

**MANAGEMENT INFORMATION SUPPORT
OF THE NATIONAL INVESTMENT BOARD
OF THE GAMBIA**

Report by
George E. Hubler, Jr.

Center for Privatization
2000 Pennsylvania Avenue, N.W. Washington, D.C. 20006

Project No. 112

March 1989

Prepared for the Bureau for Private Enterprise
U.S. Agency for International Development

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Mr. Hubler has a BA in Economics, an MA in Computer Sciences, and has completed doctoral work in Information Systems, Operations Research, Organization and Management, and Finance.

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March 28, 1989

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Gentlemen:

On behalf of the Center for Privatization (CFP), I am pleased to present our final report on the Management Information Needs of the National Investment Board (NIB), the Gambia. The study upon which this report is based was carried out in accordance with Divestiture and Privatization Project 940-0008: National Investment Board.

Please note that the report is divided into two phases/volumes:

- Phase I--which carries out an Information System Needs Analysis of the NIB and certain of the State Owned Enterprises it monitors.
- Phase II--which is the Terms of Reference/Scope of Work for a follow-on project to improve/develop the management information systems supporting the NIB and the enterprises.

As you are aware from your review of draft copies of the report, it was expanded at the NIB's request to include not only the Gambia Produce Marketing Board (GPMB), the Gambia Port Authority (GPA), the Gambia Utility Corporation (GUC)--but also to include three additional enterprises with which the NIB will be negotiating performance contracts in the near future. These additional enterprises are the Gambia Social Security and Housing Finance

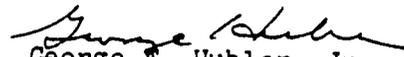
Corporation (SSHFC), the Gambia Public Transport Corporation (GPTC), and the Gambia Telecommunications Company (GAMTEL). They are included in an addendum to the Phase I/Volume I Report.

On behalf of the Center for Privatization, I would like to express my appreciation for the cooperation and guidance you provided me with on this study as well as my thanks to the Chief Executive Officer of the NIB and the management of the enterprises studied for their assistance.

The Center would be pleased to support your future efforts to carry out the follow-on work.

If you have any questions on the reports or any related matters please contact me on the management of the Center for Privatization.

Sincerely,



George E. Hubler, Jr.
Consultant Center for Privatization

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I. INTRODUCTION

Background

In accordance with the National Investment Board (NIB) Act of 1977 (as amended in 1986) the role of the NIB is to monitor and supervise the management and operations of the state-owned enterprise systems (SOE's). From an organizational structure standpoint, "the foundation for progress made during recent years was laid in 1984 when NIB embarked on a new direction. As a part of the internal reorganization of the office, three units were established: Monitoring and Supervision, Investment Promotion, and Management and Staff Development."^{1/} This is the organization that is in place today as illustrated in the chart on the following page.

Another key element in the foundation for effective and efficient operation of the SOE's (State Owned Enterprises) and for monitoring by the NIB was developed in a series of reports by Coopers & Lybrand Associates that was completed in the 1976 timeframe. This resulted in a performance contract approach to management. As envisioned by Coopers & Lybrand, the performance contract system would have the following components:^{2/}

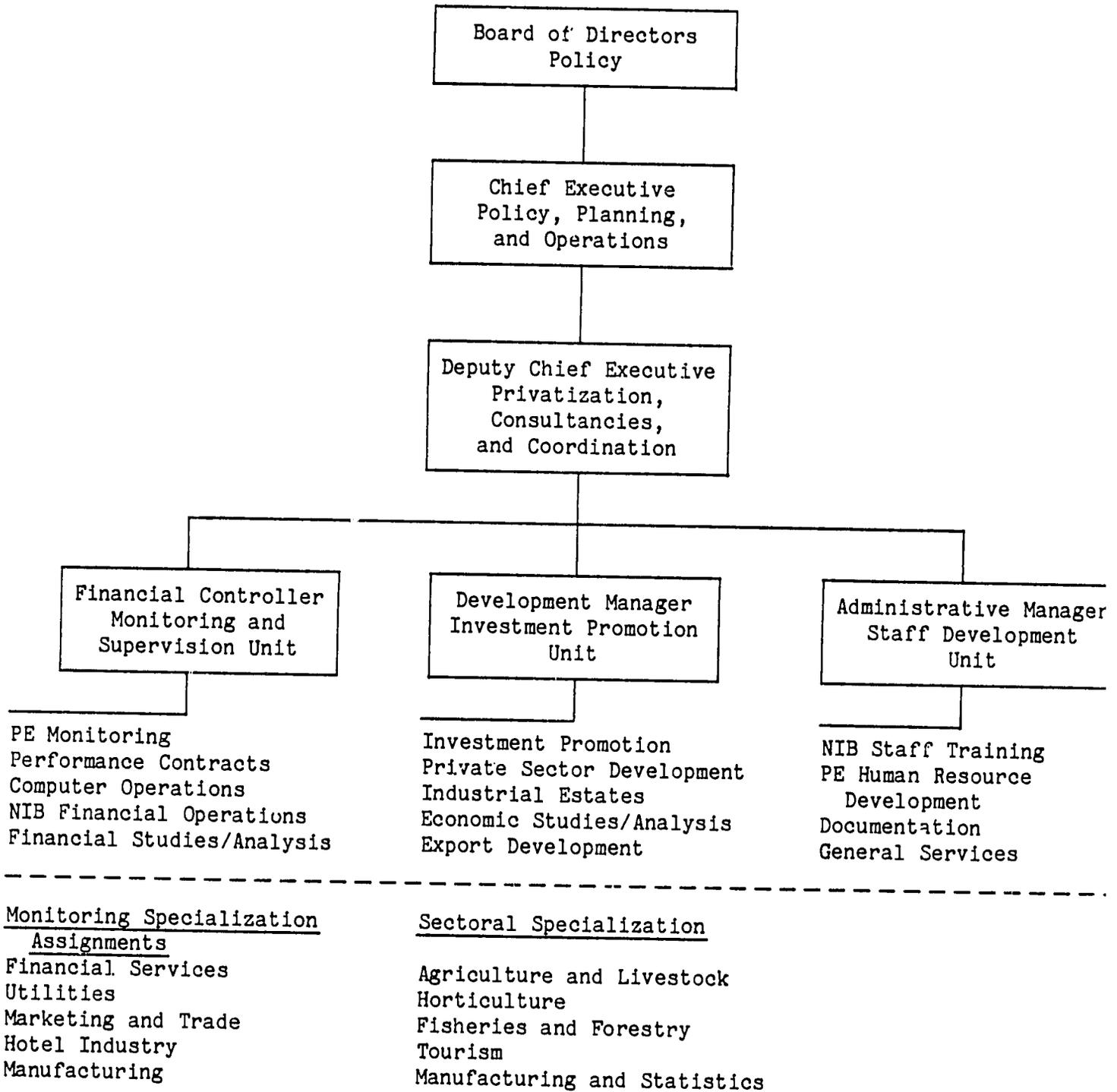
- A quarterly financial and operational report to be submitted by the SOE's to the NIB within six weeks of the end of each quarter's operations in a format agreed to between the NIB and the Enterprise. These reports include:
 - a. A profit and loss statement, showing actual performance against budget for the quarter and year to date, and a forecast for the full year.
 - b. A balance sheet drawn up on the last day of the quarter.
 - c. A cash-flow forecast for the next 12 months.
 - d. A report on the completion of capital projects compared to budget.
 - e. A report on the achievement of performance targets.

^{1/}From Report of Activities of the NIB, July 1985-June 1987, Pg. 1.

^{2/}From Coopers & Lybrand Associates Reports of 1986 related to performance contracts for the GPMB, the GUC, and the GPA.

Chart I

THE GAMBIA NATIONAL INVESTMENT BOARD
ORGANIZATION AND FUNCTIONS



- f. A report written by the Managing Director on progress achieved in implementing strategies and explaining the causes of major variances from budget and the most important trends of the quarter.
- An annual report to be submitted by the Enterprise to the NIB within three months of the end of the financial year. This report incorporates the annual audited accounts of the Enterprise.
 - An Annual Budget (in draft) and Three-year Plan to be submitted by the Enterprise to the NIB.

Upon receipt of the quarterly reports from the Enterprise, the NIB in turn is required to report quarterly to the Office of the President on the performance of the Enterprise against the approved plan and budget.

Subsequent to receiving the audited annual accounts for the Enterprise, the NIB is required to report on the Enterprise's performance over the year, highlighting:

- a. Performance against the specified performance targets.
- b. The causes of any major variances from the approved plan/budget figures.
- c. The impact of external factors on the Enterprise's performance and in particular the impact of government measures on performance; and recommendations on incentives or sanctions to be applied.

The NIB is required to send the above report to:

- a. The President;
- b. The Cabinet Committee;
- c. The Enterprise; and
- d. In summary form to all members of Parliament.

It is important to note that in the draft performance contracts (and in the final negotiated agreements/contracts) for the Gambia Produce Marketing Board (GPMB), the Gambia Utilities Corporation (GUC), and the Gambia Ports Authority (GPA) the need for an effective management information system is emphasized. In point of fact an effective management information system is a keystone of the performance contract system and it will not work effectively without one. This is due to the fact that adherence to performance criteria,

and resulting incentives or sanctions can only be judged through the provision of accurate information on the management and operations of the SOE's.

The National Investment Board laid the groundwork for a management information system to monitor the performance of the SOE's by participating in a USAID study (IOQ contract No. PDC 0085-I-00-6096-00--awarded to Management Systems International). This study was carried out when performance contracts with the GPMB, the GUC, and the GPA were still under initial negotiation. This study undertook a program with the following objectives:

- a. To translate the trial performance contracts into a statement of information needs.
- b. To train NIB personnel in information systems in general and LOTUS 1-2-3 in particular.
- c. To concentrate, in a prototype effort, on helping GPMB to use their accounting systems for providing automated information to the NIB and to teach GPMB personnel COBOL and the systems design skills necessary to prepare reports required by the NIB.

The above study and action plan carried out, over a period of approximately three months, by Management Systems International was not successfully completed or implemented (as will be specified later in this report) and the NIB and USAID have determined that a further action-oriented study is necessary. The scope of work of this extant study is outlined in the next section of this document.

Statement of Work--Scope of Services

In this Divestiture and Privatization Project (940-0008): National Investment Board, the Center for Privatization (CFP) consultant will:

1. Work with the staffs of the NIB and the SOE's to assess their information systems, including hardware, software, and training of personnel in the use of these systems. This analysis will take into consideration the reporting requirements specified in the performance agreements and NIB's present and future monitoring responsibilities.
2. Based upon the above assessment, work with the NIB and the SOE's to identify what needs to be done to ensure that an effective management information system can be implemented.

3. Specify what kind of technical assistance is needed to design an effective management information system; what kind of technical assistance, software, and training is required to implement the system; and what kind of training, software, and if necessary hardware, is needed to maintain the system.
4. Draft, in consultation with the NIB, a scope of work for a team of technicians who will provide the appropriate expertise to design a management information system as well as to assist and train NIB and SOE's personnel in effectively using it.

The final scope of work will be presented to USAID for use in requesting additional technical assistance in implementing the report.

Approach to the Study

The Center for Privatization (CFP) consultant carried out this study in two phases:

- Phase I: Need Analysis.
- Phase II: Draft Scope of Services to Design a Management Information System

In undertaking this work, we kept the following guidelines in mind:

- The MIS must support the overall strategic goals and three-year plans of the NIB and the SOE's subject to the performance contract agreements. As with any effective information systems plan, this one will be firmly tied to the organization's goals and objectives. Corporate plans have not yet been prepared by the enterprises. (It would help in the follow-on organizational work if these plans were developed before it took place. This, however, is probably not possible.)
- The MIS plan developed should position the NIB and the SOE's to make the best use of expected development in technology.
- The MIS plan must reflect the legal, political, social, and organizational environment in which the NIB and the SOE's operate.

Accordingly the CFP analysis and the resulting scope of work and plan include:

- a. The information requirements of the organization-- current and projected.
- b. The people who collect, store, process, and use information and their training.
- c. The technologies that serve as the tools to make it possible to collect, store, process, and use this information.
- d. The policies and procedures that are needed to integrate the above three resources--information, people, and technology into a smoothly functioning operation.

With this introductory material as a background, we are now ready to move to the analysis of information needs in those organizations subject to this study.

II. INFORMATION SYSTEMS NEEDS OF THE NATIONAL INVESTMENT BOARD

Current Computer Systems--NIB

A. Hardware

At present the NIB has the following hardware:

1. An IBM PC XT with a color monitor and an Epson FX100 printer. They are located in the computer room.
2. An IBM PC XT compatible or clone with a color monitor. It is located in the computer room.

Note that the two above PC's are operable as standalone computers.

3. An IBM PC Compatible System 2. This computer did not function properly and was returned to the vendor in London.

The System 2 clone was to act as a file server for PC AT's and XT's, which would be networked. It was planned that the network would include computers (Delta Gold) that would serve the needs of the NIB management team to include the Chief Executive Officer (CEO), Deputy CEO, Development Manager, and the Financial Controller. Due to the problem with, and return of, the PS 2 clone the network is not operational. The computers are, however, usable as standalone microcomputers. In summary, the network plan was a good one, that failed due to hardware problems.

B. Software

At present the NIB has the following software:

1. Operating software for the PC clones is MS DOS 3.1, with concurrent DOS planned for the PC System 2 clone/compatible.
2. Software packages include LOTUS 1-2-3 (spreadsheet); Wordstar and Officewriter (word processing); Harvard Graphics; and dBASE III plus (a database management system). The NIB also has access to Harvard Project Planner (project management system); Word Perfect (word processing) and Data Gold Collection (an "integrated

software package" that includes a document service, a database, a spreadsheet, communications, and a help menu).

3. Application programs in use in NIB include:
 - a. A Quarterly Report Application for reports from the following State-Owned Enterprises that the NIB monitors:
 - The Gambia Produce Marketing Board (GPMB).
 - The Gambia Ports Authority (GPA).
 - The Gambia Utility Corporation (GUC).

Problems with Current NIB Hardware:

1. The IBM PC XT and XT clones operate satisfactorily on a standalone basis, with the exception that it would appear necessary to have up to 40 MB of fixed disk storage to accommodate the needs of monitoring additional SOE's. For example, it is planned that the next increment of SOE's to be monitored on a performance basis include the Social Security and Housing Finance Corporation (SSHFC), the Gambia Public Transport Corporation (GPTC), and the Gambia Telecommunication Company (GAMTEL). The point is that the follow-on work should include a capacity study for memory, disk storage, speed, print capability, etc., for this expanded role.
2. As was indicated previously, the PS System 2 compatible could not be "brought up" satisfactorily and was returned to the vendor in London. This matter is pending possible litigation and is being discussed by NIB officials with a representative of the Attorney General. It was acquired under a hardware/software package contract at a approximately cost of 15 thousand pounds. The system has been paid for. In the scope of services for the follow-on study, one of the procedures to be developed will be a system of paying for hardware and software after it has been demonstrated at NIB or SOE's data and is certified by the purchasing agency as working acceptably.

3. There is no "standard configuration" for microcomputer acquisition in effect in the NIB or the SOE's whose performance it is monitoring. Such a standard configuration would promote compatibility and facilitate the timely receipt of quarterly and annual reports and reduce redundant keying on entering of data. This should be an item for further study. An example of standard configurations that should be analyzed further will include:

System Units

- a. Microcomputer PC-AT Model 5170-319, 339, or clone
 80286 processor, 512 KB RAM, 8MHz
 40+ MB fixed disk
 1.2 MB diskette drive
 1 parallel--1 serial port
 PC-DOS 3.1
 Choose standard or enhanced keyboard
 Optional: 80287 math coprocessor
- b. Microcomputer IBM PS/2 Model 80 (8580-41, 8580-071, or 8580-111)
 80386 processor which runs at 16 MHz in 8586-41 and 8580-71 and at 20 MHz in 8580-111
 Up to a 70 MB fixed disk
 At least 2 MB RAM (a minimum of 4 MB is necessary should the agencies acquire the OS/2 operation system)
 Up to 7 expansion slots
 MS DOS or OS/2 operating system
 Optional: 80387 math coprocessor
 A graphics board for use with OS/2

In developing a microcomputer standard configuration, a hard look should be taken at whether to acquire IBM Personal System/2 Models 70 and 80 (such as has already been acquired in the GUC). This is due to the fact these high-end PS/2 models suffer from an inherent incompatibility with existing "other" microcomputers due to the PS/2's unique microchannel architecture (MCA). Although in the future MCA may provide performance benefits, it does not do so without the OS/2 operating system and suffers from their being few application software packages available for it at this point. Thus, users of PS/2, Models 70 and 80, are paying top dollar to run them under DOS and are getting no real performance benefits. In this regard it should be noted that major AT compatible vendors market OS/2 ready systems with comparable performance to the PS/2 at much lower price. This issue should be further explored and decided in developing configurations in the next phase of the study (the follow-on work).

D. Problems with Current NIB Software

The Delta Gold Connection Integrated Software Package is not the optimal package for NIB's needs (or for the SOE's). In general an integrated software package is a good concept, inasmuch as it allows you to do a number of things at once to include working with multiple documents, spreadsheets, and communications terminals. It allows you to interrupt one task for another and return to where you left off. In addition, it makes it easy to share information between databases, documents, spreadsheets, and communications devices. The problem with integrated software packages is that they have a lot of overhead (require a lot of computer capacity) and generally are not as powerful as individual spreadsheets, database, word processing, and communications packages. Delta Gold "suffers" from the maladies just described. There are more efficient integrated software packages on the market to include Framework and LOTUS Symphony which contains the most powerful spreadsheet available in integrated software packages (it is based on LOTUS 1-2-3, the industry standard). It "dynamically" integrates functions so that when you change your spreadsheet data, your accompanying graph of that data and your memo continuing the same numbers automatically reflect the changes. Even though Framework and Symphony are superior to Delta Gold they are still not as powerful and efficient as "standalone" or single purpose spreadsheet, word processing, and graphics packages. Accordingly, other approaches to linking a spreadsheet with a database must be considered. They will be discussed below.

As was mentioned, there are other approaches to linking spreadsheet and databases (which is essential for efficient and effective financial reporting in NIB). For example, Software Corporation's VP Planner (a spreadsheet) has the ability to read and write dBASE files in addition to containing its own proprietary, multidimensional database module. Now other spreadsheet companies, to include LOTUS, have recognized the need for a database connection and are making it a part of their product lines. These new offerings are based upon the use of a Standard (or Structured) Query Language (SQL) interface. This makes possible asking the database questions in an English like language. Thus a person with very little programming experience can design and write an acceptable application. In a spreadsheet that supports SQL you could place an SQL statement in the spreadsheet cell in order to pull in the number you want from an external database located almost anywhere and running under almost any operating system.

LOTUS is now completing work on two products that will make possible the connection of 1-2-3 to other computers via SQL. One of these products is LOTUS DBMS, which is actually a family of products that will run under the OS/2 Presentation Manager package. LOTUS DBMS will include front-end graphical tools and a local database server using SQL. Its graphical tools will allow users to browse through databases, update files, and design new databases without procedural programming. Most importantly it allows moving data between a database and the spreadsheet without conversion or reformatting.

Another LOTUS product (and another option to connecting a database and a spreadsheet) called Blueprint is a data access architecture that allows you to write a "driver" (a simple program) to connect a database management system to the LOTUS spreadsheet.

Suffice it to say here that NIB (and the SOE's) will need a way to link spreadsheets and databases (a capability they do not now have). In this section of the report we indicated that the Delta Gold Connection (which has been procured by NIB) integrated software package (but is not being used) is not a particularly good solution. We further offer other packages, such as LOTUS Symphony as supers to Delta Gold Connection (but not as effective as simple purpose packages) and alternative SQL-based approaches all these alternatives should be explored and a recommendation made in the follow-on work.

E. Operational/Reporting Problems

On behalf of the NIB's Chief Executive Officer, the Financial Controller NIB forwards a good quality summary of performance contracts to the Secretary-General--President's Office. These provide a summation by function of the profitability (or lack thereof), cash flow, and employment of the GPA, GUC, and GPMB. Unfortunately, this task is made difficult due to the late submission of reports by the SOE's and the fact hardcopy data must be reentered or rekeyed for NIB summations. In short, NIB receives manual and not automated reports and an MIS does not really exist. Coupled with proper adherence to reporting deadlines, compatible computer systems (or bridge/protocol technology--ways of linking incompatible systems through communications) between the NIB and SOE's could reduce the work required of the Financial Controller NIB, reduce redundant keying of data and provide for meaningful and accurate management decision data, in accordance with the terms and spirit/intent of the performance contacting system.

F. Local Area Networks

Local are networks (LANS) as the name implies are systems for linking and sharing software programs, databases, and resources such as high capacity disks and high speed printers or other peripherals that are too expensive for each microcomputer. Thus LANS are a way of maximizing the use of computer resources and important to the future of the NIB and the SOE's.

As a part of the "Delta Gold Project," NIB initiated the wiring of offices for a LAN. This project was put on hold due to the failure of, and return to the vendor, of the file server. Thus, there is an opportunity in follow-on work to determine the proper topology for networks for the NIB (bus, star, or token ring) and the proper transmission media (twisted pair wire, baseband axial cable, or broadband coaxial cable). The definition of these terms and their general advantages/disadvantages are illustrated in

Appendix A. Recommendations as to which topology, transmission media, and even specific LAN product should be a part of the scope of work for the follow-up study.

G. Other Problems and Possible Solutions

Other problems include the fact that Management Systems International set up NIB, GPA, GUC, and GPMB as one file. Separate files are a more appropriate approach. Thus, the file structure to be used should be a subject for further study.

In addition, database management and administration is a problem. In follow-on work, alternatives that should be considered include: file managers, forms-oriented relational databases, and or programming-oriented relational databases, as well as linkages to a spreadsheet that were previously discussed.

Also, text processing needs to be made more efficient and effective; a user-friendly approach to storage and retrieval of information should be developed; and a package for investment appraisal acquired.

In the long range, electronic connectivity between the NIB and the SOE's should be planned. In the short range, "disk exchange" from compatible systems should be considered in the follow-up study.

Finally, disaster recovery procedures for the NIB and SOE computers should be reviewed in the follow-on work.

H. Status of Information Systems Training in NIB

Formal training in computer systems is very limited. For example, Management Systems International stated it carried out training. This, however, was directed only at the GPMB. It included basic systems design and a very brief and practically useless COBOL orientation.

As relates to NIB, formal training for key users was less than 40 hours. Regardless of this fact, the Financial Controller has a good grasp of the concepts of modern computer science and a working knowledge of LOTUS 1-2-3. The computer specialist is using 1-2-3 in a training capacity. A few clerical level personnel have Wordstar or Officewriter word processing experience. The Financial Controller also reports a knowledge of the Paradox Database Management System (the most powerful DBMS on the market today) and has reviewed dBASE III plus and Word Perfect (as well as using Wordstar word processing).

While dBASE III plus, Harvard Graphics and Project Planner and Delta Collection software packages are available in NIB, personnel have not been trained in them and do not know how to use them.

The basic "training problem" in NIB is that only the Financial Controller has a good knowledge of systems and key software packages. More depth in numbers of personnel who understand basic systems must be attained.

It should be stated that the Financial Controller, as a part of attaining this systems depth, has asked the CFP consultant to evaluate the computer specialist for further training. In addition, and also on the positive side, the consultant witnessed in NIB a collective positive attitude and a willingness to use data processing, if proper training is made available. Thus a proper training program must be a part of the scope of work for the follow-on study. This should include the pros and cons of computer-based training (CBT), the proper mix of CBT with other training. As an aside CBT has the advantage of allowing learners to adopt instruction to their own pace. Once developed and installed, it is conveniently available whenever needed. It can also keep training costs at a minimum. On the other hand it assumes some moderate proficiency in computer use. A student who does not possess some computer literacy can easily become frustrated by such simple tasks as starting up the system, placing a diskette in the drive, loading the courseware, and even finding the return key. Thus CBT can only be used in the NIB and the SGE's after moderate proficiency is gained and it must be properly integrated with formal "human being led" instruction.

Finally, the scope for future work as relates to training should include:

- a. Applications recognition training for managers,
- b. Technical training for systems personnel.
- c. Operational training for day-to-day users of the equipment.

We will now turn to a review of the information systems in the State Owned Enterprises that were subject to the study.

III. INFORMATION SYSTEMS NEEDS OF THE GAMBIA PRODUCE MARKETING BOARD (GPMB)

Previous Relevant Comments on the NIB should be Considered to be a Part of the GPMB and other SOE's by Reference

In the write-up on information processing in NIB, comments were made on spreadsheeting, database management systems, word processing packages, integrated software packages, data communications, and local area networks. Generally, these comments on the pros and cons of these matters apply to the GPMB and the other enterprises.

Organization and Mission of the GPMB

There was no organization chart available in the GPMB. It was stated that it was being revised. The Finance Director provided the organizational information that the CFP consultant has developed into an organization chart on the following page. The objective or mission of the GPMB as stated in the performance contract is "to secure the most favorable arrangements for the purchase for export and sale of ground nuts and associated commodities." In order to carry out this mission, the GPMB utilizes eight depots throughout the Gambia. Thus, the collection of management information is somewhat complicated.

Current Information Systems in the GPMB

A. Hardware

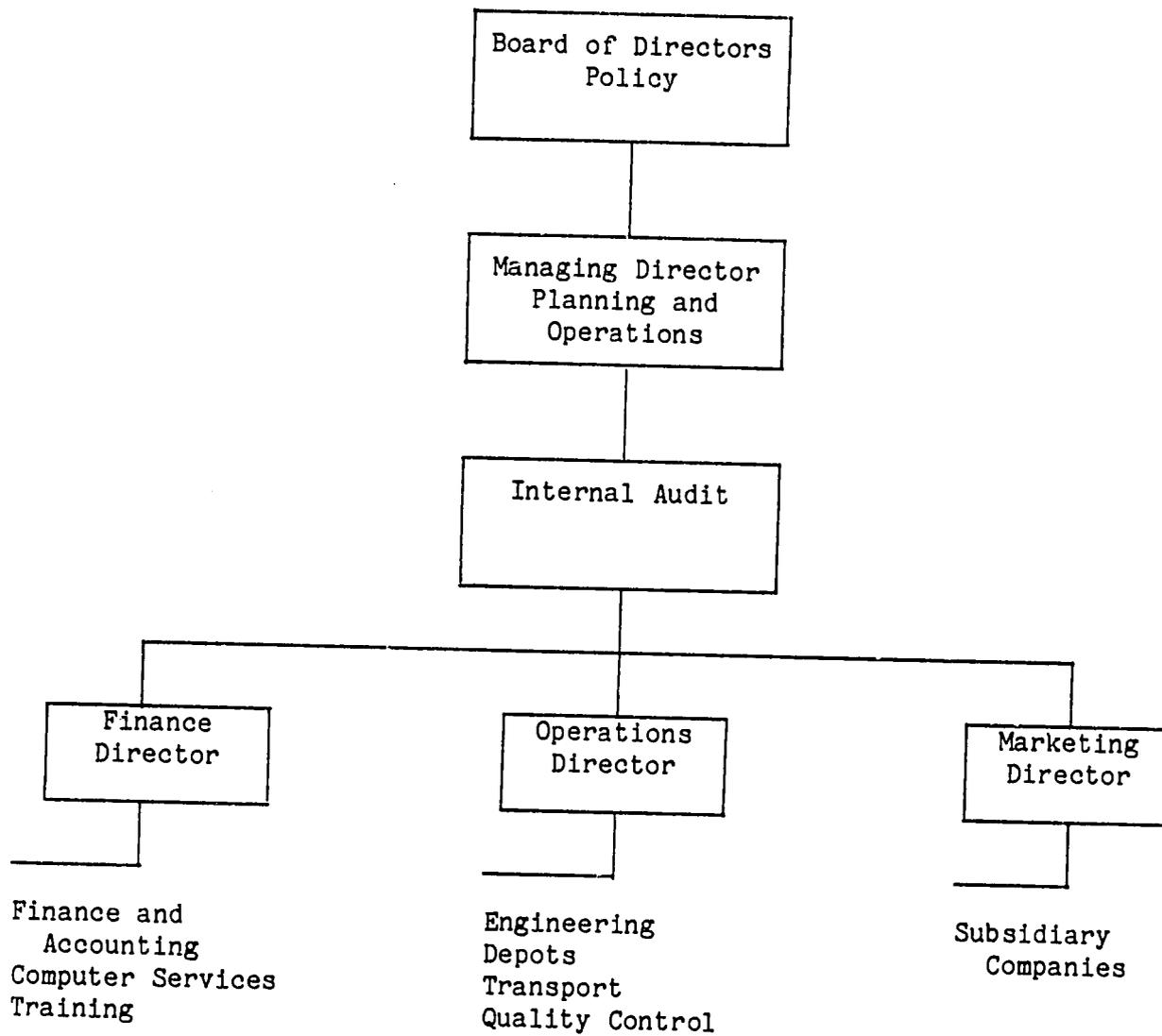
At present the GPMB has the following hardware:

1. An NCR 9300 mainframe computer which is considered Very Large Scale Integrated (VSLI) system that has a 32 bit addressable memory, which was unique when the system was introduced in the early 1980s. In other work when it was introduced it was a powerful mainframe computer. The system in GPMB has three work stations (terminals) in the computer room, one in the Finance Director's office and a console in the computer room. The storage media being used is disk and streaming tape drives.

There is also a band printer and an uninterrupted power supply (UPS).

Chart II

THE GAMBIA PRODUCE MARKETING BOARD
ORGANIZATION AND FUNCTION



2. Two IBM PC XT compatible microcomputers. These were not included in the report provided to the consultant by GPMB. One is in the Finance Director's Secretary's Office and the other in the area of the Managing Director Office. It was stated that these microcomputers are not used much.

B. Software

At present the GPMB has the following software

1. The operating system software for the NCR 9300 is the ITX operating system (Interactive Transaction Executive System). This is an interactive, multiprogramming system normally used in an interactive environment (which the GPMB is not). It is useful in an environment with skilled programmers (there are none assigned to this Enterprise). It is a somewhat old operating system, that last underwent major change over four years ago.
2. Assigned computer personnel received some very basic training in COBOL (the Common Business Oriented Language). The 9300 and the ITX operating system also supports the Basic and Pascal programming languages. They are not in use in GPMB.
3. The GPMB is currently using NCR's Payroll and General Ledger Application Software Packages. The NCR inventory package is on site in GPMB, but has not been installed. This Enterprise is considering automating the aforementioned inventory system as well as accounts receivable, payables, and fixed assets. There, however, is no plan or timetable for doing so.
4. The software for the microcomputers is an integrated package that includes word processing, spreadsheeting, database management, and communications. This consultant saw no evidence that it was in use or that people were trained to use it.

C. Problems with Current Hardware

1. The major problem is that the NCR is a mainframe computer. The needs of the GPMB could more effectively be met with microcomputers or networks of microcomputers. In 1989, microcomputers are sufficiently

powerful and much easier to use than mainframe systems. It is realized, however, that a considerable investment has been made in the NCR and in the follow-on work a program will be developed to try to optimize its use.

2. The maintenance contract which GPMB has with NCR is relatively expensive and "third party" maintenance must be examined in the next phase of this study.
3. GPMB reports problems of timeliness in obtaining service from NCR under its contracts. It is further reported that NCR Gambia does not have a complete stock of basic components in country and that systems can be "down" and not usable for extensive periods of time.
4. The fact that current microcomputers are not in use should be looked at in follow-on work and a program for their utilization developed, if possible.

Problems with Current GPMB Software

1. The Finance Director, who is responsible for supervisory computer operations has not received training in computer fundamentals and does not make hands on use of the system.
2. The fact that there is no plan or timetable for installing and using the inventory, accounts receivable, accounts payable, and fixed assets software.
3. The fact that the integrated microcomputer software is not used.
4. Documentation for the NCR application software could stand improvement.
5. The ITX system software is a relatively difficult environment for programmers to work in.
6. A strength of NCR in the United States is the NCR Software House Liaison Program which provides a list of over 2,500 programs available for the NCR 9300 and 9400 Systems. This is not available in the Gambia.

E. Operational/Reporting Problems

1. The reports required of the GPMB (to NIB) are submitted late. One of the problems causing this is late receipt of information by the GPMB from its depots. The ultimate solution would be to transmit these data electronically to the GPMB computer system. For example, in similar decentralized depots and similar facilities in the U.S., a code would be set up and touch telephones used in the depots to key the information over telephone lines that then would be "dropped" into a computer-based spreadsheet in the central headquarters. It is not believed that at this time that the telephone technology exists in the Gambia for this solution and it is known that the GPMB does not have the computer training necessary to make it work, even if the telephone facilities were in place.

In the follow-on work, a reporting format and timetable should be prepared for use in the depots. In addition, a program should be developed to bring about the use of computer-based spreadsheets in the GPMB Finance Department.

2. It should be noted that a 1986 report by Coopers and Lybrand Associates noted that accounts production is very irregular and not timely. This report also stated that the fixed assets register is maintained only annually which creates a problem for a quarterly reporting system. In the follow on, the continued existence or remedy of these problems should be verified since they impact on the development of an effective management information system.

F. Status of Information Systems Training in GPMB

By way of background, the GPMB was the prototype agency for the Management Systems International (MSI) consultants. These consultants stated that GPMB employees were trained in COBOL programming, systems analysis, and computer operations. This consultant's (the CFP consultant who drafted this report) could not locate any GPMB employee with a knowledge of COBOL gained through the MSI training. In addition, no systems analysis training or expertise was evident.

On the positive side the computer supervisor and a majority of the four employees with computer-related jobs demonstrated an enthusiasm for their jobs and a good understanding of the operation of the NCR computer and the installed software.

In the follow-on work a training program for the use of spreadsheets and word processing should be developed and the burden on the Finance Director reduced through training in the use of these "tools."

IV. INFORMATION SYSTEM NEEDS OF THE GAMBIA PORT AUTHORITY (GPA)

Organization and Mission of the GPA

The organization of the GPA is illustrated on Chart III. The mission or responsibilities of this Enterprise are to:

- Provision, operate, maintain, improve, and regulate the Port of Banjul and any other port in the Gambia.
- Provide pilotage and navigation services.
- Provide and operate ferries and river transport.
- Regulate the Gambian waters and river traffic.

The management information required of the GPA then is necessary to assist NIB and others in evaluating the performance of the port, the major ferries, and the provincial ferries.

Current Information Systems in the GPA

A. Hardware

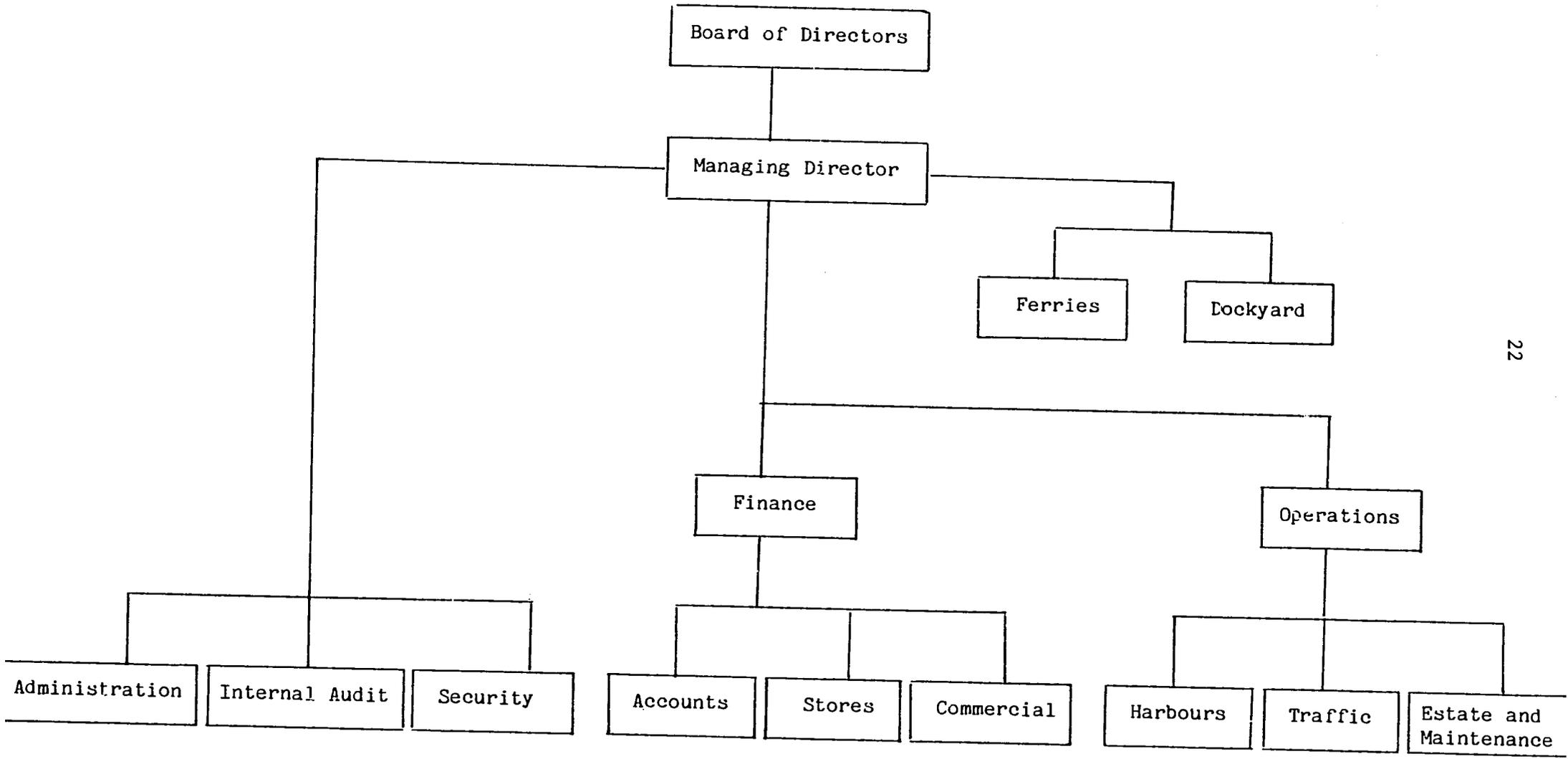
At present, the GPA has the following hardware:

1. An NCR 9400 mainframe computer. Basically, the same advantages and disadvantages documented for the NCR 9300 hardware in the GPMB apply here also.

The key difference is that the NCR 9400 shows a 50 percent performance increase over the 9300 (it is faster) and is targeted for the medium to large size computer user. (Neither of which GPA is at this point.) There are three workstations and a console in the computer room.

2. One WANG personal computer with a 20 MB hard disk and a WANG daisy wheel printer. (This is equivalent to an IBM XT machine.) This WANG PC has an IBM emulation package for running LOTUS 1-2-3. This PC is located in the GPA Financial Technical Advisor's Office and is used by him.

Chart III
THE GAMBIA PORT AUTHORITY ORGANIZATION



B. Software

At present the GPA has the following software:

1. The ITX operating system software described under the GPMB heading.
2. NCR sales ledger and general ledger application software has been installed, and there are general plans for transferring payroll and stores accounting to the computer.
3. The LOTUS 1-2-3 spreadsheet, WANG word processing, and WANG database management are available for the WANG PC.
4. The GPA has a "backup" computer agreement with Standard Charter Bank. This is a wise course of action.

C. Problems with Current Hardware

1. All the problems with the NCR 9300 listed for GPMB apply to the GPA's 9400. Principal problems include the fact that it is too large and expensive a system for GPA's needs, which could be met with microcomputers.

The GPA reports serious problems are created based upon the lack of adequate support from NCR.

D. Problems with Current Software

1. While the general ledger software package is installed, it is not currently being used. This may be related to internal problems with promptly "closing out," among others, as opposed to software problems. Needless to say, it causes additional manual work and late reporting.
2. There is a great reliance on NCR to solve software as well as hardware problems. This will be discussed in greater detail in the training section of this write-up.

E. Operational/Reporting Problems

1. There are no full-time personnel assigned to computer positions in the GPA. This puts information processing in the position of being an additional duty that is not very high in priority.

2. Data or information processing does not exist as a separate organizational entity in the GPA. Thus, there is no institutional stability. The point must be gotten across in follow-on work that information processing and management information will not be accomplished successfully in the GPA unless there are full-time computer personnel, properly trained, at an appropriate grade level, and in a data processing section of division.
3. Information does not appear to flow properly to elements in which it is needed in the GPA organization. It is difficult to install an effective MIS in this type setting.
4. Difficulty is being encountered in closing accounting records for audit.
5. There is no systematic approach to keeping records that verify and "track" an individual's employment. This makes accurate tracking of employees and payments difficult. A budget position tracking system could be explored (along with the tightening of payroll records) in follow-on work to try to rectify this problem.

F. Status of Information Systems Training in GPA

1. As relates to the NCR 9400, three persons were trained as operators. One is currently in the U.K. (in school), another has not grasped and applied the training, and thus, only one operator on site has the necessary basic skills.
2. The Financial Technical Advisor is adapt at using the LOTUS 1-2-3 on the WANG PC and has developed a useful inventory of applications for reporting to the NIB.

In summary, the computer training in GPA and data processing experience is at a low level and would have to be bolstered in any follow-on work.

V. INFORMATION SYSTEM NEEDS OF THE GAMBIA UTILITY CORPORATION (GUC)

Organization and Mission of the GUC

The organization of the GUC is illustrated on Chart IV. It was furnished by GUC personnel. In addition to this chart which shows the overall organization, the Enterprise also has detailed charts down to division level which were provided to this consultant. In addition, the new Financial Advisor is having prepared information flow charts and is developing a feasibility study on further computer utilization. These are both commendable actions.

The mission or responsibilities of the GUC are to provide commercial services such as:

- Electricity in the greater Banjul area.
- Water supply in the greater Banjul area.
- Water supply to various health centers.

In addition, support services (water and/or electricity) are provided to various provincial centers. Non-commercial service (sewerage service) is furnished in the Kotu resort area and in Banjul.

The GUC, based on its responsibilities, need an MIS to assist in evaluating its operations from effectiveness and efficiency standpoints. Until fixed assets are reevaluated (this is being done under contract with Purnell, Kerr, and Foster), the GUC's key performance indice or profit goal is a fixed percentage of revenue. After the assets are reevaluated, the goal will be the return on assets.

Current Information Systems in the GUC

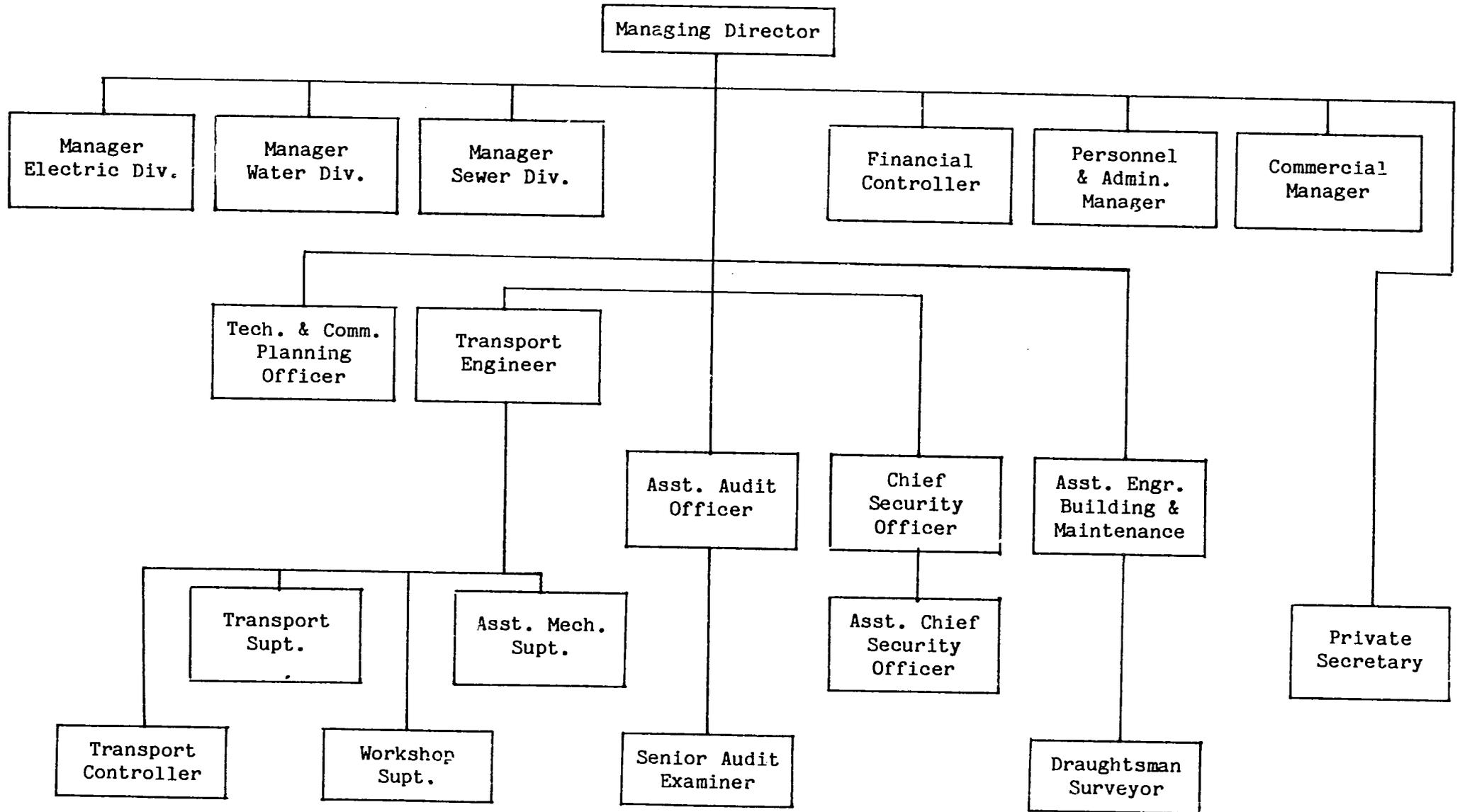
A. Hardware

At present, the GUC has the following hardware:

1. Three IBM XT personal computers with one 20 MB hard disk (in the computer room).
2. One IBM PS/2 computer, Model 80 with a 44 MB hard disk (in the computer room).

Chart IV

ORGANIZATION OF THE GAMBIA UTILITY CORPORATION



3. Two Epson FX 1000 printers and one Epson FX 800 printer (in the computer room).
4. NCR 29s (which is a record unit) for utility billing (located in Billing). The NCR 299s are planned to be replaced with a WANG VS 6 computer system.
5. A standby power supply.

B. Software

At present the GUC has the following software:

1. MS DOS 3.2 operating system for the IBM XTs and DOS 3.3 for the PS/2.
2. LOTUS 1-2-3 spreadsheet (in use).
3. Officewriter word processing (in use).
4. Wordstar word processing (not in use).
5. Microsoft Word--word processing (not in use).
6. Paradox Database Management System (not in use).
7. Peachtree Accounting System (not in use).
8. Microsoft Paintbrush graphics package (not in use).
9. Symphony integrated software (not in use).
10. Application software in use includes payroll with a fixed assets system currently being developed through PKF.

C. Problems with Current Hardware

1. The basic problem with the existing hardware is that it appears to have been purchased piecemeal without any plan. Thus, the GUC faces problems of compatibility. For example, and as was previously pointed out, the IBM PS/2 has a different type of architecture than other IBM PCs and of IBM clones. In addition, it has 3.5 inch diskettes, and the other PCs have 5.25. Thus, conversion is necessary, and the GUC does not have any person with the training to do it. In addition, there

is little software now available for the PS/2 under the operating system that maximizes its use (OS/2).

In addition, the compatibility problem is further compounded by the acquisition of the WANG VS 6. Note that from a technical perspective, connectivity and compatibility can be achieved between the GUC systems, but it requires technical knowledge, resources, and training.

2. Current hardware appears under utilized, with only payroll currently up and running.
3. On a positive note, the new Financial Advisor and his associates are aware of the problems and are in the process of carrying out a study that will address information flows, compatibility and, will properly plan for effective use of computers.

D. Problems with Current Software

1. A pronounced problem is the fact that numerous software packages (shown in detail on the previous page) have been acquired and are not in use in GUC, and no one there knows how to use them. This includes Wordstar, Microsoft Word, Paradox, Peachtree Accounting, Microsoft Paintbrush, and Symphony. Note that these packages duplicate each other in many cases and some are completely inappropriate for use in the GUC, such as Peachtree Accounting which was developed for use in small U.S. private businesses.

In summary, and once again, the major software problem is the lack of a plan for the use of software on an integrated basis. This has resulted in the acquisition of software that is duplicative and not needed.

E. Operational/Reporting Problems

1. Previous accounting/auditing reports reflect that accounts production is irregular and untimely, that stock control is weak and that the budgeting system is weak. These matters much all be rectified and taken into consideration before an effective MIS can be developed. Financial officials in GUC and aware of these matters and are working on them.

2. The current organizational structure needs to be analyzed to reduce the over burdened span of control of the managing director and to provide a proper framework for the organization that is in accordance with the principles of organization and management.

F. Status of Information Systems Training in GUC

1. The Financial Advisor has a knowledge of LOTUS 1-2-3 and how to use computer systems to support accounting and financial reporting. He is supported by two recently trained accountants who have a knowledge of computer fundamentals.
2. One computer operator has a knowledge of the rudimentary use of LOTUS 1-2-3, and a few persons can use Officewriter.
3. At present, training is being held in very basic computer fundamentals for five or six personnel with accounting duties.
4. It should also be noted that in addition to carrying out a feasibility study, the Financial Advisor is examining the use of, and the training of, personnel in the use of systems for budgeting, capital control, cash flow, accounts control, manpower statistics, stores, billing, tariffs, and meter control and installation.

ADDENDUM TO REPORT
ON MANAGEMENT INFORMATION SUPPORT OF
THE NATIONAL INVESTMENT BOARD*

*This section of the report contains those Enterprises for which performance agreements will be negotiated over the next year. This includes SSHFC, GPTC, GAMTEL. It was added to the scope of work at the request of the Chief Executive, NIB, with the concurrence of USAID.

VI. INFORMATION SYSTEM NEEDS OF THE SOCIAL SECURITY AND HOUSING FINANCE CORPORATION (SSHFC)

Performance Agreements Not Yet Developed for These Enterprises

For the Enterprises in this last section of the report, the performance agreements have not yet been written. Accordingly, the information requirements will not be as detailed as for GPMB, GPA, and GUC. Obviously, from a financial reporting perspective, it is assumed that quarterly and annual reporting of financial matters will be the same as for other Enterprises and will include, at a minimum, the following fundamental accounting/finance reports:

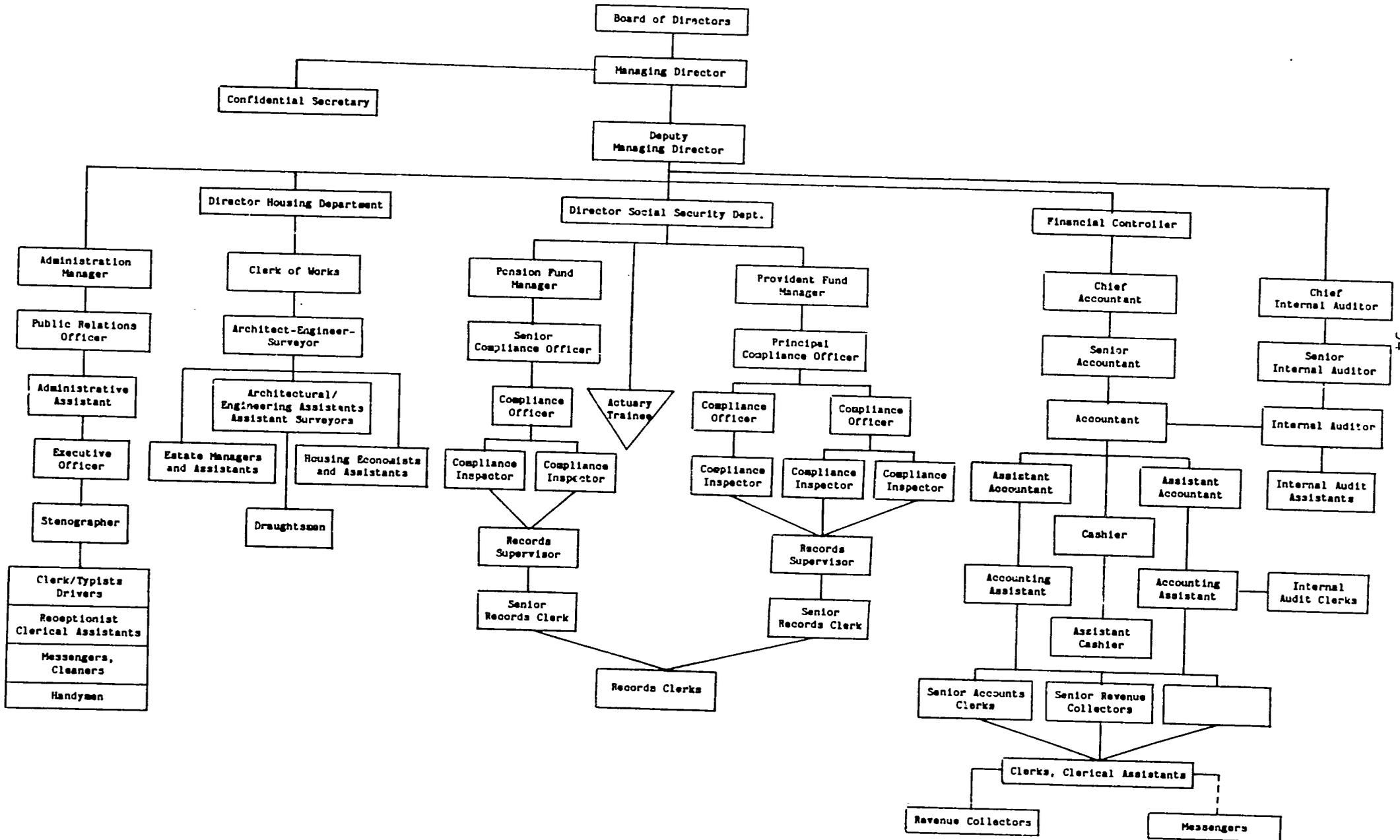
- Balance sheet,
- Profit and loss statement.
- Cash flow analysis.
- Capital expenditure report.
- Borrowing requirements analysis.
- Fixed assets report.

Organization and Mission of the SSHFC

The organization of the SSHFC is illustrated in Chart V. It is based upon a detailed chart provided by the Director of Social Security. The chart is currently being updated by this Enterprise to reflect a reorganization that will incorporate data processing as an organizational element of this organization. Prior to this time, there were no automated systems in place that are fully operational in the SSHFC. This consultant was impressed, however, with the planning that was taking place for the development of a management information system in this Enterprise. This planning should preclude the SSHFC from having some of the problems experienced by the other organizations studied. It should be noted, however, that this Enterprise has had a computer for a relatively long period of time, and aggressive action must be taken to move from a test to an operational mode.

The basic mission of the SSHFC is to provide social security coverage, a provident fund, and the financing of housing.

Chart V
 ORGANIZATION CHART
 SOCIAL SECURITY AND HOUSING FINANCE CORPORATION



Current Information Systems in the SSHFCA. Hardware

At present, the SSHFC has the following hardware:

1. This organization has recently acquired an NCR 9300 mainframe computer system with five workstations and an operator's console. (There are three workstations and the console in the computer room. There is one in the Director of Social Security's Office and one in the Chief Accountant's Office.)
2. Peripherals include a band printer in the computer room. In addition, there is a UPS and a backup generator.

B. Software

At present, the SSHFC has the following software:

1. The ITX operating system.
2. NCR's payroll, general ledger, and accounts receivable packages. Consideration is being given to also acquiring an accounts payable package, but a decision has not yet been reached.
3. NCR's Provident Fund Software.

C. Problems with Current Hardware

1. There are none at present. This agency may be one of the few studied that requires the power of an NCR mainframe computer since there are approximately 15,000 Fund members and the likelihood of significant expansion. In addition, the management of the SSHFC was aware of the problems that other Enterprises were having with NCR and properly planned and took precautions to try to prevent them.

D. Problems with Current Software

There are none at present. SSHFC reports that installation is going smoothly. For example, the basic data on Provident Fund members has been added and the system is being tested. As relates to the general ledger, balances and transactions have been entered. In short, while no system is now "operational" in this agency, reports and this consultant's observations verify that the software acquired was chosen wisely and is being properly installed. Aggressive action must now be taken to move from "test" to actual use of the information systems to support operations.

E. Operational/Reporting Problems

The Coopers and Lybrand Associates and subsequent audit reports reflect that accounting/financial records are properly maintained. There is a profit and loss statement with full details, cash flow for each fund, a balance sheet for each fund, variance analyses, and a capital expenditure report. Coopers and Lybrand reported that this Enterprise's basic capacity to provide financial reports was good.

F. Status of Information Systems Training in SSHFC

1. It was previously mentioned that good planning for MIS has taken place in this Enterprise and that data processing organization was properly thought out and designed as a separate organizational element (a division). This is being followed up on through an appropriate training program on the NCR and the software acquired. One person is being trained in programming, three in computers operations, and one as documentation librarian. The training is being carried out by NCR and is generally supervised by the Director, Social Security.
2. There is one student/employee of SSHFC, studying computer systems in the United Kingdom who will be the EDP (Electronic Data Processing) Manager. In addition, there are plans to train a systems analyst. It is understood that all of the positions mentioned are in the organization's budget and that the training is funded.

VII. INFORMATION SYSTEM NEEDS OF THE GAMBIA TELECOMMUNICATIONS COMPANY, LTD. (GAMTEL)

The organization of the GAMTEL is illustrated on Chart VI. Note that the organization of GAMTEL was changed in April of 1988. The organizational design chosen, however, still appears to need work to make it consistent with effective organization and management practices. This company has approximately 450 employees and 6,000 customers. The general mission of GAMTEL is to furnish domestic and international telephone or telegraph services. As will any such organization, its primary priority for data processing relates to billing and collections. The order of magnitude of the management effort was increased significantly in 1988/89 with significant capital expenditures for:

- Expansion and modernization of the earth stations.
- Intelcom B microwave links.
- Serrekunda-Yundum 100 pair cable.
- Bakau branch building and installations.
- Kotu branch building and installations.
- Yundum Airport branch building and installations.
- Brikama branch building and installations.

Current Information Systems in the GAMTEL

A. Hardware

At present, the GAMTEL has the following hardware:

1. Three Micromega 32s with six workstations. These computers are used for billing and general management/administration.

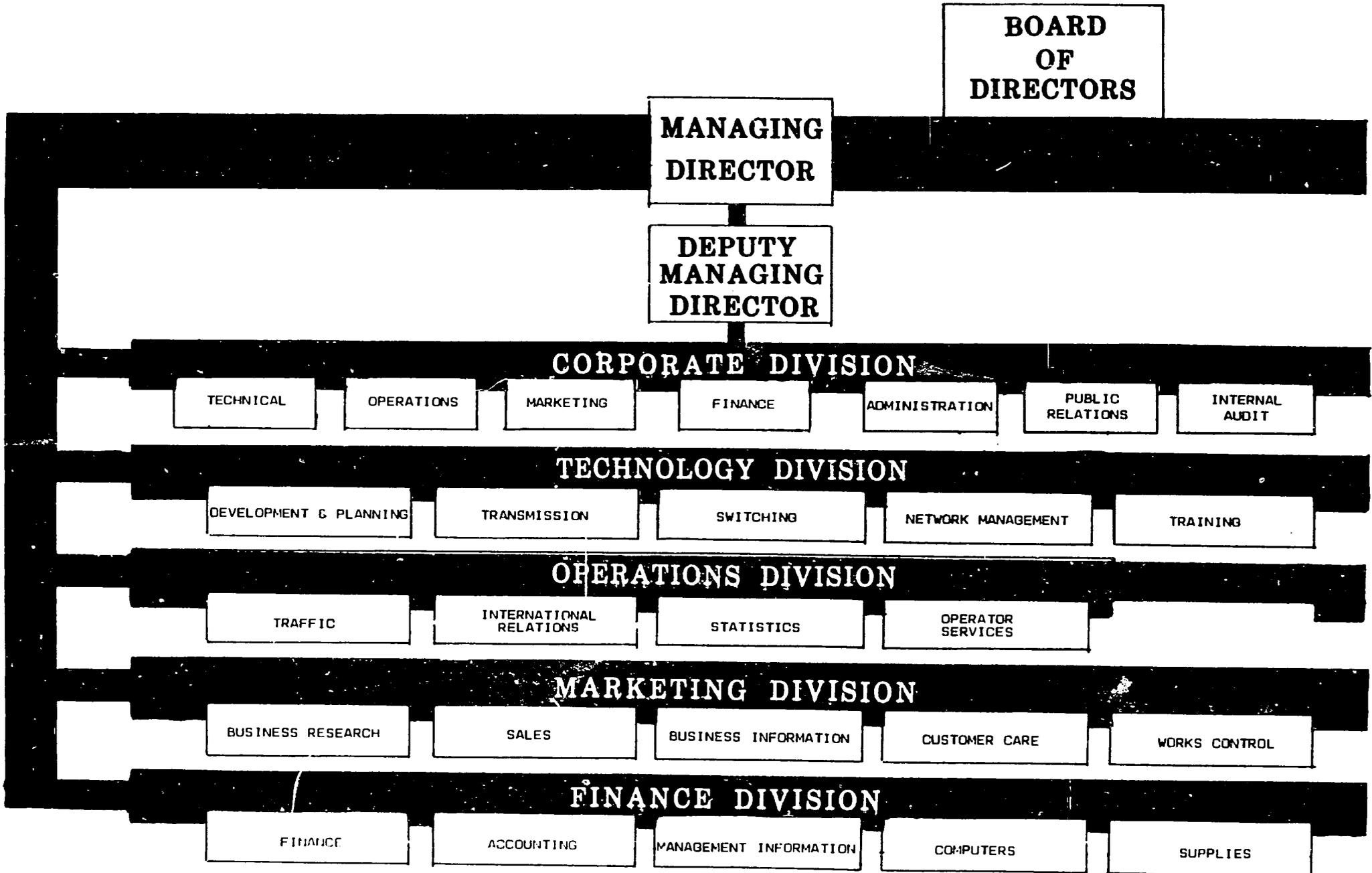
B. Software

At present, the GAMTEL has the following software:

1. The UNIX operating system and application software written in the C language.

Chart VI

ORGANIZATION OF THE GAMTEL



2. Application software provided by the ACTION Corporation, includes billing and collections and payroll.

C. Problems with Current Hardware

1. A study was completed in January 1989 of GAMTEL's information system needs by the ICEA consulting firm. This firm properly reached the conclusion that the Micromega 32 computers should be replaced. They are no longer manufactured, maintenance costs are high and difficult to obtain, and they do not have sufficient memory storage or capacity for GAMTEL's current (let along future) needs.
2. The hardware configurations provided as alternatives by ICEA include consideration of either a minicomputer or three high-end microcomputers (386 chip machines) from vendors such as WANG, NCR, BULL, GOUPIL, and IBM. ICEA properly suggested that a microbased solution of three computers is the optimum solution. In addition, they suggested the acquisition of modems to facilitate data communications.

D. Problems with Current Software

1. ICEA recommended a continuation of the C programming language and the UNIX operating system. This will facilitate conversion/migration of current programs and data to the new system and appears appropriate.
2. There is currently a lack of diversity in software available and it cannot support either proper accounting or management information systems. The GAMTEL is planning to rectify this problem by installing the applications listed in Table 1 on the new system and has a priority scheme as is shown in the table.

E. Operational/Reporting Problems

The 1986 Coopers and Lybrand Associates 1986 report indicated that GAMTEL personnel were not used to "preparing full accounts," that the 1985/86 budget showed cash totals for the year only, and that records did not reflect profit and loss versus actual. The 1987/88 annual report for GAMTEL with statements from August Prom, Auditor, reflected no qualifications on the data furnished.

Table 1

APPLICATIONS PLANNED FOR INSTALLATION AT GAMTEL
FOR "PERFORMANCE INDICATORS" IN A MIS

For Financial Services Department

- Daily bank balances (four banks).
- Daily cash collections by branch.
- Daily traffic in units.
- Weekly report of vehicles spares/fuel consumption.
- Weekly/monthly return government ministries/departments debts.
- Weekly return MMC/installation.
- Monthly return outstanding orders for equipment.
- Stores return of goods arrival on receipt.
- Monthly list defaulting subs for court action.
- Monthly cash collections provinces.
- Monthly traffic in units-local/trunk international.
- Monthly outgoing and incoming international traffic revenue.
- Monthly incoming international traffic minutes.
- Monthly traffic accounts--foreign traffic.
- Quarterly settlement statements international traffic.
- Monthly billings/collections/balances statement.
- Monthly budget/actual performance.
- Quarterly P & L, A/CS/B sheet/cash flow.
- Reports on financial services performance dates.

For Marketing Department

- Weekly report work orders and completion.
- Weekly report exchange connections/capacities.
- Weekly report waiting list.

For Technical Services Department

- Weekly report fault repair performance status.
- Monthly quality of service report--country/route.

For Operations Department

- Weekly manual calls effective/ineffective.

The order of priority for applications in GAMTEL is:

1. Improve billing and collections.
2. Provide an MIS.
3. Replace the payroll system.
4. Stock control.
5. Fixed assets.
6. Technical file.
7. Stocks.
8. Cost accounting.
9. Cash management.

F. Status of Information Systems Training in GAMTEL

1. There currently are reported to be 12 personnel who have had some computer training. There are, however, no programmers or systems analysts. In an organization using UNIX and the C language, these skills are necessary. The ICEA consulting properly recommends intensive training in these areas. This is important, since at present, program modifications must be made by the vendor in France and sent to GAMTEL on diskettes. This is not a satisfactory solution for an organization as complex as this.

VIII. INFORMATION SYSTEMS NEEDS OF
THE GAMBIA PUBLIC TRANSPORTATION CORPORATION (GPTC)

Organization and Mission of the GPTC

The organization of the GPTC is illustrated on Chart VII on the following page. The mission or responsibilities of this Enterprise are to operate a public bus system consisting of approximately 100 buses. In addition, a private hire service is available which consists of eight coaches and four minibuses. Note that, at present, there is a German consulting team (GOPA) working with the GPTC to install a Weigh Bills Analysis System. In addition, in the recent past, consultants assisted GPTC in improving its accounting practices and worked on developing an MIS system. The GPTC has approximately 665 employees.

Current Information Systems in the GPTC

A. Hardware

At present the GPTC has the following hardware:

1. An IBM PC and an IBM PC XT with a 10 MB hard disk.
2. One Epson LQ 800 and one Epson FX 80 printer.
3. A UPS (uninterruptible power supply).

All of the above hardware is in the computer room.

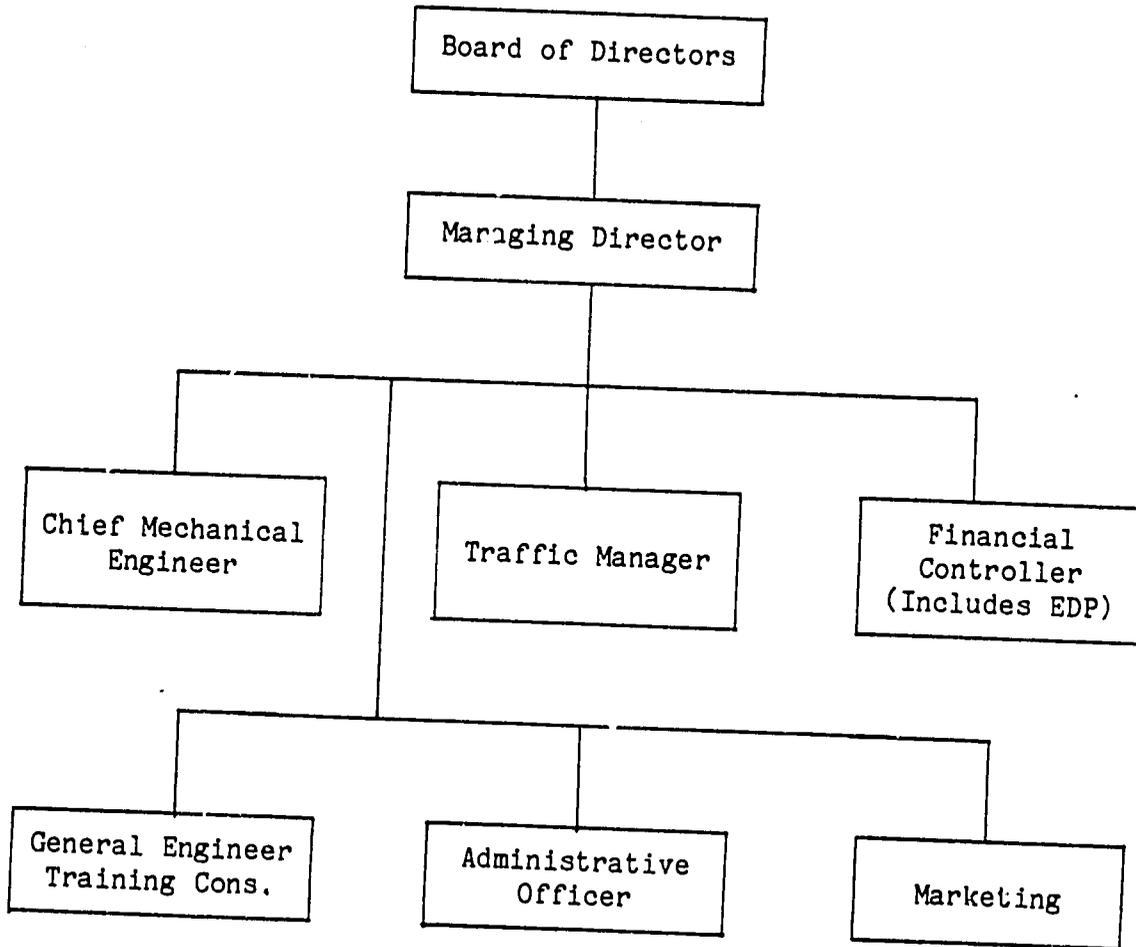
B. Software

At present, the GPTC has the following software:

1. MS DOS 3.10 operating system.
2. LOTUS 1-2-3.
3. Application software in use includes payroll, stock control, income and expenditure projections.
4. GOPA consultants currently are in the process of installing a Weight Bill Analysis System that will allow for route analysis, passengers by route, revenue analysis, duties, etc.

Chart VII

THE GAMBIA PUBLIC TRANSPORTATION CORPORATION
ORGANIZATION AND FUNCTIONS



C. Problems with Current Hardware

1. Trouble with the IBM PC XT in booting up. It appears there are problems with a disk drive.
2. A wide carriage printer would be helpful.
3. No maintenance is available nor is there any troubleshooting capability.

D. Problems with Current Software

1. All financial applications at present run off of the LOTUS 1-2-3. It was noted that in the computer room there was a chart that describes additional applications related to traffic (ratio analyses and MIS); administration (personnel management, cost accounting, and general accounting); engineering (tire test program); and ratios used for technical purposes. The personnel assigned to the computer room were not familiar with these applications. They said that they were developed by a previous consultant and were no longer in use. If this is the case, it appears that the GPTC may have regressed in its computer use.

E. Operational/Reporting Problems

1. None were observed (other than the possible loss of some skills/applications when the above mentioned EDP consultant left). In fact, the 1986 Coopers and Lybrand Associates report indicates that there are "no major accounting problems now that the German consultant have assisted in strengthening accounting and MIS." (Note that this statement was made before the departure of the MIS consultant.) Reports available (according to Coopers and Lybrand) were P & L vs. actual, kilometers/income targets by service, detailed fuel budget, P & L income, fixed and variable expenses vs. budget, and variances for month and year-to-date.

F. Status of Information Training in GPTC

1. At present, there is one supervisor of computer operations and three other employees. They have been trained in the basic use of LOTUS 1-2-3. As was mentioned previously, there is some evidence that

certain applications were developed by a consultant that the GPTC computer personnel are not now familiar with.
(See paragraph D.)

2. The GOPA consulting team is developing a training program as a part of the Weigh Bills Analysis System.

Appendix A

LOCAL AREA NETWORKS--TRANSMISSION MEDIA AND TOPOLOGY

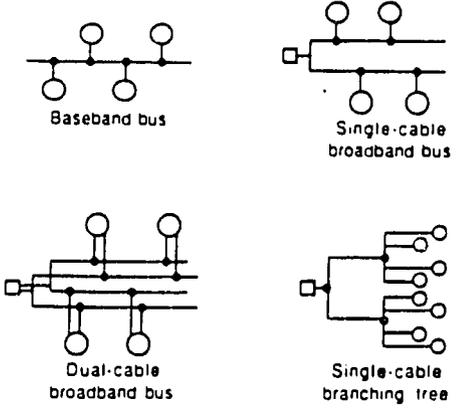
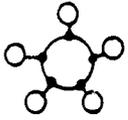
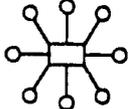
Local Area Networks

TABLE 1. COMPARISON OF TRANSMISSION MEDIA

	Twisted-pair wire	Baseband coaxial cable	Broadband coaxial cable	Fiber optic cable
Topologies supported	Ring, star, bus, tree	Bus, tree, ring	Bus, tree	Ring, star, tree
Maximum number of nodes per network	Generally, up to 1,024	Generally, up to 1,024	Up to about 25,000	Generally, up to 1,024
Type of signal	Single-channel, unidirectional, analog or digital, depending on type of modulation used; half- or full-duplex	Single-channel, bidirectional, digital, half-duplex	Multichannel, unidirectional, RF analog, half-duplex (full-duplex can be achieved by using two channels)	One single-channel, unidirectional, or bidirectional simultaneously over a single wavelength half- or full-duplex, signal-encoded light-beam per fiber; single-encoded lightbeam per fiber; single fiber per cable
Maximum bandwidth	Generally, up to 4M bps (or higher)	Generally, up to 10M bps	Up to 400MHz (aggregate total)	Up to 200M bps in 10-kilometer range, up to 1G bps in experimental tests
Major advantages	Low cost May be in existing plant; no rewiring needed; very easy to install; easy to support	Low maintenance cost Simple to install and tap	Supports voice, data, and video applications simultaneously Better immunity to noise and interference than baseband More flexible topology (branching tree) Rugged, durable equipment; needs no conduit Tolerates 100% bandwidth loading Uses off-the-shelf, industry-standard CATV components	Supports voice, data, and video applications simultaneously Immunity to noise, crosstalk, and electrical interference Very high bandwidth Highly secure Low signal loss Low weight/diameter; extremely flexible, pliable; can be installed in small spaces Durable under adverse temperature, chemical, and radiation conditions
Major disadvantages	High error rates at higher speeds Low immunity to noise and crosstalk Lacks physical ruggedness; requires conduits, trenches, or ducts Speed and distance limitations Existing plant may be unsuited to data transmission (i.e., wire pairs may not be twisted; grade and quality may vary; accurate cable records may not be available)	Lower noise immunity than broadband (can be improved by the use of filters, special cable, and other means) Bandwidth can carry only about 40% load to remain stable Limited distance and topology Conduit required for hostile environments Not highly secure Rigid and bulky, difficult to install More expensive than twisted-pair	High maintenance cost More difficult to install and tap than baseband RF modems required at each user station; modems are expensive and limit the user device's transmission rate Rigid and bulky, difficult to install More expensive than twisted-pair	Higher cost, but declining Requires skilled installation and maintenance personnel Taps not perfected Currently limited to point-to-point connections

Local Area Networks

TABLE 2. COMPARISON OF BASIC TOPOLOGIES

Topology	Typical Schematics*	Performance Considerations	Constraint Considerations
<p>Linear bus</p>	 <p style="text-align: center;">Baseband bus</p> <p style="text-align: center;">Single-cable broadband bus</p> <p style="text-align: center;">Dual-cable broadband bus</p> <p style="text-align: center;">Single-cable branching tree</p>	<p>Delay—in token bus networks, waiting time is a fixed function dependent on number of nodes in network; in contention bus networks, delay is a variable dependent on current traffic; delay distortion (jitter) is possible</p> <p>Throughput—in token bus networks, throughput decreases with each node added; in contention networks, throughput is best in light, bursty traffic conditions, and decreases in high-volume, steady-traffic environments</p> <p>Reliability—failure of one station will not affect the rest of the network; break in cable may affect only part of the network</p> <p>Robustness—relationship between stations is peer-to-peer; network is difficult to monitor; in contention networks, the difference between noise and collisions may be difficult to distinguish</p>	<p>Circuit speed—varies up to 50M bps</p> <p>Distance—generally unlimited by topology</p> <p>Maximum number of nodes—user stations may be added or deleted without reconfiguring the network; in token bus networks, addition of each station directly affects performance</p> <p>Error rate—bit errors are lowest when fiber optic cable is transmission medium; low when coax cable is used; higher with twisted pair wire</p> <p>Cost—generally, lower cost per user station than star networks and higher than ring networks</p>
<p>Ring</p>		<p>Delay—waiting time is fixed function dependent on number of nodes in network</p> <p>Throughput—decreases with each added node</p> <p>Reliability—if one station fails, whole network fails unless bypass circuitry has been implemented in each interface or node; if loop is severed, the whole network fails, unless redundancy features have been implemented; potentially low reliability can be compensated for by high quality engineering design</p> <p>Robustness—Nodes are easy to understand, construct, and maintain; may require custom-designed, device-dependent interface; communications control overhead is generally high; if network fails, recovery may be difficult, and may require complex logic and processing</p>	<p>Circuit speed—varies up to 80M bps</p> <p>Distance—limitations are imposed both on total distance and distance between nodes</p> <p>Maximum number of nodes—may be a fixed parameter dependent on command station capacity; addition of each station directly affects performance</p> <p>Error rate—twisted pair wire is vulnerable to transient errors; fiber optics has very low error rate</p> <p>Cost—generally, lower cost per station than other topologies</p>
<p>Star</p>		<p>Delay—in heavy traffic conditions, requests for service may be blocked at the switch in a PBX</p> <p>Throughput—dependent on internal bus capacity of central node</p> <p>Reliability—failure of one station does not affect the rest of the network; if central node fails, the whole network fails</p> <p>Robustness—Ready availability of network monitoring and control software; high overhead for communications control; corresponds well to applications in hierarchical (master/slave) networks</p>	<p>Circuit speed—varies considerably depending on medium, to a maximum of 10M bps.</p> <p>Distance—limitations are imposed on distance between central node and any user station</p> <p>Maximum number of nodes—expansion limitations are dependent on capacity of central node; difficult to reconfigure</p> <p>Error rate—twisted pair wire is vulnerable to transient errors</p> <p>Cost—high initial cost, but low incremental costs thereafter</p>

* Schematic symbols —
 — Transmission medium ● Connection device (network interface unit, RF modem, transceiver, etc.)
 ○ User station □ Command station (central host, PBX switch, etc.) or cable head end

**TERMS OF REFERENCE FOR CONSULTING SERVICES
TO IMPROVE MANAGEMENT INFORMATION SYSTEMS
SUPPORT FOR THE NATIONAL INVESTMENT BOARD
AND THE ENTERPRISES BEING MONITORED**

**DIVESTITURE AND PRIVATIZATION PROJECT
Number 940-0008 - NIB
Volume II**

By

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Center for Privatization Consultant**

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ENCLOSURE

1. Enterprise Performance Targets and Explanatory Indicators

I. BACKGROUND

A. Definition and Use of Performance Contracts

In 1985, the World Bank offered assistance to the Gambia National Investment Board (NIB) in developing performance contracts to facilitate the NIB's role in monitoring and assessing public enterprise performance. This assistance was in the form of developing terms of reference for consultants who would advise the government and the NIB on the development of the actual performance contracts.

From a historical perspective, the performance contract has been identified as a useful "tool" in specifying enterprise objectives and in clarifying government/enterprise relationships. The concept of a negotiated contracts between governments and public enterprises originated in the early 1960s in France and has been implemented in certain African countries to include the Gambia. Usually, the contract (which is like a negotiated business plan) specifies the medium-term objectives and performance targets and the respective responsibilities and commitments of the enterprise and the government, particularly with respect to tariffs, investment levels and financing, management autonomy, responsibility, and accountability.

While similar in most respects to a business plan, in that it lays out a firm's objectives, strategies, targets, and financing sources, the key advantage of the performance contract or agreement is that it specifies in a more precise manner the mutual obligations of the enterprise and the government. It is particularly helpful in identifying and costing out an enterprise's non-commercial activities and establishing a method of government reimbursement for undertaking or otherwise financing these social/public policy functions.

Finally, the performance contract may be superior to a business plan for incorporating performance related incentives and sanctions that can be applied to an enterprise and its management.

It is emphasized that performance contracts are most successful
when:

1. Management has been extensively involved in their preparation.
2. There is a high level of political commitment.
3. There is agreement among the enterprise, responsible ministry, and central agencies on key assumptions and strategic directions.

4. They are supported by effective management information systems.
5. There is an adequate system to monitor enterprise performance.
6. There are rewards and sanctions related to performance.

The purpose of the project contained in these terms of reference is to ensure that effective management information systems are in place to support the NIB in monitoring enterprise performance.

B. Performance Contract Models As Developed by
Coopers and Lybrand Associates for Use by the
NIB and Certain Enterprises

In the 1985-86 timeframe Coopers and Lybrand Associates were retained to assist the NIB in developing contracts for three of the approximately 20 enterprises that NIB is responsible for monitoring. The three enterprises were the Gambia Produce Marketing Board (GPMB), the Gambia Port Authority (GPA), and the Gambia Utility Corporation (GUC).

The performance contracts were negotiated for the above mentioned enterprises and are based on the concept that they are "arms length" mechanisms whereby the government's involvement in decision making focuses on the setting of guidelines on objectives and policies (which can include financial and operational targets), with enterprise management being given the freedom to apply its commercial knowledge to achieve these objectives. In short, enterprises in the Gambia operate as commercial businesses and are not just executing agencies of government. While policies and plans need scrutiny of the government and progress towards agreed upon goals and objectives monitored by NIB, the theory is that there is a need for enterprises to be self sufficient, and this must be an important consideration when decisions affecting the enterprises are made. Through performance contracts this can be achieved.

NIB, on behalf of the government, is now preparing to negotiate performance contracts with additional enterprises to include the Social Security and Housing Finance Corporation (SSHFC), the Gambia Telecommunications Company (GAMTEL), and the Gambia Public Transportation Corporation (GPTC).

C. Review of the Role of the NIB in the
Performance Contract System

Within the aforementioned concept, the NIB is the government's agent for monitoring the enterprises through the performance contracts. Generally, the NIB's mission is to monitor enterprise performance in order to:

1. Ensure that enterprises are conforming to the approved budget and plan.
2. Identify problems which may arise and so inform the government.
3. Assist the enterprises in developing strategies to resolve problems.

More specifically, as devised by Coopers and Lybrand, the NIB's primary role are to:

1. Review enterprise policies and plans to ensure that:
 - Advance corporate objectives.
 - Comply with government policy guidelines.
 - Reflect an adequate level of performance.
2. Monitor enterprise performance in order to:
 - Ensure compliance with agreed upon plans.
 - Assess management performance.
 - Recommend rewards or sanctions.
3. Analyze enterprise operations to identify key issues and assist in resolving them.
4. Review enterprise progress towards budget and performance targets.

D. Information Systems Needs Analysis

In 1986, the NIB laid the groundwork for a management information system to support the monitoring of performance by the enterprises, by participating in a MIS development study carried by Management Systems International (MSI). While useful, this study was not successfully completed or implemented. Accordingly, the Center for Privatization (CFP) was called upon in 1989, through a USAID contract, to carry out a management information

systems needs analysis to determine what additional action is necessary to furnish a MIS that supports fully the performance contracts between the NIB and the enterprise. This CFP needs analysis study entitled, "Report on Management Information Support of the Natural Investment Board" will be provided to the consulting firm that carries out the follow-on work and is incorporated herein by this reference.

E. Scope of Services

The scope of the consulting services in these terms of reference is to review the above mentioned needs analysis and to design, assist in training (NIB and enterprise personnel), and assist in implementing an effective management information system to support the performance contracts.

The enterprises that will be included in the scope of work encompass the Gambia Produce Marketing Board (GPMB), the Gambia Utility Corporation (GUC), the Gambia Port Authority (GPA), the Social Security and Housing Finance Corporation (SSHFC), the Gambia Telecommunications Company (GAMTEL), and the Gambia Public Transport Corporation (GPTC).

II. INFORMATION REQUIREMENT TO MONITOR THE ENTERPRISES

A. General Requirements

The information necessary for the NIB to properly monitor the performance of the enterprises on their contract includes:

- o A quarterly financial and operational report to be submitted to the NIB by the enterprise within six weeks of the end of each quarter's operation. This includes:
 - a. A profit and loss statement, showing actual performance against budget for the quarter and year-to-date and a forecast for the full year.
 - b. A balance sheet drawn up on the last day of the quarter.
 - c. A cash flow forecast for the next 12 months.
 - d. A report on completion of capital projects compared to the budget.
 - e. A report on the achievement of performance targets.
 - f. A report by the enterprise Managing Director on progress achieved in implementing strategies and explaining the causes of major variances from budget and the most important trends of the quarter.
- An annual report to be submitted by the enterprise to the NIB within three months of the end of the financial year. This report incorporates the annual audited accounts of the enterprise.
- An annual budget (in draft) and a Three-Year Plan to be submitted by the enterprise to the NIB.

B. Performance Measures/Targets

In addition to the general requirements that measure the "financial health" of the enterprises (as outlined above), the performance agreements in place, and those being negotiated, include performance measures, targets, and performance indicators. Examples of these for the GPMB, the GUC, and the GPA are at Enclosure 1. Those for the other enterprises subject to this study are currently being (or will be) negotiated.

III. SCOPE OF WORK TO IMPROVE THE MANAGEMENT INFORMATION SYSTEMS (MIS) SUPPORTING THE NIB AND THE ENTERPRISES

This section of the terms of reference specifies the work required of the consultant in developing a MIS to support the NIB and the enterprises subject to this study. It consists of a series of required tasks, as shown in the remainder of this section.

Task A. A Corporate Plan Review

The corporate plans of the enterprises should be reviewed so that it can be ascertained whether the improvements made to the MIS will support them. It is understood that certain enterprises do not yet have completed plans. If they do not exist, a discussion of proposed plans should be undertaken with the managing directors concerned so that at least the organizations' goals and objectives can be identified. Identifying these goals and objectives is a very important first step in the MIS planning process, for any MIS plan developed to be effective it must be aligned with the overall strategies of the organization.

Task B. Organizational Review

1. The overall organizational design of the enterprise should be reviewed and recommendations made so that the organizational design is in accordance with sound principles or guidelines of organization and management and facilitate information flow.
2. The enterprises' and NIB's organization for data processing should be examined to ascertain:
 - a. If a separate organizational entity exists.
 - b. Reporting relationships and fit of the data processing organization within the overall organization.
 - c. The internal data processing organizational structure and relationships.
 - d. If job descriptions exist (and are accurate) for personnel involved in data processing.

- e. The job qualifications of assigned data processing personnel.
 - f. The support that management of the enterprise provides for data processing and the MIS.
 - g. Whether data processing personnel understand the importance of the enterprise's performance targets and their key role in providing timely information on this.
3. Specific recommendations should then be made to improve organizational effectiveness and to resolve the problems found as a result of the organizational analysis.

Task C. Analysis of Applications Portfolio/Software

Since the effectiveness of information processing in the first instance is based upon application software and its suitability, an appraisal of it should be carried out early in the project and include:

1. An inventory of all applications software. This should include software in use and that on hand but not in use. When not in use, the reason why should be so indicated. (This inventory can simply be an update of the referenced CFP needs analysis, if this scope of work is carried out in the near future.)
2. A determination as to whether the application software properly supports the provision of the information needed to comply with the NIB enterprise performance contracts, the goals and objectives of the enterprise, and its operations.
3. An appraisal of the quality of the application software to include its appropriateness, design, coding, content, timeliness, and accuracy of the information provided.
4. Comment on the adequacy of the documentation for the application software.
5. Examination of the file structure and the databases used by the NIB and the enterprises.
6. Specific recommendations should then be made to correct any problems uncovered as a result of the

applications. This should include recommendations on software standards so that software acquired by the NIB and the enterprises is portable and compatible and can be shared by these organizations whenever possible. A checklist should be prepared to facilitate future acquisition of software and database managerial systems. Finally, an emphasis will be made on the merits of selecting standard software packages for use by the NIB and all enterprises.

Task D. Examination of the Suitability of Existing
Computer Hardware to Support Applications

1. For the NIB and each enterprise, the consultant should define the computer hardware requirements necessary for the next three years.
2. Specify whether, and how, existing computer hardware can meet these requirements. This should include comment on the current utilization of the hardware, its appropriateness to accomplish the mission, the possible evolvability of the hardware, its compatibility, backup, and maintenance.
3. Where the above hardware analysis reflects a deficiency, recommend those hardware changes/enhancements needed to support the applications and the performance contracts. Incorporate existing systems whenever possible. Emphasize compatibility of hardware, not only within an enterprise but also between the enterprises and the NIB.

In this context, compatibility refers to the fact that the computer should not be a "rare specimen" because it must be capable of handling software from other sources, it must constitute a standard work environment to make data exchange among the enterprises and the NIB possible, and it should make easier finding personnel who either "know the computer" or can easily learn to use it.

4. Develop model standard computer system configuration(s) for use in the NIB and the enterprises. This model should include a standard approach to local area network (LAN) acquisition and use.

5. Identify possible, reliable vendors for hardware (and software) products and comment on whether these vendors have troubleshooting and maintenance capabilities to properly support the NIB and the enterprises.

The maintenance task is made easier if the design and technology of the computer systems selected are recent and highly rated by professional sources. It is important that the consultant stress this due to the lack of readily available maintenance in the Gambia

Task E. Develop a Cost Benefit Analysis System
to Be Used by the NIB and the Enterprises
in Acquiring Systems

This should be developed for major investments in computer systems and not for inexpensive software packages. It should include a review of benefits such as clerical cost reduction or cost avoidance, operational savings, and possible increased operational revenues. For expenditures over U.S. \$25,000, it can include methodology such as the present value or the rate of return approach to economic valuation, as illustrated below:

- Present Value Method. Using the present value method, we compute an amount for the new system which takes the time value of money into consideration. We then compare the amount computed with the investment required to implement the new system. If the computed amount (present value or PV) is greater than the investment (I), then it is favorable in an economic sense to make the investment in the new system.
- Rate of Return Method. Using the rate of return method, we compute the rate of return that will result from making an investment in the new system.

Task F. Demonstrate Standard Software Packages

1. As a part of the contract, the consultant should be prepared to acquire standard software packages such as the latest releases of LOTUS 1-2-3, WordStar, dBase IV, and LOTUS SQL products for linking database with a spreadsheet, Harvard Graphics, Harvard Project Manager, and a powerful integrated package such as Framework (one copy each).

2. The consultant should be prepared to demonstrate the use of the aforementioned software to the NIB and the enterprises using portable computers and data display units that are the property of the consultants (and not acquired under this contract unless the NIB and USAID desire that NIB or the enterprises retain the equipment).
3. Final selection of the software packages to be demonstrated will be made after the award of the contract to the consultant.

The selection should be made subsequent to coordination with the Chief Executive of the Financial Controller of the NIB. The NIB may chose to have existing on-hand software used in the demonstrations as opposed to the acquiring of packages by the consultant.

Task G. Evaluate the Level of Information Systems Training of NIB and Enterprise Personnel and Develop a Training Plan

This should build on the assessment of qualifications of data processing personnel mentioned under Organizational Review (Task B). It should include at a minimum:

1. A computer skill inventory analysis.
The first step in analyzing computer training requirements is to make an inventory of skills already available. The consultant should design an approach to this and a worksheet for completing this task as well as those mentioned below.
2. Skills requirements definition.
The next step should be to analyze the computer skills required to operate the existing and any planned systems and to match the skills requirements with the skills available so that training decisions can be made.
3. Definition of training requirements.
The third step is to determine the actual training requirements to be used as a basis for the training plan.

The training plan should then be developed. It should focus on "training the trainers" (one or two persons from the NIB and the enterprises) who will then in turn train the data processors and other persons in their respective organizations.

The training will emphasize those skills necessary to support a management information system that effectively provides the information required in the performance contracts between the NIB and the enterprises. It should be designed to use actual examples or models of reports in use by the enterprises in their reporting to NIB.

The components of the training program should include those matters necessary in the skills analysis and include:

- Basic systems orientations.
- Technical and analytical training geared towards providing the data required in the performance contracts.
- Training in using the equipment and the software.
- Applications recognition training for supervisory and managerial personnel. This is very important since it may result in broadening the base of support for the MIS and expanding it.

Computer-based training, as described in the needs analysis (Enclosure 1) should be used whenever possible in the training program since it will remain and be useful after the consultants leave the Gambia.

It is emphasized that the ultimate success of any information systems improvement program depends on its acceptance by those personnel who will perform the procedures and use the system. They must understand not only how to operate the system but also how to recognize potential applications and how to use the information. Without a well executed training program, the NIB/Enterprises MIS improvement effort could fail.

Task H. Develop a Model Disaster Recovery Program

The power system in the Gambia has frequent outages and is subject to natural disaster. Accordingly, a model computer system disaster recovery plan should be developed for the NIB and the Enterprises. It should address the need for computer systems compatibility, backup, uninterruptible power supplies (UPS), and mutual support by the NIB and the enterprises.

In data processing, disaster recovery is a methodology that defines the steps to be taken to ensure the timely and orderly restoration of an organization's data processing capability. It normally consists of:

- A risk assessment.

- An emerging preparedness plan.
- Business interruption backup.
- Business resumption scenario.

In developing a model disaster recovery plan as a part of this project, the consultants will take the following steps:

1. Communicate to the management of the NIB and the enterprises the importance of computer disaster recovery and its need.
2. Assemble representatives from NIB and the enterprises to participate in the development of a model disaster recovery plan.
3. Target the areas of maximum exposure. Consider: personnel safety, site security, data security, hardware/software security, power failures, disclosure prevention, and possible loss of data.
4. Determine for one "prototype agency" what potential losses would occur from an incident.
5. Assign recovery practices for the prototype, based upon the criticality of the systems.
6. Investigate for the prototype alternative processing sites, mutual aid agreements, off-site storage of key data, and recovery operations centers.
7. For the prototype, outline policies and procedures needed to return data processing to operational status subsequent to a disaster.
8. Check with hardware vendors to determine what services they could provide in case of a disaster as well as with institutions such as banks, i.e., Standard Chartered.
9. Conduct an exercise in which the NIB and the enterprise use the prototype material to develop an outline of a disaster recovery plan for their organizations. This outline would later be fully developed by the organization concerned and should be approved in concept by management.

Task I. Write Model Specifications for
Hardware and Software

The consultants will develop model specifications that can be used by the NIB and the enterprises for acquiring hardware and software to enhance the MIS. They should be simple to use functional specifications that define the general information flow, the output, the input, the minimum content of the files, the maximum size of the files, the security required, and compatibility requirements.

In addition, "tips" should be provided for dealing with computer and software vendors to include:

- Requiring the vendor to provide complete documentation for the computer system, the peripherals, and the software.
- Requiring the vendor to provide demonstrations using "live data" similar to that of the potential using organization. In addition, the system being demonstrated should be configured exactly the same as the one to be acquired.
- Methods for selecting a vendor and checking his/her credibility.
- Ways to develop proper maintenance agreements.
- Procedures for monitoring installation of the system and "bringing it up."
- Methods for documenting and enforcing vendor responsibility.
- Means of acceptance testing.
- Development and enforcement of a contract to incorporate the above and to reasonably protect the interests of the NIB and the enterprises.

Task J. Demonstrate the Use of an
Information Systems Steering Committee and Users Groups

It was observed in the CFP needs analysis that there is not a lot of sharing of experience between the enterprises as relates to information processing and the establishment of information systems. One technique for

bringing this sharing about is to use an information systems steering committee. Such a committee is an informal group of systems users with common interests in information processing (such as the NIB and the enterprises as brought together by the performance contracts).

Information systems steering committees generally discuss data processing needs, ways of meeting them, common experiences, new approaches to data processing in their organizations, ways of setting priorities, and new approaches to using hardware and software for improving coordination and cooperation in data processing and generally promote the effective and efficient use of systems.

In NIB and the enterprises, and information steering committee could serve as a platform for the exchange of experiences that facilitate improved information processing, for sharing software, for tips on using hardware, and on methods for using the MIS to support the performance contracts. Accordingly, the consultants will bring to the attention of the management of the NIB and the enterprises the advantages to an information steering committee and develop procedures to set one up and hold an initial meeting.

In addition to the steering committee, the consultant should encourage the development of even broader-based user groups that could include computer users not only from the NIB and the enterprises but also from USAID, the banks, government, and the private sector who could share computer user experiences.

Task K. Assists a Selected Enterprise in
Using a MIS to Develop a Quarterly Report

As a test of the improvement to the MIS brought about by the consultant, the consultants will assist up to three enterprises in using their data processing capabilities in preparing a quarterly report. The enterprises will be chosen in consultation with NIB, with the concurrence of the Managing Directors of the enterprises selected. The enterprises selected will be those that have performance agreements with the government manual performance indicators in place.

This exercise will serve as a test of the improved MIS and the work accomplished under this project. It will also serve as a model for future use.

IV. CONCLUSION OF SCOPE OF BASIC WORK

Section III concludes the consultant requirements or tasks associated with the basic scope of work. It is emphasized again, that the primary purpose of this project is to provide management information systems that will support the performance contracts between the government and the enterprises subject to the study.

V. LEVELS OF CONSULTING EFFORT AND SKILLS REQUIRED

It is estimated that it will take four calendar months to complete the basic scope of work as outlined in these terms of reference. Over this time period, the equivalent of three consultants will be required (or 12 consulting manmonths total).

The consultants should be prepared to carry out this project in two phases as follows:

- Phase I (commencing in July 1989). This phase will encompass the following tasks:
 - Corporate plan review.
 - Organizational review.
 - Analysis of applications portfolio/software.
 - Examination of the suitability of existing computer hardware to support applications.
 - Develop a cost benefit analysis system to be used by the NIB and the enterprises in acquiring systems.
 - Demonstrate standard software packages.
 - Evaluate the level of information systems training of NIB and enterprise personnel and develop a training plan.
- Phase II (commencing in November-December 1989). This phase will encompass the following tasks:
 - Develop a model disaster recovery program.
 - Write model specifications for hardware and software.
 - Demonstrate the use of an information systems steering committee and users groups.
 - Assist a selected enterprise in using a MIS to develop a quarterly report.

A phased approach is being used so that the Gambian personnel will have a period of time to assimilate the information/training and so that the consultants can test this assimilation and take any necessary corrective action in Phase II.

The types of consulting skills required include:

- A Project Team Leader with experience in corporate planning, organizational design, management information system development, use of performance indicators to monitor contracts, experience as an information systems director, experience in West Africa (and desirably in the Gambia), and experience with SOEs.
- A Microcomputer Specialist with experience in packages such as LOTUS 1-2-3, dBase III plus, WordStar, WordPerfect, Framework, a graphics package, and a project management package. In addition, skill is necessary in demonstrating the use of these packages.
- A Computer Systems Training Specialist who has experience in training personnel in the software packages outlined above and in computer-based training (CBT).
- An Electronic Technician experience in local area networks (twisted pair, baseband, and/or broadband).
- A Microcomputer Procurement and Service Specialist.
- A Systems Analyst/Programmer who has extensive microcomputer experience and who could customize software packages to meet the performance contract-based MIS reporting needs.

Enclosure 1

ENTERPRISE PERFORMANCE TARGETS AND EXPLANATORY INDICATORS

GUC PERFORMANCE TARGETS AND EXPLANATORY INDICATORS

<u>Performance Targets</u>	<u>Profit Before Depreciation Interest & Tax</u>	<u>Asset Turnover Ratio</u>	<u>Units Billed</u>	<u>Total Connections</u>	<u>Meter Reading & Meters Replaced</u>	<u>Proportion of Time Base Load Met</u>	<u>Proportion of Time Full Service Provided</u>	<u>Average Days Debt Outstanding</u>	<u>Staff Numbers</u>	<u>Development of Investment Strategy</u>	<u>Design of Manpower Development Plan & Training Programme</u>	<u>Introduction of New Budgeting & Information Systems</u>
	<u>Corporation</u>	<u>By Division</u>	<u>Electricity & Water</u>	<u>By Division</u>	<u>Electricity & Water</u>	<u>Electricity</u>	<u>Electricity & Water</u>	<u>Corporation</u>	<u>Division</u>	<u>Corporation</u>	<u>Corporation</u>	<u>Corporation</u>
Key explanatory indicators and other factors for consideration	Ratio of long term debt to equity. Ratio of current assets to current liabilities. Tariff levels. Fuel availability & cost. <u>Electricity & Water</u> Average cost per unit sold. Units of fuel/power consumed. Units sold per units of fuel/power consumed.	Movement in turnover and the value of fixed assets. Assets revaluation. Rate of return on net revalued fixed assets.	Units generated/produced. Power house and transmission losses. Fuel availability.	Number of connections by type. Connections outstanding. Availability of materials.	Number of readings. Number of meters reported to be misread. <u>Water</u> Number of meters replaced. Number of faulty meters outstanding.	% of time base load available. Units generated as % of capacity. Fuel availability.	Amount of loadshedding. Number and duration of water cuts. Fuel availability. Generator repair & breakdown.	Turnover. Average debt repayment period. Average time to raise bills.	Numbers of staff by activity. Revenue per member of staff.	Reduction in unit costs.	Qualitative assessment based on observation of scope & content of development plan and training programme and improvement in management skills.	Qualitative assessment based on timeliness and observed working of improved systems.

GPMB PERFORMANCE TARGETS AND EXPLANATORY INDICATORS

<u>Performance Targets</u>	<u>Profit Before Depreciation Interest and Tax</u>	<u>Staff Numbers and Cost</u>	<u>Management Reorganization</u>	<u>Development of Information System</u>	<u>Divestment</u>	<u>Improvement in Marketing Service</u>	<u>Implementation of Performance Agreement with GRIC</u>
Key explanatory indicators & other factors for consideration	Ratio of long-term debt to equity. Ratio of current assets to current liabilities. Total tonnage received, handled and processed. Price spreads (difference between FOB and producer prices). Tonnage produced by grade expressed as % of total tonnage produced. Cost per ton handled or produced. Production and/or handling losses as % tonnage received. Capital restructuring. Government commitments to fund non-commercial activities.	No. and cost of staff by activity and by type. Completion of redundancy schemes. Changes in production throughput.	Qualitative assessment based on timeliness, cost & reasonableness. Observance of effective consultation & management commitment.	Qualitative assessment based on timeliness, cost & quality of information produced. Observance of proper planning and management's involvement and commitment.	Time taken and savings achieved. Qualitative assessment of Government and Enterprise commitment.	Tonnage shipped as % of tonnage received. Tonnage produced by grade as % of total tonnage produced. Reorganization of marketing services. Formal links with MINAR and GUC price trends.	Time taken % of lighters made available. Cost per tonne handled. Capital restructuring.

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