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FEDERAL INSTITUTE OF INDUSTRIAL RESEARCH,
INDUSTRIAL INFORMATION CENTRE, PHASE II

DP/NIR/83/021

FEDERAL REPUBLIC OF NIGERIA

Technical report: Support for computerization
of information services*
(second part of the split mission)

Prepared for the Government of the Federal Republic of Nigeria
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of Andrew Yeiser,
Computer expert

Backstopping officer: Juraj Pavlik,
Institutional Infrastructure Branch

United Nations Industrial Development Organization

Vienna

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* This document has not been edited.

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EXPLANATORY NOTES

Currency

The *Naira* had an official trading value between ₦4.2 - ₦4.9 to the U.S. dollar.

Technical Terms and Acronyms

Batch program: A program that issues a sequence of computer commands as though the operator had input them. By typing one word a predetermined sequence of commands is issued to the computer. Batch programs can be used to reduce operator training requirements and minimize errors.

Camera ready copy: A master image of a document that can be photographically transferred to plates for printing on an offset printing press.

CD: A plastic *compact disk* similar to those used for recorded music, but containing information in computer readable form. A single 12 cm. diameter CD can contain as much information as 300,000 typewritten pages (double spaced A4).

CD/ROM: Compact Disk - Read Only Memory, q.v.

CDS/ISIS: A widely used database software system for microcomputers developed by UNESCO specifically for bibliographic information.

Data bank: A collection of information files, not necessarily related.

Database: A related set of cross referenced information files. A component of a *data bank.*

Database software: The software (programming) that organizes the storage of information in a database.

Desk top publishing: The use of personal computers to produce 'camera ready copy' directly usable by a printer to make plates without typesetting. A variety of type fonts and sizes are available.

FIIRO: Federal Institute of Industrial Research, Oshodi.

IBM compatible: Parts, e.g. circuit boards, interchangeable with parts of a comparable IBM model and able to run the same programs as the IBM.

IBM-PC, IBM-XT, IBM-AT: International Business Machines personal computer models, in order of increasing performance. IBM compatible machines use similar designations, i.e. *PC, XT, AT.* A *386-AT* has higher performance than the standard AT.

INDICES: Industrial Information Centre and Extension Service of FIIRO.

INTIB: Industrial & Technological Information Bank (UNIDO).

On-line: Controlled directly by computer, used in this report to mean direct electronic communication between two computers.

ROM: Computer *Read Only Memory* that can be read, but cannot be changed.

SDI: Selective Dissemination of Information according tc the interests of the recipients.

Software: Computer programming, as opposed to tangible hardware. Sometimes used to include instructions, procedures, etc., i.e. all recorded system information.

Word processing:[1] Use of a computer to input, edit and print documents.

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1. See ANNEX 13, *Lecture Handout on Word Processing,* page 29.

ABSTRACT

FEDERAL INSTITUTE OF INDUSTRIAL RESEARCH, INDUSTRIAL INFORMATION CENTRE, PHASE II
DP/NIR/83/021

This report describes the second part of a split thirteen month mission. The purpose of the complete mission was to enable the Industrial Information Centre within the Federal Institute of Industrial Research, Oshodi (FIIRO) in Lagos State, Nigeria to provide information services based on a computer-handled data bank of machine readable data. The primary objectives of the second part of the mission were to install the computer system and data bank designed in the first part and to provide on-the-job training of computer personnel and information specialists. The duration of the second part was eight months.

Equipment and software (programs) requisitioned during the first part of the mission were installed. The computers were set up and interconnected in a network. Databases were implemented and data were entered. Information retrieval services are now operating.

Links with international industrial sources were achieved through the use of CD/ROMs. Progress was made toward on-line accessing of international networks.

Procedures were developed to permit library information specialists to operate the computers effectively without extensive computer training. For this purpose, a number of "batch programs" were written.

Desk top publishing, now in full use, enables the center to produce the large volume of papers and documents (announcements, forms, letters, etc.) necessary for collecting and disseminating information.

INTRODUCTION

This report describes the second part of a split mission supporting UNIDO project DP/NIR/83/021 at the Federal Institute of Industrial Research, Oshodi (FIIRO) in Lagos State, Nigeria. The objective of the project is to strengthen the Industrial Information Centre within FIIRO based on a computerized data bank to be linked with other national and international industrial information networks.

The second part of the mission commenced 10 April 1988.

This mission part had as its specific objectives to:

Install the computer system designed during the first part,

Design and install the required data bases and ancillary
programs,

Test the feasibility of on-line communication with international
data sources,

Provide on-the-job training of computer personnel and
information specialists.

All objectives were achieved. They were not revised.

The purpose of this report is to document the activities completed in the second part of the mission. Activities completed during the first part of the mission were reported in the first mission report.[2]

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2. Federal Institute of Industrial Research, Industrial Information Centre, Phase II. DP/NIR/83/021. Technical Report: Support for Computerization of Information Services (first part of split mission), based on the work of Andrew Yeiser, Computer Expert, Vienna, UNIDO, 2 December, 1987.

RECOMMENDATIONS

1) Provide coordination among Nigerian public sector computerized data banks now in the planning or design stage. Data exchange among organizations can be facilitated by choosing compatible software and database designs. Without design coordination easy exchange of data is unlikely. Mutual backup by facilities with similar equipment and software allows much faster recovery from disaster, e.g. fire, flood, etc. Essential records are not lost and an unaffected organization can carry on the most critical computing functions for the damaged facility during the recovery period.

2) Provide a network linking all public sector data banks in Nigeria. It should provide a shared leased satellite telecommunication link to international information networks. A loosely coupled distributed database configuration is suggested as the most likely to be suitable. Its value would be enhanced by the incorporation of a bulletin board capability with direct access from public telephone lines to provide a forum for the exchange of computer knowledge within the (industrial) public at large. The design should include the capacity for expansion to a regional network. Recommendation 1) above is a prerequisite.

3) Organize a club of Nigerian data bank managers to meet regularly and exchange information on common interests and problems.

I. ACTIVITIES AND OUTPUT

The principal activities described below were to design a computer system best able to fulfill the objectives of the project, requisition and install it and provide on-the-job training of the computer personnel and information specialists. Ways to establish data communication links with other national and international data banks were investigated.

A. Main duties and objectives

Specification of computer hardware configuration

Completed and described in the first mission part report.[3]

Specification of application-oriented software

Completed and described in the first mission part report.[4]

System analysis work for information services

A number of databases[5] were implemented according to specifications developed by the Head of the FIIRO INDICES Centre, R. O. Sodipe and the UNIDO Industrial Information Advisor, E. I. Vajda. Revised versions of the data bases were designed and installed by the computer staff. I believe that the staff is capable of providing for future data base design requirements.

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3. See ANNEX 2, *Computer Network Configuration As Installed*, page 17.

4. See ANNEX 3, *Computer Software and Application Programs Installed*, page 19.

5. See ANNEX 4, *Databases Implemented by the Computer Centre*, page 20, and ANNEX 5, *Sample of Selective Dissemination of Information*, page 21..

Attention was given to developing and automating suitable operating procedures, particularly procedures to insure adequate backing up of data to avoid loss due to accident or error.

Various programs e.g. CDS/ISIS, CD/ROM databases, word processing, spread sheets, desk top publishing, must run under different operating system configurations. Manually changing from one to another is tedious, error prone and requires technical computer knowledge. To make this easy for library information specialists without assistance from the computer staff, 'batch programs' were written to automate the process as much as possible.[6] Two FIIRO computer specialists have been trained to write batch programs as needed in the future to adapt to changing software requirements.

Although CDS/ISIS, the principal data base software in use in the center, is not designed for use in a network, methods were developed that allow it to perform satisfactorily. Two copies of each data base are kept in the system. One that is is available to all network users for information retrieval is write protected so that it cannot be changed. The other copy is not write protected, so that it can be updated, but it is available to only one terminal. Periodically the updated version is substituted for the less current information retrieval version. This procedure avoids potential network conflicts.

Security of the important programs and databases against unplanned user actions is achieved by a combination of data management procedures and write protection of selected files. This approach avoids the awkwardness and negative aspects of passwords or access privileges based on user status.

Agreement in principle was reached in the first mission part for mutual backup with the National Institute for Policy and Strategic Services, although on-line communication with the institute has not yet been achieved.

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6. See ANNEX 6, *Batch Program to Invoke the Agricola CD/ROM Database*, page 22.

The use of desk top publishing enables the center to expand its capacity to distribute information in a timely manner. Several staff members have been trained in the use of various desk top publishing programs and have developed the skills necessary to produce a professional product.[7]

Adaptation of application-oriented software

In addition to the tailoring of the CDS/ISIS software previously reported, the large number of application programs in use necessitated a number of procedures to adapt the output of one to the input requirements of another. For example the CDS/ISIS database that contains information on clients can produce lists of names and addresses selected according to criteria, such as those to whom a form letter should be written. Using a word processing program it is possible to print form letters and address envelopes automatically to names and addresses on a computer file in a particular format. It was necessary to configure the CDS/ISIS data base to produce the properly formatted file as an output in order to automatically print letters to clients selected from the data base without retyping the names and addresses.

Word processor formats and procedures were developed to produce duplicator stencils using the dot matrix printers. This use of stencil duplication frees significant amounts of computer and printer time that would otherwise be required to make multiple copies.

All programs required installation procedures to tailor them to the specific configuration of the computers on which they will run. Staff members were trained to perform this function.

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7. See ANNEX 7, *Sample of Desk Top Publishing Produced Document*, page 23.

Possibilities of on-line accessing of international networks

Useful links with international industrial information sources have been established through the use of CD/ROM readers. Principal information sources are distributing computer searchable databases on compact disks in increasing numbers. Performing the information searches on the data bases locally avoids significant long distance telephone charges even where telephone access is established. These CD/ROM databases are generally updated at frequent intervals. Several CD/ROM databases[8] have been obtained by the center and are in regular use.

However valuable the CD/ROM usage, there is still benefit to be derived from on-line accessing of international data networks. To achieve this objective, a series of tests was performed. Modems were connected to two computers and communication software was installed. The equipment was exercised by programming it to automatically dial one computer from the other (out on one telephone line to the telephone exchange and back in on another). Data files were transferred over the telephone lines. This test verified the compatibility of the computer hardware and software with the telephone system and familiarized the staff with the necessary programming procedures. A telephone line with "international direct dialing" capability was obtained at the end of the mission but not in time to access international data banks. I believe that connection to international industrial databases is quite feasible, awaiting only the completion of necessary administrative procedures.

Computer communication programs divide data to be transmitted into short blocks that contain additional coded information (error detecting code) that allows the receiving computer to determine whether a transmission error occurred. Every block is checked for errors by the receiving computer and acknowledged if error free. If an error is detected in a received block, the block is not acknowledged and therefore re-transmitted. The greater the number of errors, the more

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8. See ANNEX 8, *CD/ROM Data Bases Currently in Use at FIIRO*, page 24.

time is required to re-transmit. Within wide limits, the major effect of errors is to increase the cost, i.e. long distance telephone and data bank connect time fees.

Procedures[9] were designed complete the process of accessing international data networks after the end of this mission. They will determine whether the average telephone connection to an international information network encounters so much noise that it increases costs prohibitively. In case excessive errors are detected, the procedures recommended are designed to identify the source of the errors in order to determine the most effective solution. It is anticipated that the computer center personnel will be able to use these procedures to achieve satisfactory access to intern ..ional data sources.

Use of the SIRIUS 1 microcomputer at FIIRO

Completed and described in the first mission part report.

Assessment of need for mainframe computer time

Completed and described in the first mission part report.

Regional (African) and international (INTIB) networks study

As described in the first mission part report, FIIRO is now an active node in the INTIB network.

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9. See ANNEX 9, *Procedure for Connection to International Data Networks,* page 25.

On-the-job training for computer center staff

On-the-job training of the computer center staff has been continuous throughout the mission. The staff has attained a high degree of proficiency in creation of databases, system operation, information retrieval maintenance and minor repair procedures. The Computer Center Manager, Mrs. B. N. Dungor attended a UNESCO/German Foundation sponsored In-Depth Training Course in MICRO CDS/ISIS Software for English Speaking African Countries in Berlin, FGR 2/9/88 - 17/9/88 and a UNESCO sponsored On-the-job Training Course On the Use of CDS/ISIS Software in Paris, France 24/10/88 - 6/11/88. The staff is now conducting training courses for others.

Computer usage training courses

Training courses were presented to the FIIRO library staff on the creation and use of databases for information storage and retrieval. In addition a series of courses on the use of selected software packages including project management, spreadsheets, statistical data reduction and word-processing was presented to members of management and senior staff. Selected senior secretarial staff members were thoroughly trained in the use of word processing. Several projects are now using the computer system for data reduction and graphical presentation.[10]

Individual fellowships

Computer repair and maintenance training for designated members of the computer center, recommended in the first mission part, was approved. An attempt was made to locate suitable international training[11] but no suitable course was identified. As an alternative, a

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10. See ANNEX 10, *Example of Computer Aided Statistical Data Reduction*, page 26.

11. See ANNEX 11, *Memorandum Concerning Desired Computer Repair Training*, page 27.

three month program was formulated with an in-country computer maintenance firm. Three candidates have been nominated and are preparing for the course. Benefits expected from training in-country include an expected continuing relationship of the trainees with the firm that provides the training for consultation and guidance.

B. Support activities

The computer expert was invited to participate in a number of activities in support of the institute, but not directly connected with this project. Presentations were made at conferences[12] with the objective of giving the project greater regional exposure and encouraging coordination with related centers.

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12. See ANNEX 12, *Presentations at Conferences, Seminars and Training Courses* page 28.

II. UTILIZATION OF THE RESULTS OF THE ACTIVITY

A computer center has been established at FIIRO that is actively processing requests for industrial information and performing many automated peripheral support functions for the institute. Requests for industrial information are increasing in frequency. The time necessary to provide answers is going down as the staff become more proficient with the system. FIIRO is rapidly becoming dependent on computer aided activities. I believe that the computer center is self sustaining and will be adequately supported, assuring its continuing existence and growth.

Part of the reason for this success is that the computer center has taken on functions in support of diverse activities of the institute, exceeding the scope of this project. The support from other departments of the organization gained by these activities is proving valuable. Since hard currency expenses will be incurred to support the center in the future, broad based acceptance is important to its survival and growth.

III. CONCLUSIONS

The design concepts employed on this project have resulted in a computer based data bank that is rugged and survivable in a difficult environment. It could be used as a model for similar projects elsewhere in the developing world.

Factors perceived to be keys to its success are:

1) Use of standard generic personal computers of mature design as the basic computer equipment element.

2) Use of a loosely connected network of autonomous computers as work stations rather than a central computer with clusters of dependent terminals.

3) Use of the in-house computer staff to perform the necessary maintenance and repair functions rather than contracting this service.

4) Integrating other computer support functions such as data reduction, word processing and desktop publishing into the computer center function rather than narrowly confining its activities.

5) The use of the compact disk storage medium.

6) The use of multiple hardware elements, of combined capacity far exceeding the requirements of the basic center function to achieve reliability through redundancy. Multiple uninterruptable power supplies are particularly important.

7) Promotion of an 'open shop' attitude. That is, permitting and encouraging the ultimate users to operate the computers themselves rather than forcing them to go through computer operator intermediaries. This requires conscious (policy) attention since there is a natural human tendency to try to gain status by exercising restrictive control over a valuable resource.

ANNEX 1

Senior Counterpart Personnel

Project Director: Mr. R. O. Sodipe,
                                     Chief Research Officer

Computer Center Manager: Mrs. B. N. Dungor,
                                     Principal Research Officer

Systems Analyst   Mr. D. Ahorituwere
                                     Senior Research Officer

Computer Operators: Mr. D. G. Akinrinmade
                                     Higher Technical Officer
                                     Miss T. Omirin
                                     Assistant Technical Officer

Computer Maintenance Team: Mr. M. C. Eyem,
                                     Higher Technical Officer
                                     Mr. S. O. Osadare
                                     Technical Officer
                                     Mr. A. Waidi,
                                     Technical Officer

ANNEX   2

Computer Network Configuration As Installed

```
┌──────────────────────────────────────────────────────┐
│                                                        │
│          Computer Center – Main room                   │
│                                                        │
│   Computer (XT), Printer (Matrix), UPS, Network,       │
│         Modem, Telephone line                          │
│                                                        │
│   Computer (XT), Printer (Laser), UPS, Network,        │
│         CD/ROM Reader                                  │
│                                                        │
│   Computer (XT), Printer (Matrix), UPS, Network,       │
│                                                        │
│   Computer (XT), Printer (Matrix), UPS, Network,       │
│                                                        │
└──────────────────────────────────────────────────────┘
                          │
┌──────────────────────────────────────────────────────┐
│                                                        │
│          Computer Center – Office                      │
│                                                        │
│   Computer (AT), Printer (Laser), UPS, Network,        │
│         Modem, Telephone line                          │
│                                                        │
└──────────────────────────────────────────────────────┘
                          │
┌──────────────────────────────────────────────────────┐
│                                                        │
│   Computer Center – Desktop Publishing Room            │
│                                                        │
│   Computer (386-AT), Printer (Laser), UPS              │
│                                                        │
└──────────────────────────────────────────────────────┘
                          │
```
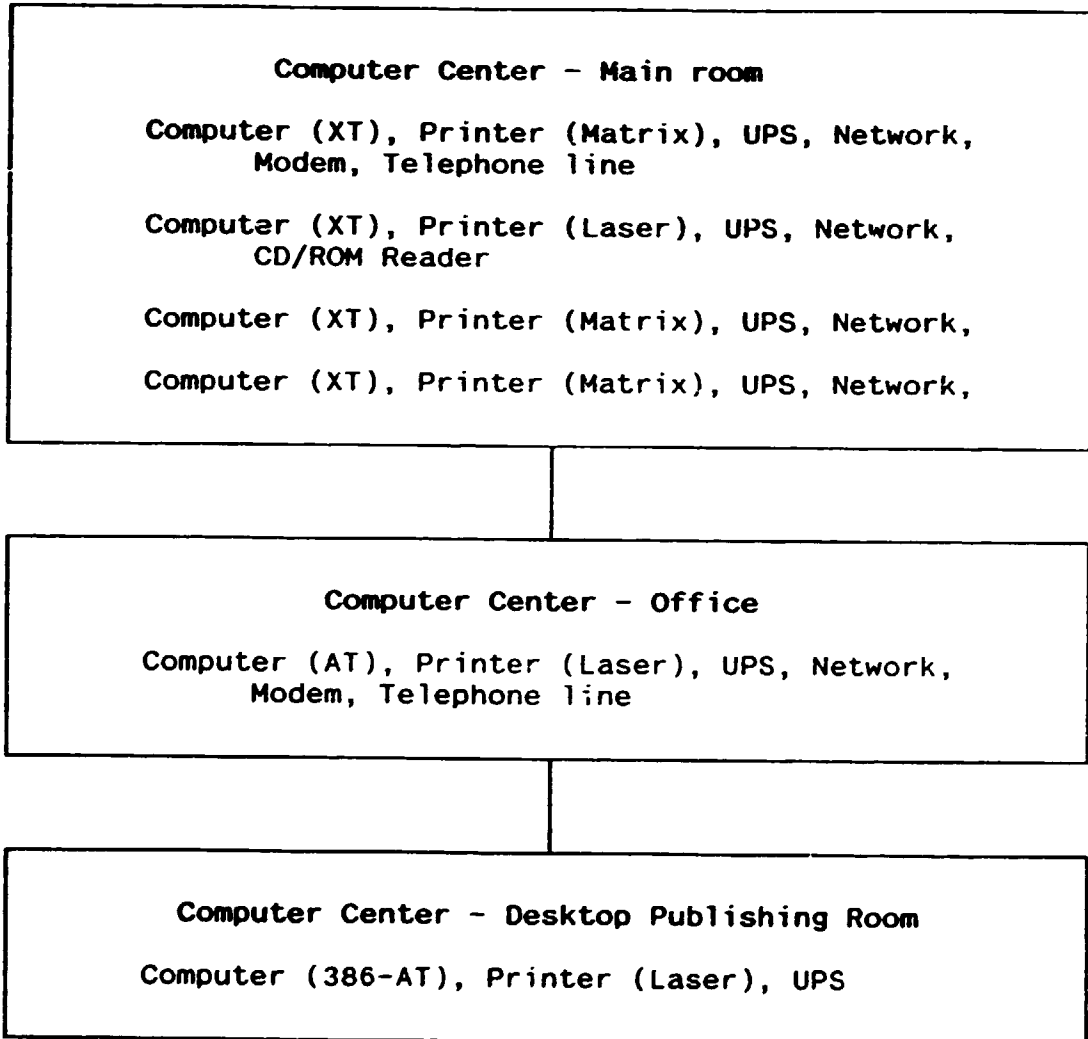
next page

ANNEX 2

Computer Network Configuration As Installed, continued

previous page

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                    │
┌───────────────────┴───────────────────────────┐
│                                                │
│              Central Library                   │
│                                                │
│   Computer (AT), Printer (Laser), UPS, Network,│
│          Modem, Telephone line                 │
│                                                │
│   Computer (XT), Printer (Laser), UPS, Network,│
│          CD/ROM Reader                         │
│                                                │
└────────────────────┬───────────────────────────┘
                     │
┌───────────────────┴───────────────────────────┐
│                                                │
│           FIIRO Director's Office              │
│                                                │
│   Computer (XT), Printer (Matrix), UPS, Network,│
│                                                │
│                                                │
└────────────────────────────────────────────────┘
```
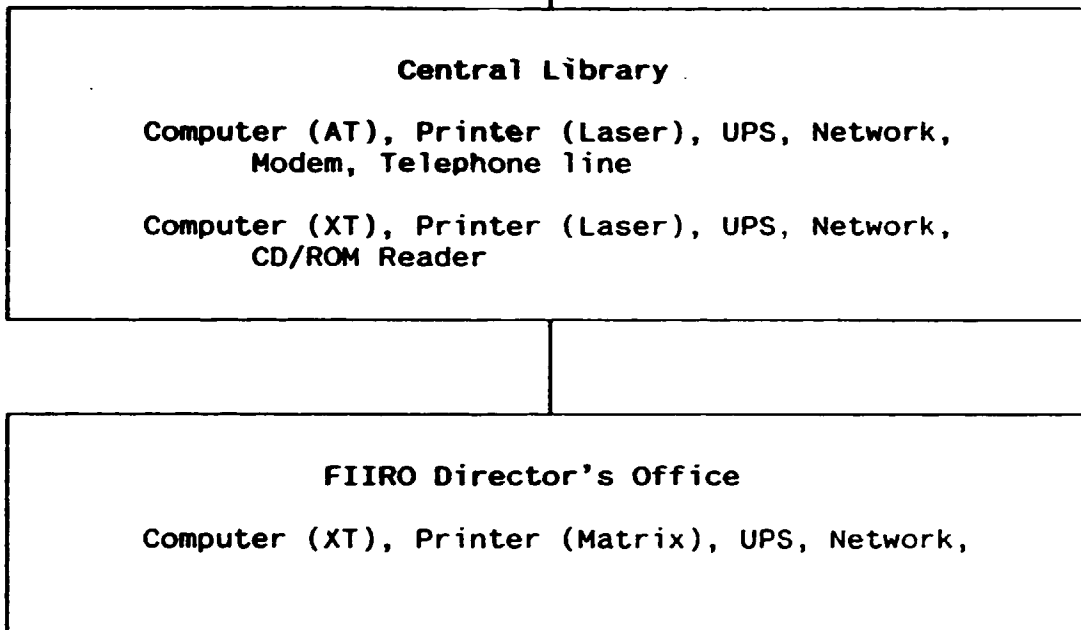
ANNEX 3

Computer Software and Application Programs Installed

_____

Xerox VENTURA DESKTOP
PUBLISHING

LeBaugh LePRINT

CLIPPER [dBASE III Compiler]

PARADOX

Borland SIDEKICK Desktop
Organizer

Microsoft MACRO ASSEMBLER

Borland TURBO BASIC

Simon & Shuster NEW WORLD
WRITER

Microsoft DOS 3.30

Microsoft TURBO PASCAL 4.0

AUTOCAD

Aldus PAGE MAKER

Microrim R:BASE

Microsoft SUPER PROJECT EXPERT

Micropro WORDSTAR 2000

Microsoft FORTRAN Compiler

Microsoft WORD

Ashton Tate dBASE III PLUS

Lotus 123

Microsoft COBOL Compiler

ANNEX 4

Databases Implemented by the Computer Center

The databases below have been implemented in CDS/ISIS software. They are in active use while they are being loaded with appropriate information.

CASE
Current Awareness Services on the Economy. Contains citations of current newspaper and periodical articles concerning the economy of Nigeria. A sample printout is shown on the next page.

COMPRESS
Company PRofiles for Extension and Similar Services. Contains data on Nigerian companies.

DANTE
Data Available on Nigerian Technologies. Similar to the UNIDO INTIB Offer of Technology (INTIB) database, but containing additional data pertinent to Nigeria.

INDAB
Industrial Abstracts. Contains abstracts of journal articles, conference papers, patents, etc.

MAIL
Mailing list of all contacts. Contains names, addresses and history of all contacts to date.

PIPE
Product and Industry Profile Extract. Describes inputs and requirements necessary to establish various types of industrial plants.

STEP
Scientific and Technical Publications. Contains citations of journal articles, conference papers, patents, etc.

THESAURUS
Thesaurus of key words used in abstracting for other databases.

ANNEX 5

Sample of Selective Dissemination of Information

Compliments of FIIRO/INDICES

CURRENT AWARENESS SERVICES ON THE ECONOMY (CASE), OCT., 1988

for: **Food Specialities Nigeria, Ltd. (Technical Manager)**

TITLE: Establishing paper cups
and saucers
manufacturing plant.
AUTHOR:
SOURCE: Business Concord;
1/4/88, P 2.
FILE NO. 4090.

TITLE: Mangoes, avocados
wanted in France.
AUTHOR:
SOURCE: Business Concord;
12/4/88, p. 16.
FILE NO. 5058.

TITLE: Biscuit consumption up
by 132 percent.
AUTHOR: ALUKO-OLOKUN, A.
SOURCE: Business Concord;
3/5/88, p. 16.
FILE NO. 6190.

TITLE: Importance of spare
parts design stressed.
AUTHOR:
SOURCE: Daily Sketch; 1/4/88,
p. 7.
FILE NO. 5077.

TITLE: Establishing a mini-palm
oil production plant.
AUTHOR: OLOMU, K.
SOURCE: Business Concord;
6/5/88, p. 2.
FILE NO. 6206.

TITLE: Hope of commercialising
soy-ogi ebbs.
AUTHOR: SHAKA, B.
SOURCE: Business Times; 3/5/88,
p. 4
FILE NO. 6309.

TITLE: Inadequate storage
facilities hinder
agricultural
development.
AUTHOR: AJAYI, D.
SOURCE: National Concord;
4/5/88, p. 7.
FILE NO. 6196.

TITLE: Walnuts, cashews wanted
in Taiwan.
AUTHOR: FALUSI, F.
SOURCE: Business Concord;
10/5/88, p. 16.
FILE NO. 6224.

TITLE: Surplus gari next year
- FIIRO Boss.
AUTHOR: OMENAZU, E.
SOURCE: Punch; 30/5/88, p. 9.
FILE NO. 6072

TITLE: Peanut butter wanted in
UK.
AUTHOR:
SOURCE: Business Concord;
13/5/88, p. 16.
FILE NO. 5082

ANNEX 6

Batch Program to Invoke the Agricola CD/ROM Database

The operator types AGRIC [ENTER] and then follows the instructions on the screen to make sure printer is not in use then to push the RESET button. The programs below take care of changing the system configuration, installing necessary drivers and setting the path.

AGRIC.BAT batch program

```
copy c:autoexec.agr c:autoexec.bat
copy c:config.agr c:config.sys
echo off
cls
echo MAKE SURE YOUR PRINTER
    IS NOT IN USE
pause
CLS
echo MAKE SURE THE AGRICOLA
    CD IS IN THE READER, POWER
    ON, DOOR CLOSED
pause
CLS
echo PUSH THE RED RESET
    BUTTON ON THE COMPUTER
    NOW!
```

AUTOEXEC.AGR autoexecution file

```
prompt $p$g
date
time
\net\LOGON NODE111
\net\SETDEV x1  /XR /YR /ZR
\net\SETDEV P1 /XRW /YRW /ZRW
\net\netcore
```

```
c:\net\instimer
c:\net\spl d:\spl.buf /s200 /u8
    /q20
d:
cd\slvrpltr\spirs
spirs
path=d:\search\bin;d:\bin;c:\dos;-
    d:\sytos;d:\prcm;d:\norton;d:\-
    ws2000;c:\;d:\
CD\
```

CONFIG.AGR configuration file

```
lastdrive=g
device=hardrive.sys
device=c:\dos\emm.sys
buffers=20
files=20
break=on
DEVICE=c:\net\xdisk.drv
    hardrive.sys=1
device=c:\net\d-link.drv /s4
device=d:\search\drivers\cm153.
    sys
```

ANNEX 7

Sample of Desk Top Publishing Produced Document

FIIRO TODAY

FEDERAL INSTITUTE OF INDUSTRIAL RESEARCH, OSHODI, LAGOS

Third Edition

1988

ANNEX 8

CD/ROM Data Bases Currently in Use at FIIRO

International Atomic Energy Agency – INIS Nuclear Database. Contains citations and abstracts of literature on atomic energy from journals, periodicals and reports.

U S Department of Agriculture - AGRICOLA Agricultural Database. Contains citations and abstracts of literature on agriculture and agro-industry.

Microsoft - BOOKSHELF Word Processing Reference Library. Reference material, e.g. thesaurus, dictionary, style guide, etc., useful with word processing programs

Findit - Kirk-Othmer Encyclopedia of Chemical Technology.

McGraw-Hill - CONCISE Science and Technology Reference encyclopedia.

ANNEX 9

Procedure for Connecting to International Data Networks

1) Connect two computers to different telephone lines through modems.

2) Call one computer from the other (out on one telephone line and back in on the other) at various times. Transfer files back and forth, keeping statistics on transmission times (error rates). This will determine the effects of noise, cross talk and signal attenuation in the lines to the local exchange. If it exhibits an excessive error rate, e.g. causing more than ten *per cent* re-transmission of blocks, NITEL (Nigerian Telecommunications Limited) should be asked to provide lines with less noise. If excessive noise proves to be in the switching circuitry of the local exchange, and therefore not correctable by line changing, NITEL should be consulted to arrive at a solution. The most likely solution to this type of problem is to acquire a line from a Lagos Island exchange.

3) Loan one of the modems to another computer center in Nigeria, exchange data with that center. Keep statistics on transmission times (error rates). If excessive, consult with NITEL.

4) Connect to various international data banks. It is necessary to obtain appropriate passwords from the data banks and communication networks that access them. The procedures for the necessary exchange of passwords and other formalities can be automated by the communication program. The method of accomplishing this is described in the program description. Automated telephone dialing has been verified operable in the Nigerian telephone network. Temporary passwords for access to international data banks that were obtained during the first mission part must be renewed.
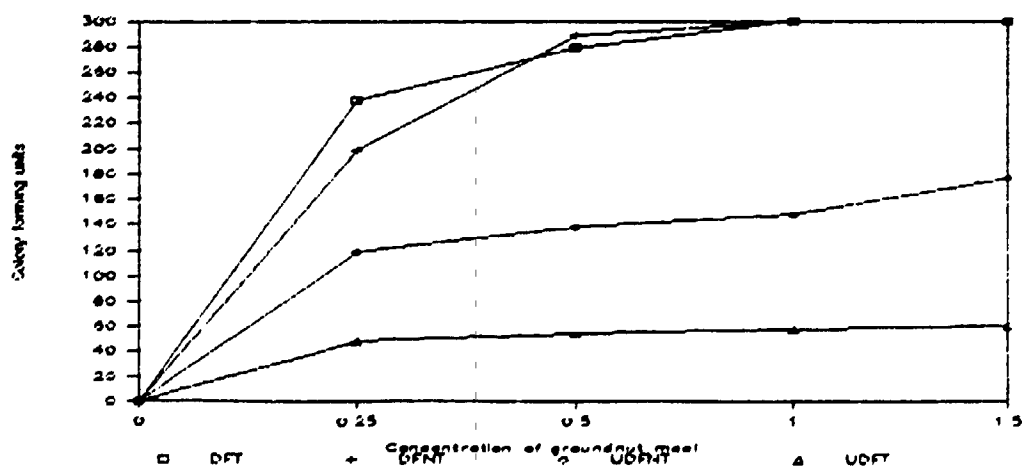
ANNEX 10

Example of Computer Aided Statistical Data Reduction

GROWTH OF BACILLUS CEREUS vs. CONCENTRATION OF GROUNDNUT MEAL

CONCENTRATION	0	0.25	0.5	1	1.5
DFT	0	235	280	300	300
	0	240	280	300	300
	0	240	275	300	300
MEAN	0	238.33	278.33	300.00	300.00
DFNT	0	195	285	300	300
	0	200	290	300	300
	0	200	290	300	300
MEAN	0	198.33	288.33	300.00	300.00
UDFNT	0	120	135	150	175
	0	120	140	145	175
	0	115	140	150	180
MEAN	0	118.33	138.33	148.33	176.67
UDFT	0	50	54	57	61
	0	45	55	58	60
	0	50	55	58	61
MEAN	0	48.33	54.67	57.67	60.67

```
Key: DFT  = Defatted Groundnut Meal with Testa
    DFNT  = Defatted Groundnut Meal no Testa
   UDFNT  = Undefatted Groundnut Meal no Testa
    UDFT  = Undefatted Groundnut Meal with Testa
```

ANNEX 11

Memorandum Concerning Desired Computer Repair Training

UNIDO Project DP/NIR/83/021/11-02

MEMORANDUM

TO: Dr. Mathey-Boo, SIDFA

FROM: A. Yeiser, UNIDO Expert

DATE: September 29, 1988

FILE: C:\WS2000\WS2DATA\MEMOAY09

SUBJECT: Computer equipment maintenance training

As discussed with you, Mr. Sodipe and I feel that five days training on computer maintenance will not be adequate to prepare FIIRO personnel to maintain the INDICES computer network. I would suggest the following topics to be covered in a six week course for each of three candidates:

1 week - Board level diagnosis and repair of digital equipment, use of diagnostic software.

4 week - Component level digital repair. Reading digital circuit diagrams / IC (integrated circuit) specifications. Circuit tracing using digital probe / oscilloscope, wave-shape and timing measurement. IC removal (unsoldering) / replacement. Floppy disk drive alignment ...

1 week - each candidate, repair of one of the following: (1) Epson LQ850 matrix printer, (2) Epson GQ3500 laser printer, (3) Philips CM100 CD/ROM reader.

I am investigating the availability of suitable preliminary training within the country.

ANNEX   12

Presentations at Conferences, Seminars and Training Courses

Andrew Yeiser, UNIDO computer expert, spoke, taught a course or presented a paper at the following meetings:

Information Resource Management Course for Chief Executives
    Sponsored by UNIDO at FIIRO 6-6 to 7-6-1988

Information Resource Management Course for Middle Managers
    Sponsored by UNIDO at FIIRO 8-6 to 10-6-1986

Creation of Corporate Information Services Course for Infor-
    mation Services and Library Heads
    Sponsored by UNIDO at FIIRO 14-6 to 17-6-1988

Workshop on National Information Network for Policy-Makers
    in Nigeria
    University of Ibadan, Ibadan, Nigeria 6-10 to 6-11-1988

Seminar on Improvement of the Quality of Roots and Tuber
    Food Products
    Organized by the Association of African Universities,
    held at FIIRO 29-8-1988

Workshop on Improvement of the Quality of Roots and Tuber
    Food Products
    Organized by the Association of African Universities,
    held at FIIRO 14-10-1988

Symposium on Quality Control in the Textile and Allied In-
    dustries
    Sponsored by UNIDO at FIIRO, 10-11-1988

ANNEX   13

Lecture Handout on Word Processing

Why Word Processing? Why not just type?

A typewriter converts keystrokes into words on paper as accurately and quickly as the typist is able to type. Typing speeds on a word processor are typically much higher.

Word processing is computer aided text writing and editing. It reduces the effort required to draft, edit, revise and finish type reports, statistical tables, contracts, letters or any text. A relatively unskilled typist can produce perfect copy.

Text is typed quickly without regard for errors and displayed and inspected on the monitor (Video screen). Errors noticed at this time can be corrected quickly by positioning the cursor (bright spot on the screen showing where the next character will go) over the error and typing the correction. Letters or words left out can be inserted. The following text automatically moves over. The text is then stored and a copy printed for the author's revision. When the text has been edited it is printed in final form. The operator can retrieve the copy from memory and make corrections. The data is entered once only eliminating (often many) retyping functions required on a regular typewriter.

The printing format is flexible, type size, style and spacing can be changed easily. The copy can be printed in a ragged right format or justified so that all lines are the same length.

This handout was produced on a personal computer using a word processing program.