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AGENCY FOR INTERNATIONAL DEVELOPMENT
Office of Information Resources Management

Five-Year Strategy for Information Resources Management 1989 - 1993

Final Report
on
Recommended Strategy
and
Implementation Steps

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Executive Summary

Five-Year Information Resources Management Strategy

The Agency for International Development engaged Booz, Allen & Hamilton Inc. to develop a five-year information resource management (IRM) strategy encompassing five areas — hardware, information systems, telecommunications, user support, and organizational issues. The strategy is based on analysis of the current IRM environment in AID/W and overseas and on information management needs defined in interviews with users and providers of IRM services. These interviews included all AID/W offices and four USAID Missions — Ecuador, Kenya, Tanzania, and Egypt.

The strategy provides high-level recommendations for initiatives the Agency should undertake in the period 1989-93 in each of the five IRM areas. These recommendations address the key challenges facing AID in providing IRM services to help deliver development assistance efficiently and effectively.

AID's Information Resources Management Program Has Accomplished Much Over the Past Five Years

AID has deployed a significant amount of hardware in the last five years. The current hardware base provides essential word and data processing capabilities for the Agency. In AID/W, the penetration level has tripled from one terminal for every nine users in 1983 to its current one-to-three ratio. In Missions, where the need is greater, the ratio is slightly higher. If the current pace is maintained, the Agency will be able to place a workstation on the desk of every qualified user by 1993.

As important as the basic capabilities is the high level of standardization AID has achieved, which allows its highly mobile work force to transfer throughout the Agency without learning new equipment and packages. Standardization has also allowed AID to connect its systems, which will be of benefit as the Agency's telecommunications capabilities grow in the coming years.

AID has established new and has solidified existing organizational units in its central IRM office in the past five years. A restructuring in 1984 resulted in improved client services and technical support, especially for overseas Missions. Major financial systems were completed, with installation of the Mission Accounting and Control System in all applicable Missions. Administrative systems, most notably a non-expendable property system, were developed. In all, over 100 applications programs were maintained.

AID has achieved its initial telecommunications goal of interconnecting all AID/W offices and bureaus for document and message exchange, using local area networks and phone lines. Dial-up telecommunications through the in-house International Communications System (ICS) links approximately one-third of the overseas Missions with AID/W.

AID Should Maximize Return on Hardware Investment by Developing Agency Software and Telecommunications Capabilities

AID is meeting essential word processing needs. It has met essential transaction-based data processing needs in the accounting and personnel areas. Management information needs are just beginning to be addressed comprehensively. Significant pockets of automation literacy exist among professionals who use decision support information.

AID's middle and top management, however, are not universally aware of the potential for improved decision-making and more effective program management from management information systems. In Missions, many gaps exist in administrative systems coverage. Essential program development and project management systems have not yet been developed, except on an ad hoc basis.

The need to integrate systems is becoming more apparent. Users are beginning to see the need for compatibility among AID/W information systems and between AID/W and Mission systems. Some integration needs are being addressed, for example, redundancy between twenty-year old systems in AID/W.

AID users have a growing interest in communicating text and data. As more program information systems are developed, the need for reliable overseas telecommunications will grow. Numerous text transfer applications between AID/W and the field have been identified, and usage of the International Communications System has grown as a consequence. Within AID/W, telecommunications will facilitate applications such as integrated budget planning and execution, and text transfer.

In addition to continuing to invest in end-user hardware, the Agency should take full advantage of its hardware investment by fully developing its software and telecommunications capabilities. A secondary thrust should be to increase the Agency's end-user computing capabilities by providing greater access to systems that are easy to use. Users, for their part, should take on more responsibility for meeting their own information needs through increased involvement in planning and systems design.

Five-year IRM Strategy Summary

The recommended five-year AID IRM strategy is summarized in the points below.

1. Information Systems Strategy: Develop "Corporate" Management Information Systems

- Address the needs of Agency top and middle management through an information systems plan, analogous to the LAC-MIS pilot effort in the Latin America Bureau

- Improve accessibility and accuracy of Agency data by developing an Agency data architecture and related databases, through a comprehensive data administration program

- Increase the Agency's software development capacity to permit greater investment in corporate applications that reduce data redundancy and provide management information

- Develop integrated program and project information systems for USAID Missions to facilitate design, management, and tracking

- Develop integrated software covering all core Mission administrative functions

2. **Hardware Strategy: Provide Access for All Agency Information Systems Users**

   - AID should continue to install hardware, providing terminals to all qualified users in a distributed processing environment in AID/W and the field
   - Institute a systematic program to replace early generation hardware

3. **Telecommunications Strategy: AID Should Connect All Systems**

   - AID should connect all systems in AID/W and USAID Missions, providing document and electronic mail support for all users
   - AID should develop the links for transfer of data between AID/W and the field

4. **Support Services Strategy: Strengthen Services and Increase Responsibility of Users**

   - Refocus AID/W IRM support services to emphasize planning and the positioning of users to assume greater responsibility for their own information needs
   - Increase on-site services to Missions for improved internal and project automation support
   - Strengthen AID information resource planning at the AID/W and Mission levels

5. **Organizational Strategy: Reflect New IRM Functions in the Organization**

   - Reorganize the Office of Information Resources Management to support a facility management approach, to establish a data administration unit, and to establish a telecommunications unit
   - Establish information management positions in major bureaus and increase inter-bureau management involvement in Agency-level IRM matters

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I. Information Systems Development Strategy

Improve Accessibility and Accuracy of Agency Data

AID Should Design and Develop an Agency Data Architecture and Related Databases and Establish an Overall Data Administration Program to Improve the Management of the Agency's "Corporate" Information

Long-Term Agency Benefits

- Greater consistency and accuracy of Agency data
- Less data redundancy
- More timely responses to ad hoc information requests
- Increased end-user accessibility to Agency data
- Less costly applications development and maintenance

Current Environment

The evolution of AID's information systems environment has followed a pattern that is common throughout government and industry. Characteristic of the pattern is the development of independent databases and applications systems for individual user organizations, often using a variety of programming languages. As user sophistication and the demand for information grows, particularly for organization-wide or "corporate" information, the disadvantages of a non-integrated approach to systems development become clear and give rise to new demands to manage development from a more comprehensive, organization-wide perspective.

In AID, there is clear evidence of a need for stronger central management and planning of the Agency's corporate information handling, in terms of:

- Data inaccessibility--Often AID has difficulty in responding to requests for information that cut across organizational and information system boundaries because data definitions for similar items vary, or in some cases,

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consistent data are not captured across the organization. This is particularly true of information on AID programs and projects across regions. The quality, timeliness, and efficiency of responses to information requests all suffer in such instances.

- Data redundancy--Information relevant to several users tends to be duplicated in redundant databases that each user creates and maintains for their particular applications. Information about AID contractors is one of the most conspicuous examples of such redundancy because the Agency's contractors often work for more than one bureau or office, and offices tend to maintain their own information. Data redundancy is not only inefficient from a maintenance standpoint, it leads to confusion and questions of accuracy when discrepancies occur between sources.

In AID's previous five-year information systems plan, recognition was given to the emerging issue of the need to manage Agency data centrally, but the completion of AID's hardware and software infrastructure correctly took priority with respect to resources and management attention. However, near the end of the five-year period, a data administration initiative began with the selection of a commercial database management system (DBMS) for applications on the Agency's main computer and testing of DBMS packages for applications on the Agency's minicomputers. Currently, four main computer DBMS applications are under development, including one addressing contractor information.

Recommended Five-Year Initiative

Over the next five years, AID should make a major commitment to improving the accessibility and accuracy of Agency data by investing in a central data administration program and developing databases and applications software using DBMS approaches. The program should encompass both AID/W and USAID information management. At the end of the five-year period, the data administration approach should be fully institutionalized, supplanting the single-user, non-integrated approach to applications development that is characteristic of evolving information systems programs in large organizations, and which has been characteristic of AID. This data administration initiative is of fundamental importance to the long-term success of the Agency's information systems program. Although AID has taken important steps in this direction over the past several years, several critical steps should be completed before DBMS applications development proceeds much further. These concern the formal establishment of a data administration function in the Agency, the development of an Agency data architecture, and introduction of data administration to the Agency:

1. Organize Data Administration Program and Obtain Resources

2. Analyze Agency Information Use

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...Improve Agency Data...

3. Formulate Agency Data Architecture

4. Develop Data Administration Policies and Procedures

5. Introduce Data Administration to the Agency

1. Organize Data Administration Program and Obtain Resources

AID should establish a Data Administration unit in M/SER/IRM to manage the Agency's data administration program. The unit should be staffed and provided with the necessary contractor and financial resources to carry out the initiative. Other units within M/SER/IRM will be affected by the advent of data administration and should receive the necessary training and establish lines of communication with the data administration unit to work cohesively.

1.1 Establish and Staff a Data Administration Unit

- A separate unit should be organized in M/SER/IRM for data administration
- A Data Resource Manager should be appointed to head the unit
- A Data Dictionary Administrator position should be created to establish and maintain the Agency data architecture
- A Database Administrator position should be created to design, create and maintain the physical databases for Agency data

1.2 Obtain Resources

- Contractor support will be required to design and develop the Agency data architecture
- A small amount of additional funding for software utilities and related materials will be necessary

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1.3 Ensure Involvement and Training of M/SER/IRM Units

- All M/SER/IRM divisions will be affected by the advent of data administration, and should be involved in decision making as it affects them and their clients; a mechanism should be established for this

- Appropriate DBMS training should be provided throughout M/SER/IRM

2. Analyze Agency Information Use

Analysis must be performed of how Agency information, defined as information used by two or more organizations within AID, is created and used. The results of this analysis will provide the basis for the development of the Agency data architecture. Both currently-automated and non-automated information should be reviewed.

2.1 Gather Reports and Review Systems

- Analysis of systems, reports, and information usage must be conducted

- End-user interviews must be conducted to determine how data are created and used

2.2 Consolidate Agency Data Requirements

- The analyses of how Agency data are created and used must be compared among users

- A consolidated analysis of data requirements among Agency data users will result from this analysis, to serve as the guide to architecture development

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...Improve Agency Data...

3. Formulate Agency Data Architecture

The logical database architecture for Agency data will provide AID with the foundation it needs to rationalize the way Agency-level data are created, maintained, and used. It is the key to reducing data redundancy and improving accessibility to Agency data.

3.1 Specify Logical Data Dictionary and Model

- By sorting and normalizing the consolidated data requirements from the previous step, an Agency data dictionary will be produced

- The resulting data dictionary and model will specify the data items to be included in the Agency data architecture, as well as their ownership, aliases, and definitions

3.2 Validate Logical Architecture with Users

- Review of the draft data architecture with Agency data users is necessary to ensure accuracy

- After refinements are made, the resulting product should provide a blueprint for DBMS application design and physical database development

4. Develop Data Administration Policies and Procedures

It will also be necessary to develop the policies and operating procedures for the data administration program, to govern changes to the Agency data architecture, database management, applications development, access and security, and standards, to name but a few of the key issues. Of particular importance is the need to establish a mechanism for coordinating AID/W and USAID requirements within integrated applications. M/SER/IRM must ensure that AID/W and USAID users do not work at cross purposes on designing databases and systems.

5. Introduce Data Administration to the Agency

For the data administration program to succeed, user organizations will need to develop a thorough understanding of its potential benefits for their operations, as well as for the Agency overall. M/SER/IRM should take the lead in developing non-technical presentations for information system users on the need for the program, its objectives and scope, and the implications for users. Examples derived from the initial DBMS applications developed should be described.

Increase Software Development Capacity and Invest in "Corporate" Applications and Databases

AID Should Make Budgetary and Other Changes to Increase Its Software Development Capacity and Concentrate Central Development Efforts on "Corporate" Applications Using Agency Data and Benefitting Multiple Users

Long-Term Agency Benefits

- Improved Agency management information
- Realized return on hardware investment
- Increased ability of users to meet their own information needs

Current Environment

In previous years, AID's information management program has concentrated on providing the necessary hardware and software infrastructure for word processing and essential administrative data processing systems. This has been an appropriate strategy, but it should be revised to meet a changing set of needs over the next five years. AID is entering a phase in its overall information systems development in which the demand for applications software will increase substantially over current levels. Although additional hardware is needed, the basic infrastructure of computer processors and workstations is in place across the Agency, and thus, investment in information resources should emphasize software over hardware during the next five years. To accomplish this will require not simply a shifting but an increase in resources devoted to software development, from both central M/SER/IRM and user resources.

Currently, the majority of applications development is centrally provided by M/SER/IRM, whose client analysts determine information system requirements and broker development services through IRM's central systems contractor. Until recently, users typically have played only small roles in systems development. In recent years, the annual level of effort available for general software development not associated with the Agency's central accounting system has ranged from 7 to 12 person-years for AID/W systems, and 4 to 5 person-years for USAID systems. This level is insufficient to meet Agency needs.

...Increase Software Development...

Recommended Five-Year Initiative

In order to increase its capacity to develop applications software and meet Agency information system needs, AID should pursue several complementary courses of action. The recommended actions consist mainly of increasing central funding for software development services, but also include measures to increase the resources provided by the systems' end-user organizations and more effectively use available resources:

1. Increase Central Funding for Software Development

2. Expand Use of User Organization Resources

3. Promote End-User Computing

4. Continue Substantive Review of Software Requests

1. Increase Central Funding for Software Development

Overall, one principal need is to increase the level of resources devoted to software development. Current resource levels for new systems development fall well short of the levels needed to meet the anticipated demand over the next five years. The introduction of database management systems, increasing user sophistication and knowledge of automation potential, and widespread hardware availability are the main contributors to this trend. USAID applications development needs are discussed separately in this report.

The AID/W corporate applications to be developed over the next five years should be identified through analysis of Agency information needs, which would normally occur as part of the previous recommendation to implement an Agency data administration program. A preliminary analysis suggests the following types of applications, including four currently underway or planned, listed first:

- Contractor Information Management System (CIMS)--Designed to consolidate redundant contractor data and systems into an integrated system

- Vendor Profile System--Designed to consolidate redundant and often conflicting databases on Agency vendors

...Increase Software Development...

- LAC Bureau Management Information System--Designed to provide Bureau management with coordinated program and financial performance information

- S&T Bureau Tracking System--Designed to provide Bureau management with information on centrally-funded projects

- Agency Project Portfolio MIS--A recommended system to provide Agency management with a central information source for frequently needed information about Agency-wide program and project issues

- Program Reporting Systems--Programmatic information systems designed to integrate USAID-level reporting with AID/W management information needs would be useful in most AID programs

- Administrative Reporting Systems--Although most AID/W administrative systems needs have been addressed, several existing systems are antiquated and should be converted to database systems to reduce maintenance costs and improve ease of use

The above list is illustrative of the categories that AID/W management information systems needs fall into. The particular requirements and their relative priorities should be established through the planning associated with the Agency data administration and IRM planning initiatives recommended in this five-year strategy.

2. Expand Use of User Organization Resources

AID should expand the use of AID/W Bureau user resources to increase its software development capacity. Because information services in AID/W are centrally funded through M/SER/IRM, the primary Bureau resources that could be made available are staff resources to participate in the requirements analysis, design, and development of information systems. Over time, a growing Bureau expertise in systems development could significantly increase the Agency's overall capacity to develop systems. Also, AID's experience has shown that significant user involvement in development increases the likelihood that systems will meet user needs. Because of this, substantial user involvement--at least through the requirements analysis and design stages--has become the intended model for AID/W software development projects. This practice should be expanded. Apart from staffing, AID should explore the possibility of obtaining program funds from users for systems development in cases where system objectives are to support program reporting.

3. Promote End-User Computing

To the extent that users develop the capabilities to meet their own information needs, within Agency guidelines designed to maintain standards, the Agency's overall software development capacity can be extended without additional funding. End-user computing, the practice of providing users with training and tools to meet their own information needs, should be promoted in AID through the following approaches:

- Training--Courses in on-line query, report generation, and development of databases and applications using the Agency standard databases should be available to users, to pursue within the limits of their capabilities

- Providing Documentation--Manuals, user guides, and documentation of the Agency data dictionary will facilitate end-user ability to meet a portion of their own information needs

- Providing Assistance--Making technical staff available to answer user questions concerning software tools and other systems resources will also be necessary to promote end-user computing

4. Continue Substantive Review of Software Requests

AID currently has a reasonably effective means of ensuring that only software meeting significant AID/W user needs is developed. This effectiveness is due, in part, to the scarcity of software development resources. However, as software requests and resources increase over the next five years, substantive review should continue. This should be a shared responsibility of M/SER/IRM and the users, through the Agency IRM planning process. Reliance on IRM alone to perform this function is undesirable as it emphasizes the "gatekeeping" aspects of IRM's role, at the expense of its consultative, facilitative role.

Develop Project Design and Management Software

By 1993, AID Should Develop Software to Support Program Personnel, Including Tools to Facilitate Project Design, Project Financial Management, Milestone Tracking, and Related Administration

Long-Term Agency Benefits

- Project officers and other USAID personnel relieved of unnecessary burden to maintain "cuff" records to track project status

- More efficient project design, implementation, and documentation; greater consistency in formats for presentation of standard project elements

- Increased integration between USAID-level and AID/W Bureau-level program information requirements

Current Environment

Over the past five years, AID has provided its overseas posts with hardware and standard software capabilities to meet word processing, USAID financial management, and selected administrative information needs. Standard software for project design and management has not been developed; instead, commercial spreadsheet, project management, and database packages for personal computers have been provided for project management applications. Additionally, some of the more computer-literate project officers have developed their own project software, for local use, to schedule project milestones, develop budgets and track budget execution, and to index and store certain project text documents.

Based on discussions with numerous project officers, it is apparent that the commercial packages, while helpful, have limited ability meet the needs of most program development and project officers to design and manage AID projects. In addition, the Mission Accounting and Control Systems (MACS), the financial management system for USAIDs, is not designed to serve project officers' project financial management needs. Moreover, the limited capabilities MACS has for generating project financial reports are, themselves, not widely known among project personnel.

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...Develop Project Software...

According to project personnel, the key limitation of the commercial packages is their inability to faithfully model the scope and complexity of AID projects, and in their lack of integration, for example, in coordinating detailed timeline, staffing, and budgetary information. The most significant financial analysis limitation in the packages and MACS is their inability to support "pipeline" financial analysis and projection, which is one of the principal project financial applications.

With regard to broader program reporting, USAID project officer information needs are not typically integrated with AID/W Bureau-level program reporting needs. Thus, project officers must capture or produce additional data for reporting that ideally would be available from existing project data files, without necessitating additional effort.

Recommended Five-Year Initiative

In the next five years, AID should invest in the development of software to support USAID project and program management needs. To be useful, such software must faithfully model the project work environment and be flexible to adapt to variable conditions. It must also be integrated with existing systems, e.g., MACS. Exhibit I, following page 15, lists the AID program administration functions that should be considered as candidates for automation. The exhibit indicates whether the functions are now or in the future will be addressed by current or planned systems. The major activities required to implement this initiative include:

1. Organize the Software Development Project

2. Determine Requirements and Software Scope

3. Design Application(s)

4. Develop and Test Prototypes

5. Complete Development and Prepare for Release

1. Organize the Software Development Project

To ensure the necessary perspectives are brought to this effort and to enhance the software's acceptance by users, it is vital to include users and other functional experts in the project. It is also vital that the project technical staff be well structured. The following guidelines are recommended:

...Develop Project Software...

- M/SER/IRM should be the overall project organizer

- It is essential that the project involve one or more USAIDs to serve as test bed sites, whose involvement would span the entire project and consist of providing project officers to assist in the analysis and design, as well as the overall support of USAID management

- An advisory panel composed of program staff representing all three regional bureaus, S&T, FM, and perhaps others, should be organized to provide broad guidance

- At least one, and preferably, two or three experienced project officers with automation knowledge should be part of the project technical team

- The roles of M/SER/IRM divisions and MSC (Costa Rica) should be made clear, if both are involved

2. Determine Requirements and Software Scope

In general terms, the needs for project-related software fall into three categories:

(1) Project Management -- financial projections and tracking of planned and actual expenditures; milestone tracking, critical path analysis; project document indexing and retrieval

(2) Program Reporting -- Tracking completion of program objectives, e.g., no participants placed in training, volume of commodities distributed, number of loans guaranteed, etc.

(3) Project Design -- Expenditure projection; timeline/milestone development and critical path analysis

Given the broad scope that project-related software could cover, it will be important to specify the intended coverage of the application(s) to be developed. The following approaches should be considered:

- Obtain and analyze project management and design software developed by project officers; definitions of "project" should be developed

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...Develop Project Software...

- Interview project officers at length and observe them over time in USAIDs to understand their specific requirements and the limitations of existing systems

- Ensure the requirements analysis encompasses the range of project models and AID program areas, again, by direct observation on-site in USAIDs

- Identify interface requirements with existing systems, such as MACS, and consider making modifications to those systems, as appropriate, to facilitate project management

- Once the requirements are identified, decision making is needed to prioritize the areas to be addressed and determine the scope of individual applications

- The requirements identified should be compared with AID Handbook policies for conformance, and discrepancies resolved

3. Design Application(s)

In designing project management applications, the following criteria should be observed:

- Applications should be designed, to the extent practical, to run on PCs, as well as VSs, because many project officers, e.g., in 17 African posts, have access only to PCs

- Design(s) should be comprehensive in their coverage of functions, rather than addressing only portions of functions, to avoid proliferation of fragmentary systems

- Where possible, project and program software should be developed using DBMS approaches to provide maximum flexibility

- Designs should be modular, allowing flexibility to use some or all capabilities as applicable

...Develop Project Software...

- Demonstration prototypes of application screens, reports should be developed for review prior to full-scale development

- Design(s) should be reviewed with the advisory panel before development

4. Develop and Test Prototypes

Advanced prototypes of project management applications should be developed for field testing in USAIDs participating in the project. The software should be tested with a range of projects and with project officers who have various levels of automation expertise.

5. Complete development and prepare for release based on USAID test-bed results. Significant preparations include:

- Developing a tutorial program that illustrates by example how to use the software

- Developing a substantial user's manual

- Training M/SER/IRM client analysts in use of the software

- Publicizing the release throughout AID

- Planning for workshops overseas and in AID/W on use of the software

Exhibit I
USAID Program Administration Functions with Automation Potential Contrasted with Planned and Actual Systems

USAID Administration Functions with Automation Potential	Addressed By Planned or Actual System
1. Project Design and Management	
• Access AID historical project papers, evaluations by subject, etc.	Partially, PPC/CDIE Index
• Technical Information Center management	Yes, Micro DIS
• Schedule tasks and analyze critical path; track actual vs plan; revise	Partially, Timeline
• Schedule expenditures in concert with critical path; track actual vs plan; revise	Partially, Lotus 1-2-3
• Monitor earmarkings, commitments, accruals, rates of expenditure, etc.	Partially, MACS and Lotus 1-2-3
• Track training participants	Yes, PTMS (under revision)
• Process and track PIOT/C/Ps and other standard project documents	Minimally, through various Wang glossaries; more comprehensive, integrated system needed
• Monitor contracts	Partially, MACS and Lotus 1-2-3, and CIMS

Exhibit I (cont.)
USAID Program Administration Functions with Automation Potential Contrasted with Planned and Actual Systems

USAID Administration Functions with Automation Potential	Addressed By Planned or Actual System
1. Project Design and Management (cont)	
• Process and track vouchers	Yes, MACS Trax
• Standardize contractor reporting by program area	Partially, CIMS
2. Program Management	
• Track program accomplishments in integrated fashion with USAID level management information	• Some initiatives underway, e.g., LAC-MIS • Some manual reporting ongoing e.g., PL480 • Little or no integration with USAID-level management information for most applications • Most major AID programs could benefit from MIS development or enhancement, e.g., population, health, agriculture

Develop Software for Core USAID Administrative Functions

By 1993, AID Should Include in Its Mission Software Portfolio Agency-Standard Software Covering all Core USAID Administrative Functions

Long-Term Agency Benefits

- USAIDs gain effective software to support full range of administrative operations
- USAIDs relieved of software development burden and associated duplication of effort
- Reduced systems learning curve for rotating Executive Office personnel due to standard software
- Consistent administrative practices among USAIDs due to standard software

Current Environment

Over the past five years, AID has distributed various software applications to USAIDs to support aspects of their administrative operations. Some of the software has been developed centrally by M/SER/IRM, and some by the field, which M/SER/IRM has obtained and refined for general distribution. Additionally, many Executive Office (EXO) staff have developed administrative software that is only used locally, at their posts. It is not unusual for rotating Executive Office staff to bring the administrative software they have developed to their subsequent posts. On occasion, USAIDs share their locally-developed software.

There is inefficiency in the current state of affairs regarding USAID administrative software. Because Agency-supported software addresses only a portion of USAID administrative operations, USAIDs often develop their own applications, duplicating effort; or, they continue their manual administrative operations. Also as Executive Office personnel bring the software they have developed or used at previous posts to their new posts, local staff must be retrained in this software. Conversely, rotating staff encountering new software at each post must similarly be retrained.

...Develop Administrative Software...

A related problem is that administrative software is not necessarily developed with reference to AID Handbook standard procedures. In some cases, automation of an administrative operation makes the relevant Handbook sections obsolete from processing, recordkeeping, or reporting standpoints. The quality of the software available to support USAID administrative operations also varies. The consensus is that software designed in the field by EXO staff and subsequently refined, documented, and distributed by M/SER/IRM is superior to software developed either by IRM or USAIDs alone. Software designed by field personnel tends to have greater fidelity with the operating environment, but also tends to need additional work to constitute a complete package. Both Wang VS and PC applications have been developed for certain functions.

A problem common to USAID administrative software regardless of its origin is that its applications are non-integrated across data or functional lines. This is due to the fact that administrative applications have been developed without an integrated design concept across the range of Executive Office functions. Likewise, little attention has been given to integrating USAID-level systems with AID/W-level reporting requirements.

Recommended Five-Year Initiative

In the next five years, AID should build on its administrative software to provide full automation support for all standard functions of USAID Executive Offices. The software should be integrated across functions involving the same data, both at the USAID-level and between the USAID and AID/W levels. To the extent practical, administrative applications should be developed using commercial data base management system software. Applications should be developed for both Wang VS and PC-based systems environments, and to the extent feasible, should offer identical or similar capabilities. Exhibit II, following page 19, lists USAID administrative functions that should be considered as candidates for automation. The exhibit indicates whether the functions are new, or will be addressed by current or planned systems.

The major activities required to implement this initiative parallel those for the development of project management software:

1. Organize the Software Development Project

2. Determine Requirements and Software Scope

3. Design Application(s)

...Develop Administrative Software...

4. Develop and Test Prototypes

5. Complete Development and Prepare for Release

1. Organize the Software Development Project

Similarly to the USAID project software initiative, an advisory panel is recommended for the administrative software initiative. Members should represent Executive Officers from the three Regional bureaus and AID/W M/SER Directorate functions. The technical team should include at least one current or former Executive Officer. The test-bed USAIDS, where requirements analysis and prototype testing will occur, should represent VS and PC-based processing environments. In selecting USAID sites, it is crucial to obtain the full interest and support of the USAID Mission Director as well as the EXO.

2. Determine Requirements and Software Scope

Sources of information to determine USAID administrative software requirements include:

- Current portfolio applications
- USAID-specific applications
- Extensive on-site analysis of administrative operations
- AID Handbook administrative requirements
- M/SER functional experts
- Project advisory panel recommendations

After the functional requirements are identified, the scope of the application(s) must be determined in cooperation with the project advisory panel. The ideal would be to support all standard USAID administrative functions through the products of this project.

...Develop Administrative Software...

3. Design Overall USAID Administrative Systems Architecture

Because a number of USAID administrative applications have been developed already, the overall architecture will include completed as well as uncompleted applications. The design should address interfaces between new and existing applications as appropriate. Once completed, the design should be reviewed by the advisory panel, and validated with USAID personnel, on-site. A database management systems approach is recommended for flexibility. Multiple linked databases and integrated applications are envisioned, as opposed to a single database system.

4. Develop and Test Prototypes

Prototype applications and databases should be developed for field-testing and validation of the design. The prototypes should simulate as closely as possible critical features of the design.

5. Complete Development and Prepare for Release

New USAID administrative applications should be completed based on field test results. When all applications are complete, they could be packaged as a comprehensive USAID administrative software program. Or, depending on the completion schedules, individual applications could be released. In either event, comparable documentation, publicity, training, and implementation workshops as recommended for project management software should be provided.

Exhibit II
USAID Administrative Functions with Automation Potential Contrasted with Planned and Actual Systems

USAID Administrative Functions with Automation Potential	Addressed By Planned or Actual System
1. Property Management	
• Non-expendable property management including inventory taking, reporting; and property acquisition, assignment, disposal	Yes, Guatemala NXP and ROCAP Bar-code system
• Property maintenance request tracking	No
• Utilities accounting and billing	Partially, Cost Rica real estate management systems
• Expendable property management	Yes, Guatemala EXP
• Property check-out/loan tracking (short-term)	No (minor function)
2. Procurement Management	
• Purchase order tracking	No (M/SER/MO system may be adaptable)
• Import license and customs exemption tracking*	No

*If not integrated with purchase order tracking

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Exhibit II (cont.)
USAID Administrative Functions with Automation Potential Contrasted with Planned and Actual Systems

USAID Administrative Function	Addressed By Planned or Actual System
2. Procurement Management (cont.)	
• Petty cash accounting	No
• Vendor source register	No
• Contracts file	Yes, CIMS
• Contract writing system	Yes, FaraPlus
• Automated retrieval of FARS, AID and other procurement regulations	No
3. Motorpool Management	
• Vehicle life cycle system, including mileage/fuel accounting and billing, maintenance tracking, vehicle scheduling, licensing, insurance	Yes, Costa Rica Vehicle Management
4. Personnel Management	
• Staffing pattern, telephone list, etc.	Yes, MAP
• TDY management	Yes, MAP

Exhibit II (cont.)
USAID Administrative Functions with Automation Potential Contrasted with Planned and Actual Systems

USAID Administrative Function	Addressed By Planned or Actual System
5. Communications and Records Management	
• Mission correspondence control/tracking	Yes, VS, PC, OIS systems in mission software portfolio
• Records management system with indexing and archiving functions	No
6. Data Systems Management	
• Hardware and software inventory systems integrated between USAIDs and AID/W	No; AIMS partially meets need but lacks interface with USAID systems
• Wang VS installations management	Yes, various Wang VS utilities
7. Mission-Wide Administrative Management	
• Automated forms (W/P glossaries, etc.)	Some
• AID Handbook index	Yes, under development

Exhibit II (cont.)
USAID Administrative Functions with Automation Potential Contrasted with Planned and Actual Systems

USAID Administrative Function	Addressed By Planned or Actual System
8. Financial Management (Administrative)	
• Mission accounting and control	Yes, MACS
• Operating expense budget status ("cuff" records to supplement MACS)	No
• Employee receivables/payables	Yes, MACS accounts receivable module
• Payroll (PSC, FSN, daily hires, direct hires)	Partially, Lima PSC system
• ABS and CP development	Partially, for LAC MIS
• Travel budget status (to supplement MACS)	No
• MACS codesheet and transmittal letter index (for missions supported by an RFMC)	No
• Paytrack-FMS interface	Yes, FMS Interface

II. Hardware Strategy

AID's Hardware Strategy Should Continue to Emphasize Completion of the Planned Distributed Processing Environment

AID Should Continue Its Current Hardware Strategy, to Provide a Distributed Processing Environment in AID/W and Mini-Computer-Based Environments in USAIDs, Where Feasible

Long-Term Agency Benefits

- Increased responsiveness to user needs through greater user control over access, processing schedules, local file creation

- Provides basis for intra- and inter-office communication of data and text

Current Environment

Over the past five years, AID has concentrated on installing a standard hardware base across AID/W and USAIDs to provide essential word processing capabilities Agency-wide and transaction (data) processing capabilities for Agency-level applications. Additionally, the hardware base also supports a number of management information (decision support) systems. The Agency has been highly successful in establishing its basic processing environment, as it has ensured that essential needs (mainly word processing) across all AID/W and overseas organizations have been met before expanding system functionality.

AID's current hardware strategy is to provide a distributed processing environment based on a three-level processor architecture, consisting of a central IBM main computer, Wang VS minicomputers located in AID/W operations centers and in USAIDs, and personal computers that can be used independently or as workstations for the mini- and main computers. The bulk of end-user computing, however, will be performed on VS workstations. Additionally, dedicated terminals that constitute a main computer terminal network in AID/W are used for specific applications and are expected to continue to serve these functions.

The main work AID must perform to achieve its hardware strategy is to complete the replacement of most of its Wang OIS word processors with VS processors, mainly in AID/W but also in several USAIDs. Additionally, the several remaining USAIDs with PC-based environments that have the local conditions and personnel to support VS operations are slated for VS conversion. The OIS-to-VS conversion is necessary as it provides true data processing capabilities, and, OIS production has been discontinued by Wang, which will phase-out OIS support.

...Hardware Strategy...

Recommended Five-Year Initiative

Over the next five years, no major new hardware initiatives are recommended. The hardware strategy the Agency is pursuing is sound and should be implemented. This will require follow-through in several areas and additional tasks as described below.

1. Replace OIS with VS Processors

AID should continue with its program of replacing OIS with VS processors and upgrading USAIDs to VS environments when the USAIDs clearly can support such an environment. The plan to co-locate VS processors in AID/W VS operations centers is also sound, as it will reduce operations and maintenance costs and relieve users of the system operations functions as compared to the functions they would need to perform in multiple, user-operated installations.

2. Monitor Processor Capacity

With regard to the IBM main computer, recent decisions to upgrade the central processor and MVS operating system are likely to yield sufficient capacity and reliability to meet anticipated work load for the next several years, at minimum. The main computer CPU reliability has been excellent during prime shift, and the upgrade will increase capacity by as much as 50 percent. This should provide ample power to handle the projected work load increase from new database applications under development and additional applications under consideration. Nonetheless, the actual impact of DBMS introduction into AID remains to be seen, and therefore, should be monitored through the cooperative efforts of the Data Resources Manager and the Automation Support Division Chief. In general, a main computer capacity analysis should be done in the early 1990's, and at the same time, an analysis of the capacity of the distributed VS network should be conducted to gauge the impact of DBMS and communications traffic.

3. Continue to Deploy End-User Equipment

Although AID has provided sufficient processing capacity and workstations to meet basic word and data processing needs in AID/W and USAIDs, it has by no means reached a saturation level in its hardware deployment. In AID/W, the ratio of workstations to staff is roughly 1-to-3. In USAIDs, there are more workstation-to-staff ratio is slightly higher. At AID's current rate of workstation acquisition, it will approach saturation (approximately a 1-to-1 ratio), by the end of the five-year period covered by this strategy, in 1993.

As unit costs of information processing continue to decline, and as organizations become more able to integrate information technology into their daily operations, the notions of what constitutes an appropriate employee-to-workstation ratio become less certain and depend more on the individual office requirements. AID has perceived this

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trend and has initiated an experiment to concentrate workstations on nearly a one-to-one ratio in part of the Financial Management Bureau. This effort should be evaluated as to its benefit-cost and organizational impact on FM, with consideration as to its applicability to other AID organizations. Depending on the success of the pilot tests of electronic mail and other communications initiatives, the deployment of workstations may be accelerated.

4. Implement Equipment Replacement Program

Although most of AID's hardware has been purchased within the past five to seven years and is not obsolete, the Agency nonetheless should establish an equipment replacement program, forecast its costs, and set a master schedule. Already, some workstations and daisy printers are obsolete, and maintenance costs for discontinued or aged equipment are, or soon will be, more than equipment replacement costs. Therefore, within the next five years, equipment replacement costs should become part of the Agency's recurring budget, and a replacement program formulated.

5. Adopt New Technologies As Applicable

While it has grown inherently difficult to project the long-term impact of technology breakthroughs on a given organization's information technology environment, there appears at the moment to be nothing on the horizon that questions AID's basic hardware strategy. AID's three-level processor architecture reflects one variation on the current proven state-of-the-art. Indeed, the most significant technological advances from AID's standpoint are likely to be in communications and database software, as opposed to hardware. Nonetheless, there are several technological sidelights that may have relevance to AID as they develop, and which AID should monitor.

- Laptop Computers--As laptops become more powerful, compact, and inexpensive, they may be an alternative to PCs and workstations where portability or minimal space requirements are important.

- Desktop Publishing--A maturing technology but still new to most of AID, desktop publishing has applicability for many of AID's printed products. Because demand is growing for desktop publishing in parts of AID, and because of compatibility issues, AID should establish a standard that balances user need for functionality with the need for compatibility with existing word processing capabilities.

- Optical Storage--Optical storage for large, stable databases or reference texts may have applicability to AID financial management, project document archives, or Agency Handbooks. For the time being, however, until costs decrease there is no compelling interest beyond experimentation for AID to invest in this technology.

- Laser Printers--Laser printers are beginning to be used in AID, and should become the standard for printers as daisy-wheel printers are replaced over the next five years. Lasers provide letter quality output, do not require sound hoods, take up less space, and involve less maintenance effort and expense than daisies.

- LAN/DBMS Software--Improvements in the ease-of-use, functionality, and interface capabilities can be expected for data base and communications software. To the extent commercial products can obviate custom software development in AID, the Agency can reduce product development time and costs.

6. Maintain Agency Hardware Standards

Regardless of other initiatives it might undertake, AID should continue its policies and procedures for maintaining hardware (and software) standards in the Agency. M/SER/IRM must retain the authority to determine and enforce standards throughout the Agency. These standards have paid dividends for AID personnel rotating among posts worldwide and in AID/W by minimizing the equipment learning curve and allowing portability of software. They have also preserved the Agency's connectivity options, whose importance will become more apparent as telecommunications initiatives are undertaken in the next five years. As the distributed environment is completed, and as user sophistication and demand for information services grow in the coming years, there may be more pressure from users for non-standard technology. IRM should retain the final decision making role on these questions and adhere to its established standards program.

III. Telecommunications Strategy

Build on Existing Hardware Connectivity to Provide a Production-Level Telecommunications Environment to Support AID/W and USAID Needs for Text and Data Exchange

AID Should Upgrade Its Telecommunications Capabilities in the Context of an Updated Agency-Wide Telecommunications Architecture to Provide Near-Seamless Office-to-Office Connectivity in AID/W and Reliable Communications Between USAIDs and the AID/W Network

Long-Term Agency Benefits

- Timely data and text transfer between USAIDs and AID/W, to facilitate management information and budgetary reporting, and transfer of project documents, ENGSPAN translations, other lengthy texts, and socioeconomic data

- Office-to-office transfer of documents, data, and financial information within AID/W

- Integrated, Agency-wide applications such as budget development and execution systems

Current Environment

During the period covered by AID's first Agency-wide, five-year IRM plan and subsequent telecommunications plan, the Agency has accomplished its initial goals of establishing connectivity among AID/W office automation equipment and the AID main computer, and providing links between USAIDs and the AID/W network. (A terminal network to support financial transactions on the main computer was previously established.) Both sets of linkages were intended to support document transfer, and to some extent, data transfer. Because the Agency's emphasis during this period was on deploying basic hardware and software capabilities, telecommunications initiatives were limited in scope and functionality.

Currently, text and data transfer in AID/W over the telecommunications linkages is a fraction of the volume it has been projected to be in a completed telecommunications environment. This is due to the cumbersomeness for all but the most confident users of

procedures required to transmit text from one Wang OIS or VS to another, or to access external data switching through the IBM main computer. Consequently, diskettes or hardcopy are the common modes of transmission.

AID's overseas telecommunications efforts to date have had better, yet still mixed results due to a combination of factors. The first system, ICS 1, is still in use at a number of posts. Early reliability problems and a lack of sustained education/promotion for users both within USAIDs and AID/W have kept traffic at much lower-than-expected volumes. The cumbersomeness for AID/W users, described above, and to some extent, for USAID users, was also a contributing factor to the limited use of the system for text transfer. The poor quality of host country public telephone lines and even Department of State leased lines has had an impact on system usage, as well. The system is not used much for data transfer for a variety of reasons, most of which are unrelated to the system itself, such as the lack of integration between field and AID/W reporting systems. Currently, the second version of the system, ICS 2, is being implemented and will improve ease of use significantly.

Nonetheless, there are a number of regular users of the system who find it useful for timely document transmission and who have integrated it into their routine business operations. The majority of text and data transfer applications envisioned for the system remain valid, and a number of new applications have come into being, such as ENG-SPAN translations between Latin and Central American posts and AID/W. The potential for the system is larger than ever, and it remains an important utility that AID should develop. Exhibit III, following page 30, lists documents and data suitable for transfer via an overseas telecommunication system.

Recommended Five-Year Initiative

During the next five years, AID should take steps to realize the benefits of its substantial investment in hardware by achieving a production-level telecommunications network to support text and data exchange. Along with the data administration initiative, establishing a more user-friendly telecommunications environment and institutionalizing its use will be necessary for AID to manage its information resources effectively in the future. As data and text processing applications become more integrated between AID/W and the field, and within AID/W, telecommunications will grow more essential. To accomplish this will require further specification of the Agency's original telecommunications architecture, completion of the AID/W local area network, and investment in software, network management, and user education. The following steps are recommended:

1. Organize and Staff a Telecommunications Unit in M/SER/IRM

2. Update the Agency-Wide Telecommunications Architecture

...Improve Telecommunications...

3. Complete the AID/W Local Area Network

4. Pilot Test Electronic Mail in AID/W and USAID Environments to Determine Appropriate Implementation Approaches

5. Assess user needs and the Overseas Telecommunications System to Determine Additional Technical and Managerial Refinements Needed

6. Analyze the Feasibility of Collecting and Distributing Cables in AID/W via the Local Area Network

7. Acquire, Adapt, and Develop Software to Provide Near-Transparent Inter-Processor and Inter-Application Data Transfer

8. Develop and Implement a Phased Program to Introduce the Telecommunication Enhancements to the Agency

9. Monitor State Department Telecommunications Initiatives and Share Resources or Otherwise Participate, Where Practical

1. Organize a Telecommunications Unit in M/SER/IRM

In order to further develop and maintain a telecommunications capability, an organizational focus is required. A telecommunications unit should be created in M/SER/IRM to manage the development and operation of AID's telecommunications capability. Major functions of the unit should be:

- Update and further specify the Agency's telecommunications architecture and development plan

- Manage the implementation of the plan, including hardware procurement and installation, network software evaluation and selection, operational standards development

- Operate the system and troubleshoot problems

...Improve Telecommunications...

- Participate in the development of network applications software

- Provide user education and support related to telecommunications operations, in cooperation with other IRM divisions

2. Update the Agency-Wide Telecommunications Architecture

In the 1984-89 AID telecommunications plan, an Agency-wide telecommunications architecture was proposed and has served as the basis for much of the development to date. Although aspects of this architecture have been superseded, overall it remains relevant to today's requirements and information systems environment. M/SER/IRM should update this architecture and development plan to guide implementation over the next five years.

Over the next five years, the thrusts of the telecommunications strategy should be to:

- Complete the AID/W local area network and install network software and related management procedures to allow rapid, user-transparent exchange of documents among AID/W offices

  - Introduce electronic mail between AID/W offices

  - Tailor the network to support integrated applications such as an agency-wide budgeting system

  - Improve ease-of-use for originating overseas text and data transfer communications

  - Explore the feasibility of an interface between the (DTS) cable system and the AID/W network

- Provide reliable point-to-point communications between AID/W and USAIDs to support text and data exchange

  - Communications should be designed to support bulk text transfer (project documents, ENGSPAN translations) and data transfer (MACS and other MIS)

- More interactive applications, such as project officer or contractor queries of the AID/W main computer, or USAID direct access to the AID/W network, should be undertaken only after reliable text and data exchange capabilities are in production

3. Complete the AID/W Local Area Network

AID currently has cabled for local area networks among multiple processors in two of its buildings and has plans to cable in a third. A fourth building's users are connected to a single processor. The various buildings are inter-connected by leased lines, which support dial-up communications among all AID/W processors. It is the Agency's intent to complete this network in the next two years. It is important to the Agency's overall telecommunications development to complete the network cabling and related hardware installation. Once this infrastructure is in place, network software can be installed and tested, and AID can take advantage of the potential that a fully-functional network holds. A formal evaluation of network software, such as Wang Office, should be conducted. Additional technical issues, such as switching options, will need to be examined as well.

4. Pilot-Test Electronic Mail in AID/W and USAID Environments to Determine Appropriate Implementation Approaches

With the advent of the AID/W LAN, the value-added feature of electronic mail should be adopted for intra- and inter-bureau document exchange. The current level of connectivity is cumbersome and thus inhibiting for many users. Such a capability would also provide the context for integrated applications, such as a budgeting system. Electronic mail may also provide added value to selected USAIDs .

Pilot tests of electronic mail should be conducted to determine the appropriate implementation approaches for AID/W intra- and inter-bureau communications, and intra-USAID communications. Although development of a world-wide network is not proposed for the five-year plan period, experimentation with seamless USAID interfaces with the AID/W network would be appropriate.

5. Assess User Needs and ICS2 to Determine Additional Technical and Managerial Refinements Needed to Support Overseas Communications

The role of the overseas telecommunications system over the next five years should be to provide a reliable, production-level medium for bulk text and data exchange. Examples of text exchange applications the system should be designed to support include

large project and program related documents, ENGSPAN translations, field reports such as IG inspection memoranda, contract documents, and other non-official and unclassified documents requiring rapid transmission. Examples of data applications include existing systems such as MACS, various program reporting systems such as PTMS, and new or pending systems such as LAC-MIS and CIMS. Eventually, but not likely in the next five years, the overseas telecommunications utility could routinely support queries of Agency main computer databases by USAID project officers, or access to databases external to AID.

To accomplish this will involve further technical and managerial evolution or replacement of the present system, ICS2. Overseas user needs should be reassessed along with evaluating of how well ICS2 is meeting those needs. The advent of networks in AID/W and selected USAIDs will also have an impact on system refinements, and in all likelihood, be a precondition for its widespread use. Further efforts to ensure reliable communication lines to USAIDs without them should be continued, as well. AID should continue to explore the use of commercial datanets and other alternatives to host country PTTs as warranted by the particular USAID circumstances.

6. Analyze the Feasibility of Collecting and Distributing Cables in AID/W via the Local Area Network

To take advantage of the planned LAN capabilities in AID/W, IRM and SER/MO should jointly analyze the feasibility of developing an office-level AID/W cable collection and distribution system. Issues such as the traffic volume on the processor designated as the network controller, the impact of such a system on management procedures, and the like, should be examined. If deemed feasible, a prototype system should be developed for evaluation in one or two Bureaus to determine the appropriate approach for Agency-wide implementation.

7. Acquire, Adapt, and Develop Software to Provide Near-Transparent Gateways to Facilitate Data Transfer Between Processors and Applications

To take maximum advantage of the connectivity potential of the network, users need to have a relatively unencumbered path for sending and receiving data between processors, for example, between their host VS and the Agency main computer. The same applies to the path between various software applications, regardless of their host processors. For example, passing MACS data from a USAID to AID/W. It is particularly important that such gateways exist between the Agency standard database management systems for the various processors. Although software that facilitates such connectivity is becoming more prevalent from off-the-shelf, it is likely that AID will need to invest in adaptation or development of software to meet the needs of its environment, at least in the forseeable future.

8. Develop and Implement a Phased Program to Introduce Telecommunication Enhancements to the Agency

It is important to the success of telecommunication enhancements that they be introduced to the Agency's users in a structured manner. As the early experience of the Agency's international communications system (ICS1) has shown, system acceptability depends significantly on the degree to which users are made aware of its capabilities and procedures. Therefore, as each aspect of the overall AID telecommunications program is introduced, it should be accompanied by a phased approach to user awareness and education, emphasizing demonstration and rehearsal among all potential user groups.

9. Monitor State Department Telecommunications Initiatives and Participate Where Practical

Because of the close relationship between AID and State, especially overseas, there have been opportunities for AID to utilize telecommunications capabilities developed by or in conjunction with State. While it is not always the case that State design specifications meet AID requirements, AID should continue to stay abreast of these developments to assess opportunities to save on its own development costs. Changes that hold the greatest potential for AID are improvements to overseas telecommunications links.

Exhibit III
DOCUMENTS AND DATA SUITABLE FOR TRANSMISSION VIA ICS

Project Design and Development Documents

- Country Development Strategy Statements (CDSS) (unclassified portions)
- Project Papers and summaries, evaluations, and other documentation of prior AID projects
- Project Identification Documents (PID), Project Papers (PP), and other documents associated with project conception and design

Budgetary Documents

- Annual Budget Submission (ABS)
- Congressional Presentation (CP) (unclassified portions)
- Budget status reports for operating (OYB) and project budgets
- Budget execution reports (e.g., U102)
- Congressional notifications (CN) and expirations
- Obligation schedules

Exhibit III (cont.)
DOCUMENTS AND DATA SUITABLE FOR TRANSMISSION VIA ICS

Project Implementation and Contractual Documents

- Project Agreements (Pro Ags)
- Project Implementation Letters (PILs)
- Commerce Business Daily notices
- Requests for Proposals (RFP)
- Notices of award
- Contracts (review drafts, excluding final, signature copies)
- Other contractual documents, such as data sheets, amendments, grants, loan documents, etc.
- Project Implementation Orders (PIO/T/C/P) and related documentation for grants, loans, interagency agreements, cooperative agreements, host country contracts, etc.
- Minority business information
- Contractor capability information, contractor proposals

Exhibit III (cont.)
DOCUMENTS AND DATA SUITABLE FOR TRANSMISSION VIA ICS

Administration and Program Reporting Documents

- Bureau reporting systems, such as LAC-MIS
- Commodities management documents and data (contractual documents listed above plus program specific reporting, e.g., Forms 11, 282, 1450-4, waivers, bills of lading, audit results)
- Personnel management documents and data (e.g., status reports on arrival at post, language training, etc.; U146 report; standardized documents such as SPARS, COARs, other RAMPS documents; waivers; memos; travel authorizations)
- Inspector General reports (e.g., draft audit reports; monthly activity letters; other status reporting, such as IG MIS input on time reporting, investigations status; memos and correspondence)
- Other central program reporting, such as for participant training (PTMS)
- Economic and social data base updates, extracts (e.g., ESDB/DIS)

IV. Support Services Strategy

Refocus AID/W Information Support Services to Emphasize Planning and to Position Users to Assume Greater Responsibility for Their Own Information Needs

M/SER/IRM Should Refocus Its AID/W Client Analysts to Emphasize Information Systems Planning and to Assist Users to Gradually Assume Greater Responsibility for Information System Planning and Development, Hardware Acquisition and Deployment, and Day-to-Day Problem Solving

Long-Term Agency Benefits

- More responsive user support than possible if increasing work load continues to be mainly the responsibility of IRM client analysts
- Better information systems due to users' ability to analyze their own information needs and play a major role in systems design and development
- Increased leverage of IRM client analysts on Bureau systems planning and development
- Greater ability of IRM client analysts to focus on Agency information issues involving two or more Bureaus, Regional Bureaus and their USAIDs, and Central Bureau programs

Current Environment

Over the past several years, M/SER/IRM has made significant improvements in its delivery of "client services" to AID/W organizations. Provision of a single point of contact to arrange services, a rationalized service delivery organization, focused services, new leadership, and better client analyst preparation have all contributed to the improvements. However, several factors are working to make the inherently difficult task of providing client services even more difficult.

User interviews indicated there is a rising demand for information systems, especially for systems that provide information across programs and projects, and that combine information from separate domains, such as projects, contractors, and finance. The nature of the service delivery environment is also changing, one notable example of which is the use of database management systems for main computer and Wang VS applications

development. These two factors in combination will have a significant impact on the nature of information service delivery requirements in AID, mainly in requiring an Agency-level perspective about information as well as a working knowledge of DBMS, to be effective. Current requirements for analysts to have a thorough understanding of the client Bureau business operations will continue to be important.

It is also the case that with a contingent of 12 analysts to cover AID/W, services must be narrowed as much as possible to perform only those functions that clients cannot perform for themselves. The Bureaus, in turn, must make staff available to assume more of the responsibility for planning, developing, and conducting their information programs.

Recommended Five-Year Initiative

AID should refocus its AID/W user support services over the next five years to follow a strategy being used with success in the private sector and in some government agencies. The strategy involves positioning large user organizations to assume the majority of the responsibilities for their own information systems programs. The central IRM staff thus, become more free to concentrate on Agency "corporate" systems benefitting multiple users, and strategic systems planning for their Bureau clients.

In AID, not all Bureaus and offices will be able to develop the capabilities to assume the bulk of responsibility for planning, developing, and managing their information systems programs. Some Bureaus and offices, however, already have or are close to having substantial capabilities. The general goal is to emphasize and build user capabilities to the extent possible.

To implement the strategy will take time and progress will be, at best, gradual. It will involve as much a change in perspective on the part of users and central IRM staff as it will specific activities. Four activities designed to facilitate this initiative are recommended:

1. Reposition IRM Client Analysts to Perform a More Proactive Consultation Role

2. Ensure Client analysts and Bureaus Develop the Expertise Necessary to Refocus User Support Services

3. Increase M/SER/IRM's Working Knowledge of Database Systems

4. Strengthen Communications with Users

...AID/W User Support Services...

1. Reposition the Client Analysts to Provide a More Proactive Consultation Role

- Focus the Client Analysts on Management and Planning Issues -- Refocus IRM client analysts away from day-to-day user problem solving to strategic planning and requirements analysis issues, as applicable

- Assist Users to Develop Their Own Information Management Capabilities -- IRM client analysts should also redouble their efforts to assist Bureaus to develop end-user capabilities and assume a greater responsibility for their information programs by:

  - Strengthening, or in some cases establishing, Bureau information systems committees to plan and manage bureau IRM matters

  - Increasing Bureau management awareness and involvement in key IRM issues, e.g., Bureau DBMS applications development, or USAID and Bureau systems interface needs

  - Continuing to and make known within the Bureaus, Bureau personnel who can serve as day-to-day problem solvers, e.g., on LOTUS, downloading, etc.

- Minimize "Gate-keeping" and Limited Impact Functions -- IRM should minimize the "gate-keeping" role it sometimes places its analysts in with respect to conveying hardware allocation decisions and denials of non-standard procurement requests

- Limited impact activities, such as providing assistance to develop small applications, also should be minimized over time by completely shifting responsibility to users

2. Ensure Client Analysts and Bureaus Develop the Expertise Needed to Refocus User Services

- To refocus user services to increase emphasis on the planning and consultative role, and to stay current with the changing AID systems environment, IRM must ensure that its client analysts and user Bureaus, as appropriate, have a comprehensive skills base. Additional training or supervised experience are needed in the following areas:

- Business systems planning and related requirements analysis and conceptual design techniques

- Data administration in general, and Agency-standard database management systems in particular, to facilitate client analyst planning for DBMS with users

- Agency-level data issues, including Regional Bureau and USAID integration issues

- Organization building to strengthen users' ability to plan, manage, and in general take greater responsibility for their information systems activities

3. **Increase M/SER/IRM's Working Knowledge of Database Systems** -- In order to promote the Agency-wide data administration program and assist the users more effectively, the client analysts and Technical Support staff should develop knowledge of the Agency's data administration program, and particularly in the usage and benefits of DBMS, and in the procedures for planning and developing applications:

- Better Promote End-User Computing in DBMS -- The Technical Support staff should acquire an in-depth knowledge of the Agency-standard DBMS report generation, data transfer, on-line query language, and fourth generation language facilities to more effectively assist in developing in end-user computing

- Improve the Planning and Assessment of Development Requests -- The client analysts should build a sufficient knowledge in the capabilities and features of DBMS as well as the usage of the Agency databases to better assist users in:

  - Assessing the size and complexity of application requests

  - Determining the level of processors (mainframe, VS or PC) in which the applications should reside

  - Conducting simple queries for demonstration purposes

4. Strengthen the Day-to-Day Communications Between IRM and the Bureaus

- Develop Points of Contact Throughout User Organizations -- To assist Bureaus to develop their own internal information systems user capability, as well as to ensure comprehensiveness of IRM service, client analysts should develop points of contact throughout their users' organizations

- Publicize IRM Services -- IRM should periodically publicize its services and products through user meetings, newsletters, and user group activities

- Provide Formal Feedback -- The client analysts should consistently provide formal feedback to the Bureau management regarding IRM decisions on the priorities for development and user requests

Increase On-Site User Support Services to USAIDs

AID Should Increase the Level of On-Site User Support Services to a Minimum of Two Person-Weeks Annually, Per USAID, to Address Internal USAID and Project Automation Issues

Long-Term Agency Benefits

- Strengthened USAID automation planning resulting in environments that meet user needs and produce maximum return on information technology investments
- Institutionalization of Agency-standard software and procedures through personalized installation and orientation
- Increased ability to end-users to meet their own needs due to expert demonstration and consultation
- More effective use of automation resources in AID projects

Current Environment

User support services to USAIDs are provided through a combination of means, including telephone calls to M/SER/IRM technical staff, periodic workshops and site visits by M/SER/IRM, and in Africa, periodic site visits by regional IRM specialists. While this level of service is sufficient to maintain a basic operating capability, it is not sufficient to allow USAID's to realize the potential of their automation investments.

For example, USAID-performed automation planning is limited to hardware and software acquisition in the next year; little systematic, comprehensive planning occurs. Formal mission automation assessments, performed by M/SER/IRM analysts, do not occur frequently enough to meet systems planning needs.

The frequency of automation workshops, consultation, and training also should be increased. Although workshops delivered by M/SER/IRM staff on TDY are well received by the field, they are not held often enough to meet user demands. The majority of automation training is provided by the USAIDs, and is mainly on basic word processing operations; little advanced training on applying commercial or Agency-developed software to USAID operations is provided.

...Increase USAID User Support...

USAID systems managers do not have sufficient time to provide troubleshooting and technical assistance to the majority of USAID end-users. Informal assistance provided by USAID staff who are computer-proficient, while useful, is not always sufficient nor is it available in all USAIDS.

In recent years, AID also has increasingly included automation as one of the significant components of its foreign assistance projects. In response to the need of AID project officers for support with project automation component planning and implementation, M/SER/IRM provides service through a central unit in AID/W and through an IRM specialist posted in a regional office in Africa. Although effective, the level of support provided only meets a portion of the need, most of which is unstated because project officers are unaware of support availability.

Based on interviews, it appears the majority of program development and project officers have little or no automation planning or management experience, and feel unqualified to critically review contractor designs for project automation components or monitor implementation.

Although current Agency policy requiring M/SER/IRM approval of project automation components whose life cycle costs will exceed $100,000 is apparently begin observed, it flags projects too late in the design process to permit practical intervention in all but the most problematical cases. While this policy thus provides some insurance against major project automation problems, it does not readily promote constructive design assistance.

Recommended Five-Year Initiative

As the recent experience of an IRM specialist posted in REDSO-ESA clearly demonstrates, USAIDs need and want automation support services both for internal USAID and project automation problems. It is also clear that effective service delivery requires regular contact to build working relationships and to develop an understanding of the USAID and host country environments, and program objectives. Experience shows, for example, that USAID program personnel will begin to request assistance with project automation issues if the IRM analyst becomes known, either through internal USAID activities or through attending period program planning meetings to offer project automation assistance.

The recommended strategy for increasing user support services to USAID's consists of the following initiatives:

1. Post Between 6 and 10 IRM Specialists in the Field

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...Increase USAID User Support...

2. Develop a Service Program

3. Ensure Analysts Have the Requisite Skills

4. Conduct an Analysis of Automation in AID Projects

1. Post Between 6 and 10 IRM Specialists in the Field

Based on experience, a minimum of two person-weeks of annual assistance per USAID is estimated as necessary to build the relationships and local understanding, and provide meaningful services on both USAID and project automation problems. More time is necessary for larger USAIDs. To achieve this level of service, a minimum of six (6) field-based IRM analysts is required, assuming each analyst travels 50 percent of the time.

2. Develop a Service Program

While outposted IRM specialists should tailor their services to USAID need, there is need for an overall service strategy that includes standard services, also. Recommended services included:

- Mission automation assessment and planning
- Automation training needs assessment and planning
- Information analysis of applications needed, including local USAID applications and broader program reporting applications proposed by AID/W
- Building of USAID capabilities for end-user computing
- Introduction of Agency-standard systems, e.g., USAID project management and administrative software, new Agency telecommunications software releases, and new program reporting systems
- Project automation component planning and consultation

...Increase USAID User Support...

Technical support for Wang VS operations, procurement support, and other technical matters should continue to be provided centrally by M/SER/IRM

3. Ensure IRM Analysts Have Requisite Skills

The strategy of increasing user support services to USAIDs will not succeed unless IRM analysts providing the support each has a broad base of skills. Besides experience in delivering the services identified above, analysts should have baseline knowledge of the following:

- USAID operations, including administrative, financial, and programmatic
- Agency-standard USAID software and standard commercial PC packages
- PC and VS operations
- Network configuration and operations
- Management analysis, including organization, work flow, information and related analyses
- Client handling techniques

Analysts need to be able to work independently. To provide analysts with the necessary skills, M/SER/IRM should make careful staff selections and provide classroom and supervised on-the-job training. AID should consider selection of PSC personnel for these positions as a means of minimizing impact on direct hire ceiling levels.

4. Conduct a One-Time Analysis of Automation in AID Projects

AID has estimated that tens of millions of dollars have been spent on automation assistance in AID projects. Although individual projects are evaluated, no comprehensive review of AID's experience in project automation has been conducted. Such a review could provide important lessons learned for future project automation efforts. To conduct such a review, AID should:

- Compile results from evaluations of projects with automation components

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...Increase User Support...

- Interview project and program development personnel involved with successful and unsuccessful automation components

- Analyze the factors associated with success and failure, and document and disseminate them to program development and project officers

Strengthen AID Information Resource Planning at the AID/W Bureau and USAID Levels

AID Should Institute a More Structured Process for IRM Planning at the AID/W Bureau and USAID Levels, Along with the Introduction of Database Management Systems, Focused on Information Systems as well as Hardware Needs

Long-Term Agency Benefits

- More efficient use of software development resources through integrated systems designs that minimize redundancy within and among Bureaus, and USAIDs

- Increased consistency between Bureau and Agency IRM Objectives through Coordination of Plans

- Increased Ability to "Manage" User Expectations for Systems through More Open Communication of Agency Priorities and Resource Availability

Current Environment

Bureau-level IRM planning in AID/W generally is an informal process with a one-year horizon that coincides with the Agency's annual budget process. The plans are largely hardware-oriented. With several exceptions, annual Bureau IRM planning does not occur in the context of longer-range Bureau systems development plans. As requests for systems surface from Bureaus, they are considered by M/SER/IRM in relation to other requests and Agency need. While there is a formal process for systems development services, the overall resource allocation process is not documented for communication to the Bureaus, who consequently do not always feel involved or informed about resource allocation decisions or the status of their requests.

The primary reason why the AID/W IRM planning process has evolved this way is the legitimate concern that more extensive planning would raise user expectations to unrealistic levels and cause greater disappointment. A contributing factor is that the Bureaus do not all have a sufficient internal organization and process for identifying Bureau needs and priorities, and thus, make uncoordinated requests.

USAID IRM planning, also, is largely an annual budgeting process focused on hardware needs. Because USAIDs themselves determine the level of their resources to be allocated to information technology, the process does not involve the degree of

M/SER/IRM decision making as for AID/W users, whose resources are centrally budgeted. USAID annual IRM plans, to some extent, are developed in the context of a longer-range plan, for USAIDs which have had a formal mission automation assessment or special plans developed by M/SER/IRM. Roughly one-third of the 70-odd USAIDs have had an assessment, and the cycle is to conduct an assessment every three years, although the at current pace the cycle will be every five years.

Recommended Five-Year Initiative

As the Agency's data administration program is implemented and efforts are made to develop "corporate" databases and applications, AID would be better served by a more structured IRM planning process, especially in AID/W. A more structured process would involve more comprehensive and longer-term needs analysis than currently is conducted, and thus, provide a better opportunity to consider Agency-level commonalities among plans and prioritize their importance to the Agency. It would also provide an opportunity to consider the information needs of Regional Bureaus and their USAIDs in an integrated manner, to minimize redundancy in the data USAIDs must generate for their own management as well as Bureau management and reporting.

As AID information systems users have become more sophisticated about information management, their demands for systems usually have grown. The current informal process is likely to lead to increasing user frustration if not changed. A more structured and open planning process would not necessarily raise expectations but could instead be an effective vehicle to manage them. Resource levels to meet the needs expressed through plans, of course, will be as important a factor as the planning process in managing expectations. This planning initiative could provide better information about the level of resources needed for information management.

The steps described below present a conceptual design for a more structured Agency IRM planning process. Rather than implementing the process Agency-wide, it should initially be implemented for individual Bureaus or major offices, in similar fashion as the recent Office of Procurement strategic plan was conducted. USAID needs should be considered in relation to Bureau needs as part of this process; USAID-specific needs are addressed as separate initiatives in this five-year strategy. The four major steps of the planning cycle are:

1. Develop the Infrastructure for Bureau Planning

2. Develop Five-Year Bureau Implementation Plans

3. Consolidate Plans into an Agency-Wide Implementation Plan

4. Revise Plans Annually

1. Develop the Infrastructure for Bureau Planning

Institutionalizing a more structured IRM planning process will require several years, at least, to establish the roles and working relationships necessary between M/SER/IRM and the users, and within the user organizations. M/SER/IRM client analysts should be the catalyst in this infrastructure development, to:

- Strengthen the interface between the client analysts and the Bureaus--Client analysts must develop a thorough understanding of their assigned Bureaus' business to be effective in planning assistance. They must also develop working relationships with managers throughout the Bureaus, and especially with those influential with top Bureau management.

- Assist the Bureaus to plan--Client analysts should assist their Bureaus to develop internal organizations and networks for IRM planning and operations, in cases where such networks do not currently exist. However, the majority of the commitment required must come from the Bureaus, themselves, in the form of:

  - Bureau staff time in its various offices to participate in planning and systems management meetings

  - Designation of Bureau points of contact with sufficient perspective to address Bureau information system needs

  - Bureau management attention to major IRM planning decisions, similar to the attention paid to non-IRM issues of Bureau management significance

2. Develop Five-Year Bureau Implementation Plans

In cooperation with M/SER/IRM client analysts, each Bureau should develop a comprehensive IRM strategy and implementation plan. Steps required to accomplish this include:

- Assess Bureau's current IRM environment--Current information systems, hardware, internal organization and support, level of staff training should be analyzed

- Determine information needs--Needs for information should be identified in relation to Bureau operations and decision making

- Prioritize needs--Information system needs expressed by Bureau organizations must be prioritized by the Bureau management

- Formulate draft plan--Based on prioritized needs, a draft plan should be developed specifying the applications, equipment, support, training, and other resources required

3. Consolidate Bureau Plans into an Agency-Wide Implementation Plan

M/SER/IRM should consolidate the draft Bureau plans into an Agency-wide expression of IRM needs and manage the process for determining Agency priorities. Major steps include:

- Consolidate and analyze plans--M/SER/IRM should consolidate the Bureau plans for review, identifying the Bureau priority rankings; it should also identify information systems needs that are common among Bureaus or could have an impact on USAIDs

- Recommend Agency priorities--M/SER/IRM would recommend Agency priorities for systems initiatives to Agency management, as currently handled or as revised

- Provide formal feedback--After Agency priorities have been determined, Bureaus should receive feedback on which initiatives are likely to be undertaken, and when, and which are not

- Finalize the Agency-wide plan--The final plan should provide M/SER/IRM and the Bureaus with an estimate of the information system development priorities for the coming five years

4. Revise Plans Annually

Once the base five-year implementation plan is established, the level of effort required for annual updating will be minimal unless there are major new programs or Agency initiatives that have an impact on information systems, including changes in the Agency's information systems technologies. A similar consolidation, review, and feedback process should be carried out for the annual revisions to the plan, as described above.

V. Organizational Strategy

Organizational Strategy

The AID organization for IRM services includes the program manager and policy agent, M/SER/IRM, the AID/W user bureaus and offices, and overseas users, principally USAIDs. In general, the organizational structure for IRM services throughout AID is sound. Nonetheless, several adjustments should be made to accommodate the five-year strategy:

M/SER/IRM

- A data administrator unit and the positions of Data Resource Manager, Data Dictionary Administrator, and Database Administrator should be created to implement the recommended agency data program. The Data Resource Manager should report to IRM Special Projects or the OIRM Deputy, but not to an existing division due to role conflicts.

- A telecommunications functions should be established to update the Agency's telecommunications architecture, develop and implement systems, and manage communications -- in the near term, ICS traffic; and in the longer term, AID/W LAN traffic.

- Additional overseas-based client analyst positions should be created to provide USAID user support, including project automation component planning assistance. These analysts should report to IRM/MPS.

- The organizational roles of and division of labor between IRM/MPS and IRM/MSC for USAID software development recommended in the five-year strategy should be clarified.

- IRM/WS should consider organizing its systems development contractor along client lines, as MPS client analysts are organized, to promote continuity and understanding of client environments, as practical.

AID/W USER BUREAUS

- With the assistance of IRM/WS, AID/W user Bureaus should strengthen their organizational approaches to information resource management by the following, as applicable:

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...Organizational Strategy...

- Forming a Bureau-level information systems committee to determine bureau needs, set priorities, and work with IRM on planning and implementation

- Identifying information advisors within the Bureau -- persons senior enough to understand bureau programs and information uses

- Bureaus should provide staff to assume increasing responsibility for their information systems programs

USAIDs

- With the assistance of IRM/MPS and IRM personnel located overseas, USAIDs should strengthen their approach to information resource management by the following, as applicable:

  - Forming an information system committee representing all offices, to plan and budget for automation

  - Identifying USAID personnel proficient in various aspects of information systems who might be consulted by other users

  - Ensuring that USAID employees understand the full range of information systems, resources, and services available to them, as relevant to their positions

AID INTER-BUREAU MANAGEMENT

AID needs a mechanism for addressing inter-bureau information resource management issues. This need will grow as the Agency's data administrator program approaches database design and development decisions. Through the lead of M/SER/IRM, with top-level support from AA/M, an inter-bureau group should take on a policy decision making role for the Agency data administration initiative. The AA/M and M/SER/IRM should continue efforts to foster inter-bureau management involvement in strategic Agency information resource planning and decision making.