISIS, and hence the members of its constituency, into the future of library management and data processing. By the end of this year IDRC will offer Version H of MINISIS to its users worldwide. Based on previous versions of MINISIS, Version H is an

improved software package that can run on microcomputers as well as the HP3000 series mini computer, and enable sophisticated users to migrate the software to other hardware platforms and operating systems by revising several key functions. This new version will provide totally integrated relational database system with a user friendly interface. Future systems have set the minimum requirements for the micro computer platform as:

** IBM PC/AT or higher or 100% compatible
** At least 640 K RAM
** Free space required to store data files at the ratio of 2:1
** 5 Mega hard disk space
** Monochrome display terminal (Color monitor is optional)
** One or more 3.5" or 5.25" disk drives
** Line printer - if alternate character set processing is used, it should support alternate character sets
** Operating system - MS or PC DOS 3.3 or higher - if expanded memory is supported then it should support the LIM specification.

MINISIS Version H is following a bold plan to incorporate contemporary computer and documentation design methods in the recreation of MINISIS. The first recommendation is to change the computer language used to code MINISIS from SPL to C language. This furnishes an opportunity to renovate the internal structure and the user's view of MINISIS and opens the way to other computer hardware platforms and operating systems. The Computer Systems Group is following up on another recommendation: improve the documentation of MINISIS and the User Contributed Library and make MINISIS and its accompanying documentation fully functional in other languages. Development of MINISIS as a management tool responds to other suggestions from MINISIS users which Include: incorporate the more useful contributions in the User Contributed Library into the main body of MINISIS, open the system for easier development of library and documentation centre managements tools, institute easier paths for navigation between processes, and include more menu-driven functions. The

development of MINISIS in response to the abundant input from users in the form of software in the User Contributed Library and requests for enhancements has brought MINISIS to a plateau. From here it is possible to envision a mature product; from here a system based on MINISIS, related to MINISIS and upwardly compatible with MINISIS can be developed.

The Computer Systems Group (CSG) of IDRC is working on three applications.

- Standard MINISIS Application (SMA)
- Inter-agency Development Research Information System (IDRIS)
- Integrated Library System (ILS).

A special feature of MINISIS version H is a 4 GL language development tool called the Application Specification Toolbox (AST). With this programming tool, CSG will develop each application for version H. Subsequently, the AST will be available to users to enable them to develop their own or modified existing applications. The design of MINISIS version H is of a package which can easily be implemented and customised when necessary.

A MINISIS application consists of a series of interfaces which contain a layout with related actions. The MINISIS Integrated Processor (MIP) interprets these interfaces. See the MINISIS conceptual diagrams.

**The Standard MINISIS Application Specification**

Version H will provide users with a standard application called the Standard MINISIS Application. All of the functionality of the Version G of MINISIS will be incorporated in SMA, including the following:

- An integrated environment will allow users to perform different operations on databases and data without having to close and reopen the

database. The version G processors, like COMPUTE, UPDATE, and PRINT, will be replaced in version H by function modules which will make this integration possible.

- An improved HELP system will provide help from all modules at all levels. For example, information on database help, field help, and module help will be available.

- An enhanced error recovery system and automated system maintenance functions will facilitate the job of the database manager.

- An improved user interface will provide a choice between menu mode (full screen or scroll mode for remote access) and command mode.

- Certain user defined routines taken from the User Contributed Library (UCL), like MARC(EXIT), will be integrated into MINISIS ver H.

- The DBMGR module allows system and database managers to perform database maintenance, security, and system functions.

## The IDRIS Application Specification

Another application being developed is the Inter-Agency Development Research Information System (IDRIS). IDRIS is a common database of information describing research activities located in or concerned with developing countries. A group of donor agencies contribute information to the database. The contributors have a common goal of supporting technological research and development in developing countries. These agencies include:

- Board on Science and Technology Exchange (BOSTID), United States.
- German Appropriate Technology Exchange (GATE).
- International Development Research Centre (IDRC), Canada.

- International Foundation for Science (IFS), Sweden.
- Japan International Cooperation Agency (JICA).
- Netherlands Universities Foundation for International Cooperation (NUFFIC).
- Swedish Agency for Research Cooperation with Developing Countries (SAREC)
- United Nations University.

The IDRIS database is installed in MINISIS format on the IDRC computer. IDRC manages the database and provides technical support and coordination to users. In addition to the contributors listed above, IDRIS has a wide base of users known as searchers, in the international research and development community who search the database, but do not contribute data. These users may have online access to the IDRIS database on the IDRC host computer or may obtain copies of the database to install on their own systems.

The main objective in developing the IDRIS application is to make it easier for agencies to install the database on their own systems. By increasing installation capabilities, agencies will not have to log onto the IDRC host computer, whether for the purpose of contributing data on their own research activities or merely for searching the database. Data will be distributed with the application, and will be updated regularly.

Users may obtain IDRIS free of charge under no obligation by contacting IDRC. IDRIS is available on tape or diskette in ISO 2709 format for MINISIS and Mini-Micro CDS/ISIS users.

The inclusion of the IDRIS application module will allow users to participate in the IDRIS project and share in the wealth of information available through the IDRIS database. This particular application specification will facilitate easy searching, sorting and printing functions.

## The Integrated Library System

Many members of the MINISIS constituency are libraries and documentation centres. These types of operations require a distinct set of processors. Some of the operations particular to the Integrated Library System application are: acquisitions, cataloguing, Online Public Access Catalogue (OPAC), circulation (including activities such as loans and reserve), Inter-Library Loan (ILL) and serials control (including activities such as inventory, receiving, billing and ordering). The ILS will provide all database services such as validation and thesaurus, using full screen data entry. The ILS will provide the user with modules that will perform basic library functions. Using the Application Specification Toolbox (AST), however, libraries will have the capability to modify and enhance the ILS to meet any additional needs.

The site visits for collecting input for the ILS have been finished and the users visited were asked to fill out a survey to be used to help define the design requirements for the ILS. The completed surveys have been analyzed and the highest priorities have been assigned to SERIALS CONTROL, CIRCULATION, OPAC, SDI, CATALOGUING, and ACQUISITIONS. The first five of these items are supported within the version G.01 software or the UCL. IDRC is committed to building these into the first release of the ILS. Middle rankings were given to FUND ACCOUNTING, MANAGEMENT STATISTICS and INTER-LIBRARY LOAN. The lowest ranking was given to a proposed BINDING module. Participants were almost unanimous in assigning the highest priority to module-specific functions. The ACQUISITIONS functions, ORDER ENTRY AND UPDATE, ITEM RECEIPT and CLAIMING were ranked high. The CIRCULATION functions, CHARGE, DISCHARGE and OVERDUE NOTICES were also ranked high. Middle rankings were most often assigned to such items as online library-specific help, ROUTING, STATISTICS COLLECTION and FUND ACCOUNTING (within modules). Lowest rankings were given to system level features such as transaction archives, multiple library support

and line mode operation (by default the system will function in full screen mode).

IDRC is not using the survey as an absolute guideline for development. Their current plan is to develop ACQUISITIONS and FUND ACCOUNTING first followed by the five modules supported by version G.01 and the UCL. While FUND ACCOUNTING received only a middle ranking, it links to the other modules and must be in place before design of the others can go forward. IDRC is working on a prototype of the entire system. Proceeding from the prototype, a detailed functional design will be drawn.

## APPLICATION SPECIFICATION TOOLBOX (AST)

### What Is a Specification

A specification is a series (or tree) of screens for performing various operations on MINISIS data structures (tables and views). For example, with the release of MINISIS H.00 will be a universal application called the Standard MINISIS Application (SMA); the SMA will allow the users to perform all the familiar functions available in MINISIS Ver G as well as a few new additions. Like earlier versions of MINISIS a user can follow through a series of menus and prompts to arrive at a result; unlike earlier versions, user will be able to use commands to work and achieve results quickly. Also, the presentation of the menus and prompts will be modified; a toolbox of editor tools will be included, allowing users to create specification, alter existing specifications, and change the language of the specification.

### What Is The Toolbox

The toolbox is an editor capable of creating or modifying the appearance of the layout part of the application and identifying the related commands or

values in the action field of the application. It is being designed to be a user friendly application; this has the two considerations of the end user and the database manager. The system must present itself to the end user as malleable; new or infrequent users need an easy interface between them and the software. The database manager needs a system which can be secured and altered to fit the requirements of the site. The applications are designed to satisfy the needs of the unsophisticated user and allow for increasing confidence and ability by including the option of command mode; the Application Specification Toolbox is for the database or system manager to build applications suitable to the site. The AST includes three systems: The Application Development System; The Application Language Change System; and the Application Extension System. The three systems perform different tasks but managed to share some common features. The initial release of MINISIS Ver H will have only one of the systems available, the Application Development System.

## The Application Development Subsystem (ADS)

The main task of the ADS is to create new applications (menus and data entry windows). This system is the most universal of the three systems and can be manipulated into accomplishing the tasks assigned to the other two systems. The system is essentially an editor with the ability to connect menu and data entry items to commands, tables, and views. When the process of development is complete, the development system produces a MINISIS format file; this file contains a generic or a dedicated application. A generic application can be used with a variety of tables and views, while the dedicated application has a specific relationship to one or more tables or views. When a specification is associated with a particular table or view, all the fields associated with that table or view (or table and views) become available to the application developer. It is not necessary to have the database in place to create an application.

## Creating An Application

The steps to creating and editing an application are very similar; when editing an existing application it is necessary to identify the existing application by name. With a planning tool, the activities available in an application can be decided upon, the relationships identified, and the design of the progression of screens can be simplified. With a plan in hand a database or system manager can start up AST and create an application (or copy and modify an existing application).

## Profiling An Application

Profiling an application entails identifying the application for the system and for the user, setting the security for the application, and assigning the default language.

## Application Identification

The application identification is the file name of the application, the directory information for the application, and a description of the application for the help system.

## Security

Security for the application consists of identifying the users with the capability for altering all or specific elements of the application.

## Default Language

The default language commands set the language of the messages, the input/output mode, and the terminal handlers associated with the application. The translation of the messages themselves, if a change is needed, can be done through a separate facility. The I/O modes available are scroll,

command, or menu. Scroll mode is similar to what all processors (except DATADICT) are by default in version G; command mode allows users to enter commands in an interactive mode; and menu mode is the screen by screen presentation of menus and data entry windows. Many languages require specialized terminal handlers to interpret the input and output for MINISIS.

**Creating A New Screen**

Menu screens present a number of options for the user to select from. All menu items are connected or associated with a command or series of commands. Menu items can be identified by numbers or, on a PC, by cursor controlled highlighting; listed horizontally across the top or the bottom of the screen; or vertically down the screen. In the SMA, ILS, and IDRIS applications, the menus will run horizontally across the top of the screen. Each screen contains a layout and an action field.

**Layout**

The layout of the menu screen will contain the literals (listing of each option) and on the PC, a help line associated with each option. The literals will be a single word or asynchronym which represents an action or function or group of actions available to the user. The development system will prompt for one line of information about each item in the screen for the help system and then move on to the relationship between the items and the action field.

**Action Field**

The development system will prompt for the command(s) to be performed by each item on the menu or data entry field in the layout. Commands are valid primitives or valid screen activations. Each item is

given a security level; this effectively bars access to various functions based on the user.

### Creating a Data Entry Screen

Much like a menu screen, a data entry screen has literals associated will declared variables, commands, or data.

### Declared Variables

A declared variable is a temporary value not contained in any table; it is by default length 10 and of type character. This is a special type of field, associated with the application, it can be used for a variety of purposes: for example, it could be used to maintain a running total of field value during one entry session, or it could be used to store data for further manipulation later in the session.

### Commands

Commands can appear in data entry screens as easily as in menu screens; generally in this context the commands will have an impact on the data being entered, rather than activating functions or other screens.

### Data Fields

Data fields represent the fields in the table or view associated with the session or the application. Data fields can be of a regular type or display only; if a data field is a regular type it is available for update. It is probable that literals in the data entry screen will be associated with both data fields and commands.

## Compiling and Debugging an Application

The compiler included with the AST will highlight the syntax errors in the construction of the application. Each screen affected by errors would then be edited and the application recompiled. This is an iterative process, leading to an application without syntax errors (e.g. calling a non-existent screen or incorrect command activation).

## The Application Language Change Subsystem

The Application Language Change System will operate like the Application Development System, but, the developer will not be prompted for action field values. Developers will be able to change the prompts and literals in the layout field into the new Language.

## The Application Extension Subsystem

The Application Extension System will allow users to add screens or modify screens in existing applications. If certain terms used in the original application are not used at a particular site, the developer can alter the screens which display the unfamiliar terms; a quick edit allows the developer to replace the unfamiliar terms with the terms used at the application site. This work does not affect the action field of the screen. Another use for the application extension system is the development and introduction of additional screens, alternate groupings of commands in the action field or additional information on existing menu or data entry screens. This work affects the action field and is similar to the development system.

## Documentation/Training

The applications distributed by IDRC will be fully documented; the application development subsystem will be fully documented. Individual

sites are responsible for the development of appropriate documentation for new or altered applications.

## MINISIS VERSION H TECHNICAL ASPECTS

Detailed or technical views of MINISIS include the development concepts: portability, application development, information management methods, and file structures.

To facilitate the software to new platforms, it is written in a layered manner: uppermost of these layers is a set of machine dependant routines, the other three layers, which are the intrinsics, the application functions, and the interface worked together within the core code of MINISIS. The machine dependant routines allow the core of the MINISIS software to interact with the various platforms. The intrinsics perform the manipulations of data, data structures, and statistics. The application functions bridge the concepts and broad activities of the user level with the minute details handled by intrinsics. The interface presents the application functions to the user in the form of screen layouts. This layered approach allows the machine dependant routines to be altered without affecting the integrity of the core code.

MINISIS ver H is being designed with comparability with ISIS family of database management systems and SQL. The continuing support of ISIS will allow users to continue to exchange data between databases of the same family; the exchange of information in the ISO 2709 format will continue to be an indispensable feature of MINISIS. In addition MINISIS Ver H will incorporate into the database management functions, some degree of SQL compatibility. This will allow users to use SQL functions in the maintenance of the various database RDs, PSs, and DS, known in SQL and MINISIS Ver H as tables (RD) and views (a view with a single component is equivalent to a PS, and a multi component view is equivalent to a DS). The SQL compatibility is at the MIP primitive level; within the set of primitives available are primitives based on SQL syntax and an extended set of

primitives which handle the MINISIS functions outside of the range of abilities available in SQL in the standard MINISIS applications. It is possible that the database manager level of user will have direct access to SQL compatible commands within the MIP primitives, but most users will have their work mapped into SQL syntax by the application in a manner transparent to them.

The feature of MINISIS Ver H which may be of great interest to various users is the migration possibilities. The top most layer of machine dependant routines will be documented and available for users to alter or rewrite, thus tailoring MINISIS to previously unsupported platforms.

**Product Documentation [Guides, Manuals, References]**

Five areas of concern related to the design of the documentation distributed with MINISIS are being examined: the relationship between support and documentation: the diversity of the MINISIS users; the integration of training and documentation; revisions and corrections to the documentation after distribution; and the methods of handling transitions between users at installations and versions of MINISIS. Analysis of these factors and design techniques for documentation can build a slick product, but that product may miss the mark entirely and Usability Testing will highlight the areas where corrections are needed. The users will receive the best of direction from the manuals distributed with the MINISIS software, whether it is for an HP3000 series computer, an IBM compatible micro-computer, or a hardware platform which have not been identified for development by IDRC. The documents developed to accompany the MINISIS version H release will be tested in tandem with and independent of the software. The two sets of tests will prolong the life and ensure the achievement of the goals set for the documentation.

## The End Result

MINISIS has a long history with IDRC and has reached maturity with ver G. The development process to date has allowed for the creation of a complete redesign which not only encompasses the development to date, but migrates that development to new system. Version H of MINISIS will be the last major restructuring of the software. Once the new release of the software has stabilized and an appropriate support program has been put in place, IDRC will focus its attention on the development of applications rather than the development of a DBMS tool. This upcoming release of the software will provide users, MINISIS Resource Centres, commercial distributors and IDRC with a flexible tool to build applications to meet their specific textual information management requirements. MINISIS ver H will be better suited to serving the developing regions in the cultivation of information and documentation centres of varying sizes.

## REFERENCES


1) MINISIS Newsletters & MINISIS Bulletin, 1986 to 1991.

2) Maureen Sly, *"The Role of the IDRC Library in the design of MINISIS"*, March 1983.

3) Andre McNicoll, *"THE ELECTRONIC NET MINISIS - A Computerized Information System for the Developing world"*, R & D 84 Arabic Magazine.

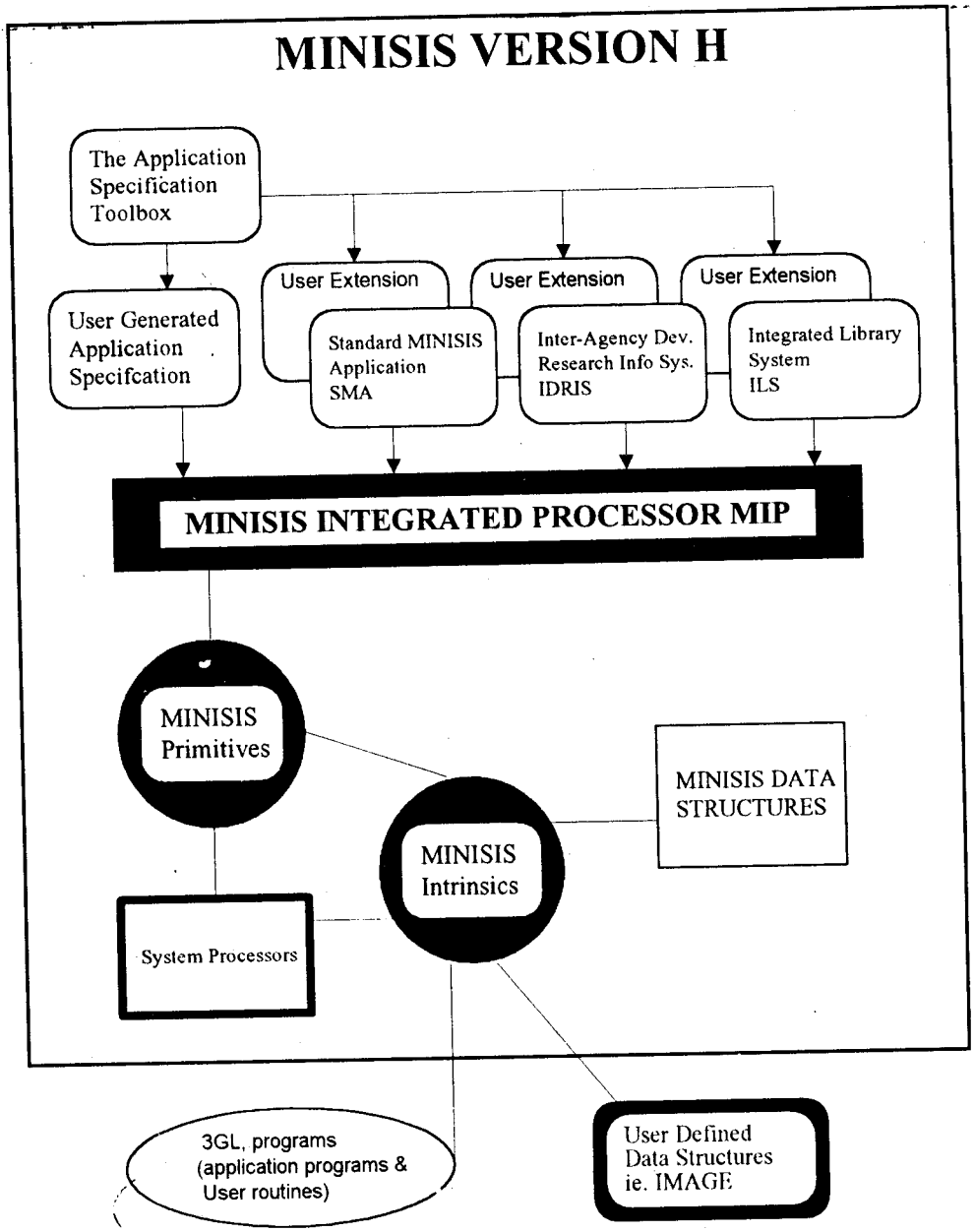
## Version H Conceptual Diagram

The diagram included is a conceptual representation of MINISIS version H. Everything inside the largest box labelled MINISIS (Version H) is what users receive on the release tape.

The first level of MINISIS is the user interface which is represented by a series of application specifications. MINISIS Version H will come with the standard MINISIS Application and the Application Specification Toolbox; there is the option of the IDRIS Application Specification as well. Later releases of MINISIS will include an Integrated Library System Application Specification. This upper level is what the user interacts with.

Below this level is the MINISIS INTEGRATED PROCESSORS (MIP). This is the collection of functions which, in previous versions of MINISIS, were included into the various processors. They are activated by the application specifications and, in turn, interact with the MINISIS primitives.

The primitives lead to the intrinsics, which are also accessible from external programs through the MINISIS High Level Intrinsics documented in the third volume of the MINISIS manuals. The intrinsics actually access and manipulate the MINISIS defined or user-defined data structures.




**MINISIS VERSION H CONCEPTUAL DIAGRAM**