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DP/EGY/88/031

THE ARAB REPUBLIC OF EGYPT

Technical Report:*
Computer Based communication Environment for RAMSES

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

Based on the work of Wulfdieter Bauerfeld, expert in design and establishment of computer networks

United Nations Industrial Development Organization
Vienna

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EXPLANATORY NOTES

Currency

The Egyptian Pound has the official value of 3.21 LE to the US Dollar (May 1991).

Technical Terms

OSI: Open System Interconnection is the acronym for the vendor-independent standardization framework of communication between computers.

ISO: The International Organisation for Standardization issues ISO-Standards for, between others, protocols and services within the framework of OSI (e.g. ISO FTAM).

CCITT: The Comitee Consultatif International de Telephonique et Telecommunication is the international consortium of national PTTs which issues, between others, recommendations on protocols and services in the area of telecommunication (e.g. X.25).

(Switched) Network: There exists no exact and common definition of the term network; throughout the report it will be used as a resource which is intended to connect more than two communication partners at the same time. In order to provide n potential partners with communication links to each other n *(n—1) links would be needed. Since not all communications take place at the same time the costly resource "wire" can be shared by means of implementing a network consisting of a lesser number of wires and switches which connect partners according to their signalling. Two techniques can be distinguished in communication: Circuit-switched" mainly implemented in telephone networks and "packet-switched" mainly implemented in data networks.

Communication Link: Two technical levels" of communication links have to be distinguished, the link to the next available switch of a network in form of a physical existing wire and the link provided through the network to the partner. Links to the next available switch have to be permanent in order to signal to the network the request to get connected to the partner. On demand (e.g. dial-up on a telephone receiver), links to the communication partner are established as "real" channels in circuit-switched networks and as "virtual" channels" in packet-switched networks. Since a permanent link to a data network might be to costly, the connection can be provided through the telephone network on demand. CCITT recommendations specify permanent links or dial up-links to X.25-switches as well as to PADs.

Modem: A modem (modulator / demodulator) is needed on both ends of a digital communication link to provide secure electrical transportation if the length of the wire(s) used for data communication exceeds a certain distance. The wires are in principal identical to those used in telephone conversation but digital information gets distorted and cannot be amplified. Therefore, modems converts zeros and ones into certain frequencies which are transferred then on a dedicated link or via a dial-up line of a telephone system and back to zeros and ones. Modern modems have auto-dialing and auto-answering facilities and do not require human interventions in order to set up a link. Usually modems are needed either between two partners, or if a network is used in between each partner and the next available switch of the network.

Physical Network or Transport System: Usually it is the term for the description and the actual implementation of a data communication system. Its describes the topology (e.g. star-shaped, mashed) and the technique used (e.g. circuit-switching, packet-switching) as well as the underlying media (e.g. telephone links (2-/4-wire), coax, fibre optic) to connect the end-systems of a computer-based communication system. In OSI the transport system comprises the layers 1 (physical), 2 (data link), 3 (network), and 4 (transport).

Logical Network or Application System: Usually it is the term for the description and the actual implementation of end-to-end services (e.g. dialogue, file transfer) and the underlying common elements (e.g. sessions, data presentations) of a data communication system. The logical network enables the users to communicate via their end-systems by means of the physical network and reflects a certain community. A physical network, i.e. all "wired" connections, might host several, even different logical networks. The logical network may be realized through "pure" communication services only (like a dialogue facility for any kind of interactive application like a data base or an isolated message handling system), of "build-in" communication facilities (like a file transfer as an integrated function in a distributed data base to import and export files in a simple way) or a "complete" application (like electronic mail which handles local messages and interconnects, if needed, automatically to other computers). In OSI it comprises the layers 5 (session), 6 (presentation), and 7 (application).

Protocol: It is the definition of a communication within the physical or the logical network between two or more endsystems and describes the format of data sets and their sequence and relative timing in the exchange. Protocols are, according to the OSI-framework, executed in different layers (up to seven) which structure certain responsibilities for resources in the communicating systems (e.g. links, interfaces, switches, end-to-end-relations, data transport, user application systems). The execution of a protocol provides a communication service, common on all endsystems. While a protocol describes "how" communication takes place, a service describes "what" is offered by that communication.

X.25: This CCITT recommendation describes the protocol necessary and service obtained to connect digital end systems like computers to packet switching data networks (PSDN) and is concerned with OSI-layers 1 - 3.

X.25-Switch: Packetized data are forwarded between nodes in public or private packet switching data networks. A X.25

switch which in principal a dedicated small computer acts as the node where a physical link to the user providing the X.25 protocol is connected. This physical link can be a permanent link or a dial-up line using the public telephone systems and/or its private extensions. As an extension of a public PSDN the user might provide its own X.25-switch(es) (similar to a private telephone exchange) or builds up his private network completely relying on his own switches.

X.3/X.28/X.29: These CCITT recommendations describe the protocols necessary and services obtained to connect line-oriented terminals via a PAD (Packet Assembly / Disassembly) to a PSDN and is concerned with OSI-layer 4.

PAD: A PAD (Packet Assembly / Disassembly) is in principal a dedicated small computer or a piece of software running on general purpose computer. It connects terminals - or personal computers or work-stations with a terminal emulator - with a X.25 switch. A PAD can be used exclusively on private premises or can be provided through a PSDN operator as a public resource. Links to a PAD can be dedicated links or dial-up links of the telephone system.

EGYPTNET: EGYPTNET is a public packet switching data network (PSDN) service in Egypt operated by ARENTO which offers in and between Alexandria, Cairo, and Suez X.25 access to customers. The network is operational since December 15th, 1989 and consists of nine nodes and two additional concentrators. At present (May 1991) EGYPTNET serves around 400 customers. It will be upgraded and eventually extended to Upper Egypt according to the need of customers. EGYPTNET offers a large range of access speeds (50 - 64 000 bit/sec). The tariffs are considerably low in comparison to many European networks but equal to them independent of the distance and essentially depending of the volume of data really transmitted. EGYPTNET can be extended by private nodes (X.25-switches), i.e. sub-addressing is provided. In the cities mentioned above public PADs are installed which can be reached either by dial-up links via the telephone or via permanent links.

ABSTRACT

RAMSES is the proposed name for the whole project and resulting facilities. It stands for **R**esearch-Data **A**ccess and **M**anagement **S**ystem for **E**ngineers and **S**cientists. The purpose of the project is the establishment of the Information System RAMSES for effective management and coordinating of 10 multi-branch R & D centres belonging to the Ministry of Industry in Egypt.

This report describes the findings of the communication expert (11-51) during the second part of the split mission.

The objectives to be reached between the first and the second mission by the national counterpart in Egypt have been described in an ambitious workplan. Additional material which was left after the last mission became part of the order for hard- and software. Since hardly any of the tasks described have been performed in the meantime, due to different reasons, basic building blocks for the communication between remote centres and the Ministry of Industry had to be installed and tested at the second mission. An updated workplan was left which describes in detail the tasks for all parties involved.

One of the original tasks, to test telecommunications channels to be used, was of less importance. It was found that the telephone system in Egypt has been upgraded substantially during the last years. According to available maintenance statistics no reasons could be found not to use dial-up telephone links as some of the needed physical communication paths.

A project revision has been prepared in order to finalize successfully this important and exemplary project.

During the second phase of the split mission the following objectives have been reached in co-operation with the principal supplier:.

- Installation of the central data base computer at MoI;
- Preparative work for a communication connection of a PC at interim residence of the CTA (Hotel President in Cairo);
- Installation of a private X.25 and a private PAD;
- Installation of a remote PC/work-station at MoI with communication facilities (modems) and a dedicated link at MoI
- Installation of a remote PC/work-station at MoI with communication facilities (modems) and a dial-up line via the public telephone network;
- Basic training for the staff and MoI and preparative work for a user manual;
- Preparation of the Application Forms for EGYPTNET
- Tests and demonstrations.

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INTRODUCTION

The purpose of the project is the establishment of the Integrated Information Network for effective management and coordinating of the R & D institutional infrastructure of the Ministry of Industry (MoI) in Egypt.

The Information System RAMSES - stands for **R**esearch-Data **A**ccess and **M**anagement **S**ystem for **E**ngineers and **Scientists** - is designed and implemented in order to establish an effective tool for horizontal co-ordination of activities among 10 multi-branch R & D centres belonging to the Ministry of Industry in order to provide vertical monitoring and servicing facilities from industry via R & D centres to the Ministry and backwards.

This report describes the findings of the communication expert (11-51) during the second part of the split mission.

The main purpose of this second stay (12 days in the field) was to test the installed equipment, to carry out interconnection proofs, to demonstrate the flexible use of the installed equipment and communication facilities to be used for the RAMSES project, to provide basic training and to edit a user manual. Furthermore it was planned to supervise the installation of - if available - advanced communication facilities (File Transfer and Electronic Mail).

These objectives could not have been reached completely since basic building blocks of the communication systems had not yet been installed.

Therefore, other objectives immediately identified on site by the expert were:

- to get acquainted in the field with the present stage of the project, especially with the needs of installations required from the equipment supplier, provisions required from

EGYPTNET and basic resource installations (wires) required from MoI;

- to analyse the current status of the communication services and the underlying physical network an to test and demonstrate the principal feasibility of the communication facilities;

- to understand the planned or existing communication environment in Egypt which become important for the near or far future for the private industry in Egypt as well as for other Arabic countries;

- to recommend ways and means best for future progress in terms of communication facilities;

- to prepare a project revision which includes a third part of the split mission.

These objectives were achieved.

RECOMMENDATIONS

The following recommendations are made to the Ministry of Industry in Cairo (MoI), the UNIDO headquarters in Vienna (UNIDO) or the UNDP office in Cairo (UNDP):

1. (to MoI): to take all efforts to improve the current situation of the project, to make the staff understand the importance of that project especially for state-of the art data communication and computer networking, to see the role of RAMSES as a vendor-independent system which includes computers of different vendors on an equal level of "partnership" according to their established role at MoI and to the available operating systems and programmed tasks;

2. (to UNIDO and UNDP): to understand that the spreading of data processing and information retrieval to main frames and work-stations or personal computers in a distributed communication environment remains a continuing technically ambitious process which is, nevertheless, needed to compete in industrial developments, to tighten the supervisory role of a government, to strengthen the private sector and to improve the knowledge and relations between customers and suppliers of computer equipment;

3. (to UNIDO, UNDP and MoI): to consider the UNIDO project EGY/88/031 as a nucleus and a pilot demonstrator for integrated computer-based communication facilities and to follow the proposed paths in all future expansions; to align necessary hard- and software purchases and/or implementations for the communication system (interfaces, switches, protocols and services) with the International Standards (ISO) and/or Recommendations (CCITT);

4. (to UNIDO and UNDP): to subcontract a company in order to: a) transfer the experimental stage of connection within the RAMSES network into the pilot and demonstration stage, b) maintain and operate the RAMSES computer network, c) deal in all communication matters with the external partners specifically with the R+D Centres, EGYPTNET and the UNDP office, d) provide on-the-place training for the RAMSES network technical maintenance team, e) support the Ministry of Industry in problems concerning internal cabling, and f) provide consultancy on distributed database designing, implementation, maintenance and training.

5. (to UNIDO and MoI): to arrange for specialists from Egypt visits of institutions (preferable in Europe) in order to expose them to similar projects in information and data networking using computer based systems and to gain experience in operational problems;

6. (to MoI): to support the recommended technical solution which is in alignment with the public packet switching data network in Egypt (EGYPTNET) and considers the physical layout of a private extension of EGYPTNET by using a private branch exchange (X.25 PABX) which interconnects HP and ICL computers likewise;

7. (to MoI): to consider EGYPTNET as the principal service supplier of wide-area communication facilities and to gain experience with different physical solutions for interconnection (leased or dial-up lines, private or public PADs, direct X.25 access) in order to minimize operational costs;

8. (to MoI): to support the principal contractor and supplier of RAMSES (ORASCOM) to install on all corresponding end-systems (computers) the necessary hard- and software for communication and to provide the necessary wires between

the EGYPTNET connection and the private X.25-switch and the public telephone network and the private PAD;

9. (to MoI): to install for file transfer on all appropriate RAMSES systems the corresponding software which, if available, should follow the ISO-Standard called FTAM and is based on a transport protocol following an ISO-Standard;

10. (to MoI): to install for electronic mail as a first step at one of the multi-user systems at MoI in Cairo an Electronic Message Handling System which runs as a remotely accessible application and follows, if available, the CCITT recommendation X.400 to provide further expansion in a standardised way and to collaborate as closely as possible with the UNDP project EGY/87/006 (Electronic Mail) and to consider common meetings with their specialists;

11. (to UNIDO and UNDP): to install at the UNDP office in Cairo an end-system (computer) with dialogue access to the RAMSES hosts and services;

12. (to UNIDO and UNDP): to consider the proposed project revision an to support the recommended purchases and the extension of missions of international experts.

I. ACTIVITIES AND FINDINGS

1. First Mission: Workplan and Activities Left

In order to fulfil the actual and future requirements of an open distributed information systems like RAMSES should accomplish, a number of activities have been identified after the first part of the mission. Prerequisites for a paced progress of the project and to be reached between the first and the second stay of the split mission have been described in the workplan as follows:

1. Purchase in Egypt of the needed hard - and software through UNIDO and timely delivery to the Ministry of Industry in Cairo.

2. Negotiations and installation of the EGYPTNET access points (direct X.25 access) at the Ministry of Industry in Cairo.

3. Negotiations on and installation of the EGYPTNET access points (direct X.25 access) at appropriate sites (R & D centres) in Cairo and/or Alexandria.

4. Negotiations on and installation of the EGYPTNET access points (through PSTN) at appropriate sites (R & D centres) in Cairo and/or Alexandria.

5. Local installation at the MoI of the X.25 equipment (X.25 switch, X.25 interfaces to ICL ME 29 and to HP3000, hardware PAD) and basic dialogue access tests.

6. Installation of a dialogue access to the mainframes at MoI from PCs/work-stations via direct X.25 access or via PADs located at remote R & D centres.

7. Installation of dial-up modems and hard- and software PADs at R & D centres not accessible via EGYPTNET.

8. Installation of corresponding partner modems at the X.25 switch at MoI, remote dialogue access tests from the remote R & D centres.

The main purpose of this second stay (12 days in the field) was to test the installed equipment, to demonstrate the flexible use of the i ...d equipment and communication provisions to be used for the RAMSES project, to provide basic training and to edit a user manual. Furthermore it was planned to supervise the installation of advanced communication facilities (File transfer and electronic mail). These objectives could not have been reached completely since basic building blocks of the communication systems had not yet been installed.

The principal activities carried out had, therefore, to be aimed at mapping the identified communication needs to the physical network - layout, topology, and technology - and to define in all details the necessary work. The implementation of the logical network - applications and user services - in order to build up the base for an advanced, homogeneous communication system had to be postponed.

2. General

Discussions have been held at or with:

- Ministry of Industry
- UNDP office in Cairo
- ARENTO, the telecommunication authority in Egypt
- DETECON, a consultancy company for ARENTO
- Shawki, an accounting and management consultancy company
- ORASCOM, the principal contractor and distributor of the equipment

Many of these discussions were held jointly with Mr. Shams (Supervisor of the Information Systems Centre for the Ministry of Industry / MoI), Ms. Nagwa, engineer and system spe-

cialist at the Computer Centre of the Ministry of Industry and the CTA from UNIDO, Mr. Muraszkiewicz (11-01).

As a general impression it could be found that the project RAMSES is to be considered as an important nucleus for an intensive collaboration between **telecommunication users and suppliers** in order to apply and evaluate new services based on developing international standards. RAMSES can fulfil this role if the MoI will be prepared to assume the responsible role of a "launching customer". As a result the supplying companies involved in the project will learn and understand how to deal with new equipment, techniques and workload sharing. This experience is a valuable side effect which will strengthen the private sector in Egypt in general. That is true to the following factors:

- RAMSES is not designed to be a vendor-dependent proprietary communication system which tightens the user to a specific set of products but - as in the telephone system - allows the interconnection of a heterogeneous environment (here for the time being ICL, IBM, HP).

- a main emphasis of RAMSES is to demonstrate the interoperability of OSI (Open Systems Interconnection) -conformant products and to enforce vendors to enable user communities to communicate on the basis of standards (here a specific lack, which becomes obvious through RAMSES, is a vendor-independent representation of the Arabic language).

- RAMSES will prove that vendor-independent communication even for the specific needs of the Arabic countries is feasible; it increases the awareness to devote more resources of a co-ordinated approach to (computer) communication in order to enhance the productivity and trading power.

II. COMMUNICATION SYSTEM FOR RAMSES

The options and resulting conclusions for the communication part of RAMSES had been analysed in detail during the first part of the split mission and explained in the first report. It is still valid that the X.25 network is the ideal solution for anyone wishing to:

- communicate with national or international users or data banks, or
- remain available to remote correspondents.

Thus, X.25 offers a sound and reliable base for the physical network or Transport System. This system specifically outlined for RAMSES is sketched in fig. 1 and can be accessed via the following addresses (see numbers at fig. 1):

1) Telephone Numbers (CAIRO) to dial-up access to RAMSES PAD

	7 digit number	nick name
1.1: CAIRO	(to be completed	RAMSES-phone
1.2: CAIRO	after installation)	RAMSES-phone

2) X.25-Addresses of RAMSES end systems (e.g. to log-in remotely via RAMSES or public PAD):

Computer	12-digit number	nick name
2.1: ICL ME 29	(to be completed	RAMSES-ICL
2.2: HP 3000	after installation)	RAMSES-HP

3) Telephone numbers to dial-up access to public (EGYPTNET) PAD and available network user identifications (NUI) for RAMSES

	7 digit number	nick name
3.1: CAIRO	(to be completed	CAIRO-phone
3.2: Alexandria	after installation)	ALEX-phone

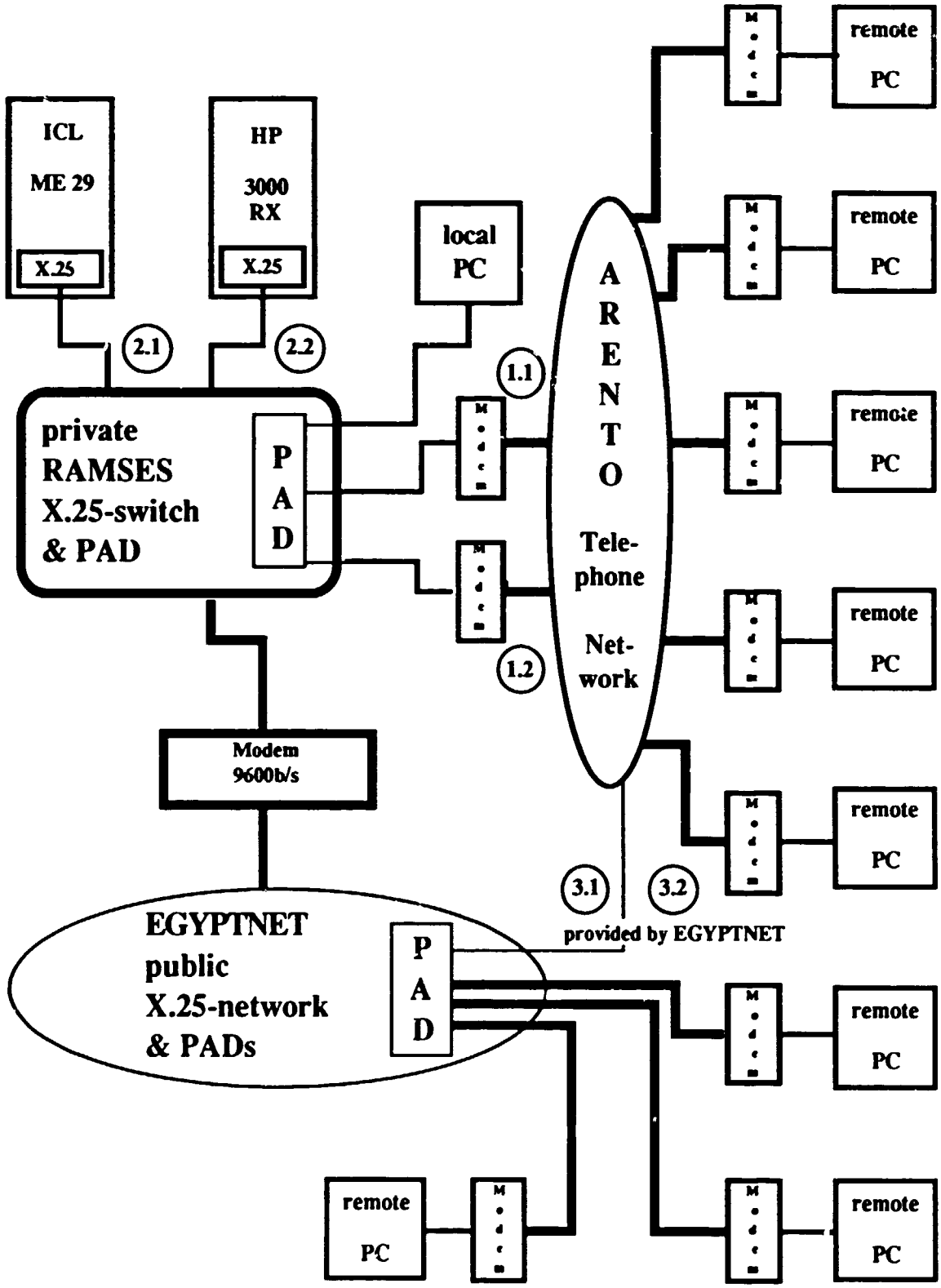

Fig. 1 The Physical Network/Transport System of RAMSES

In order to prevent from unauthorized access to the EGYPTNET a user must enter a personal Network User Identification (NUI) after the link has been established and before the X.25-connection to the destination host is signalled.

The decision on how to implement the logical network for MoI and the R&D centres depends evidently on the needs of this specific user community. From a communication point it would be far beyond the aims of this report to list all possible choices of application protocols and services.

As a most simple application a dialogue/remote log-in access to multiple hosts is offered on top of the X.25 service to the user. This access has to be provided via soft- or hardware PADs according to the CCITT recommendations X.3/X.28/X.29. Via a terminal or an emulator programme any remotely located interactive application programme like data bases, editors, compilers, or even a non-distributed, single electronic mailing system residing on a remote host can be used via the network.

The access from the R&D centres to the central data base host at MoI will be performed through the dialogue/remote log-in facility.

Additionally, it is planned to install an electronic mailing system according to the CCITT recommendations X.400. For each user of RAMSES an electronic mailbox (.i.e. a dedicated data area with specific access rights on a disk) accessible through his/her personal name, will be provided on the dedicated computer at MoI and can be accessed via the dialogue/remote log-in facility from all PCs and workstations at the R&D centres.

In the second stage with a growing user community, more than one mailing system can be installed on different computers in order to form a distributed mailing system. Some messages of a local community will not leave the local computer but are forwarded from the mailbox of the sender to the mailbox of the addressee. Other messages are send via the physical network to the corresponding addressee, owning a

mailbox on a different computer. An ultimate goal which is already partially available, is a world-wide electronic mailing system based on identical protocols (X.400).

The CCITT recommendations X.400 ff. describe the protocols necessary and the services obtained for a distributed Message Handling System (MHS) which is often called an Electronic Mailing System. A Message Handling System resides as an application on one or more computers and provides an exchange of messages between "mailboxes", i.e. special data areas on a disk assigned to personal user names. A Message Handling System usually contains functions to write, send, receive and file messages in a user private data area on that computer and exchanges messages with users on the same or other computers. X.400 is concerned with OSI layer 5 - 7 and requires a transport protocol (layer 4, e.g. ISO TP 0 = CCITT T.70) common for all end-systems. X.400 is aimed to become the base for a world-wide exchange of electronic mail.

Even more important for a regular update of the central data base at MoI by means of the remote data bases residing on the PCs and workstations of the different R&D centres is a file transfer facility which allows the transfer of binary or character-oriented data from any end-system to any other end-system within. Preferable the file transfer protocol will follow an ISO standard.

FTAM (File Transfer Access & Management) is the ISO Standard to transfer files or components of them between computer systems of different vendors/operating systems. A file transfer executed between two end-systems according to a standardized protocol and interconnects, therefore, the filing system of the two computers. FTAM is concerned with OSI layer 5 - 7 and requires a transport protocol (layer 4, e.g. ISO TP 0 = CCITT T.70) common for all end-systems and is based on a common transport protocol (e.g. ISO TP 0 = CCITT T.70).

The resulting main features of RAMSES will, therefore, be:

- a distributed research data access and management which - through communication - enables the local and remote user likewise to participate on mutually exchanged information without the disadvantage of a geographical separation;

- it is based upon international ISO-Standards and CCITT-Recommendations for open system interconnection and on commercially available operational products;

- it will create a demand for more vendor-independent products with the special emphasis on the Arabic language and the infrastructure created by RAMSES will be a model for co-operative research and development work throughout Egypt.

III PROJECT REVISION PROPOSAL

Project revision is proposed due to the following reasons:

1. there is a growing awareness and interest of the project as a pilot application of a vendor independent communication which is based on international ISO standards and CCITT recommendations and will include recently available public facilities as EGYPTNET.

2. the project should be adjusted in order to respond to a national trend towards strengthening the private sector and emphasis on commercialisation of the economy.

3. some of the originally identified specialists are not available any more; even if the role of telecommunication facility operators has been recognized, it cannot be appropriately staffed by the available personnel.

4. most of the training programme has not been completed due to some organizational problems,

in general, resources and training have to be extended beyond the originally planned scope. An appropriate budget proposal is given in the annex..

IV REMAINING WORKPLAN

The following actions must be taken in order to achieve the planned objectives:

1. Ministry of Industry (MoI)

1.1. Air Conditioner (split unit) at the RAMSES room (9th floor)

1.2. two access links in the RAMSES room (9th floor) to the public telephone system (ARENTO) in order to connect auto-answering modems to the private (RAMSES) PAD (CODEX 6505)

1.3. three private links between the RAMSES room (HP 3000) and the following offices in order to connect HP 3000 terminals

- Ms. Nagwa (9th floor)
- Mr. Mazhar (2nd floor)
- Minister of Industry (1st floor)

1.4. one link to EGYPTNET (Modem CODEX 2345) according to specific requirements to be defined between MoI and EGYPTNET

1.5. one link between the ICL computer room and the RAMSES room in order to connect the ICL ME 29 and RAMSES-X.25-Switch (CODEX 6525)

2. ORASCOM (HP)

2.1. Interconnection of the existing computer HP 3000 to the RAMSES-Switch (private X.25-switch, CODEX 6525) at the premises of MoI via the HP 3000 Interface;

2.2. Installation of PAD software at the HP 3000 to be accessible through the HP terminals and connected PCs;

2.3. Connection of one or two (according to requirements of MoI) VECTRA PCs to be installed at the premises of MoI to the RAMSES-PAD (private PAD, CODEX 6505);

2.4. Connection of RAMSES-PAD (Code 6505) and RAMSES-Switch (CODEX 6525);

2.5. Installation of directly connected HP Terminals in the following offices at MoI:
- Ms. Nagwa
- Mr. Mazhar
- Minister of Industry;

2.6. Installation of a dial-up modem at UNDP (off. of Mr. Sabry);

3. ICL

3.1. Interconnection of the existing computer ICL ME 29 to the private RAMSES-X.25-Switch (CODEX 6525) at the premises of MoI via the ICL X.25 Interface (see fig. 1);

3.2. Installation of PAD software at the ICL ME 29 to be accessible through the ICL terminals and connected PCs;

Equipment needed	Price US $
ICL Communication-Hardware:	
F 3570/15 X.25 HDLC Coupler	4000.00
ICL Communication-Software:	
E 70103/02 Protocol TME (incl. PAD Software)	2000.00

4. EGYPNET (see official application forms for details)

4.1. at the premises of MoI in Cairo (RAMSES room, 9th floor):
Synchronous Access direct X.25: with one-digit sub-addressing, 4 logical channels, 4 wires, 9600 bit/sec;

4.2. at the premises of one R&D centre in Alexandria:
Asynchronous Access to EGYPTNET-PAD: direct, 2 wires, 2400 bit/sec

4.3. in Cairo or Alexandria:
Asynchronous Access to EGYPTNET-PAD: through dial-up phone, 2400 bit/sec, 4 NUIs

ANNEXES

Interworking Proofs and Connection Procedures

Project Revision Proposal

Interworking Proofs

The following Interworking proofs are essential for the success of the project and have to be carried out in common efforts of the MoI, the companies ORASCOM, ICL, EGYPTNET and the technical adviser on communications.

1) Interworking (remote log-in) between a local PC and the ICL ME 29 operating system and/or the HP 3000 operating system via private RAMSES-PAD (CODEX 6505) and private RAMSES-X.25-Switch (CODEX 6525) according to fig. 2 and connection procedure CP 1;

2) Interworking (remote log-in) between a remote PC and the ICL ME 29 operating system and/or the HP 3000 operating system via dial-up line to private RAMSES-PAD (CODEX 6505) and private RAMSES-X.25-Switch (CODEX 6525) according to fig. 2 and connection procedure CP 2;

3) Interworking (remote log-in) between a remote PC and the ICL ME 29 operating system and/or the HP 3000 operating system via dial-up line to public PAD (EGYPTNET), EGYPTNET Packet Switching and private RAMSES-X.25-Switch (CODEX 6525) according to fig. 3 and connection procedure CP 3;

4) Interworking (remote log-in) between a remote PC and the ICL ME 29 operating system and/or the HP 3000 operating system via direct access to public PAD (EGYPTNET), EGYPTNET Packet Switching and private RAMSES-X.25-Switch (CODEX 6525) according to fig. 3 and connection procedure CP 4;

5) Interworking (remote log-in) between a HP-3000 terminal and the ICL ME 29 operating system via HP-PAD software and private RAMSES-X.25-Switch (CODEX 6525) according to fig. 4 and connection procedure CP 5;

6) Interworking (remote log-in) between a ICL ME 29 terminal and the HP 3000 Operating system via ICL PAD software and private RAMSES-X.25-Switch (CODEX 6525) according to fig. 4 and connection procedure CP 6;

RAMSES Connection Procedures

The following RAMSES Connection Procedures have to be refined according to the software which will be actually installed but describe in principal all possibilities to log-in into the distributed information system RAMSES. Necessary details can be derived from the additional sketches.

CP 1 (see figure 2):

LOG-IN from a local MoI PC connected to RAMSES-PAD

1) Load and Run Advanced Link SW

2) wait to receive PAD prompt

3) enter RAMSES-HP or RAMSES-ICL address

4) wait for connection to operating system of RAMSES Host

5) Log-in ....

...

6) disconnect from RAMSES-Host (log off)

7) disconnect from PAD or enter new address

8) quit Advanced Link SW

CP 2 (see figure 2):

LOG-IN from a remote PC in Cairo via RAMSES-PAD

1) Load and run Advanced Link SW

2) Get connection via dial-up modem to RAMSES-phone and

..... proceed as in 2) of CP 1

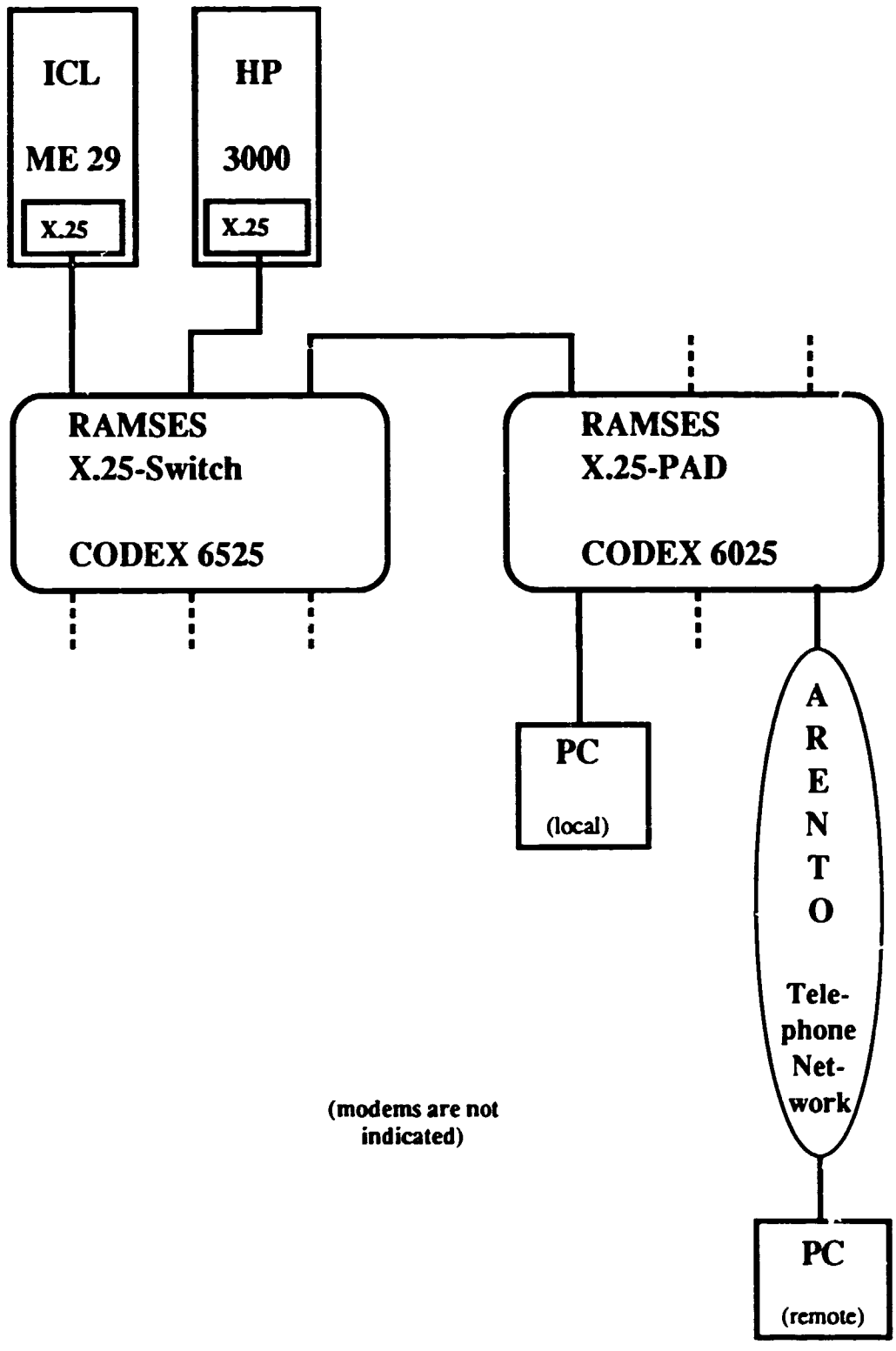

Fig. 2 RAMSES Interconnection to log-in from a local or remote PC to the ICL or HP computer via direct or dial-up telephone links and the private RAMSES-PAD

CP 3 (see figure 3):

LOG-IN from a remote PC in Cairo or Alexandria via dial-up modem to a public PAD

1) Load and run Advanced Link SW

2) Get connection via dial-up modem to CAIRO-phone or ALEX-phone

3) enter NUI and password and proceed as in 3) of CP 1

CP 4 (see figure 3):

LOG-IN from a remote PC in Alexandria with direct access to public PAD

1) Load and run Advanced Link SW

2) enter NUI and Password and proceed as in 3 of CP 1

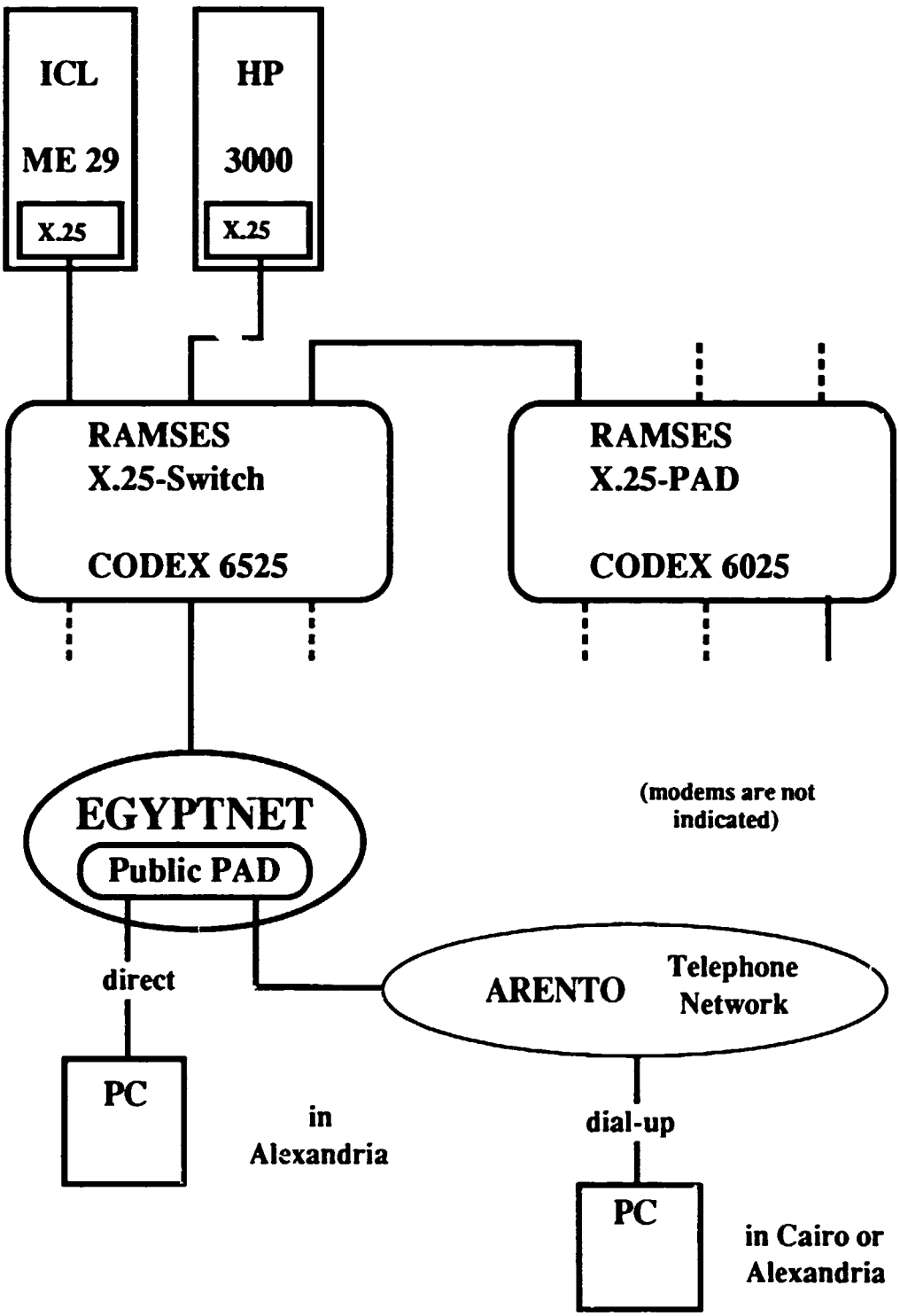

Fig. 3 RAMSES Interconnection to log-in from a remote PC to the ICL or HP computer via direct or dial-up telephone links and the public EGYPTNET-PAD

CP 5 (see figure 4):

LOG-IN from a local terminal connected to HP 3000

1) Load and run PAD SW

2) proceed as in 2 of CP 1

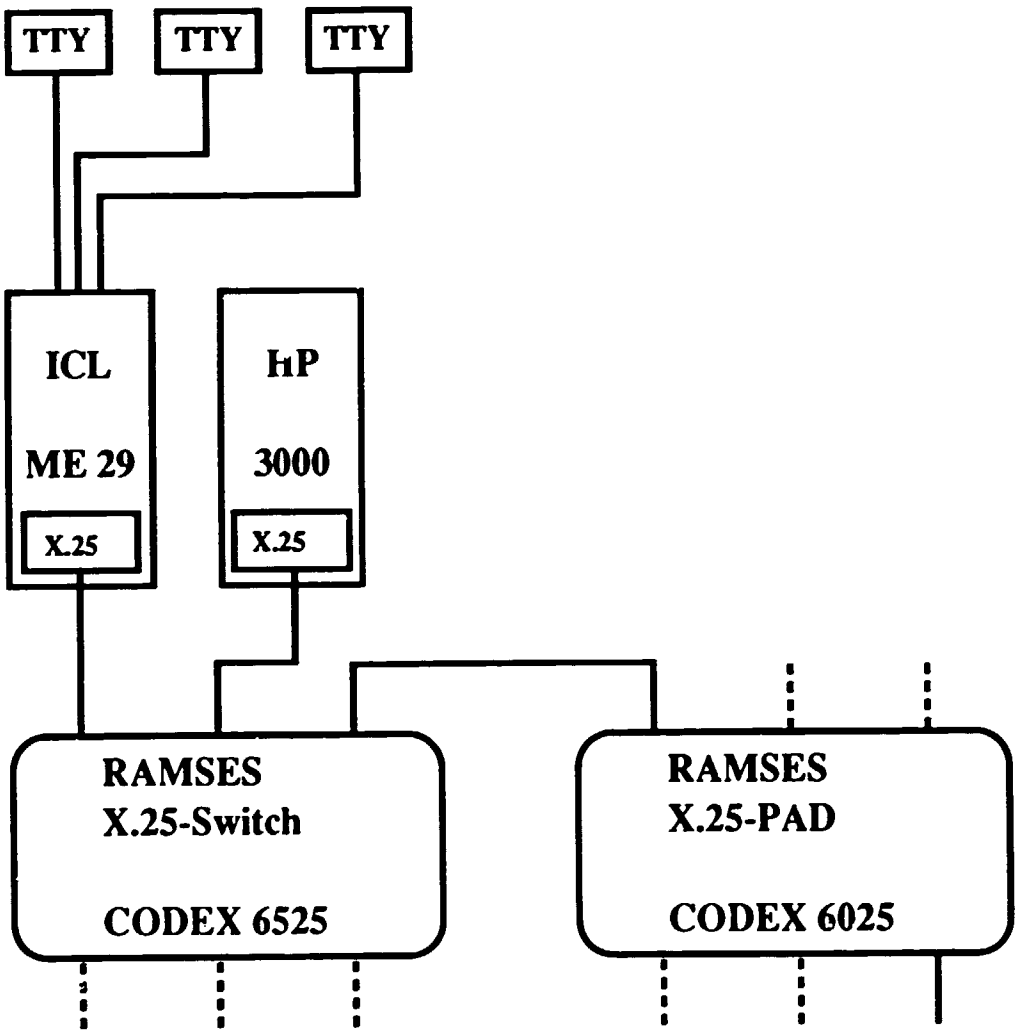

Fig. 4 RAMSES Interconnection to log-in from a ICL-terminal directly to the HP computer

CP 6 (see figure 5):

LOG-IN from a local terminal connected to ICL ME 29

corresponding to CP 5

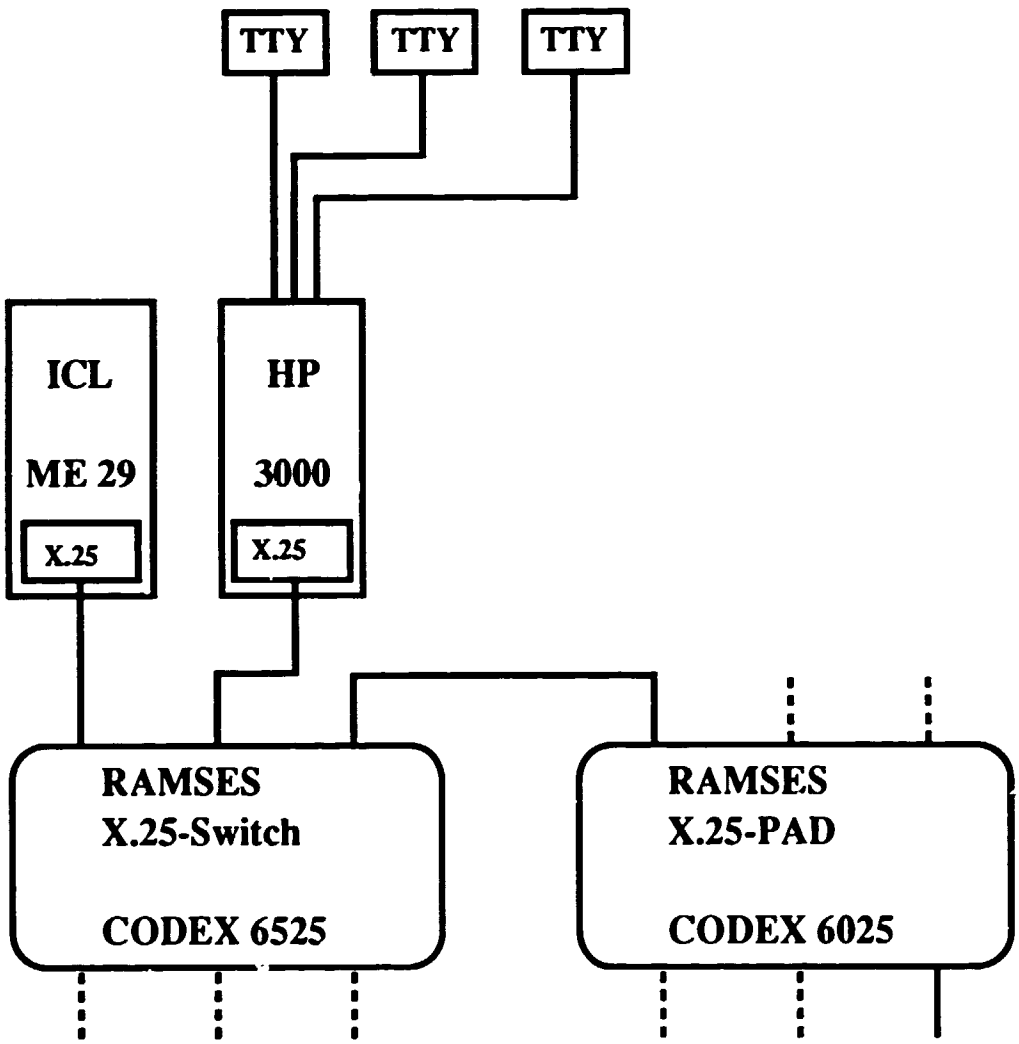

Fig. 5 RAMSES Interconnection to log-in from a HP-terminal directly to the ICL-computer

PROJECT REVISION PROPOSAL

Integrated Information Network for Effective Management of R + D Institutional Activities (RAMSES)

EGY/88/031

Original budget

IPF	US $	278,714
Government input	LE	250,000

Proposed budget

IPF	US $	307,519
Government input	LE	250,000

Increase:	US $	22,805

Cairo, May 9, 199[illegible]

This proposal has been prepared by Mr. W. Bauerfeld (consultant in computer networking, 11-51) and Mr. M. Muraszkiewicz (CTA, 11-01) as a result of the evaluation of the present status of the project development and discussions with the counterpart specialists.

Budget Proposal

11-01	0.5 mm (from 4.5 mm to 5.0 mm)	US $ 5,000
11-51	0.5 mm (from 1.5 mm to 2.0 mm)	US $ 5,000
17-01	canceled	US $ - 2,800
17-02	1.5 mm (from 10.0 mm to 1.5 mm) US $ 1,500 - 6,600 (part time over the period of 6 months)	US $ - 5,100
Total		US $ 2,100

21-00 Subcontract

Consultancy, user support and training in facility management and pilot operation of the communication components (over the period of 6 m)	US $ 20,000

NOTE: As the ORASCOM company is a principal contractor of the project, installs successfully the equipment and has provided basic training, it is strongly recommended to render the subcontract to this company.

42-00 Non-expendable Equipment and Supplies

EGYPTNET connection installation	US $ 2,000
Laptop personal computer	US $ 4,000
Plotter and 2 printers	US $ 4,000
Computer supplies (diskettes, ribbons, paper, etc.)	US $ 1,000
Air-conditioner	US $ 1,500
Computer room equipment (cables, racks, desks, etc.)	US $ 5,000
	US $ 17,500
Amount available within the year 1991:	US $ -18,295
Total	US $ - 705

51-00 Sundries

Promotional material (brochures, leaflets, etc.)	US $ 1,500
GRAND TOTAL	US $ 22,805