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# *The CDIE HP-3000 Computer: Searching for a Viable Replacement*

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## **Management Summary**

This report has been developed as a joint effort between the Office of Information Resources Management (IRM), the Center for Development Information and Evaluation (CDIE), and the Records Management function within the Information Support Services Division (RM). The report is the result of a joint analysis conducted by the three organizations during August and September of 1994. The initiative was undertaken at the direction of the Management Bureau's senior executive management in an effort towards accomplishing two primary goals;

- 1) to bring about greater integration of the technology and information presently managed by CDIE on the HP-3000/MINISIS hardware/software configuration with the rest of the agency's Information Systems Program, and
- 2) to expand agency-wide access to the information currently managed by CDIE on the HP-3000/MINISIS solution set.

Toward this end the analysis focused on finding a viable replacement for the HP-3000/MINISIS solution set, while at the same time, documenting alternatives with less impact and cost. Within the limited time-frame of this study, the analysis focused on 3 primary areas:

- 1) gaining an understanding of CDIE's current use of the HP-3000/MINISIS,
- 2) establishing a core set of CDIE's system requirements, and
- 3) conducting a preliminary assessment of the marketplace and key products considered likely candidates for a MINISIS replacement.

Ancillary to the above areas, the study team considered the augmentation of the MINISIS-replacement requirements with reference to those requirements associated with:

- 1) managing the agency's electronic records, and
- 2) emerging text/document-related requirements surfacing from the various ISP initiatives.

While the foundation for these requirements are not as well developed at this time, they are critical to making improvements in the agency's overall management of its text/document information resources. The potential opportunity to establish a consistent tool set and synergy of operations between these activities constitutes a significant advance in the agency's overall IRM program.

Using the base set of CDIE, IRM, and RM requirements, the analysis took a quick scan of the text and document marketplace and requested vendor information (from approximately 15 vendors). Where sufficient information was already available such that a preliminary screening could take place, demonstrations were scheduled and carried out during September. In two cases, follow-up presentations were scheduled to secure more information and probe a little deeper into the products' capabilities. The sessions were attended by CDIE, IRM, and RM personnel.

The consolidation of requirements from CDIE, IRM, and RM, and the joint review of products in the marketplace, proved extremely valuable in several areas:

- ▶ The potential strategy of integrating the activities of CDIE (with its focus on maintaining corporate memory and providing research services), IRM (with its focus on managing the technology and developing a new generation of information systems that must include narrative, unstructured text and management of information), and RM (with its move towards more electronic management of records), surfaced as a viable direction to pursue--depending in large part on the product selected. This builds on the recommendations emerging from the KRA text and document handling study undertaken this last year;
- ▶ While the genesis for this analysis was the replacement of hardware and software (i.e. CDIE's HP-3000 and the MINISIS relational database), the real challenge in selecting and implementing a replacement hardware/software tool set is in the potential changes that would likely be required in CDIE's operations, and ultimately the text/document management activities across the agency. In addition, any replacement brings with it considerable efforts required for data conversion, CDIE workflow re-engineering, application conversion, and training; and
- ▶ The vendor community is presently making available products that are consistent with the agency's new technology and applications architecture, and that meet the core requirements identified within the scope of this study (with some customization required). The review team formed a general consensus that the one product that meets the agency's future text/document management requirements is BASIS Plus and BASIS Desktop from Information Dimensions, Inc.

## **Recommendations:**

This proposal seeks to establish an agency-wide standard solution set, make a copy of the current bibliographic databases to the agency via this new solution set, while concurrently assessing the solution set for application within the context of the ISP and ironing out implementing details. The major elements of the recommendations are as follows:

- ▶ Establish the target solution for text/document management system at the agency level, not just at the CDIE level;
- ▶ Acquire and install a system to support development and porting of CDIE's bibliographic databases for agency access, and to assess impact, migration requirements, and other text/document management requirements of the agency (Phase I);
- ▶ Assess viability of target solution set for meeting the agency needs, establish BASIS Plus/BASIS Desktop as an agency-standard tool set, and deploy as a standard tool;

- ▶ Acquire and install production-level system (hardware and software) for CDIE's operation and migrate operations of CDIE from MINISIS to BASIS Plus/BASIS Desktop (Phase II), and
- ▶ Incorporate new Solution Set into the specification for the replacement DIS Clearinghouse Solicitation.

While the Report does not specifically address the changes associated with the current operations of the HP-3000 computer, a parallel effort was undertaken to relocate the computer operational responsibilities from CDIE to IRM. This was carried out via a delegation of authority under the current contract with LTS. This change was undertaken at the direction of senior Management Bureau direction.

### **Management Review and Implementation:**

Approval has been granted by Management Bureau to acquire and install a production-level system (hardware and software) for CDIE's systems and to migrate operations of CDIE from MINISIS to BASIS Plus/BASIS Desktop. The initially proposed schedule [see page 26] to migrate all production systems off the HP-3000 by July 1996 has been compressed to complete system migration by July 1995. Sufficient funding has been provided by IRM to fund a Sun SPARC 20/61, BASIS Plus server software, and a limited number of client hosts for BASIS Desktop. When the system is fully migrated in 1995, additional funding will be necessary to increase the number of Desktop licenses. The Sun SPARC 20/61 will be installed at the Clearinghouse under the operational control of IRM/TCO to support the BASIS Plus applications.

The current plan calls for the Development Information System to be converted by CDIE to BASIS Plus by June 1, 1995 with the remaining CDIE and RM systems converted by September 30. The implementation plan will provide the Agency with standardized architecture for the systems currently implemented in MINISIS on the HP-3000 minicomputer. Desktop access to the Development Information System will be available to USAID Washington staff. The planned systems will be user-friendly Windows applications, with full-text capabilities. In addition, these BASIS Plus applications will form a nucleus of text management experience that can be leveraged throughout the Agency in other applications.

Final review and approval of the current planned approach [see page 38] is subject to joint review by PPC and M Bureau management.

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# **CDIE's HP-3000: Searching for a Viable Replacement**

## **I. Issue Statement**

This study has been conducted in an effort to evaluate alternatives for the Center for Development Information and Evaluation's (PPC/CDIE) current reliance on the HP-3000 computer and the MINISIS relational database management system. The study seeks recommendations for bringing the information technologies more into alignment with USAID's current architecture, and for expanding access to those databases maintained by CDIE via the existing USAID Network.

## **II. Requesting Customer/Organizational**

This study was undertaken on behalf of USAID's Office of Information Resources Management (M/IRM), in cooperation with the Center for Development Information and Evaluation (PPC/CDIE) and the office of Records Management (M/AS/ISS/RM). Specific direction for the initiative was provided by senior management of the Management Bureau (M).

## **III. Background**

The following provides key background information upon which this study was conducted.

### **A. CDIE**

The Center for Development Information and Evaluation's (PPC/CDIE) mission is to lead USAID in learning from experience in order to improve development results. To accomplish this mission, CDIE strives to accomplish two basic objectives:

- (1) To continuously inform USAID managers about development experience appropriate to their needs, and
- (2) to be recognized [by Agency staff] as influential and effective in leading USAID to learn from experience.

These two objectives are, in part, supported through the following CDIE functions: the acquisition of information on development experience relevant

to USAID assistance programs; analyzing and synthesizing it into useful knowledge; disseminating that knowledge; and applying it to program, policy and management decisions in ways that allow USAID to replicate successes and avoid repeating past mistakes or failures.

CDIE also strives for development results in which people in partner countries achieve substantial and sustainable improvements in their lives. These results flow from greater empowerment and expanded choices brought about by USAID-supported activities.

One principal development activity, funded and managed by CDIE, which is designed to support the CDIE Mission and strategic objectives is the Information as a Tool in Development project. Today this project continues to support the development, operation and maintenance of the Development Information System (DIS), USAID's institutional memory. The DIS was developed in 1975 in response to Congressional concerns to improve USAID's development assistance portfolio through better knowledge of past Agency development experience and provision of field guidance based on past lessons learned. The system also facilitates the sharing and access to USAID development experience with organizations and individuals who are in, or providing support to, developing countries receiving U.S. foreign assistance.

In 1981, the software which was used to manage the DIS, INQUIRE, was replaced and the DIS information converted to MINISIS, a text management, relational database software package developed and still maintained by the International Development Research Centre (IDRC). (IDRC is a Canadian international development organization which receives funding from the Canadian government.) MINISIS is a powerful tool for managing multiple, relational, textual database applications.

Since its inception and subsequent conversion to MINISIS, the DIS has grown and adapted to change. It now supports major databases on more than 9,000 USAID projects and about 90,000 key development experience reports. CDIE/DI uses this resource to respond to both internal USAID and external requests for development experience information, and disseminates information from these databases to thousands of users, in USAID/W, USAID Missions overseas, host country development organizations, international development organizations, and the U.S. public.

Today's Center for Development Information and Evaluation (CDIE) performs, among other services, the Development Experience Information (DI) function of the agency. CDIE/DI funds and manages the Development Information Services Clearinghouse (DISC) contract for implementing part of this function. The DISC is responsible for the technical processing of USAID-funded and produced development experience materials and provides access, as well as, delivery for these documents and reports through the operation and maintenance of the DIS.

Services provided through the DISC contract include the technical processing of USAID documents and reports (cataloging, indexing, abstracting, document preparation, filming, scanning, distribution, inventory, warehousing, and on-demand document delivery), as well as, other related clearinghouse services such as training, thesaurus maintenance, system maintenance, publications production, mailing list maintenance, and order processing. The contracted services for the development and operation of the DIS databases includes the processing and maintenance of project, bibliographic, full-text (abstract and document), records management, thesaurus, inventory, warehouse control, technical process control, document ordering/tracking, and order payment databases. Included within these contracted services is the lease and operations of an HP-3000 computer used to support the internal DISC clearinghouse operation, in addition to, information access requirements for development experience information services provided by CDIE.

## **B. Rightsizing Efforts**

In 1991, the Agency embarked upon a major restructuring, to improve performance and increase efficiency and responsiveness. Numerous studies of USAID management practices were performed, including those of the Bollinger Task Force on Agency Redundancy, the Administrator's Management Initiatives Task Force, the Administrator's Reorganization Task Force, and Deloitte and Touche. Recommendations and actions to support the reorganization have focused on defining management objectives, holding managers accountable, streamlining, decentralizing, and providing performance incentives.

As part of the agency-wide "right-sizing" effort carried out in early FY 1994, there was considerable discussion between M/IRM and PPC/CDIE, as to possible alternatives for organizational re-alignment. These discussions focused on the role of CDIE with respect to managing development-oriented

information relative to the Information Management role of IRM. The conclusion of these discussions was that each organization would remain intact. The one exception was a decision made to consolidate the operations of the HP-3000 computer into IRM's other computer operational responsibilities. Arrangements for transferring the operational responsibilities from PPC/CDIE to M/IRM have been completed.

### **C. KRA Study**

A text and document handling study performed by KRA Corporation for M/IRM, completed in April 1994, provides a new perspective on USAID's information needs and the role that MINISIS can and cannot play within the Agency's changing information environment.

According to KRA, the current version of MINISIS is an old technology which is increasingly isolated from Agency standards, yet the new MINISIS Version H has the potential to revitalize MINISIS's contributions to meeting both short term and long range requirements, not only for CDIE/DI but other offices with text and document management issues...dealt with most effectively using an agency-wide solution.

KRA's report focused on the importance of *live* internal information as accounting for the largest amount of text information in the Agency. And yet, the report notes, there are few information tools to support collaborative use of live information. Relevant agency-wide standards do not exist and existing systems cannot deal with live information.

The KRA report espoused the belief that while USAID needs a new policy and a standard tool kit for handling textual data, MINISIS and the USAID Thesaurus will continue to be vital tools; in fact they must be preserved to provide access to documents on DIS. At the same time, USAID should move immediately toward full-text electronic capture.

### **D. Information Systems Plan**

The Information Systems Plan (ISP), prepared in December 1992, predates the KRA study, and indeed provides the foundation from which many of KRA's recommendations are developed. The ISP cites many deficiencies in USAID's information management systems, including redundancy and duplication, lack of standardization, lack of integration, little information

sharing, not enough emphasis on textual data (which is "critical to an agency that relies on ideas as much as numbers"), and inadequate sharing of program and sectoral data. (These criticisms are reiterated in several other studies, e.g., the PPC Internal Review of December 1993 finds that there is need to improve coordination of USAID's information services and reduce the redundancy of its document collections; the Appendix to this PPC Internal Review suggests that migration from MINISIS to UNIX-based systems will allow easier access to information; the Results Oriented Re-Engineering Report (March 1994) discusses the need for integrated, electronic, shared data.)

The ISP also notes that access to the institutional memory has been limited by technology, incomplete submission of documents, and budget constraints. It correlates USAID's informational weaknesses with shortcomings in the Agency's organizational culture as a whole.

ISP's proposed solutions include desktop workstations, electronic business transactions, a common user interface, standardized and integrated software applications, standard data definitions and data structures, and a worldwide telecommunications network.

The ISP concludes that the Business Area Analysis (BAA) for operations management (which includes information management) should be given high priority.

**E. Focus/Approach of this study**

The issue being addressed by this study relates to the replacement of the HP-3000 computer and the associated applications. The initiative was undertaken at the direction of the Management Bureau's senior executive management in an effort towards accomplishing two primary goals;

- 1) to bring about greater integration of the technology and information presently managed by CDIE on the HP-3000/MINISIS hardware/software configuration with the rest of the agency's Information Systems Program, and
- 2) to expand agency-wide access to the information currently managed by CDIE on the HP-3000/MINISIS solution set.

Toward this end the analysis focused on finding a viable replacement for the HP-3000/MINISIS solution set, while at the same time, documenting alternatives with less impact and cost.

In addition to responding to the immediate management direction, there is near-term need requiring attention. The current computer operation is provided through the DISC contract operated by LTS Corporation. The performance period of this contract runs through September 1995. It is understood that this contract will be re-competed beginning in the spring of 1995. Prior to initiating that procurement action, there is the need to determine the most appropriate technology platform and applications software for supporting future DISC operations and CDIE services which are currently served through the HP-3000 computer system.

## **IV. Analysis and Discussion**

### **A. USAID's use of MINISIS and the HP-3000**

#### **1. History of Minisis Use**

In 1981, USAID competitively procured the MINISIS software and corollary hardware (HP-3000 minicomputer platform) to fulfill the dual role of managing the DIS institutional memory and supporting USAID's information technology transfer program embodied in the Information as a Tool in Development project. The hardware and software were integrated into the operation of the Document and Information Handling Facility contract (now the Development Information Services Clearinghouse [DISC]). It was used as a tool for acquiring, processing, storing and disseminating, both strategically and on-demand, USAID's development experience information to LDC institutions, USAID Missions and other international development organizations.

Since 1976, some of the documents and reports which DI has been collecting represent a subset of the documentation which form the official Bureau project files. In 1983, the Records Management Office (now M/AS/ISS), which had responsibility for Agency policy guidance and services associated with the maintenance and archiving of these files, opted to use the same technologies as those used by the DISC contract (hardware, software, micrographics) to manage the Agency's official project files. These additional MINISIS databases contain brief citations that act as an index to the microfiche collection of the official project files located in several bureau offices (LAC, ANE, AFR, in selected G Bureau Offices, and the M/OP/PS office).

#### **2. Current Use of MINISIS**

During the past 13 years, CDIE has developed extensive informational tools, procedures, and specialists dedicated to obtaining, organizing, analyzing, and disseminating external information resources and internal documents concerned with Development Information (DI). The MINISIS relational database and textual information management software is used to maintain numerous Agency development experience databases in the Development Information System (DIS). The DIS is

used to develop and manage bibliographic, textual and abstract (summary) information describing the Agency's development experience referenced in the following databases:

- The PROJECTS Database, containing descriptions of over 9,000 USAID projects based on project design documents or other primary sources of project information.
- The DOCUMENT Database, providing bibliographic citations and abstracts of approximately 90,000 USAID development experience documents, as reported in the project, program, and research documents produced and sponsored by the Agency.
- The DIS INVENTORY Database, containing brief bibliographic citations for over 38,000 selected older Agency documents of historical interest (circa 1950-1989).
- The DIS Audiovisual Database (AVDS), a central inventory containing over 600 references to Agency mixed media resources, such as audio tapes, videotapes, photo transparencies, sound recordings, filmstrips, and assorted computer software programs.
- The Development Assistance Committee Evaluation Inventory Database (DAC), containing selected evaluation documents from the DOCUMENT Database, reformatted and submitted for inclusion in the DAC system.

In addition, the USAID official project file databases point to an additional 285,000 project file documents.

Beyond the various MINISIS databases needed to support the DIS and Clearinghouse operations (authority files, subject and geographic thesaurus, mail and distribution lists, customer orders, etc.), relational linkages to two principal databases are used by the majority of clearinghouse activities: PROJECTS and DOCUMENTS. The

PROJECTS database contains data on USAID programs and projects, including value-added data such as title, keywords, logical framework, abstracts, funding data and activity and special interest codes. The DOCUMENTS database of USAID-sponsored reports contains bibliographic citations (including USAID-specific data such as project and contract number), keywords based on the USAID thesaurus, and, for the more important reports, informative abstracts. A relational join between these and other databases allow CDIE/DI searchers to view or generate reports containing a description of a project (or a group of projects) and the reports related to each project. These databases are used by USAID researchers to provide on-line information and reports on USAID-sponsored activities and to identify reports that are relevant to current subjects of interest.

### **3. DISC Operations and the HP-3000 Environment**

All aspects of the DISC operations, processing and dissemination functions are supported by the HP-3000 minicomputer system. This includes the Clearinghouse document distribution unit uses of MINISIS databases for managing mailing lists and client orders for various reports and to track ad-hoc requests for documents cited in the reports database.

The DIS is an on-line system which is accessible via dial-up modem. Access to the on-line DIS databases and to the text and images cited by their records is currently provided only through CDIE/DI staff. (Note: See CD-DIS CD-ROM discussion below regarding alternative access to DIS databases.) All DIS databases and DISC operations are managed by a system operator.

The DISC also provides MINISIS support to define new MINISIS databases for cataloging and indexing USAID development experience holdings. New database models are defined in MINISIS to produce new database views and reports for CDIE/DI end-user research and library reference staff. New reports are defined for each database using MINISIS. Special database indexes are created and maintained to support special DISC processing requirements or end-user retrieval and reporting requirements.

The HP-3000 used to support DISC functions is a vital resource for providing access and control over the documents and reports that are processed at the Clearinghouse. The HP-3000 is a model 947 with 128 MB of RAM and approximately 3 GB of disc storage. It was obtained on a lease-purchase arrangement in February, 1992 to replace the HP-3000/Model 48 purchased in October 1981 and which had been in constant operation. Ownership of the equipment is still vested with the manufacturer (HP) until the final payment in 1995.

The DISC contractor carries insurance to cover the cost of equipment replacement in case of disaster (fire, water damage). Since HP still owns the equipment, they also hold certain liabilities to ensure and protect their property, and to render it useful for operational purposes.

#### **4. Limitations of MINISIS**

The DIS is presently not available on-line through the AIDnet. Several factors have made direct agency-wide access to this information difficult. The current version of MINISIS runs only on an HP-3000 computer and access from outside the DISC offices is by dial-up modem. Also the standard MINISIS Query interface is command driven and, although the commands are not difficult to learn, command languages are not intuitive to everyone and are not easily remembered by casual users. Menu-type front ends to MINISIS (including one written by CDIE in 1985) are available but because they were usually written to support a variety of end user equipment (CDIE was dialing up from HP terminals, PC's and Data Graphics terminals in 1985), they do not include features like pull-down menus or point-and-shoot pick lists that are part of more advanced Windows interfaces on PC's. These solutions are, therefore, incompatible with M/IRM's ISP goals to have a GUI interface at the desktop throughout the agency.

#### **B. International Community's Use of MINISIS**

The MINISIS system is developed and maintained by the International Development Research Centre in Ottawa, Canada, and is currently used by more than 400 organizations in over 55 countries around the world. A multilingual system, the MINISIS software has allowed developing-country organizations to manage their information activities in their local language and character set.

Beyond its technical characteristics, another reason MINISIS was originally chosen by CDIE was because of its use by the international development community. It is provided free to developing country institutions by IDRC and is an inexpensive solution for textual database applications by international development organizations, e.g. annual software maintenance costs are only \$3,500.

Today, MINISIS is used to automate textual and relational information management systems within a number of development assistance organizations, including the World Bank, the Canadian International Development Agency (CIDA), the Islamic Development Bank, the Japan International Cooperation Agency (JICA), and several UN agencies, such as the International Labour Organization (ILO).

Because of the common use of MINISIS by many counterpart international development organizations and host country government institutions, CDIE has used MINISIS to facilitate the transfer and access of the Development Information System holdings (which consists of the Projects and Documents MINISIS databases) with many of these organizations. One example of this is the presence of the DIS database through IDRC's Development Data Bases Service (DBBS) which is accessible through dial-up modem, packet-switched network and the Internet, and provided for the benefit of external development research use. Another example is the contribution of USAID evaluation report findings as part of the OECD/DAC Donor Evaluation Inventory Database which is accessible through the CIDA MINISIS system.

In a similar fashion, CDIE's Research and Reference staff, who are trained to access the DIS databases on a daily basis as a regular tool in their work, have been able to access and use many other development experience databases available through the World Bank, IDRC, CIDA, JICA and ILO MINISIS systems to respond to USAID staff inquiries with no further training required.

Because of its exclusive HP-3000 operating environment, some organizations, including the World Bank, have considered in the past moving away from MINISIS to other systems that will operate in an "open systems" environment. MINISIS Version H, designed to run in MS-DOS (and in the future UNIX-based systems), may prevent this exodus. It will offer full-text capability and provide a more user-friendly interface. Version H has the potential to move beyond a classic bibliographic database management system and to venture

into new fields of information processing such as the storage of sound and images, storage and retrieval of data on CD-ROM, computer-assisted training, and machine-assisted translation.

The need to have an HP-3000 computer has, in some cases, hindered the use of MINISIS by smaller organizations in developing countries. IDRC's work on MINISIS Version H will resolve this shortcoming in the future. However, funding problems and the sweeping scope of rewriting the MINISIS software code from the ground up at IDRC have greatly delayed the completion of this latest version of the MINISIS software. Delays in the new software version have not permitted users to take full advantage of new hardware technologies (e.g., RISC-based architecture), improved software performance via C-level programming and GUI-style (Windows) interfaces.

### **C. Production and Use of CD-ROM**

In 1989, CDIE adapted CD-ROM technology to improve access to the DIS databases and to facilitate distribution of a growing collection of full-text electronic publications and reports to LDC institutions and USAID Missions overseas. CDIE's CD-ROM product is called CD-DIS.

To create CD-DIS, information is downloaded from the MINISIS databases residing on the HP-3000 onto magnetic tape. The tape is used to export the principal Development Information System databases (Projects and Documents) to the CD-ROM authoring work-station. The CD-ROM is authored using a proprietary software called ROMWARE. A master tape is produced and shipped to the CD-ROM publisher for pressing of the CD-ROMs.

CD-DIS is produced and distributed regularly to approximately 350 users internationally, thus greatly expanding access to the DIS at minimal cost. This CD-ROM product contains database citations and descriptive information on USAID projects and USAID-produced and -funded reports, library catalog databases for several USAID Missions, the USAID telephone directory, as well as, full-text publications of USAID's Congressional Presentations, CDIE evaluation and performance management publications, PPC policy papers and determinations and other Agency technical and research reports. It comes equipped with a user interface with point and shoot menus customized for CDIE data which can guide the user to data of interest. An MS-Windows version for CD-DIS is being made available in FY 95.

Data exchange between major donors has also been facilitated through the use of MINISIS and CD-ROM technology to significantly improve the (1) sharing of

information on international development assistance activities and (2) coordination of development assistance delivery among donors. An example of this is CDIE's support and participation in the International Network for Development Information Exchange. This network, through the use of MINISIS, has been able to acquire, process and prepare a special series of CD-ROM products containing development activity information for more than 100 major bilateral and multilateral donor organizations in a cost effective manner.

In 1992, M/AS/ISS made a decision to stop converting its official project files to microfiche. A subsequent logjam of paper files necessitated the initiation of scanning operations instead, and the HP-3000/MINISIS resources were applied to the production of one-off CD-ROMs of official project files used in various geographic bureau offices. These CD-ROMs contain the complete MINISIS database indexes to all official project files, both in microform and in image form. These indexes have preserved the Agency's investment in microfiche by providing database access to this valuable development experience resource. This combination of resources has also met regulatory and statutory requirements for Federal records and files management programs.

In 1993, M/AS/ISS opted to use the CDIE investment in CD-ROM technology resources to develop a new CD-ROM product, DR-CD, which contains all of the USAID directives. It has been estimated that the conversion of USAID directives to CD-ROM has led to USAID saving approximately \$300,000 annually in the printing and distribution of directives and updates.

#### **D. CDIE's Functional Requirements**

The primary focus of this study was to review potential vendor offerings within the context of the current CDIE Development Information System application which supports the tasks of acquiring, processing, storing, and disseminating USAID's development experience information. The heart of the application is the users' combined view of USAID's project experience and documents (including full-text, where available) related to those development assistance activities. These functions are performed by the Development Information Services Clearinghouse (DISC) using a family of databases comprising the

Development Information System (DIS). The DIS represents a complex model of relational databases which support a variety of applications, including:

- ▶ bibliographic database of document citations
- ▶ limited text capability for abstracts of up to 64-KB length
- ▶ computational capabilities to support the dissemination services
- ▶ flexible reporting and exporting capabilities
- ▶ a data interchange capability widely used among international donor organizations (ISO 2709)
- ▶ on-line thesaurus
- ▶ flexible updating and modification capabilities
- ▶ quality control through multiple authority files
- ▶ mailing list control

A comprehensive array of functional requirements inherent in the MINISIS product enabled the development of these extensive and complex applications. The initial detailed list of functional product/system characteristics was narrowed to a core list of functional and technical requirements which were deemed absolutely essential to preserve the current functionality.

This study offers a valuable opportunity to broaden the view of the application; however since time prohibited the development of a thorough list of functional requirements for document and text management applications, the screening criteria focused primarily on the current CDIE bibliographic application with a view to enhancing text and document management capability. One of the acknowledged current weaknesses of the MINISIS product is its inability to link to full-text or imaged documents. Our review of vendor products included not only the current functional requirements, but also the capability of managing full-text and imaged documents.

Core functional requirements included:

***Mandatory:***

- o Core database engine a true relational model
- o Variable-length text field support: min 64-KB
- o Number of records: 5-MB
- o Possess authority file management features for use in data entry/searching
- o Full-featured, text and term list-based indexing, search and retrieval
- o Customizable DOS & Windows interface (end-user and entry screens)
- o Extensive user, database, file, record and field-level security
- o Strong database administration features

***Desired Features:***

- o Variable-length text field support: > 64-KB up to 1-MB
- o Number of records: unlimited
- o Thesaurus management capability
- o End-user defined report formatting features
- o Remote access query capability
- o Ability to export data in ISO 2709 format

In addition to the CDIE requirements discussed above, RM and IRM requirements are addressed in Section VII.

## **V. Alternatives**

As part of the study, considerable effort was expended to explore viable alternatives to the current reliance on the HP-3000 and MINISIS. In summary, these alternatives fall into 2 categories; A) alternatives relative to expanded access to MINISIS, and B) alternatives that include replacing MINISIS. These two are explored below:

### **A. MINISIS Alternatives**

#### **1. Expanded Dial-up facility**

At present the HP-3000 computer is located at the DISC site at 1500 Wilson Blvd. Access to the HP-3000 is via direct connection to those located at this site, and via dial-up/modems to those located in SA-18.

Relative to providing expanded access to the MINISIS databases, there is the potential to expand the number of modems on the HP-3000, such that increased direct access could be provided to a larger audience at a relatively low cost. In essence this alternative leaves the HP-3000 and MINISIS in place, but expands access. This access to the USAID community could be via the existing or an expanded modem pool on the Banyan network.

#### **Advantages:**

- Provides access to DIS soon and at relatively low cost.
- No replacement hardware/software cost.
- No CDIE staff retraining necessary.
- No data conversion cost.
- Saves approximately \$500,000 in Agency costs.

#### **Disadvantages:**

- Continues incompatibilities to planned Agency technology directions and does not overcome current MINISIS limitations vis a vis newly emerging hardware/software solution sets.

**2. Connect Current HP-3000/MINISIS LAN**

At present the HP-3000 computer is operated in a stand-alone mode, with access via directly-connected terminals and via dial-up modem access.

One alternative that would expand access to the USAID community is via placing the HP-3000 computer onto the existing AIDnet. This would be accomplished via the agency's standard TCP/IP. As such it would become another node on the network and available to those needing access.

In order to execute this alternative, additional software/hardware would need to be procured and installed. MINISIS would remain in use on the HP-3000.

**Advantages:**

Low cost to implement. Makes HP-3000 resources available via AIDnet.

No replacement hardware/software cost.

No CDIE staff retraining necessary.

No data conversion cost.

Saves approximately \$500,000 in Agency costs.

**Disadvantages:**

Same as cited above in 1.

**3. Migrate from HP-3000/MINISIS to PC-DOS/MINISIS**

While at present MINISIS is only available for the HP-3000, the IDRC is currently in the beta-testing phase of a new version that will run on MS-DOS. This version will run on the AIDnet and would support migrating the MINISIS databases in use by CDIE to a server on the network. Expanded access to the USAID community would result.

The scheduled release of this new version of MINISIS is mid-November 1994. In that IDRC is doing the development on their Banyan network, compatibility with our current environment should not be a problem. Capacity and performance issues are unknown at this time.

**Advantages:**

Protects USAID investment in MINISIS while bridging to new technologies. Would allow use of lower cost servers.

No CDIE staff retraining necessary.

Minimal data conversion cost.

Saves approximately \$400,000 in Agency costs.

**Disadvantages:**

Uncertainty as to scheduled release date of new software, and as to the reliability of newly released software vis a vis meeting management's schedule. Version H is not as feature-rich in its "out of the box" mode and would require integration with other application suites (e.g., scan/image processor) to achieve a full solution tool set.

**4. Migrate from HP-3000/MINISIS to future UNIX/MINISIS**

An effort is currently underway to migrate the MINISIS to the UNIX platform. This is being carried out in Montpellier, France by CIRAD (Centre de cooperation internationale en recherche agronomique pour le developpement). Planned completion is June 1995 for an HP-UNIX version that will run on the HP-9000 series computer. A SUN-Solaris version will be developed immediately after and should be available in October 1995. Capacity and performance issues are unknown at this time.

**Advantages:**

Protects USAID investment in MINISIS while bridging to new technologies.

No CDIE staff retraining necessary.

Minimal data conversion cost.

Saves approximately \$200,000 in Agency costs.

**Disadvantages:**

Same as 3. above. In addition, software would not be provided by the normal developer (IDRC), but by a French-speaking organization (CIRAD) with limited or no English language capability. This may result in difficulties in obtaining adequate support.

**B. Non-MINISIS Alternatives**

The analysis reviewed key products in the marketplace that would potentially provide the agency with an alternative to MINISIS. Considerable effort was expended in September 1994 to gain information on key products in the marketplace that would potentially provide the agency with an alternative to MINISIS. This was accomplished by developing a set of requirements (see above), that would serve as a base line for comparison. Two lists of vendors/products which would potentially satisfy these requirements were developed. Based on product literature, the vendors of the following products were invited to present their product before a Review Panel composed of representatives from IRM, CDIE, and RM:

BASIS Plus  
BRS/Search  
Excalibur  
InMagic  
Notis  
Oracle  
Star (from Cuadra)  
Topic (from Verity)

In addition, literature searches and telephone inquiries were made of the following products, but none were found to match the requirements list closely enough to merit further investigation and demonstration.

Byte/Byte Quest  
Concept Finder  
Dataflex  
FileNet  
Focus  
Folio/Views  
Fulcrum  
Inquire/Text  
Interleaf  
InTEXT/Windows  
KeyFile  
Lotus Notes  
Mezzanine  
Mutilus

Parlance  
PI KaWare  
Personal Librarian  
Sydneyplus  
TMS  
Viewstar  
VTLS  
Wais  
ZyIndex

The product review did not seek to identify a single product that would be an adequate replacement. Rather, the analysis sought to assess the market for potentially viable products that would support a move away from MINISIS, and if so, gain some preliminary information on potential ramifications.

However, while several of the products demonstrated before the Review Panel met the requirements, either individually or in combination with another product, BASIS Plus clearly stood out from the rest as the only product designed purposely for large-scale document handling in a relational database environment. As such, the product not only offers a satisfactory path for the migration of CDIE's DIS and DISC operations away from the MINISIS/HP-3000 platform, but also includes features which open new possibilities for integrating these operations with full text document and associated object/image management in the Agency -- all of which would be potentially accessible to the end user via the complementary BASIS Desktop product.

Key features include:

- o MS-Windows interface
- o Relational database
- o Full-text storage of Word Perfect documents
- o Internet Web server connection to database (Feb 1995)
- o Search facility includes proximity searching enabled within index and ANSI Thesaurus
- o Connectivity to SQL databases, e.g., Oracle

### **C. Summary - Product Assessments**

Considerable effort was expended in September to gain information on key products in the marketplace that would potentially provide the Agency with an alternative to MINISIS. This was accomplished by developing a set of requirements (see above), that would serve as a base line for comparison. From this, the analysis reviewed a number of commercially available packages. This was accomplished via a series of demonstrations from those vendors with packages thought to be the most promising, and via a literature search and review of several others. The reviews were conducted by CDIE, IRM, and RM personnel.

The product review did not seek to identify a single product that would be an adequate replacement. Rather, the analysis sought to assess the market for potentially viable products that would support a move away from MINISIS, and if so, gain some preliminary information on potential ramifications.

However, the effort did identify a set of products that were thought to be worth further pursuit. The effort also reflected a broad array of product features that serve to differentiate the vendors' solution sets. The following reflect key information gained from this review of products.

- Specific products reviewed as part of this study included: BASIS Plus, BRS/Search, Excalibur, InMagic, Notis, Oracle, Star (from Cuadra), and Topic (from Verity);
- Literature search/reviews were made of additional products including: Fulcrum, Interleaf, KeyFile, Lotus Notes, Mezzanine, Personal Librarian, ZyIndex (from ZyLabs), and others;
- The Star product seemed to come the closest to matching the current MINISIS system capabilities;
- Most of the products reviewed have strong text-management capabilities (with many handling fielded and unfielded data), but few had truly relational capabilities;
- In a few cases where the products did not have relational capabilities, there was the potential to obtain relational capabilities via linking the text management tool with a relational database management system (e.g. Oracle or Sybase);

- Very few products have the combination of text management and document management capabilities included in package;
- Only two products, BASIS Plus and BRS/Search, allow for extending the access of databases maintained on the server, outward to allow for direct access via Internet (World Wide Web);
- Only one product, BRS/Search, provides supporting/complementary software for mastering CD-ROMs (others support this by producing an extract file and a relying on a second-party product to produce the CD-ROM);
- Two or three of the products support SQL extensions needed to support text management (BRS/Search and BASIS Plus);
- Several of the products are moving toward the adoption of ANSI standards that apply to text management;
- Several of the products support not only text, but images, video, etc.;
- All of the products reviewed will need to have some customization in order to meet the mandatory RM requirements.

## VI. Recommendations

The analysis undertaken by IRM, CDIE, and RM to find a suitable replacement for the HP-3000/MINISIS solution set, reached a significant crossroads relative to making a final recommendation to management. This crossroad is characterized as follows:

- o The first alternative is that of finding a functional replacement of the HP-3000/MINISIS solution set that focuses on bringing about compliance with the Agency's reliance on UNIX, TCP/IP, and MS-Windows. Under this scenario the solution set is limited to adoption and implementation by CDIE for satisfying its corporate memory-related activities. While the solution may be of value to other parts of USAID, the solution being sought is very limited in scope.
  
- o The second approach is that of finding a replacement for the HP-3000/MINISIS that is not on' compliant with Agency standards, but extends beyond finding a functional equivalent, to embrace an agency-wide tool set upon which the Agency manages its text and document information resources. Under this scenario the selected tool set holds the potential for electronic records management; managing text associated with the various ISP initiatives; as well as meeting CDIE's corporate memory-related activities. In addition, the tool set has the potential to serve as a solution for making USAID information available over Internet via the World Wide Web (WWW), and to serve as a replacement for the Magellan-based Agency File Access System (AFAS).

The study concludes with a general consensus that the solution set should be pursued from an Agency-wide perspective, with commitments by M/AS, M/IRM, and PPC/CDIE to seek a common solution. The implementation of this direction should be carried out in a staged manner with broad participation by all those needing to support the decision. The goal in taking this approach is to establish an agency-wide convergence in the selection and establishment of text/document management. It serves to elevate the decision from a CDIE-specific decision towards an Agency-decision, with CDIE being one of the first implementors of the new solution set. This will ensure that CDIE's organizational goals can be met using a solution set that can be mirrored throughout the Agency.

The following outlines the overall proposal. A preliminary schedule and costs follow.

A. Implementation

1. Establish an agency-wide target solution as follows: SUN/Solaris as the Server operating system, TCP/IP as the network protocol, MS-DOS/MS Windows 3.1 as the Client operating system/GUI, and BASIS Plus/BASIS Desktop as the text/document management system.
2. Acquire the above system for implementation in a development/pilot environment.
3. Install the development system and place into operations on the AIDnet. This will provide a managed pilot environment upon which to test potential impact on the network, integration capabilities with Internet, Oracle, ISP-derived systems, user access, etc.
4. Provide CDIE access to the new platform to allow development, data migration, experimentation, access, etc.
5. Port existing data from the current MINISIS system to the new platform for user access on the AIDnet, and to allow further testing and refinement of the solution set. This would be done by LTS under the current contract (Phase I).
6. Use the new system for assessing the viability of the target solution set for meeting the following requirements:
  - a. Providing a functional equivalent to CDIE for replacement of the MINISIS database to support its research, reference, and corporate memory management operations;
  - b. Operational BAA-related text/document management-related requirements;
  - c. Providing WWW access of USAID information;
  - d. Providing a replacement to the Magellan-based EIS/AFAS;
  - e. Meeting the text/document management-related requirements associated with management of the agency's official files; and
  - f. Providing a tool set for satisfying ISP-related text/document management requirements.

7. Establish BASIS Plus as agency-standard tool set.
8. Acquire and install production-level system for supporting CDIE's operation.
9. Migrate applications and operations of CDIE from MINISIS to BASIS Plus. This would be accomplished via LTS and/or the DISC replacement contract (Phase II).
10. Employ BASIS Plus as a standard tool kit as appropriate, and expand server resources as needed to meet the agency's need for text/document management.

B. Schedule [Note: The proposed schedule was not approved by M bureau; completion of migration mandated by Sept. 1995. See page 38.]

The following is a brief schedule of the major events as outlined above:

- |     |  |              |
|-----|--|--------------|
| 1.  | Make Decision on the target solution<br>(Including funding)                          | Oct 30, 1994 |
| 2.  | Acquire Development system   | Nov 30, 1994 |
| 3.  | Install system   | Feb 28, 1995 |
| 4.  | Provide CDIE access  | Feb 28, 1995 |
| 5.  | Port CDIE bibliographic databases<br>to new solution set (Phase I)                   | Apr 30, 1995 |
| 6.  | Assess viability of target solution<br>set for agency needs                          | Jun 31, 1995 |
| 7.  | Establish BASIS Plus as<br>agency-standard tool set                                  | Jul 30, 1995 |
| 8.  | Acquire and install production-level system<br>for supporting CDIE's operation       | Oct 31, 1995 |
| 9.  | Migrate RM databases and operations of CDIE<br>from MINISIS to BASIS Plus (Phase II) | Jul 31, 1996 |
| 10. | Employ BASIS Plus as a standard tool<br>kit as appropriate                           | Ongoing      |

C. Costs

1. Development System

The following costs are associated with installing a small SUN server with the BASIS Plus software and licensing for 40 concurrent users. This configuration will be placed on the AIDnet and made available to CDIE for porting the current bibliographic database to the new solution set, as well as used to assess viability of the solution for meeting other agency-wide text and document management-related requirements.

-- SUN/Solaris Server	\$ 50,000
-- BASIS Plus (server)	35,000
-- BASIS Desktop (40 concurrent)	<u>20,000</u>
<b>TOTAL</b>	<b>\$ 115,000</b>

2. Development of BASIS Plus/BASIS Desktop Bibliographic Database

This development effort is an initial reconstruction of the current MINISIS-bases bibliographic databases. This will enable CDIE to develop needed skills, and will result in the data being made available across AIDnet for direct access by the user. The full redevelopment of the applications will come later after it has been determined that the tool is acceptable for agency-wide implementation (see 3 below).

-- Training	\$ 20,000
-- Development	40,000
-- Data Extraction/Migration	5,000
-- Assessment/Evaluation	<u>10,000</u>
<b>TOTAL</b>	<b>\$ 75,000</b>

2. CDIE Production System

These costs are associated with the complete redevelopment of the current set of MINISIS applications. In addition, this cost includes the acquisition of a production server and software for supporting the CDIE operations.

-- Training & consultation	\$ 25,000
-- Hardware and Software	\$ 115,000
-- Application Development	<u>200,000</u>
<b>TOTAL</b>	<b>\$ 340,000</b>

## **VII. Implementation Considerations and Related Issues**

### **A. CD-ROM**

As part of CDIE's current set of services, the bibliographic database is produced in CD-ROM form and made available to the agency, as well as for resale to the international community. This has been a vital part of CDIE's efforts to share information on the agency's corporate memory. As reflected earlier, the CD-ROM is supported with full-text retrieval capabilities and with a user interface more appropriate to the occasional user.

To enhance the availability of this information, as well as other CD-ROM titles, IRM has acquired and installed Network CD-ROM servers. An effort is underway within IRM to install these servers on the AIDnet and place high-demand CD-ROMs on these servers for access at the individuals' PC work-stations. However, due to priority and technical complexities, placing these servers onto the network into full-scale production capacity has yet to take place. The result is that they are only available to those individuals with CD-ROM readers on their PCs.

An immediate near-term solution to expanding the availability of CDIE's bibliographic databases to agency personnel is to place additional priority and resources on the CD-ROM server project. This will allow this CD-ROM (as well as the agency handbook and other titles), to be available quickly at a relatively low cost. An alternative being explored is to place the contents of the CD-ROM onto a standard network server (hard drive) for similar access. If this is successful, the access would be faster, and the current memory-limitation problems would be lessened.

### **B. Security and Access**

At present the HP-3000/MINISIS resides off-site at the DISC (1500 Wilson Blvd., Arlington, VA). Access to the HP-3000 is via terminal emulation on PCs connected to the HP-3000 via a Novell Local Area Network (LAN), and via terminal emulation available via dial-up modems (primarily from users located in the SA-18 location). The HP-3000 has no direct connection to AIDnet; however, a gateway (VBridge) does allow for exchange of E-mail with AIDnet. The current solution does not allow direct access to the bibliographic database by USAID employees on the AIDnet.

All non-USAID employees that are current users of the HP-3000 are cleared. Securing the HP-3000 is a simple matter of instituting approved access to the office.

In seeking to make the data directly accessible on the network, there is an issue of security relating to access to the AIDnet by off-site contractors;. At present there is a hesitancy to open up access to AIDnet by off-site contractors. If this access cannot be approved, there will be the need to maintain the data in two locations--one on a separate Server used by the contract staff for update/maintenance (not connected to AIDnet), and a second Sever for direct access by USAID employees (this server would be on AIDnet). Under this scenario an updated database would periodically be loaded from the one server used for maintenance to the server providing user access. While perhaps improving network security, this is not a desirable solution. Ideally there would be one database accessible by contractors and USAID employees. A second copy would only be needed for providing access via Internet.

### **C. Internet Access**

In addition to providing expanded access to USAID employees, there is the growing need to expand access to the international community. This is presently being done via the production of CD-ROMs, and to a lesser degree, by the more recent establishment of the USAID Gopher menu on Internet. With the increased reliance on Internet for information access and sharing, there is an implementation consideration whereby the new target solution set should facilitate making information more readily available via Internet.

The current technology used with Gopher limits the information made available via Internet to straight text (ASCII). In addition, it has limited searching capabilities to assist the user in locating the needed information. This also requires an interim level of effort to be expended in "cleaning up" data that typically resides in non-ASCII format (e.g. Lotus or Word Perfect formatted data) such that it can be placed on the Gopher Server.

As part of the implementation of an Agency solution there is a need to consider expanding Internet accessibility of DIS information using technologies beyond the current Gopher. This would be aimed at supporting richer text formats including graphics, etc., such that no conversion is required, as well as search capabilities similar to what is available to users inside the agency.

**D. Migration/Conversion**

The MINISIS database management system is a fully relational DBMS and while it does not handle unlimited text, it does allow for the effective handling of limited text (e.g. a bibliographic databases with fielded data and abstracts of between 1-3 pages). Being fully relational, MINISIS has also been the tool used by CDIE to develop supporting applications (in addition to the bibliographic and projects databases, with supporting thesaurus). These include such application databases as mailing lists, order tracking, and microfiche index. In addition, the tool has been used to develop other application databases such as records management, warehouse inventory, etc.

The migration of the DIS bibliographic data from the current MINISIS database to a new replacement tool set residing on AIDnet and accessible to the USAID employees is the least-complex migration. Since the data is well-structured, it can be output in a manner similar to what is now being done to produce CD-ROMs (i.e. an ASCII extract). This data would then be indexed within the new tool set and made available.

However, the conversion required to move the application supporting the operations of CDIE will require considerably more effort. This will include the migration of various databases and supporting applications. In that most of the tool sets examined as part of this study have limited relational capability, it is possible that the MINISIS replacement is not a 1-to-1 replacement. Multiple tool sets may be required--one to handle the bibliographic data and a second solution for the supporting applications, and potentially even the relational requirements of the bibliographic and project databases.

It is anticipated that this migration will require re-development of several administrative and housekeeping applications along with the conversion of the data. These are not "corporate" applications, but rather are local Clearinghouse support applications. The most logical location for this re-development is within CDIE. It is anticipated that this could take upwards of 6-9 months to complete.

**E. CDIE Clearinghouse Contract & Replacement Acquisition**

The present contract with LTS provides support for CDIE's activities as well as for selected RM activities. The contract was put in place beginning October 1, 1990, and runs through September 30, 1995. Efforts are underway to develop updated specifications for a replacement contract with a beginning performance period of October 1, 1995.

The current contract specification identifies the MINISIS relational database management system as the tool to be used for supporting the various databases (e.g. bibliographic, project, etc.). With an agency decision to shift to a new tool set, there are several contract-related issues that need to be addressed. These include the following:

- The current contract with LTS will need to be modified in order to add support for the new tool set and the porting of data to the new solution set.
- Redevelopment of the current applications will most logically be either added to the current LTS contract or built into the replacement contract. In either case, a Statement of Work is required. A potential is to contract the conversion of applications and data separate from the on-going support of the Clearinghouse operations.
- There is the need to have a selection of replacement technologies for inclusion into the CDIE Clearinghouse replacement specification. This decision should be made NLT March of 1995.
- An issue to be resolved before the LTS contract expires will be the question of future ownership of the HP-3000 (assumedly USAID) and arrangements for future maintenance/service and for a viable backup/disaster recovery plan.

**F. Effects on CDIE's Clearinghouse Operations**

CDIE's mandate to manage USAID's institutional memory requires that the new Agency-selected tool set enable it to continue to manage development experience particularly as USAID re-engineers its business. This is not a trivial issue and cannot be overlooked. Whatever solution is chosen, it is paramount that parallel DIS operations currently performed at CDIE's DISC be maintained until technology shifts are fully operational and become common-place agency-wide.

While the proposed approach makes significant strides to achieving improved data availability throughout the Agency, it will impact established DISC

workflow procedures related to USAID document acquisition, processing, storage, and dissemination. Equal impact will result when considering the changes in program/project design, management, and evaluation, and the new suite of documentation that is to result from this re-design of how USAID does business.

The impacts are not at all negative, however. While it is important to recognize the cost of DIS conversion from the current HP-3000/MINISIS toolset, at the same time that the redesign is taking place, improvements in the procedure of document acquisition, processing, and dissemination are possible. Electronic document submissions by contractors and grantees, with management support, will reduce much of the current document handling. Scanning and imaging technologies will provide rapid and integrated text/document retrieval, display, and use in day-to-day work. Internet access to the DIS can become more viable, again reducing the support needed to perform many associated tasks now performed to disseminate USAID development experience. Through IRM's provision of this toolset, the potential for the Agency to manage a virtual clearinghouse (various media across many platforms in many locations to many demands) becomes more feasible. This solution results in a more closely integrated solution that optimizes the strength of IRM's technology leadership role, CDIE's vast skills in managing the Agency's development experience portfolios, and RM's tasks of ensuring accountability and responsible oversight to the Agency's official files.

**G. Effects on CDIE's Research and Reference Services**

The migration of the Development Information System (DIS) databases from a MINISIS-based environment to a BASIS Plus environment will have several immediate and long-term impacts on the Research and Reference Service.

The entire R&RS contract staff (approximately 40 librarians, research assistants and research analysts) who use the DIS databases on a daily basis will have to be retrained in a new database interface language, BASIS Plus. Since the MINISIS databases will be redesigned to convert existing data into BASIS Plus, including the addition of new features such as full text document retrieval, the R&RS staff will also have to be trained on using these new software features.

The R&RS staff will still be required to make daily use of other MINISIS databases maintained by other bilateral and multilateral development organizations. Systems maintained by Canadian CIDA and IDRC, ILO, World Bank and other organizations can only be accessed effectively by trained MINISIS researchers. Current and future R&RS staff will still require ongoing training in the MINISIS search and retrieval language for using these external development resources.

The BASIS Plus software, with a properly designed end-user interface, will make the DIS information available at the desktop of USAID staff. This will permit direct reference searching by USAID professional staff. It is anticipated that the increased accessibility of the DIS databases will decrease the number of routine reference questions on USAID documents and reports, while increasing the number of in-depth research questions for development experience generated by USAID staff.

#### **H. Records Management Functional Requirements**

The text-management requirements from a Records Management perspective are contained in the information life-cycle. Electronic systems design must cover the creation, identification, accessibility, retrievability, and retention--both short-term and long-term--of the information in the system. Because the information that presently resides on the HP-3000 minicomputer has been scheduled as permanently valuable, special care needs to be taken to ensure their final retirement to the National Archives and Records Administration in their proper format including required documentation. If it is determined that the new platform will involve modifying the database structure, a new SF-115 will need to be filed with NARA requesting disposition authority for the modified systems.

The Development Information System (DIS) has been scheduled as a permanent electronic record series under Item No. 51020 in the Electronic Records Schedule. Snapshots of the System are required to be retired every five years. These records have been retired twice, the last time being six months ago.

The computerized index to the Agency's project files also resides on the HP-3000 and has been scheduled as permanent under Item No. 01200. The system presently serves as a pointer to the microfiche copies of project files. This computerized index is retired when corresponding project records are retired.

Requirements mandated by the National Archives and Records Administration are detailed in Appendix C.

## **I. IRM Requirements**

The text-management requirements from an IRM perspective are in the areas of Technical Infrastructure, Application and Information Management. These requirements are aimed at ensuring continuity and integration at the technology, application, and information levels.

### **1. Technical Infrastructure-related Requirements**

The Technical Infrastructure-related requirements address those elements associated with compatibility of the solution to USAID's current technical architecture. This is a key issue within the context of this study as the current HP-3000/MINISIS toolset lacks the desired levels of integration. The following are the key Technical Infrastructure-related requirements. Those indicated via a "M" are considered mandatory; those indicated with a "D" are desirable.

- Client-Server Architecture (M)
- Server: SUN Sparc with Solaris operating system (M)
- Client: MS-Windows 3.1 or higher and DOS (M)
- Network: TCP/IP on Banyan 5.0 (M)
- Distributed database support (D)
- Linkages with Oracle 7.0 databases and to other OA software (D)

### **2. ISP-Application-related Requirements**

Concurrent with this analysis, the Agency is engaged in a major undertaking to redevelop its core information systems. These are being developed using a structured Information Engineering (IE) approach, and will reside on the new technical infrastructure (SUN/Solaris, TCP-IP, Oracle, and MS-Windows).

In that many of these applications incorporate the development, reference, and accessibility of textual information, it is important that these applications have the capability to establish automated linkages with supporting text and image files. The following are the key ISP-Applications-related requirements. Those indicated via a "M" are considered mandatory; those indicated with a "D" are desirable.

- Ability to link text with applications via SQL calls (D)
- Integration with image/document management capabilities (D)
- Hyperlink of text to other documents, images, etc. (D)
- Fielded and unfielded data (M)

### **3. Information Management-related Requirements**

A rapidly emerging component of the IRM Program is that of managing the agency's information. While many of the new ISP systems will bring about improvements in the management of critical structured data, the predominant form of information within the agency is non-structured narrative text. Much of this data is currently created via electronic means, however, the Agency has not as of yet put into place tools for effectively managing this narrative text.

Many of the requirements associated with managing non-structured narrative text are similar in nature to those required for electronic Records Management, and in fact, are similar to those requirements identified by CDIE.

The following are the key Information Management-related requirements. Those indicated via a "M" are considered mandatory; those indicated with a "D" are desirable.

- Text management to include full-content indexing and retrieval (M)
- Document-level management across the network (M)
- Tool kits for developing user-group-specific interfaces (M)
- SGML support (ISO 8879) (D)
- Internet connectivity (D)
- CD-ROM authoring, search, and retrieval (ISO 9660) (D)

### **J. EIS/AFAS Replacement**

An important information management initiative underway within the Agency is an effort to expand the accessibility of key information to managers across the Agency. This is being spearheaded by the Office of the Executive Secretariat (ES) with support from IRM. In summary the initiative consists of Bureau-level management/maintenance of key information (in WordPerfect and Lotus 1-2-3 files). These documents are then made available via a set of menus, either for the Bureau personnel, or via an Executive Information set of menus, to personnel across the Agency--including executive managers. Much of the information is the

same or similar to what is made public via the Internet, however the EIS and the various Bureau-level systems comprising AFAS also contain internal data not cleared for external use.

At present, the various set of AFAS systems rely on a product from Lotus Development Corporation, called Magellan. This product provides basic document management, indexing, viewing, and menuing capabilities. This product is no longer supported by the vendor, is non-Windows, and while proving valuable, is in fact very limited and in need of replacement. The replacement for the current AFAS solution has been programmed for FY 1995.

In finding a tool set to replace MINISIS (as being applied in CDIE), it seems appropriate to try and select a product that could form at least the basis for replacing Magellan. The requirements, while not the same, are overlapping in the areas of text indexing/retrieval, document management, viewing capabilities, and customizable user interface. This commonality extends to the potential for agency-wide implementation such that source documents would be captured and managed across the Agency. The EIS would access a subset of these documents for easy accessibility and presentation to managers and analysts; and CDIE would access a larger (but different) subset of these documents for developing and maintaining the corporate memory.

**K. Tool for Agency-wide Management of Text and Documents**

The potential exists that in selecting a replacement tool set for MINISIS, that the Agency can select a solution for managing its electronically produced records. Records Management would potentially have an agency-wide solution for electronically managing the Agency's growing reliance on electronic records. The lack of such a capability surfaced within the context of the KRA study completed this last spring.

In addition, the selection should be aimed at satisfying the needs of the ISP-related development efforts, where there is the need to manage text (as opposed to selected fields of structured data). This need is surfacing within the Operations Business Area Analysis (BAA), even though at this time it is not fully determined.

**L. IRM Support**

An issue surfacing during the analysis is that of support required by IRM. Specifically there will be added workload required by Telecommunications and Computer Operations (M/IRM/TCO) and Software Development and Maintenance (M/IRM/SDM). As proposed, phase I of the proposal will require the acquisition, operations, maintenance, and ongoing support of a SUN Solaris workstation and a new tool (BASIS Plus/BASIS Desktop) to support development and evaluation activities of CDIE. It is also anticipated that work will be required by various application development efforts (Operations BAA-derived systems, EIS/AFAS support, etc.). CDIE will perform the actual applications development for migrating the databases/applications now on the HP-3000 to the new Sun SPARC 20. IRM/TCO and IRM/SDM will provide a base level of support for the BASIS Plus tool itself.

Recently, responsibility for computer operations at the Clearinghouse for the HP-3000 minicomputer has been transferred from CDIE to IRM/TCO. This was carried out via a delegation of authority under the current contract with LTS. The addition of the Sun SPARC 20 into the solution set to support CDIE Clearinghouse services will be included as part of IRM/TCO operations responsibilities. Beginning in FY 96, IRM/TCO will also have responsibility for funding CDIE Clearinghouse computer operations (it is currently funded by CDIE). It is anticipated these computer operation responsibilities will no longer be covered by the Clearinghouse contract, but instead will come under IRM's computer operations contract. This may include the physical transfer of the computer(s) to an IRM facility. This report does not address funding and operations issues of the Clearinghouse contractor-provided LAN.

IRM/TCO will need to oversee the operations of the new Sun SPARC 20 and ensure connectivity of the Sun SPARC 20 both to the Clearinghouse and to CDIE offices in SA-18 during the development phases. If the Sun SPARC 20 is not physically located in the Clearinghouse, adequate access must be available to Clearinghouse staff, who will be providing the primary system development and data entry functions in support of the migration effort. In addition, to fully leverage this technology, the Sun SPARC 20 must be connected to the AIDNet in order to provide desktop access to Agency staff.

As BASIS Plus takes hold throughout the Agency, both in Desktop use of the DIS and in future applications, IRM will need to provide user help services and a basic level of support for development efforts. This may result in a minimal impact on IRM/SDM resources.

## **VIII. Management Review and Implementation**

A briefing was held for senior Management Bureau management on September 29, 1994. The direction to proceed with BASIS Plus was approved; however, the time schedule was deemed to be too long. Implementation was mandated within one year or less subsequent to this meeting. M/IRM agreed to provide a budget of \$80,000 for the initial purchase of hardware and software. CDIE agreed to develop BASIS Plus systems to replace the MINISIS systems. Acquisition proceeded in December 1994 with delivery slated for January 1995.

A follow-up briefing was held for CDIE management on December 12, 1994. LTS and CDIE began planning for a cutover from the HP-3000 to a Sun SPARC 20 computer with BASIS Plus software for September 30, 1995. The current plan calls for the Development Information System to be converted by CDIE to BASIS Plus by June 1, 1995 with the remaining CDIE and RM systems converted by September 30. The implementation plan will provide the Agency with standardized architecture for the systems currently implemented in MINISIS on the HP-3000 minicomputer. Desktop access to the Development Information System will be available to USAID Washington staff. The planned systems will be user-friendly Windows applications, with full-text capabilities. In addition, the BASIS Plus product holds potential for serving as a nucleus of text/document management that can be leveraged throughout the Agency in other applications. The use by CDIE will provide valuable "hands-on" experience to assess the validity of this tool for such purposes.

Final review and approval of the current planned approach is subject to joint review by PPC and M Bureau management.

The current implementation plan developed by CDIE is detailed in Appendix B [page 41].

## **XII. Appendix A: Inventory of HP-3000 Software**

### *System Software:*

**MINISIS Ver. G:** Relational database obtained from IDRC (Canadian Government agency).  
**ALLBASE:** HP's relational SQL database. NOT USED.  
**Image:** Hierarchical database. NOT USED.  
**HP GlancePlus MPE/iX:** System monitoring software. No conversion issue.  
**HP Edit/iX:** Text editor. No conversion issue.  
**MPE iX B.40.00:** Operating system. No conversion issue.  
**HP COBOL:** COBOL compiler. No conversion issue.

### *COBOL Utility Programs:*

**Menu-DIS:** User front-end for MINISIS. It presents a full-screen guided search interface for the user who is unfamiliar with the MINISIS command language. It processes the user's query and outputs MINISIS commands to the DIS MINISIS application. It has been made available to all MINISIS users and is used in some developing countries.

**Purge program:** Deletes user Search Result files that have not been recently accessed.

**Other Programs:** Many COBOL programs exist to provide alternate types of user interfaces for data entry, queries and reporting and to assist with database and file maintenance and system use reporting. These programs are described in the DISC operations manual.

### *MINISIS DIS applications:*

#### **DOCUMENT SYSTEM:**

Information on USAID generated or funded reports including bibliographic citations, abstracts, descriptors, and tracking information (e.g. whether document is in the DISC fiche collection).

#### **PROJECT SYSTEM:**

Information on USAID projects including brief descriptions, abstracts, and descriptors, and information loaded from other AID systems (PAISHIST, TABLE4, TABLE9, and the former PBAR and BUDGET15).

#### **DOCUMENT ORDERS:**

Tracks user document orders and generates invoices.

**SUBSCRIPTIONS:** Subscribers to CD-DIS. (Has been used for other things in the past and could be again in the future.)

**MAILING LISTS:**

There are 3 mailing lists in addition to subscriptions:

- 1) Requesters or individual documents. Part of the DOCUMENT ORDERS system.
- 2) USAID bulk mailing list. A download of RAMPS from the IRM mainframe.
- 3) Non-USAID recipients of bulk mailings.  
*(The bulk mailings are of CDIE publications or possibly publications distributed by CDIE.)*

**DIC CATALOG:** Citations and descriptors for holdings in the DIC.

**THESAURUS:** Valid descriptors for use in the DOCUMENT, PROJECT, and DIC CATALOG systems.

**CONTRACT INFO:**

Downloaded from Agency applications CIMS and COORS.

**Microfiche Index:** Index to documents on microfiche at the DISC.

***MINISIS Other applications:***

**Records Management:**

The Records Management database (formerly called the Agency Project Document Microfiche System (APDMS) provides for the maintenance and retrieval of the Agency's official project records. Since its implementation in FY 83, the APDMS has collected and put on either microfiche or CD-ROM over 4,000 development assistance projects in the AFR, ANE, LAC, and G/SIT Bureaus and M/OP. M/AS is part of the CORE contract. Contact is Renee Poehls.

**Warehouse Inventory:**

Inventory of old and other documents of lesser significance kept off-site in a warehouse.

**AV Materials:**

Audio-Visual catalog. Contains two parts:

- 1) Materials at DISC.
- 2) Materials for the Learning Resource Center. (contact is Ellen Boissevain)

**R&RS MIS:** Contains archival information for CDIE R&RS staff activities. Contact Linda Leonard.

**XIII. Appendix B: Implementation Plan**

**Plans for DIS Conversion from HP/3000-MINISIS  
to SUN-BASIS Plus**

**GOAL:** Complete conversion of ALL DISC operations currently dependent upon HP-3000/MINISIS by 9/30/95 and perform pilot test of text/document module linked to USAID corporate information system; permit USAID to cease operating HP-3000 and stop using MINISIS as database resource.

**I. Issues to Consider:**

- A. Can extant DIS and RM database be made accessible to Agency desktops via USAID WAN in FY95?
- B. How much of a contribution can be made in FY95 towards addressing agency-wide text/document and records management (IRM & RM concerns)
  - o with no additional resources
  - o with additional resources
- C. How can DISC operations be accommodated in FY96 if conversion not completed in FY95?

*Problems Related to Conversion-Ideal Application of New Tool Set*

- 1. How do we avoid making DIS irrelevant to management since data will not be presented along lines of new management operations (e.g., Mission re-engineering)?
- 2. Do we design for future Agency-wide solution(s) while implementing only CDIE/RM driven conversion immediately?
- 3. How do we account for new programming initiatives?
  - a. Mapping DIS to new Strategic Objectives/Program Outcomes and new supporting documentation?
  - b. Planned Business OPS BAA related to text/document management?
- 4. What needs to be done to accommodate new CEFDA codes/formats to permit easier exchange of data with INDIX and other international/bilateral donor organizations? How can we program changes into conversion?
- 5. How do we program DIS to accommodate *development activities* structure that will permit linkages from current DIS project/geo-code based systems to new Strategic Objectives/Program Outcomes?
- 6. How do we program new tool set to overcome current lack of Records Management infrastructure and permit new tools to achieve improvements in text/document and records management at user level?

II. Plans & Schedules (tentative):

1. Begin DIS conversion design/conceptual modelling:
  - o Redesign DB structures/linkages
  - o Define fields (in BASIS Plus)
  - o Define joins/alternatives
2. Take receipt of and install Hardware/Software and make operational
3. Establish linkages to AIDNet.
4. Model and design client interfaces using:
  - a. FQM access
  - b. BASIS Plus Desktop
  - c. WWW Mosaic Internet interface
5. Design/develop report formats
  - a. Convert following databases (in priority sequence):
    - o Document
    - o DOCRD
    - o Bibtypes
    - o Thesaurus
    - o GeoCodes
    - o Abstracts
    - o Institutions
    - o Orders
    - o Projects
    - o Mailing Lists
    - o APDMS ( RM Geobureau databases)
6. Move data to new tool set
7. Test Hardware/Software and communications to AIDNet
8. Briefing and Training: Classroom and On-Line
9. Bring CD-DIS equivalent of DIS on-line via AIDNet

*DISC-Client Office ReEngineering:*

1. Design revamped DISC workflow including internal RM operations processing working closely with IRM/OPS BAA Team
2. Design databases for to reflect new OPS BAA constructs/data elements incorporating extant DIS fields/codes.
3. Design and develop client interfaces including test of existing client tools (including ARMS, CD-ROM-emulated Windows interface for CD-DIS and DR-CD, client module(s) to BASIS Plus Desktop DB structures
4. Develop text/document prototype model and test plan (using AFAS file Structure)
5. Design client/server architecture linkages and workflow in pilot office
6. Test all BASIS Plus modules and make corrections as needed
7. Develop training strategy, materials, and program
8. Document operational and systems guidelines and procedures

III. Assumptions:

- A. Work will be performed in accordance with existing contract authorization
- B. Work will be done in accordance with project budget ceilings (not including contract option component)
- C. Levels of effort will be re-directed to achieving conversion and performance levels impacted if NO additional resources are made available.
- D. Any conversion work not accomplished at end of current contract on which DISC operations depend of HP-3000/MINISIS tool set will :
  - (1) be performed using continuation of HP-3000/MINISIS tool set until converted, or
  - (2) not be performed.
 (Note: Budgetary considerations of continuing to pay for MINISIS/HP maintenance must be factored into FY96 budget).
- E. Equipment (Sun SPARC) and software (BASIS Plus and related modules) will be delivered in sufficient time for testing, debugging, development, and conversion.
- F. Any conversion tasks not completed in FY95 will be specified as immediate short-term conversion tasks in new DISC contract scope

IV. DISC Conversion Team: [Core]

Operational Systems Integration and Workflow Redesign  
 Database Design, Modelling, and Data Definitions  
 Client Screen Interface Development -  
 Communications and Hardware Operations -  
 Training Program and Documentation -  
 (Additional support will be provided by other staff members as required at time need arises)

V. Major Milestones:

	<u>Target Dt</u>
DIS Conversion Design/Modelling	2/28/95
Sun SPARC Hardware Install	2/16/95
Load Software: System & BASIS Plus	2/22/95
Establish Links to AIDNet	3/10/95
Redesign Database Structure/Linkages	8/22/95
Model & Design Client Interfaces	8/15/95
Convert Documents DIS Database	6/22/95
Convert Rest of DIS Database	8/04/95
Convert Other Databases (including RM)	9/01/95
Test Hardware/Software/Connection to AIDNet	8/28/95
Test Full-Text Client/Server Model	8/28/95
Operate Parallel Tests	9/25/95
Develop Training Program	9/01/95
Conduct Training	9/28/95
Cease Production Use of HP-3000/MINISIS Systems	9/30/95
MINISIS DIS and RM Databases archived to NARA	9/30/95
Verify All Data Transferred and decommission HP-3000	10/06/95

## **IX. *Appendix C: Regulations for Records Management***

The Functional Requirements listed below are mandatory per NARA.

### **1. Creation, Identification, and Retention of Records**

Provide the capability to identify and capture all records and store and retain them for subsequent retrieval to ensure adequate and proper documentation of the activities supported by the system. **(Mandatory)**

The system design must explain not only how to capture and process information, but also when and how to generate and retain records. Doing this will ensure that the system will contain all needed records. The system must also be designed to distinguish between records and non-record materials.

### **2. Retrievability of and Access to Records**

Ensure the retrievability of all the electronic records in the system for their entire authorized life, including their transfer to and preservation in the National Archives. **(Mandatory)**

- Any new system or application should meet the needs for preserving either the informational content or the original human readable representation of text documents, or both.
- When text documents are stored, they should be retrievable without recourse to proprietary formats.
- The new application should allow (and control) varying levels of access to all or part of the data.
- The new application(s) must be able to output all electronic records scheduled for permanent preservation in National Archives and Records Administration (NARA) in a way that permits their transfer according to NARA regulations.

### **3. Reliability and Verification of Data**

Ensure the reliability and integrity of data that is entered into the system. **(Mandatory)**

- The application(s) should provide on-screen verification that a document is in the final version and/or has been officially signed, or

endorsed, by someone. It should "freeze" final, or official, versions of documents.

- The application(s) should provide information on authorizations for data access, i.e., information on who had access to what data when, if relevant to the Development Information function.

#### **4. Retention and Disposition**

Ensure the proper retention and disposition of all records and related documentation, and that any additional records or records series are scheduled (SF 115 or General Records Schedule). **(Mandatory)**

- Any new application(s) should be able to identify, access, and segregate the text documents or data files corresponding to an approved item above and perform, or permit appropriate users to perform, the authorized disposition instructions. **However, if in the future plans of the ISP a replacement platform is used, the system design should also taken into account the possibility that the database may include both record and "non-record" materials.**
- Any upgrade or replacement should be effected to ensure that records access and retention requirements are met; especially that the item numbers mentioned above can continue to be retrievable and retired by record series.
- The application(s) should provide for migrating data to different storage media in a way that ensures compliance with authorized disposition instructions.
- The system should prevent deletion of a document or data file without verification by an authorized official.
- System procedures should include proper maintenance, handling and inspection of storage media, and the system should prompt appropriate personnel to execute such procedures.
- The system should enable a records manager or an archivist to browse its contents for records scheduling and appraisal purposes.

#### **5. Documentation**

Create and maintain both program and technical documentation, which is essential for proper creation, use, maintenance, and disposition of the electronic records.  
**(Mandatory)**

- Documentation should identify when and how data become records. In text document systems, for example, a document may become a record whenever it is transmitted to someone else in the Agency or whenever it is "filed."
- For every segregable category of records in the system (as determined by the scheduling process), documentation should specify: (1) the manner and procedures for transfer to a storage medium, (2) the duration of storage in that medium and every anticipated succeeding medium; and (3) the manner and procedures for carrying out the authorized disposition of each category of records in the system.
- The system documentation should identify links between electronic records and related paper/microfiche, etc. records. (The present system already does this).
- The documentation should be updated to reflect major changes in the system, and the system (or user if documentation is separate from the system) should maintain all generations of documentation for the authorized life of the system.