PN-AAA-183
56900

A STUDY OF ACCESS TO ON-LINE DATA BASES FROM LATIN AMERICA AND THE CARIBBEAN

March 1984

Sandra Lauffer

Margaret Anderson

This study was prepared by the Telecommunications Program,

Academy for Educational Deveopment,

for the U.S. Agency for International Development (LAC/DR/EST),

under Order Number LAC-0000-0-00-3056-00

TABLE OF CONTENTS

		Page
Executive Summary		1
I.	Introduction: Development Information, Communications, and Data Base Access	7
	A. An Introduction to the On-line Data Base System	10
	B. Data Base Access and Latin America: Anticipating the Options	12
	C. Overview of Data Access Problems Encountered by Developing Countries	16
II.	Information Systems and Data Base Services in the Latin American/Caribbean Region	20
	A. Mexico's SECOBI: A Prototype Agency for On-line Access	20
	B. Venezuela's SAICYT	21
	C. Activities Sponsored by the Organization of American States	22
III.	Data Bases and Data Base Services	30
	A. Data Bases Considered Important by Latin American Scientific and Technological Information Specialists	30
	B. On-line Data Base Search Services (Vendors)	31
IV.	End Equipment for Data Base Access	37
	A. Telex	37
	B. Teleprinters	38
	C. Word Processors	39
	D. Microcomputers	39
	E. Facsimile	44
V.	Communications Options for Accessing Data Bases	47
	A. International Mail	47
	B. Telex	47
	C. International Long-distance Telephone Service	48

D. Value-added Networks 51

E. Communication Satellites 52

VI. Development of Telecommunications for Data Services in Latin America 62

A. Overview of Current Status 62

B. Inter-American Agencies Instrumental in Latin American Telecommunications Development 64

VII. Summary of Problems Associated with On-line Data Base Access by Countries in the Latin American/Caribbean Region 67

VIII. Recommendations 70

A. Development Information Strategy Study 70

B. Regional Development Information Conferences 71

C. Data Base Promotion 71

Notes 72

Glossary of Terms 74

Bibliography 76

Appendix A: Participants in OAS/NTIS Microcomputer Seminar

Appendix B: Questionnaire

Appendix C: Questionnaire Responses by OAS/NTIS Seminar Participants

Appendix D: Data-base Consultation Services: The Case of Mexico

Appendix E: Informacion Tecnica: Consejo Nacional de Investigaciones Cientificas y Tecnologicas (SAICYT)

Appendix F: On-line Data Bases Currently Used by OAS/NTIS Seminar Participants

Appendix G: Modems

Appendix H: Function Boards

Appendix I: Dos and Don'ts of Acquisition, Installation, and Use of Microcomputers

Appendix J: Profiles of Telecommunications Development in Selected Latin American Countries

EXECUTIVE SUMMARY

Telecommunications and advanced information processing are revolutionizing much of how the United States and the rest of the industrialized world functions. Combinations of new electronic communications, computer technologies, and sophisticated applications are increasingly speeding larger amounts of more accurate and useful information around the office and around the world.

Unfortunately, this revolution is mostly of benefit to the industrialized countries. The developing countries seldom have, and generally cannot afford, such immediate access to the information they need to achieve national development objectives.

This is a report on data access and telecommunications in Latin American and Caribbean countries. It is important to note that data and its aggregation in data bases as defined in this report are an important but narrow part of the information that influences and is processed by people in the course of carrying out their activities.

Information provides choice; the more information, properly matched with problems facing individuals and institutions, the more choices available to identify and solve those problems.

Data is the informational material with which knowledge is built. Data bases are select aggregates of particular kinds of information. The Cuadra Associates Directory of On-line Data Bases currently lists over 1,800 data bases, available through more than 270 vendors. These data bases cover dozens of subject areas in two primary ways: reference data bases provide researchers with the ability to search for documents; source data bases provide access to specific data in subject areas.

With proper training, equipment, and financial capability, it is possible for a researcher in practically any part of the Latin American/Caribbean region to search this vast array for needed information in minutes.

However, with all its advantages, data base access itself is not simple, inexpensive or without its own set of problems. For example, while the title to a useful document may be discovered in a few minutes of on-line data base searching, acquiring that document can take a developing country researcher from a week to several months.

Obtaining the equipment needed to communicate and work with data bases is technically demanding and can be a serious drain on foreign exchange--as can the purchase of documents discovered through a data base search.

There is also a fair element of chance in trusting that a document's title and abstract are in fact indicative of the document's contents, or that the source data, once acquired, is sufficiently complete and valid.

Other problems related to data base access through telecommunications are as follows:

1. Costs

   - The equipment, information access, communications costs, and maintenance of data base access through telecommunications systems constitute serious investments of the limited resources of developing countries. Measuring the result of this investment is a critical, necessary, and difficult activity.

   - Resolving questions relating to balance of payments problems due to data systems costs, data information system sustainability, and the costs of alternative approaches to satisfying the information needs of developing country users should be a constant objective of any assistance activity.

   - It is not clear whether the costs for data base access through telecommunications will be paid through external subsidies or as the result of profitable research.

2. Institutional Problems

   - Multiple agencies functioning with multiple purposes in a technologically complex area such as communications and data

base access tend to be uncoordinated and thus, unlikely to develop the synchronous institutional understanding and behavior necessary for efficient, cost effective, information system development.

- Local and regional data base and communications availability, need, and quality are insufficiently understood or recognized as useful in comparison with externally generated data.

- Coordinating mechanisms between information service providers in the region are virtually non-existent, barring their ability to share costs, resources, and experiences in providing adequate and relevant scientific and technological information to their clientele.

- Regional policies are needed to address technical, financial, scientific, and educational questions in this complex and changing area.

3. Technical Problems

- The proliferation of technologies and the rapid change in equipment and its uses are injecting costly confusion into an already complex area.

- There is an insufficient systematic basis for matching the acquisition of technologies with needs, potential for addressing future growth, and ability to pay for and maintain services and equipment.

- Training is needed in information system design, operation, maintenance, and use, particularly in conducting efficient on-line data searches.

- There is a need to adapt data base access and telecommunications training and user guidance materials to the specific needs of developing country users. This often means creating levels of user-friendliness that operate across cultures and a broad range of technological familiarity.

- Cost-effective value-added telecommunications networks are needed, e.g., TELENET and TYMNET.

- Existing telecommunications links are often of insufficient quality for data transmission.

4. Data Base Problems

- Local data bases (e.g., on agricultural productivity, economics, health, population, and trade) are not well developed and are seldom appreciated in the same terms as are data and information from external sources. This holds even though the availability of local data is often the most critical factor in the success of development activities.

- Obtaining primary source documents, once a desired reference has been identified on-line, is a costly and often time-consuming process, taking from one week to several months.

- Actual document prices can be expensive in terms of developing country economics relative to foreign exchange and balance of payments.

- Many local operators, particularly those in business and non-research areas, are often unfamiliar with data base availability.

- The proliferation of data bases available on-line exacerbates the problem of knowing where to look to find the information needed at least cost.

- Language is a significant barrier in data base access, particularly because most material about on-line data searching is in English. This problem is compounded by the fact that the primary search technique for data base access involves "key word" data identifiers, which often have subtle differences in meaning.

RECOMMENDATIONS

The problems summarized above are obviously extensive and range across a number of areas involving a variety of actors and agencies. The recommendations that follow are derived not only from the research that was conducted in putting this study together, but also from conversations with information professionals working in the region and information and development professionals in a variety of international assistance programs. Some of these recommendations will be directed toward improving the capabilities of the Latin American/Caribbean region to access on-line data bases in the United States, others toward improving the availability of data bases that are locally produced and locally relevant.

A. Development Information Strategy Study

A two-level development information strategy study should be carried out. Data base access through telecommunications would be a focal element.

Against this specific part of the information environment in the LAC region, the larger role of information related to development would be assessed. This study would focus on planning and development issues that would guide AID's long-range planning in fostering the development and sharing of scientific and technical data bases in the Western Hemisphere. The final product of the study would be a clearer working understanding of the role of data base telecommunications in the region, as well as a structured basis for considering the myriad of other issues related to the region's development information systems.

Specific tasks of the strategy study would be the following:

- Define issues and related policies that would support the improved use, effectiveness, and costs associated with data base access, telecommunications, and development information issues in general.

- Conduct a thorough inventory of activities in the Latin American/Caribbean region related to the development of scientific and technological information networks.

- Create a data base on teleprocessing and telecommunications facilities for the development of computerized local and regional services to support all sectors of regional activities (e.g., agriculture, business development, culture, education, energy and environment, health services, and science). This data base would be designed to be self-maintaining after the strategy study project is completed.

- Lay the basis for establishing a permanent, self-supporting network of on-line data base users and information service providers in Latin America and the Caribbean, to meet regularly, with a regular means of information exchange.

- Establish a clearinghouse on on-line data base access that would collect and disseminate information on subjects such as training courses and instructors, manuals and guides for on-line searching, and studies and other experimental descriptions of on-line searching.

- Establish a regional ability to develop national organizations such as Mexico's SECOBI to coordinate on-line data access.

- Establish the basis for the provision of training courses in on-line data base search and other information and communication subjects.

B. Regional Development Information Conferences

Convene two meetings on development information in the region:

- An AID regional meeting co-sponsored with OAS/CITEL that would bring together the relevant actors in regional data base access and communications.

- A meeting on generic development information systems for AID bureau and mission personnel. This meeting would be designed as an interactive activity to assess and improve the information processes that support AID's development activities. This meeting could be co-supported by AID/S&T, PPC, and PRE.

C. Data Base Promotion

- Promote wider use of existing data bases by providing each information center in the NTIS network with an appropriately configured microcomputer and appropriate data base management software and, considering the difficulty of obtaining copies of primary documents, providing facsimile equipment in each information center so that the centers can share their resources more readily.

I. INTRODUCTION: DEVELOPMENT INFORMATION, COMMUNICATIONS, AND DATA BASE ACCESS

Many see a telecommunications revolution proceeding with full force in the United States and the rest of the industrialized world. Combinations of new electronic communications and computer technologies and applications are increasingly speeding information around the office and around the world. Microcomputers, diverse local and international networks, and globe-girdling satellite systems provide instant access to information that can help design a product, develop a business, and buy or sell commodities at the best prices--if one has the proper equipment and training, and the ability to pay for the services.

Unfortunately, this scenario pertains almost exclusively to the industrialized countries. The developing countries seldom have, and generally cannot afford, such immediate access to the information they need to achieve national development objectives.

Information provides choice; the more information, properly matched with problems facing individuals and institutions, the more choices available to identify and solve those problems. The United Nations Centre on Transnational Corporations echoes this statement and carries it to the arena on which this study is focused, that is, information as it is stored and made available in on-line data bases. "If the developing countries' capabilities to utilize transborder data flows and their access to the international data market can be improved sufficiently and these flows allow applications that are useful for developing countries, they may become an instrument for the advancement of the development objectives of the developing countries."[1]

This report is centered on data base access in Latin American and Caribbean countries. It is important to note that data and its aggregation in

data bases as defined in this report are an important but narrow part of the information that influences and is processed by people in the course of carrying out their activities.

Data is the informational material from which knowledge is built. Data bases are select aggregates of particular kinds of information. For example, a catalog is a vendor's data base on the products he has for sale. A telephone book is a data base of people's names, addresses, and phone numbers. AGRIS is the name of a data base specifically designed to service the interests of researchers in international agriculture. The Cuadra Associates Directory of On-line Data Bases currently lists over 1,800 data bases available on-line commercially through more than 270 vendors.[2]

With the growth of computer technologies, data bases have taken on new importance: large volumes of data can be accessed very quickly, and the information in them can be manipulated, reformatted, and, using telecommunication systems, distributed rapidly to people all over the world. Access to data bases is increasingly a precondition to effective and efficient research and scientific activities; program management and operations; educational, health care, and agricultural planning; and commercial, trade, and industrial transactions. In North America, Japan, and Europe data bases are readily available, and their use and proliferation are accelerating.

The public and private sectors of many other countries and regions could strengthen their national development performance through access to existing data sources, particularly to the comprehensive and innovative services based in the United States. However, efficient and effective data base access depends on the existence of a number of factors: modern telecommunications systems, computers, adequate training, the clear definition of problems, and available financial resources to purchase the goods and services that support

data base access. Regions that lack such resources are severely hampered in their ability to tap what is, for all practical purposes, the major stock of information from much of the world.

This is not to say that with data base access all problems would be solved. Nothing is further from the truth. Adequate data base access is simply one more tool for gaining a more profitable and competitive position in carrying out individual and national affairs. Further, data base access itself is neither simple nor inexpensive, nor is it without its own set of problems. For example, while the title of a useful document may be discovered in a few minutes of on-line data base searching, acquiring the document itself can take a developing country researcher from two weeks to several months. Obtaining the equipment needed to communicate and work with data bases can be a serious drain on foreign exchange--as can purchasing the documents discovered through a data base search.

There is also a fair element of chance in trusting that a document's title and abstract (where an abstract exists) are in fact indicative of the document's contents. Finally, gaining access to needed information through data bases involves understanding complex search procedures, in addition to the complexity of the subject area the data base is being used to address.

One does not have to understand how a phone works in order to use it, yet to fix or install a phone one should know much more. The same is true for modern telecommunications and information systems management. The planning, operation, and maintenance of advanced communications and information processing calls for addressing a high degree of complexity. The better we are able to understand these complex and constantly changing systems, the more benefit we can hope to realize from our effort and investments.

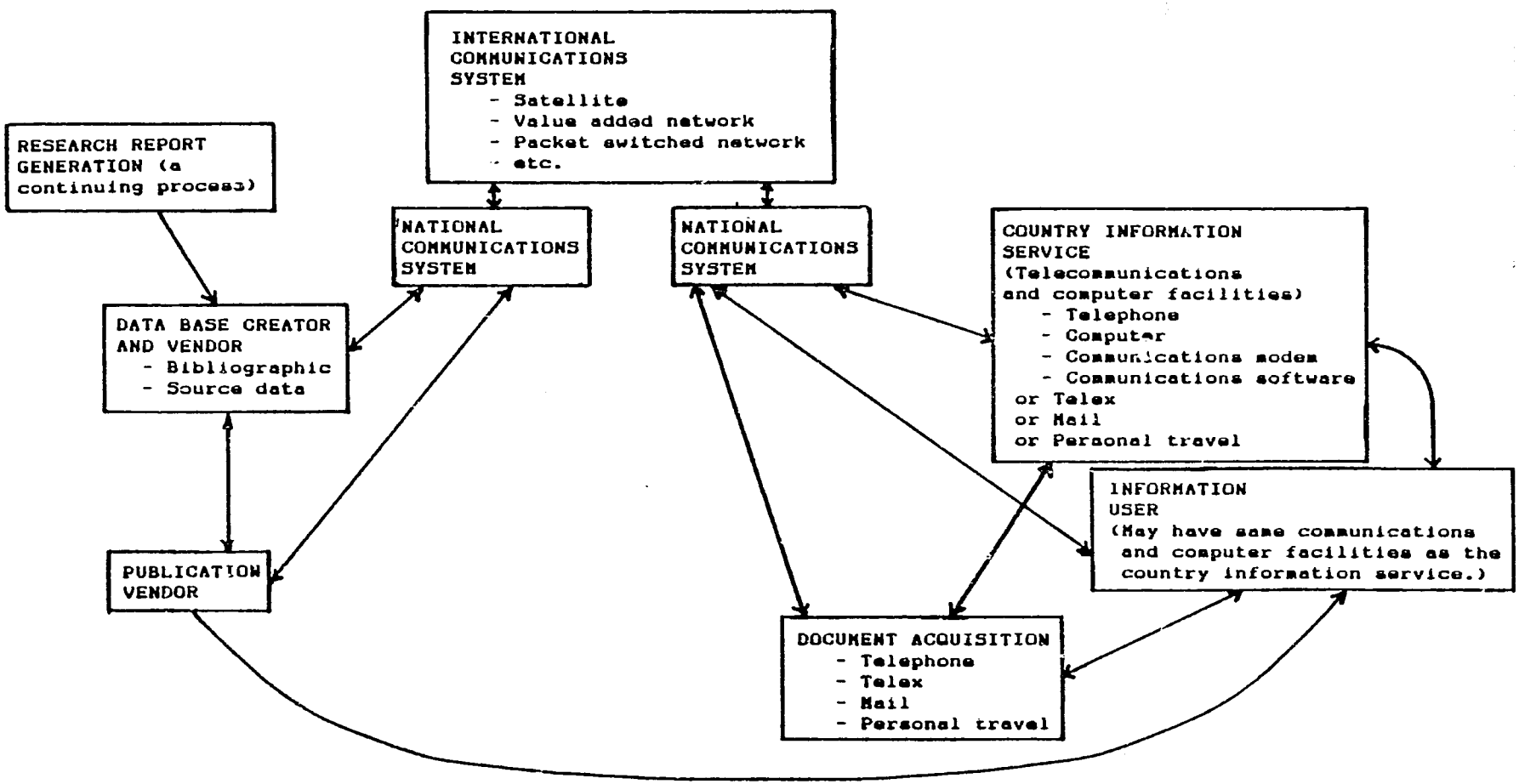
A. An Introduction to the On-line Data Base System

In order to proceed from a common ground of understanding, it is necessary to articulate the structure of the information system under discussion, the on-line data base system. (See Figure 1.) The present study focuses on the delivery of scientific and technological information to end users in Latin America. The typical end-user is characterized as a researcher from the industrial, governmental, or university environment. That end-user goes to an intermediary--a librarian, an information broker, a professional in an information center--with a request for information about an industrial process, a market, a supplier, a patent, a statistic. The intermediary searches the resources at hand in his own center, in other national centers, and possibly in regional centers.

If the information is not available, the intermediary must then consult resources outside of the region, generally by searching a data base. Data bases are characterized as either reference data bases, which refer users back to a primary source such as a periodical; or source data bases, which contain either numeric data or the full text of a primary source. Reference data bases are also referred to as bibliographic data bases.

The most efficient way to search a data base is through the on-line process, a kind of interactive computerized "conversation" between a remote computer terminal and a central computer. In order to engage in this process the user needs a telephone, a computer terminal with a display unit (either a screen or a printer), a modem, and communications software. Using this equipment, the user connects into the national or international telecommunications system, which in turn connects to the central computer. The central computer in this case is generally that of a data base vendor, a company that brokers multiple data bases. The information that is accessed is actually produced or provided by yet another entity, a data base producer,

Figure 1



SCHEMATIC OF INTERNATIONAL ON-LINE DATA-BASE ACCESS SYSTEM

which may be a private company, a government agency, or a research center such as a university.

Once connected to the central computer, the remote computer user searches for the information he needs. This search is a real-time, interactive process, during which the user poses questions, receives answers, and gradually refines his request so that, in the end, the information he receives is as directly relevant as possible.

Lacking any portion of the technology necessary for a computerized on-line search, users can still obtain information from data bases, using mail, telex, and other communications media. These options are, however, time-consuming and limiting to the interactive process, and the results of such searches are usually not satisfactory.

The main obstacles to on-line access are the lack of suitable telecommunications channels, particularly, in developing countries, for locations outside of the national capitals; the costs of transmission; lack of computer equipment; and, to some extent, the shortage of trained staff to plan and sustain the operation and maintenance of electronically-based systems. A major associated problem pertaining to searches of reference data bases is gaining access to the full copy of the document itself.

B. Data Base Access and Latin America: Anticipating the Options

The expected coverage of Latin America and the Caribbean by high-powered domestic, regional, and international satellites will soon offer striking opportunities for access to data bases from both urban and rural areas in that region. Brazil and Mexico have domestic satellites under construction, and the Andean countries and Argentina are in the system design stage. U.S. domestic satellites with a beam for Puerto Rico provide the technical capability to provide service throughout the Caribbean and Central

America. INTELSAT is reviewing its global service offerings. Earth station and computer technologies and services are developing at a rapid rate, changing the overall systems economics and availability in favor of small user and rural requirements.

It is timely to anticipate and analyze these developments regarding the current and future availability of data bases and telecommunication systems, as together they could represent an important aspect of the development process. It is particularly timely to take a long-term view of the requirements of the scientific, planning, educational, and related sectors, in order to ensure that they are included, not only in the overall system design parameters, but also in the consideration of tariff issues, regulations, and service offerings.

Such a long-term view will also help countries anticipate and plan for the human resource development necessary to successfully manage, use, access, operate, and evaluate information systems. Without such an assessment, the developmental benefits of the "information revolution" will be delayed because the planned telecommunication infrastructures will not be used to maximum benefit, there will be a continuing undersupply of trained manpower, and an adverse regulatory and cost environment will persist.

In an effort to aid the U.S. Agency for International Development (AID) in anticipating these developments, the Academy for Educational Development proposed to undertake a study and assessment of on-line data base access for the Latin American and Caribbean (LAC) region, with emphasis on analyzing the various transmission options and their costs and institutional development implications. It was proposed that the study look at present and near-term options as well as long-term options, and that it include transmission systems; technological trends in the end equipment; costs and tariffs;

regulatory and policy issues, including copyright; identification of relevant data bases, both U.S.-based and international; identification of the information requirements of key user institutions in the region and the volume of such requirements; and the institutional issues associated with the introduction of data networks.

It was proposed that the study be undertaken in three phases. The report that follows is the first of those three phases, and as such sets the context for the total effort. In brief, this Phase I report addresses the following tasks:

1. Data Base Inventory: A review and analysis of the U.S. data bases that are most appropriate to LAC users working in development-related fields, specifying the type of information they make available, the cost of use, access restrictions, and the training and technical assistance needed to assure the data bases are used effectively.

2. Equipment Survey: A review of the end-user equipment necessary for accessing the data bases identified, taking into consideration expansion to broader ranges of data base access and manipulation, and including a review of capital and operating costs, as well as an assessment of the training and technical assistance requirements for introducing the equipment in the field.

3. Telecommunications Options: A survey of the transmission and access systems that can be used for providing efficient access to U.S. data bases from LAC countries. This survey includes a range of existing media, as well as telecommunications options that may become available for international data base access in the near-term future.

4. Recommendations: The identification of options that should be considered by AID to increase data base access by user institutions in the LAC region.

The Phase I report is intended to serve as a guide to policy makers within AID to alert them to the nature of the problems and opportunities associated with on-line data base access, and to suggest steps that might be taken to address them. The report gives special consideration to supporting the ongoing LAC Regional Science and Technology Information Transfer Project, under which AID provides base support to the National Technical Information Service (NTIS) of the U.S. Department of Commerce. The purpose of that project is to improve access by the LAC countries to scientific and technical information resulting from U.S. Government investment in research and development, and to appropriate technology information resulting from worldwide research and development.

In December 1983 the Regional Program of Scientific and Technological Development of the Organization of American States (OAS), NTIS, and the University of Miami co-sponsored a seminar on the use of microcomputers in technical information centers in the LAC region. The objective of the meeting was to familiarize supervisors and staff of such centers with the characteristics, applications, and requisites of microcomputers in the context of providing services within their centers. Some 48 participants from 20 countries in the region attended the seminar (see Appendix A). The participants can be characterized as information professionals charged with providing scientific and technological information support to private and government researchers in their countries, generally for a fee.

The seminar provided an opportunity to circulate a questionnaire to the invited participants to elicit information on their experience with on-line data base access. (A copy of the questionnaire, which was circulated in English and Spanish, is attached as Appendix B). The questionnaire included questions pertaining to the data bases currently searched by the participants,

the methods they use for doing so, the clients for such information, how documents are acquired, the telecommunications systems used, costs, transmission quality, and microcomputer technologies available for use in-country.

Twenty-four of the participants submitted completed questionnaires. The results, which have been aggregated and analyzed, will be discussed as they are pertinent in the pages that follow. A summary report reflecting responses to all of the questions is included as Appendix C.

C. Overview of Data Access Problems Encountered by Developing Countries

The problems that are encountered by developing country agencies such as these, charged with providing scientific and technological information to their client base, can be reduced to some common elements: the lack of data bases available locally, the cost of using data bases, the cost of telecommunications, the quality of telecommunications links, lack of training in conducting an efficient on-line search, lack of equipment such as microcomputers, language (much information is available only in English), and, once the data base search has been completed, the difficulty of obtaining primary documents. (See responses to Questions 6, 17, 20, 21, 24, and 29, Appendix C.)

1. Costs

The cost considerations of on-line data base access bear careful scrutiny by development assistance agencies. One of the most comprehensive studies recently produced on the topic of international on-line access is that produced by the U.N. Centre on Transnational Corporations, Transborder Data Flows: Access to the International On-line Data-base Market.[3] The overall purpose of that study is "to provide a description of the on-line data-base market to enable developing countries to assess the usefulness of this new resource."[4]

One of the major points made in the study is that, "since most of these (developing) countries are not linked with international data networks, access to the principal on-line data-base markets becomes almost prohibitively expensive."[5] The OAS/NTIS seminar participants lend support to this assertion in their responses to Question 6, "What are the main reasons you do not use on-line data bases more frequently?"

In fact, the lack of international data links is not the only cost-related constraint to developing country usage of on-line data bases. The U.N. report provides a concise description of all of the costs that accrue to users of data bases, including the following main price components:

- subscription fees, which can range from several hundred dollars to more than $15,000 per year.
- monthly minimum, generally about $100 per month, charged by most time-sharing firms and applied if usage does not reach a certain level.
- connect time, for the time the user is connected to the system, an average of about $65 per hour for reference data bases.
- computer resource units, a variable rate that accounts for access to the computer memory and central processing unit.
- information resource units, a relatively new service that charges for the actual information used, rather than charging a subscription fee.
- disk storage, charged if the user chooses to store data in a private file.
- on-line and off-line printing, usually based on the number of citations or pages, typically ranging from $.05 to $5.00 per citation.

- start-up fees, covering the cost of establishing an account, some initial training, and materials.

In addition to these data base usage charges, there are equipment purchase and maintenance costs, telecommunications costs, and user aids costs. Basic equipment costs range from $1,000 to $18,000, with a good, flexible system averaging $5,000. The costs for international telecommunications vary according to the country of origination and country of destination, but there is usually an hourly connect rate and a charge for the number of characters transmitted. (See responses to Question 21 for some typical telecommunications costs.) A critical issue is that most of the costs cited above involve foreign exchange, which is scarce in nearly all instances in LAC countries.

EMBRATEL, the Brazilian telecommunications entity, has conducted an informative experiment comparing the cost of conducting an on-line search to DIALOG using telex (see page 37) and the Brazilian INTERDATA system, which is linked to TELENET (see page 51). The search was an 8 kilocharacter search, using a data base with a $76.00 per hour on-line connect charge. Comparative figures are as follows:[6]

	TELEX	INTERDATA
Transmission Speed	110 baud	300 baud
Time on-line	30 minutes	10 minutes
Efficiency	4.5 cps	13.5 cps
Telecommunications cost	20,311 cruzeiros (U.S.$24.18)	18,896 cruzeiros (U.S.$22.49)
DIALOG cost	50,560 cruzeiros (U.S.$60.19)	16,854 cruzeiros (U.S.$20.06)
Total search cost	70,871 cruzeiros (U.S.$84.37)	35,750 cruzeiros (U.S.$42.55)

Note that the telex rate in the above-cited experiment was 110 baud, about twice the normal telex speed, indicating that Brazil has an enhanced telex service. Telex searches at normal speeds would be even more expensive,

because both the telecommunications costs and the on-line time are increased.

2. **Copyright**

Another area that could become increasingly difficult, and costly, is associated with copyright and the acquisition of primary documents. Once an information intermediary has obtained a useful reference through an on-line bibliographic data base, he is likely to want access to the original source document. One of the most commonly used repositories of primary documents has been the British Library Lending Division, or BLLD. Until recently, a user could order a document from BLLD either by mail or telex or directly through an on-line vendor. BLLD would then mail the document to the requester, a process that took from two to four weeks for Latin American users. (See responses to Questions 19 and 20.) Unfortunately, the British Library is reported to have recently suspended this valuable service.

Similar agencies in many countries are permitted to make photocopies of documents for document delivery purposes, but the international publishing industry is beginning to take a harder stance on photocopying. If, as many conjecture, "royalty systems are universally imposed, this could bring added difficulties to developing countries by cost increases, which will mostly be in hard currency, and may increase the administrative burden on document supply centres by requiring the introduction of more complex accounting methods, thus still further increasing the costs of document delivery."[7]

II. INFORMATION SYSTEMS AND DATA BASE SERVICES IN THE LATIN AMERICAN/CARIBBEAN REGION

An assessment of the general status of information systems and services in the Latin American/Caribbean region reveals that the infrastructure for advanced information services is rapidly taking shape, and that information services are given prominence and significant levels of support in several countries.

A. Mexico's SECOBI: A Prototype Agency for On-line Access

Mexico, one of the heaviest users of on-line services in the LAC region, has created a special agency, SECOBI (Servicio de Consulta a Bancos de Informacion) to coordinate on-line data base access, specifically for the scientific community. SECOBI may serve as a model to developing countries as a way of developing a workable on-line service.

Established in 1976, SECOBI caters to two categories of users: over-the-counter clients who use SECOBI's own computer facilities, and clients who install their own terminals. For over-the-counter users, SECOBI provides the services of information-retrieval technicians who help the user formulate the request and conduct the search. For installed terminal users, SECOBI contracts for the terminal installation and provides access codes, manuals, and training. Other services include a document procurement service, selective dissemination of information (SDI) or current awareness services, and translation.

SECOBI's over-the-counter inquiries increased from 230 in 1976 to 2,078 in 1981, with students emerging as the main user group, at 59 percent in 1981. Subject areas most commonly searched include medicine, psychology, agriculture, chemistry, and education. Also in 1981, there were 118 installed

terminals linked into SECOBI's TYMNET node. SECOBI introduced DIALOG and ORBIT in 1976, and DRI in 1980. DIALOG and ORBIT still attract the greatest number of on-line requests from SECOBI's users.[8] (For a detailed description of SECOBI's experience in providing on-line services, see Appendix D.)

B. **Venezuela's SAICYT**

Venezuela's Automated System for Scientific and Technological Information (SAICYT) is a flexible network designed by the National Telephone Company of Venezuela (CANTV) for the National Council for Scientific and Technological Research (CONICIT) to give users access to data bases in the U.S., Europe, and Canada, and also to data bases in Venezuela. Again, it serves as a model for other countries.

Foreign data bases include those available in the U.S. through DIALOG and ORBIT. Access to foreign data bases is achieved by direct dialing of assigned numbers that are put through to the data base by Caracas. This requires the use of a terminal and a modem. Private (leased) lines are also available. These are connected directly with the international node and do not require a modem.

The design for SAICYT also includes a code to connect all Venezuelan scientific and technological institutions with each other. Users are able to access information stored in various institutional computers on research in progress and works by Venezuelan scientists and researchers, and will be able to locate publications and periodicals held by various institutiosn across the country. Some regions of the country will be served by a node interconnecting institutions with each other. Calls from other parts of the country will be switched through principal cities. System design provides for direct computer-to-computer communication.

The SAICYT design anticipates adding regular users gradually. Meanwhile, occasional users have access to the system. Important features of the SAICYT model are the availability of training in the use of equipment and the provision of technical assistance to set up collections of documents and publications for the retrival of full text. Financial assistance is also available, if needed. (For a more detailed description of SAICYT, see Appendix E.)

C. **Activities Sponsored by the Organization of American States (OAS)**

Latin American countries have benefitted since the early 1970s from information resource development programs sponsored by UNESCO, foundations, governments, and other agencies. In particular, the OAS, working through the Departments of Education, Science, and Culture, has played a key role. Some of the projects have been carried out cooperatively with the U.S. Departments of State and Commerce and the U.S. Library of Congress, and also with professional associations and UN agencies. In recent years emphasis in such projects has been placed on the creation of automated library services, national information systems, and universal standards and formats, such as MARCAL, the Spanish-language version of the Library of Congress's MARC (Machine Readable Catalog) format, with a view to promoting resource sharing and networking throughout the region.

The advent of low-cost teleprocessing and satellite communications prompted the Education, Science, and Culture Council (CIECC) of the OAS to commission a number of studies in 1981-83 to determine the extent of progress attained in modernizing library processes and procedures and in creating national information systems. CIECC also directed the OAS Secretariat to develop a plan for establishing regional networks for educational, scientific, and cultural information.[9]

Of the three studies commissioned by the OAS, which are discussed below in more detail, the Shepard study reveals substantial advances in automation, adoption of universal formats, creation of indexes to national materials and national bibliographies, and the introduction of computerized processes and services.[10] The Martinez study focuses on the introduction and operation of scientific and technological information services as a spur to economic productivity.[11] The Anderson study examines the status of telecommunications facilities for data transmission, concluding that adequate modern technology has been or will be installed within four or five years by most, if not all, of the telecommunications administrations in the region.[12]

All three studies call for regional consultation and international cooperation to expedite the creation of regional information networks and to achieve economies of scale. The telecommunications study points to the need for the library and information sectors to coordinate their planning with the Inter-American Telecommunications Conference (CITEL), which brings together the telecommunications administrations that will design and create inter-American data transmission networks.

1. **A Survey of Information Systems and Library Automation**

Marietta Daniels Shepard's report on The Present State of Information Systems and Bibliographic Data Bases in Latin America and the Caribbean is a useful summation of the current regional situation.[13] She focuses on the transfer of scholarly, scientific, and technical information between North and South America. Although her study was directed toward the programmatic interests of the Organization of American States, her findings and recommendations should be of interest to others working with information systems in the region.

According to Shepard, "most of the countries of Latin America and the Caribbean have created either formal or informal national information systems and subsystems, with special attention given to subsystems in science and technology for national development and industry."[14] Countries that have been particularly successful in this regard include Colombia, Jamaica, and Venezuela.

Shepard also calls attention to several regional information systems, notably AGRINTER, BIREME, and REPIDISCA. AGRINTER is a system of the Inter-American Institute for Agricultural Cooperation (IICA) based in San Jose, Costa Rica. Working through a network of agricultural libraries in member countries, AGRINTER provides regional agricultural bibliographical data to the AGRIS data base of the U.N. Food and Agriculture Organization (FAO). Seven of the IICA field offices have automated their files in preparation for a regional data network.

BIREME, the Regional Medical Library of Sao Paulo, was developed cooperatively with the Pan American Health Organization (PAHO) and the National Library of Medicine in the U.S., specifically to facilitate the utilization of the MEDLARS and MEDLINE data bases. Today BIREME provides data services throughout the region.

PAHO was also instrumental in developing the regional REPIDISCA system in sanitary engineering and environmental sciences, located in Lima, Peru, at the Pan American Center for Sanitary Engineering and the Environment (CEPIS). In addition to these systems, Shepard provides an extensive inventory of regional and national data bases and of the information systems and institutions that are in place in each country.

On-line data base access in Latin America is reported by Shepard as being at very low levels, and primarily through three U.S. vendors: DIALOG, ORBIT,

and BRS. (See Section III below.) Many data bases are used in their printed form, and some in magnetic tape form, such as INIS of the International Atomic Energy Agency. As reported above, Mexico has created a special agency, SECOBI, to coordinate on-line data base access for the scientific community.

SECOBI was created by CONACYT, Mexico's National Council for Science and Technology, which also supervises the activities of the Multinational Center for the Transfer of Automated Bibliographic Information. This OAS-sponsored activity supports the development and use of the MARCAL system. The MARCAL format has been used successfully in Mexico and Venezuela, and is also being used to automate library systems in Brazil, Argentina, Colombia, Chile, and Peru.

Standardization of form and compatibility of format are extremely important as countries in the region look toward sharing their library resources, possibly in a system such as the On-line Computer Library Center (OCLC) in the United States. OCLC is a computer network used by librarians to acquire and catalog books, order custom-printed library cards, arrange interlibrary loans, and maintain information on which libraries have which materials.

An OCLC-type system would also tie in with the creation of a Latin American Data Base, which could contain materials published in and about the region. Many Latin American information professionals seek to foster horizontal access to information of Latin American origin, as the data retrievable in local data bases is more amenable to adaptation, transformation, and transfer among the Latin American countries. Two library systems in the region are noted by Shepard as being on-line and accessed by outside entities: the National Library of Venezuela and the National Autonomous University of Mexico (UNAM).

Shepard groups her recommendations vis-a-vis improving information resources in Latin America into four categories: information systems and their development, data bases and their creation, data bases and their usage, and data bases and improved access to them. The latter two categories include such recommendations as wider use of existing data bases, whether on-line or in printed form; better knowledge of data bases maintained in the region, and better means of making them accessible; lowering of telecommunication costs for on-line access, or developing alternative means of access; and facilitating data base use by creating services such as Mexico's SECOBI.

She also emphasizes the need for coordination among the various agencies involved in development programs in the field of information in the region, suggesting the need for a multinational body that would serve not only as a clearinghouse but also as a planning, coordinating, and implementing agency for an Inter-American network. This point is well taken, when one considers the number of programs that are being considered or implemented in the Latin American/Caribbean region by agencies such as UNESCO, OAS, PAHO, OECD, IDRC, IICA, ECLA, and UNCSTD.

2. **Technical Information Services**

Victor Martinez's study, Development of Technical Information Services in Latin America and the Outlook for the Eighties (translated), traces and evaluates efforts of governmental and international organizations to implement scientific and technical information services to support economic development in Latin American countries. A retrospective firsthand review, the study provides both factual detail and informed commentary on programs and projects carried out with the help of the OAS, various UN entities, and agencies of the U.S., Canadian, and Danish Governments. The purpose of the study is to guide the OAS in refining and refocusing the objectives of the

Regional Scientific and Technological Development Program (PRDCYT), which Martinez credits with having made the most substantial effort in transfer of technology to Latin America.

The major thrust of this study is the need to upgrade technical information services substantially in order to help lift Latin American economies out of their severe state of recession. Lack of foreign exchange for imports in the 1980s will drive Latin American industry to emphasize import substitution and export development on a major scale. Success or failure, according to Martinez, will hang on effective transfer of information and know-how. Information services as constituted now cannot provide the necessary quality of support.

Martinez attributes deficiencies in current services to lack of institutional infrastructure--libraries, qualified personnel, training of technical students in search techniques and use of information--to support indigenous systems. He also cites problems inherent in the sophisticated level of information obtained from international sources. Nevertheless, Latin America must continue to rely on foreign sources during the 1980s to avoid being hampered by the initial stage of the technological process, i.e., the production of basic knowledge. Importation of information also reduces costs and time in the phase of technological research. Further, foreign sources can provide restricted information to support the process of copying technologies. These activities will require intensive use of on-line data base searching by means of computers and telecommunications.

Lack of foreign exchange will also stimulate the development of mechanisms for resource-sharing on a regional basis. Martinez foresees the creation of regional document centers, indexing of theses, and responses to on-line searches and patent information requests. Regional information

networks will be required for rapid access to information about applications already attempted in the Latin American countries. He stresses the importance of focusing all these efforts around specific industries to be developed, also citing the need to deliver services in terms of various defined user needs.

Martinez concludes with a set of practical proposals to expedite the refocusing of services and their implementation on a regional scale. These include a survey of supply and demand for technical information, a feasibility study to create a regional center for classification and retrieval of patents, a similar study to establish a regional science and technology network, and document centers. The study and its recommendations are basic to planning for new technical information services in Latin America, particulary when read in conjunction with the Shepard report on information systems and library automation and the Anderson report on telecommunications, summarized below.

3. **Telecommunication Facilities**

Telecommunications in the Western Hemisphere: Status and Prospects 1981 (translated), by Margaret I. Anderson, focuses on the availability of data and text transmission facilities to support information and library development in Latin America and the Caribbean. Early OAS specifications for the study were limited to north-south data services. However, advances in telecommunications technology prompted the inclusion of south-south facilities for regional networking.

A recurring theme in the numerous recommendations throughout the study is the need to coordinate planning for information networks with telecommunications authorities on a regional basis through the Latin American Telecommunications Conference (CITEL). Anderson sees the involvement of telecommunications administrations as essential to the development of flexible and reliable information networks, citing the SAICYT project in Venezuela as a

model. She points out, however, that a national network for one kind of information does not constitute the critical mass needed for cost-effective networking at this early stage. No publicly accessible telecommunications/computer system exists linking Latin American countries to one another, although Mexico and Brazil have undertaken an experimental project.

Working with telecommunications authorities opens up possibilities for cooperative development and/or application of software. The introduction of sophisticated telecommunications facilities in many Latin American countries has produced a cadre of telecommunications engineers and managers knowledgeable about digital management and processing. In some cases (Argentina, Brazil, Mexico, Peru, Venezuela), the telecommunications company offers training in data processing and the use of data bases developed abroad or in-country.

III. DATA BASES AND DATA BASE SERVICES

The magnitude of the on-line data base industry has been referred to above. One of the most respected directories to that industry is the Cuadra Associates Directory of Online Databases, a subscription service (updated quarterly) available in Mexico for $85 a year, and in other LAC countries for $92 a year. It currently lists over 1,800 data bases and over 270 on-line vendors. The discussion of particular data bases and vendors in this study is restricted to those (primarily U.S.) data bases that have been identified by the OAS/NTIS seminar participants as currently used and useful, and to those vendors with an established presence in Latin America, i.e. DIALOG, ORBIT, and BRS.

A. Data Bases Considered Important by Latin American Scientific and Technological Information Specialists

One of the most important considerations in providing on-line data base access for development users is to identify the kind of information that is needed in the development context, and, if possible, the data bases that development professionals have used and found most relevant.

In response to the question, "Do you ever seek information from on-line data bases other than NTIS?", all of the questionnaire respondents replied yes, although most of them do not have the capability of doing an efficient on-line search using microcomputer technologies and cost-effective telecommunciations technologies. Respondents identified more than 20 data bases, most of which are available on-line, that they use with some degree of frequency, and that they find relevant and useful in responding to clients' requests. Details on those data bases, including a description of the type of information they contain, the cost of use, access restrictions, and availability, are provided in Appendix F.

B. On-line Data Base Search Services (Vendors)

1. DIALOG

The DIALOG Information Retrieval Service, begun in 1969 as a subsidiary of Lockheed Corporation, is the largest on-line system in the world, with more than 170 data bases containing more than 70 million records, and information on virtually any subject. The DIALOG retrieval system allows the user to use either standard indexing terms or to choose his own words or phrases describing a topic in conducting a search. A multifile index, DIALINDEX, helps the user identify which data base to search by indicating how frequently a word or phrase appears in various data bases.

Search costs are dependent on the length of the search (the amount of time on-line) and the price of the particular data base. A typical search averages 10 to 15 minutes, depending on the searcher's experience, and costs from $5 to $15, exclusive of telecommunications costs. The telecommunications connect time rate per hour from Mexico, via TYMNET, is $16.00 per hour. DIALOG charges no minimum or start-up fees and offers new users $100 of free search time for the first month. Various contract options offer discounts for increased usage, and also to consortia of users.

An on-line ordering service enables the user to order complete documents while on-line, the order being conveyed directly to the document supplier, who bills the customer and mails documents directly to him.

DIALOG recommends that new users participate in a training program to learn basic system commands, which takes about one and one-half days. This training costs $135 per person in open sessions in the U.S., and is offered at users' facilities in the U.S. for $985. Search aids include the basic search manual, A Guide to DIALOG Searching ($65.00 air mail, $40.00 surface), and the DIALOG data base documentation chapter series, which gives specific details on searching a particular data base ($6.00 each air mail, $5.00 each surface).

DIALOG gives special attention to the Latin American market, primarily through its staff coordinator for Latin America, and is currently conducting a study of the potential market in the region. Training manuals have been translated into Spanish, and training is provided in Spanish. Local trainers are now in place in Mexico, Venezuela, and Argentina, and will soon be in place in Brazil and Chile. The training courses they will offer are expected to be open to other countries in the region. DIALOG also offers two-day courses in the region, conducted by DIALOG staff for a maximum of 12 people per course, for fees that allow them to recover all direct costs. For information contact DIALOG Information Services, 3460 Hillview Avenue, Palo Alto, California 94304, U.S.A.; telephone (415) 858-3785, or toll-free in U.S., (800) 227-1927.

2. **ORBIT Search Service (SDC Information Services)**

SDC's ORBIT Search Service, one of the four largest in the world, contains over 70 data bases with more than 55 million records. The ORBIT Information Retrieval System, based on English commands, enables the user to access information by typing words, names, dates, or numbers describing the topic to be searched. Search costs vary according to the data base used and the connect time. There may be additional fees for records printed on-line, but print charges usually apply only to records printed off-line.

ORBIT offers several rate structures, including one that has a $100 monthly minimum charge. Another option is a $720 deposit account, from which usage fees are subtracted. There is also a $1,200 annual guarantee plan, which is billed quarterly and has no maximum usage levels. Group accounts are also possible.

The ORBDOC Online Ordering Service enables the user to order the full text of a document while on-line.

ORBIT offers a self-instructional training package for $125, and a one-day basic skills workshop for beginners, at $200 per person in regional offerings in the U.S. Advanced Skills Seminars are offered in advanced search techniques in subject areas, such as energy, engineering, chemistry, and patents. Custom training seminars in chemistry and patent information are offered on customer premises for up to 12 attendees, at a cost of $450 plus expenses for a one-day session.

The ORBIT SearchMaster is a special microcomputer software package that streamlines the processes of logging on, creating search strategies, remembering commands, and creating edited products for clients.

Contact SDC Information Services, 2500 Colorado Avenue, Santa Monica, California 90406; telephone (213) 453-6194, or toll-free (800) 421-7229; or the SDC representative in Brazil, Barroslearn, Rua 24 de Maio 62-5.0, Caiza Postal 6182, Cap. 01000, Sao Paulo, Brazil; telephone (011) 223-6011.

3. **BRS**

The BRS Online Search Service began offering commercial data bases in 1977 and now makes nearly 70 such data bases available on either a subscription or an hourly access basis. BRS's Open Access Plan, or Hourly Access Plan, charges users $35 per connect hour, plus data base royalties and telecommunicatiaons costs, with no commitment to a specific number of hours.

The BRS Subscription Access Plan provides lower rates for higher usage, with subscription rates ranging from $750 per year for 25 hours of connect time (a basic rate of $30 per connect hour), to $3,800 per year for 240 hours of connect time (a basic rate of $16 per connect hour), plus royalties and telecommunications costs. BRS also has some innovative rate structures that

permit shared subscriptions, so that as many as five institutions can share a subscription and qualify for a lower connect time rate; and group plans and mini-group plans. Such shared subscription arrangements should be explored by Latin American information centers.

BRS is making a concerted effort to approach the Latin American market, as reported at the OAS/NTIS seminar in Miami. Training materials are being developed in Spanish and the $16 connect hour charge is being offered to all Latin American users. Initial efforts began in Mexico, through SECOBI, which is now logging up to 200 hours a month in search time. BRS has agreed to receive payment in pesos, which will help to alleviate foreign exchange problems, and to hire local trainers. Upcoming market targets include Colombia, Peru, Chile, and Venezuela.

BRS offers a variety of user training programs, with introductory training in the U.S. at $35 per day per person. On-site training at the user's facility is offered for $35 per person per day, with a minimum of eight people, plus expenses for the BRS staff member.

Contact BRS, 1200 Route 7, Latham, New York 12110; telephone (518) 783-1161; TWX 7104444965.

C. **Training**

In a presentation on "Online Search Training in Latin America," Nancy Grimes of DIALOG outlined some of considerations she has found most important in the training process.[15] She identifies the prerequisites for the trainee as:

- familiarity with computer terminals and keyboards.
- elementary awareness of how telecommunications networks function.
- reading-level knowledge of English.

- elementary bibliographic expertise or indexing skills.
- practice in reference interview situations (important in conducting searches for a third party).

Necessary pre-training preparations if the training is to take place in-country include:

- contacting the local telecommunications enterprise to discuss accounts, charges, and protocols of connection so that on-line practice can be part of the training.
- contacting local equipment suppliers to lease or borrow equipment if it is not available on premises.
- contacting local information resources to locate others doing on-line searches, or sources of documents.
- contacting the on-line search services for information about local representatives, trainers, and services.

Training options for the Latin American region include self-training by the searcher-to-be, travel abroad to courses or training sessions, use of local or regional trainers, and importation of trainers from abroad. Grimes stresses that "unless it is part of a larger program of education, online search training is most effective when received on one's own site, or at least in the context of home. The advantages of being in one's own locale, learning on one's own equipment and in one's own language, are significant."[16]

According to Grimes, the ideal training sessions will:

- be given in the local language.
- be accompanied by supplementary printed materials, preferably in the local language.
- provide on-line practice as part of its content.
- be given by an instructor with a substantial level of expertise.

Having conducted many training sessions in Latin America, Grimes is in a good position to summarize the needs of the region:

"As training tools and resources are developed throughout Latin America, cooperation and coordination take on increasing importance. There is a need in nearly all countries for information about the online courses and instructors available, the manuals and guides in publication, the experiences and lessons learned by those who have already been through online search training. The options available for training are numerous and, as has been indicated, courses can be tailored to specific needs. The key is to locate the appropriate instructor. Manuals and guides are of course published throughout the world, but there are very few that are of high quality and are in Spanish, and no bibliography of them exists. While colleagues encountered along the way may be able to provide tips based on their experience and knowledge, there is no central source for information on search training in Latin America to which to turn. Practically nothing has been published about the topic at its practical, applications level, although some useful background articles are available in the literature....A central clearinghouse would be the ideal solution...."[17]

IV. END EQUIPMENT FOR DATA BASE ACCESS

On-line data base access can be accomplished through the use of several types of equipment, including telex, "dumb" or printing computer terminals, word processors, and mini- and microcomputers that are capable of communicating interactively using ASCII coding. (ASCII is the American Standard Code for Information Interchange, a binary code that enables computers and word processors to communicate with each other.)

A. Telex

Before discussing telex equipment, an introduction to the telex process is in order. Telex is a low-speed communication service that is available virtually everywhere in the world. Messages are typed into a terminal by an operator, the telex number of the recipient is selected, and the message is relayed. Telex is not a preferred option for on-line access, because it transmits at only 50 baud. (Baud is a unit for measuring the speed of data transmission, and is roughly equivalent to the number of bits transmitted per second.) Comparing telex to other telecommunications modes, most microcomputers transmit data at either 300 or 1,200 baud. Telephones in the U.S. are capable of handling both of these speeds; telephone systems in other countries may be currently limited to 300 baud data speeds to maintain clean transmissions. Each character requires 8 bits, thus a telex machine can transmit roughly 6 characters per second (cps). Comparatively, a 300-baud modem can transmit at 37.5 cps, a 1,200 baud modem at 150 cps. Telex at 50 baud could therefore transmit a 250-word page of text in approximately 41 seconds; that same page would take 7 seconds at 300 baud, and .21 seconds at 1,200 baud. Because telecommunications transmission between the LAC region and the U.S. is costly, it is best to choose an equipment configuration that will transmit at the fastest speed possible. An exemplary telex charge is $3.60 per minute from El Salvador to the U.S.

The advantages of telex are its nearly universal availability, the ability of telephone lines in developing countries to handle the transmission, and the fact that both users and telecommunication entities are accustomed to the technology and, in the case of the latter, promote its use. Telex capacity is growing in most countries in the region, and, because it requires no special line conditioning, can expand to areas outside of the capital city as basic telephone service expands. Six questionnaire respondents indicated that they currently use telex for data base access.

Further research is required to determine the costs of leasing or purchasing telex equipment in-country. However, equipment lease and purchase prices in the U.S. will provide some basis for comparison with other technologies. Current lease cost in the U.S. for a TRT Data Products Lynx terminal configured with a TRT Gateway Line and a Western Union Telex Line is $270 per month, including maintenance, for a three-year lease/purchase agreement, with a $150 installation charge. Purchase costs for that same equipment would be about $5,160 at current prices.

B. **Teleprinters**

A teleprinter, or "dumb terminal" is another possibility for on-line access. A dumb terminal allows the user on-line access to a computer, provides electronic mail capability, and prints hard copy. Unlike a microcomputer, it does not have a screen or storage capacity. It therefore cannot be used for functions such as data management or word processing. The relatively low cost of such a teleprinter terminal makes it a feasible option for some users for on-line access, but limits the terminal's applicability for other functions. An average price is that of the TI Model 707, which has a list price of about $700.00 in the United States.

Printing terminals that can be used for on-line data base access include:

Anderson-Jacobson AJ630, AJ832

Control Data Corporation 713, 751, 752, 722 CRT

Computer Devices TELETERM 1030, 1203

Computer Transceivers EXECUPORT 300

Digital Equipment DECWRITER II/IV

DIABLO 1620, 1650

GE TERMINET 300

Hazeltine Corporation 2000, 1400/1500 Series

Texas Instruments 735, 745, 746, 756

UNIVAC DCT 500[18]

C. **Word Processors**

A word processor is essentially a microcomputer that is dedicated to the function of word processing, or text editing, which means that it does that job very well, and other jobs less well. It does not perform functions such as data management as well as a microcomputer does. Because dedicated word processing equipment is generally as costly as microcomputers, and because microcomputer word-processing software packages are becoming as good as dedicated word processors, the purchase of word processors for general purpose usage in documentation and information centers is not recommended, as the needs in such centers for computer functions are generally more wide ranging. (See, for example, answers to question #31 in the questionnaire report.)

D. **Microcomputers**

A microcomputer is a small, desk-top computer made up of several components that, taken together, can perform an increasingly substantial number of functions. The essential components of a microcomputer system include:

- the central processing unit, or CPU, containing the microprocessor that actually carries out the system's computations;
- random-access memory, or RAM, which is the "working memory", and which stores data while the computer is providing power;
- read-only memory, or ROM, which stores data even when the computer is turned off;
- a keyboard, which is used to enter data or commands;
- ports, or connections to peripheral equipment; and
- a display screen, or television monitor, which allows the user to see the information he is entering into the computer, or receiving from it.

Peripheral equipment that is added to make up a total system includes:

- the disk drive, which can read disks, and which allows for the recording and collection of data (the disk is the actual storage medium);
- a printer, which generates the paper copy;
- a modem (modulator/demodulator), which translates the computer's digital signals into analog signals that can be transmitted over a telephone line (see Appendix G for information on modem models);
- function boards, added to a microcomputer to enhance the system, whether by enabling it to do more complicated tasks, by adding new capabilities, such as graphics, or by enabling it to emulate another computer and use its software (see Appendix H for information on boards).

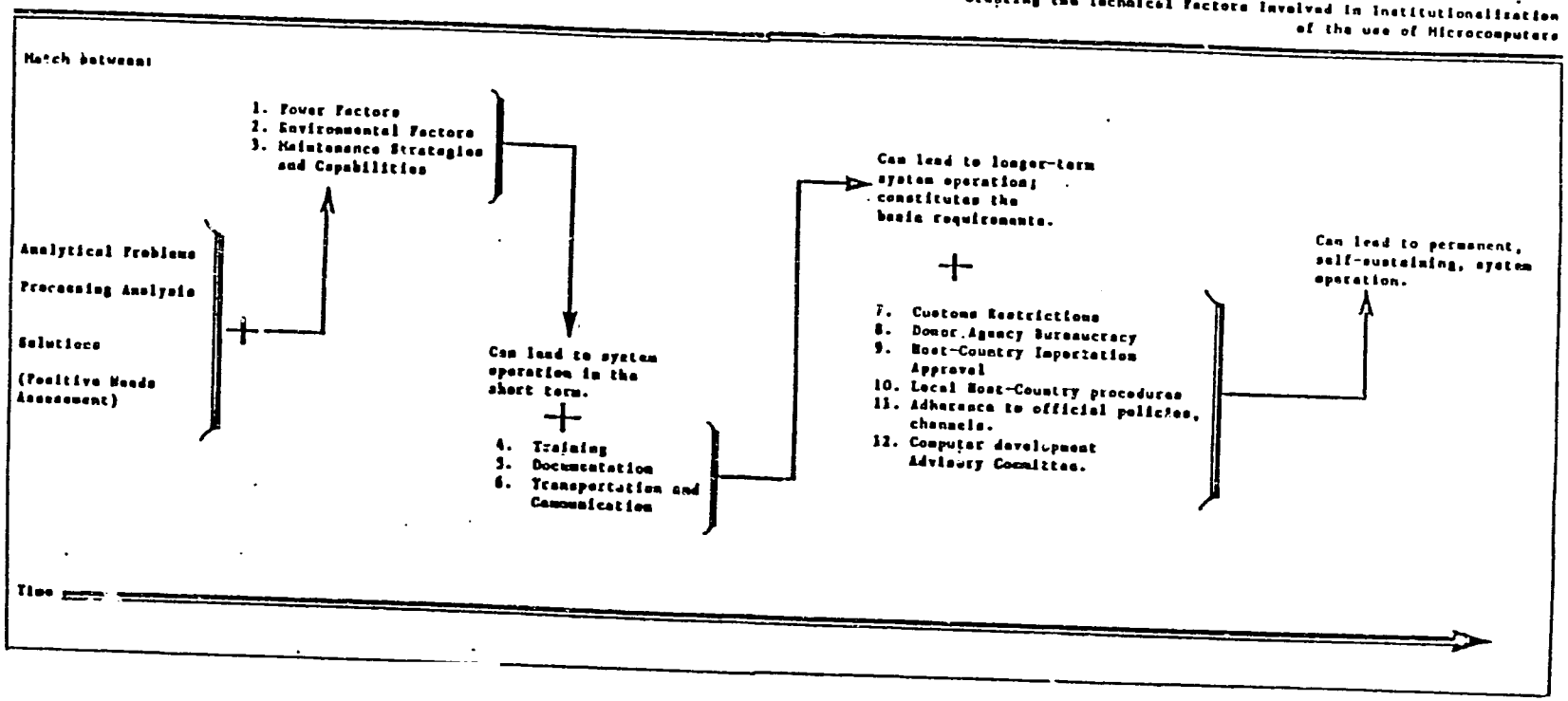
Communications software is needed to enable the microcomputer to communicate with other computers, using its modem. Communications software can range from simple software that will turn the microcomputer into a "dumb terminal," to more sophisticated software that will give the micro a wider range of networking capabilities.

Most writers discussing the subject of microcomputer selection divide the process into two phases, 1) identifying functional requirements, and 2) evaluating the characteristics of microcomputers in meeting those requirements. Marcus Ingle, a management specialist who has spent several years studying the appropriateness of microcomputers for management applications in developing countries, has put together a list of "Do's and Dont's of Acquisition, Installation, and Use of Microcomputers."[19] (See Appendix I.) In that same paper, Ingle presents a useful diagram of the critical issues involved in institutionalizing the use of microcomputers. (See Figure 2.)

In Acquiring and Using Microcomputers in Agricultural Management: A Manager's Guide, co-authored by Ingle with Noel Berge and Marcia Teisan for the Development Project Management Center of the U.S. Department of Agriculture, the authors look more closely at the question of microcomputer system costs. They suggest that the $4,000-$6,000 hardware costs and $2,000 worth of software are only a small part of the expense of putting together an integrated, operational microcomputer system. Additional costs, as suggested in Figure 3, include protection of the power supply, air conditioning and other building requirements, spare parts, supplies, technical assistance, training, and maintenance. Taking all of these costs into consideration makes the decision on whether to buy a microcomputer a weighty one, and one deserving of a great deal of time and attention. The intricate decision of which microcomputer to buy must then follow.

Figure 2

Ordering the Technical Factors Involved in Institutionalization of the use of Microcomputers



The Figure above was based on the list of critical issues involved in institutionalization generated by the participants at the Michigan State University conference on Microcomputers, May 1982, Working Group Two. The list that emerged was:

1. Needs Assessment
2. Power needs considerations
3. Environmental considerations
4. Maintenance strategies/capabilities
5. Software documentation (and in local language)
6. Training considerations
7. Transportation and communications
8. Customs restrictions
9. Donor agency bureaucracy
10. HC importation approval
11. Local host country procedures, regulations, etc.
12. Adherence to official policies/channels
13. Computer Development Advisory Committee

Source: Marcus D. Ingle, "Evaluating the Appropriateness of Microcomputers for Management Applications in Developing Countries," a paper presented at the National Conference of the American Society for Public Administration, New York, April 1983.

FIGURE 3

Approximate Costs of Microcomputer Systems
(Based on U. S. Purchase Prices)

	First Year	Second Year
Cost of first system	$4000-$5000	----
An additional system*	4000	----
Protection for power**	1000-5000	500-1000
Air conditioning and building arrangements***	5000-10,000	4000
Spares****	1500 per year	1500
Supplies	1000 per year	1000
Technical assistance	30,000	----
Training time	15,000	10,000
Maintenance	1500 per year	2,000
TOTAL	$63,000 - 73,000	$19,000-19,500

* additional system may be required to assure continuity of operation
** cost will depend on power situation and measures necessary
*** may require structural changes of building
**** freight can be costly item

Source: Marcus Ingle, Noel Berge, and Marcia Teisan, Acquiring and Using Microcomputers in Agricultural Management: A Manager's Guide (Washington, D.C.: U.S. Department of Agriculture, 1983).

The listing of microcomputers already purchased and/or in use in the questionnaire respondents' information centers is found in answers to Question 30; microcomputers being distributed in the region are listed in responses to Question 34.

E. **Facsimile**

Some of the problems associated with procuring copies of original source materials can be addressed through the use of facsimile, which provides the capability of transmitting copies of printed documents over telephone lines. A facsimile system functions by:

- converting an alphanumeric (text) or graphic image to an electrical representation in the form of analog or digital signals;
- transmitting the signals over a communication facility, which can include voice-grade telephone lines, private transmission lines, microwave relay systems, and satellite transmission systems;
- reconverting the signals received from the communication facility and producing a copy of the original image.

A facsimile system includes a facsimile transmitter (scanner) and a facsimile receiver (recorder), which are now usually combined into one unit, called a transceiver.

Although the most commonly used communication facility is the voice-grade telephone line, an increasing number of facsimile applications have been designed around satellite transmission, e.g., for oil companies conducting operations in remote areas.

While the most common equipment in use today transmits a page in about three minutes using amplitude modulation (AM) Analog Transmission, the state-

of-the-art equipment uses digital transmission to deliver a page in less than one minute.

Information comparing the operating characteristics and prices of several models of facsimile equipment, compiled for a project in the Caribbean region in 1982, is included as Figure 4.

FIGURE 4

FACSIMILE	Burroughs 3600	Burroughs 2100	Burroughs[f] 1102/1103[5]	Panafax MV-1200	Xerox 455	Xerox 485	Omnifax
GSA Pricing	$5995	$3495	$2000	$5170	$2370	$6455	$5750 (non-GSA)
Power Supply[a]	110 50/60	110 50/60	110 50/60	110 50/60	110 50/60	110 50/60	110/60
Weight	79 lbs.	64 lbs.	21.5 lbs.	81 lbs.	24 lbs.	170 lbs.	61.7 lbs.
Compatability with other models	Grp. II,III			Grp. I,II	Grp. I,II	Grp. I, II	Grp. II,III
Operation in conditions of high:[b] - temperature	OK	OK	OK	----	tested-out at 98° for 48 hours	----	tested-out at 41°F-95°F
- humidity	indefinite operation at 99%[1]	indefinite operation at 99%[1]	OK[6]	----	tested-out at 110% for for 48 hours	----	tested-out at 35%-85%
Average down time	32 weeks between repairs	34 weeks between repairs		.4 service calls per year	15 months between repairs	12 months between repairs	3000 hours of use without repair
Schematics available	yes[2]	yes[2]	yes[2]	yes	yes	yes	yes
Repair and maintenance training available	yes[3]	yes[3]	yes[3]	yes	yes[7]	yes[8]	no
Spare parts available	yes [4]	yes [4]	yes	yes	yes	yes	yes
Nearest repair center to UWI or BKS sites	Miami/ Los Angeles	Miami/ Los Angeles	Miami/ Los Angeles	Miami/ Los Angeles	----	----	Miami/ Los Angeles
Warranty	30 days	30 days	30 days	not available outside of U.S.	90 days	90 days	not available outside U.S.
Broadcast capability[c]	no	no	yes, but not recommended	yes	no	no	yes, automatic dial-up
Type of Feed	automatic	automatic	manual	manual-add $846 for automatic feed	manual	automatic	automatic
Est. cost per 11" page	5.7¢	5.7¢	7.8¢	6.5¢	10¢	.005¢	5.5¢
Digital/Analog[d]	Dg	An	An	An	An	An	Dg
Flatbed/Drum[e]	Fb	Fb	Dr	Fb	Dr	Fb	Fb

Comments:

(1) Thermal printing process creates dry heat to protect unit from moisture build-up. Effects of prolonged storage at high humidity unknown. (2) With training package or $50 for manual. (3) $750 per student, 5 days, Dallas, TX. (4) New machines, spare parts prices available soon. (5) 1102 phone coupler, 1103 hand wired. (6) Uses an aluminum based paper; outer layer disintegrates with electrical charge to eliminate residue build-up on nedle, a problem encountered in areas of high humidity when using carbon-based paper. (7) Xerox

(a) All models need a converter for 220

(b) Information is from sales reps and not from user experience. All manufacturers recommend keeping paper stored in plastic until ready for use.

(c) Broadcasters are available from several manufacturers, but most suppliers & users do not recommend their use.

V. COMMUNICATIONS OPTIONS FOR ACCESSING DATA BASES

There are a number of communications options through which a user in the Latin America/Caribbean region can gain access to the information in an on-line data base. The traditional means include mail, telephone, and telex. In responding to the question, "How do you contact on-line data bases?", participants in the OAS/NTIS seminar responded as follows (see Question 2):

7 use international long-distance telephone

6 use telex

11 use international telecommunications networks (7 TELENET, 4 TYMNET)

12 use international mail

7 go through an information broker (who in turn uses one of the above methods).

A. International Mail

Virtually all of the respondents use international mail to obtain copies of primary documents, indicating in their answers that it can take from one day to three months to obtain a document (see Question 20). Several respondents stated that they find the process of obtaining information by mail inadequate, as their clients' needs for information tend to be more immediate. Nonetheless, it is the least expensive means of communication.

B. Telex

Telex, as described above, is another option for intermediaries who do not have access to microcomputers and packet-switched nodes. Some telecommunications entities are beginning to upgrade their telex capabilities with value-added services. As reported to the International Development Research Centre (IDRC) in Canada by Telematics International:

> "Major international record carriers (IRCs), which provide the majority of the international telex communications facilities, offer 'gateway' services into the U.S. and Canadian national data networks. By means of services such as ITT World Communications UDTS service or RCA Global

Communication's Datalink service, the user of a telex terminal may place an international telex call to a value-added network in the U.S., such as TYMNET or TELENET. After making the connection, the telex terminal user may connect to any host computer on those packet-switched data networks (PSDNs) as though he were using a standard data terminal. For those with no other telecommunication access, these gateway services permit the telex user to use the same...on-line data base services available to domestic users. It should be noted that the interaction with a computer on the PSDN is limited to the standard telex speeds, and is charged at the standard international telex rates. Thus, the use of such services would most likely be limited to those instances where access to an...on-line data base was of high enough priority to warrant the cost."[20]

In a paper prepared for a UNISIST working group, John Page includes one of the only other comments on telex that appears in any of the literature reviewed for this study:

> Several on-line systems have a telex interface which allows the host computer to be called up on the telex network from a remote station, which can then use its telex machine to send commands and receive responses. The use of the telex network over intercontinental distances is not cheap, but such a system may be more cost-effective than use of the telephone network, particularly since it will be unnecessary to rent or buy separate data terminals and modems; telex is moreover fairly widespread throughout the world; maintenance facilities for telex will be part of the telecommunications infrastructure in developing regions before parallel facilities exist for data terminals and modems.
>
> On the negative side, although high speed telex machines operating at similar speeds to data terminals are becoming increasingly popular, the generality of systems is five or six times slower than a data terminal operating over the telephone network; slow speed will inhibit the interaction between the searcher and the data base, as display of a large number of references will take a considerable time and therefore will be expensive. Nevertheless, for a relatively large number of countries, telex offers the only immediate possibility of obtaining some direct benefit from the on-line information resource; references to major operational experiments in the use of telex in this way do not, however, seem to be very common in the literature. It may be noted that, as part of its Direct Access project, the International Atomic Energy Agency has for the past year offered telex access to the INIS and AGRIS data bases resident on its computer in Vienna as a supplement to access by TYMNET for regions outside Europe. Use of this facility has not yet built up to a point at which general conclusions on its acceptability and feasibility can be drawn."[21]

C. International Long-Distance Telephone Service

If an information center has a terminal device such as a "dumb" terminal, a word processor, or a microcomputer with a modem, regular

international telephone service can be used to gain on-line data base access, either through direct dialing or through operator-assisted calls. As is indicated in the answers to Questions 6 and 21, this can be a very expensive proposition. If, as the DIALOG literature indicates, a typical search takes 10 to 15 minutes, and the cost of a five-minute telephone call from Mexico City to the U.S. is $12.50, the telecommunications costs for a data base search are virtually prohibitive for most developing countries, especially when combined with the on-line access charges, royalties, and other data base costs. In addition, telephone service in some countries is inadequate to the task of data communication, with line noise causing transmission errors and heavy volume in international traffic making access difficult to obtain. Dedicated leased lines are available in some countries and can improve reliability and access, but costs are generally high.

As James Martin points out in Future Developments in Telecommunications, "computer users have fundamentally different characteristics and requirements from Plain Old Telephone Service (POTS). To force computer traffic to fit into telephone channels with telephone switching both severely limits the potential of the computer and is likely to waste the channel capacity....Sometimes old-established POTS engineers have difficulty grasping that the needs of computer users are so different from telephone users."[22] The different needs of these two user groups are enumerated in Figure 5.

Because of these different requirements, new telecommunication network architectures are being developed, such as burst multiplexing and burst switching, which can handle the sporadic bursts of transmission that are characteristic of data transmission. As Martin points out, telecommunications entities must decide whether telephone and data traffic should travel over the same integrated network, or over entirely separate networks. In the long-

FIGURE 5

Telephone traffic and computer traffic have characteristics so different that different network architectures are needed.

Telephone Users	*Computers and Terminals*
• Require a fixed capacity channel.	• Require a very wide spread of channel capacities ranging from a few bits per second to (ideally) millions of bits per second.
• Always carry out a two-way conversation.	• One-way or two-way transmission.
• Tolerant to noise on the channel.	• Data must be delivered without errors.
• Transmit or listen continuously until the call is disconnected.	• In a man-computer dialogue, transmission is in bursts.
• Require immediate delivery of the signal.	• In non-real-time data transmission the data can be delivered later, when convenient.
• The transmission rate is constant.	• In a man-computer dialogue the mean number of bits per second is usually low, but the peak requirement is often high. The peak to average ratio is often as high as 1000.
• The time to set up the connection can range from a few seconds to one minute.	• Sometimes it is desirable that the connection should be set up in a second or less.
• Switching is carried out only at the start of a conversation.	• Efficiency can be improved if the messages which constitute a dialog are individually switched with a very low switching time.
• Telephone dialing is manual.	• Setting up a connection between machines is often automatic.
• Telephone callers employ simple compatible instruments.	• Incompatible machines may intercommunicate giving a need for code or signal conversion.

Source: James Martin, Future Developments in Telecommunications (Englewood Cliffs, N.J.: Prentice-Hall, 1982, Second Edition), p. 159.

term, many Latin American countries are moving toward Integrated Services Digital Networks (ISDN), which will allow the same network to carry both voice and data efficiently.

D. Value-added Networks

For the present, domestic common carriers (i.e., the national telephone service provider); international record carriers, such as ITT World Communications, RCA Global Communications, and Western Union International; and satellite systems are the major elements in the transmission of data internationally. Value-added networks (VANs) are an aspect of this system that bears particularly on on-line data base access.

A value-added network is "one in which existing transmission links are used in a new way which enhances their value to the end users....Value-added carriers add computers to existing transmission links to provide new transmission services such as data networks which move bursts (packets) of data rapidly and inexpensively from one subscriber location to another."[23] Such value-added packet-switched networks "permit a faster, more reliable and more cost-effective link-up of computers than could be obtained if users were to lease standard lines from common carriers and were to invest in the necessary equipment themselves."[24] Experience indicates that users pay about three times as much for an on-line search using regular long-distance telephone service as for one using a value-added network, although rates vary from country to country.

The major intercontinental value-added networks are TELENET and TYMNET, which are used by almost four-fifths of all data base operations.[25] Countries in Latin America and the Caribbean with operational TYMNET access include Argentina, Barbados, Chile, Costa Rica, Mexico, Panama, and Trinidad, with Jamaica, Venezuela, and Peru to be included in the near future. Countries

with operational TELENET access include Argentina, Barbados, Brazil, Chile, Colombia, Dominican Republic, and Mexico, with Trinidad adding service in the near future.

As John Page points out, however, "The direct use of this powerful information resource by developing countries is possible, but conditioned by possible solutions to a complex of interlinked problems. Clearly, an adequate telecommunications infrastructure must exist in the countries concerned to enable reliable linkages with existing networks to be established; while these linkages may be by international switched connections or by international leased circuits, in either case the local telecommunications situation is a determining factor in the practicability of obtaining reliable and reasonably error-free connections."[26]

E. Communication Satellites

Communication satellites currently play a role in international data transmission to the extent that they are used by the international record carriers; they will undoubtedly play an increasingly important role in the future as they provide increased capacity to carry international telephone and data traffic.

1. Current Satellite Options

The INTELSAT system, which began commercial operation in 1965, offers international communication services, with worldwide interconnectivity, to member and non-member nations all over the world. A full-time INTELSAT voice circuit lease is now $4,680 a year, or $390 a month. The LAC countries with existing and planned INTELSAT Standard A and Standard B earth stations are indicated in Figure 6.

In addition to offering international communciation services, INTELSAT has also permitted countries to use the INTELSAT space segment to develop

FIGURE 6

Earth Station Antennas for International Service

(31 March 1983)

ATLANTIC OCEAN REGION

Standard A Earth Station Antennas

Algeria: Lakhdaria 3 LK
Angola: Cacuaco 1 CC
• Argentina: Bosque Alegre 1 BL
Balcarce 1 BA
Austria: Aflenz 1 AF
Bahrain: Ras Abu Jarjur 1 RJ
• Barbados: Barbados 1 BB
Belgium: Lessive 1 LI
• Bolivia: Tiwanacu 1 TW
• Brazil: Tangua 1 & 2 TN
Cameroon: Zamengoe 1 ZA
Canada: Mill Village 1 & 2 MV
Des Laurentides LT
• Chile: Longovilo 1 & 2 LO
• Colombia: Choconta 1 & 3 CH
Congo: Mougouni 1 MR
• Costa Rica: Tarbaca 1 TA
Cyprus: Makarios 1 MH
• Dominican Republic: Cambita 1 CB
• Ecuador: Quito 1 QU
Egypt: Maadi 1 MF
• El Salvador: Izalco 1 IZ
Ethiopia: Sululta 1 SU
France: Pleumeur-Bodou 3 PB
Bercenay-en-Othe 1 BY
Trou-Biran (French Guiana) TB
Trois Ilets (Martinique) TR
Gabon: N'Koltang 1 NK
Germany: Raisung 2, 3 & 5 RA
Ghana: Nkutunse NU
Greece: Thermopylae 2 & 3 TH
• Guatemala: Quetzal QE
• Haiti: J-C Duvalier DV
Iceland: Skyggnir 1 SG
Iran: S. Dr. Ghandy 1 AA
Iraq: Dujail 2 DL
Israel: Emeq Ha'ela 1 & 2 EH
Italy: Fucino 1 & 3 FO
Lario LR
Ivory Coast: Abidjan 1 & 2 AI
• Jamaica: Prospect Pen 1 PP
Jordan: Baqa 2 BQ
Kenya: Longonot 2 LG
Kuwait: Umm Al-Aish 1 & 2 UM
Lebanon: Arbaniyeh 2 AB
Libya: Tripoli 2 TP
Malawi: Kanjedza 2 KJ
• Mexico: Tulancingo 1 & 2 TU
Morocco: Sehouls 1 SE
Mozambique: Boane 1 BO
Netherlands: Burum 1 BM
• Nicaragua: Managua 1 MN
Niger: Karma NI
Nigeria: Lanlate 2, LA
Kujama 1 KZ
• Panama: Utibe 1 & 2 UT
• Paraguay: Aregua 1 AR
• Peru: Lurin 1 LU
Poland: Psary 1 PY
Portugal: Sintra SI
Romania: Cheia 1 CZ
Saudi Arabia: Taif TF
Riyadh 4 RI
Senegal: Gandoul 1 GA
South Africa: Pretoria 1 & 3 PR
Spain: Buitrago 1, 3 & 5 BU
Aguimes AG
Sudan: Umm Haraz 1 UH
Sweden: Tanum 1 & 2 TM
Switzerland: Leuk 1 & 2 LE
Togo: Cacavelli 1 CV
• Trinidad and Tobago: Matura Point 1 MA
Turkey: Ankara 1 AK
Uganda: Mpoma 1 MP
United Arab Emirates: Abu Dhabi 1 AZ
United Kingdom:
Goonhilly Downs 2 & 3 GH
Madley 2 MD
United States: Andover 3, AN
Etam 1 & 2 ET
U.S.S.R.: Dubna 1 DB
• Venezuela: Camatagua 1 & 2 CM
Yemen, A.R.: Sanaa 2 SX
Yugoslavia: Jugoslavija 1 JU
Zaire: N'Sele 1 NS

Standard B Earth Station Antennas

Ascension Islands: Ascension 2 AS
• Belize: Belmopan 1 BP
• Bermuda: Devonshire 1 DE
• Brazil: Natal NT
Cape Verde Islands: Varzea 1 VZ
• Cayman Islands: Grand Cayman GD
Central African Republic: Mpoko 1 MY
• Cuba: Caribe 1 CF
France: Pain de Sucre (St. Pierre) PF
Gabon: N'Koltang 2 NK
Gambia: Banjul BJ
Gibraltar: Gibraltar 1 GI
Guinea: Wonkifong 1 WK
• Guyana: Georgetown 1 GG
• Honduras: Lempira 1 LP
Liberia: Sinkor 1 SK
Mali: Sullymanbougou 1 & 2 SL
Netherlands Antilles:
Vredenberg 1 & 2 VR
Sao Tome e Principe: Sao Marcal SO
Sierra Leone: Wilberforce 1 WI
• Surinam: Partes PS
Santo Boma SB
Upper Volta: Somgande 1 SM
• Uruguay: Manga 1 MT

Standard C Earth Station Antennas

France: Bercenay-en-Othe 3 BY
Germany: Usingen 1 US
United Kingdom:
Goonhilly Downs 4 GH
United States: Etam 3 ET

Non-Standard

Ascension Island: Ascension 1 AS

INDIAN OCEAN REGION

Standard A Earth Station Antennas

Algeria: Lakhdaria 1 LK
Australia: Ceduna 1 & 2 CE
Bahrain: Ras Abu Jarjur 2 RJ
Bangladesh: Betbunia BI
China: Peking 2 PE
Taipei 3 TI
France: Bercenay-en-Othe 2 BY
Pleumeur-Bodou 4 PB
Germany: Raisting 4 RA
Greece: Thermopylae 1 TH
Hong Kong: Hong Kong 3 HK
India: Vikram 1 VI
Ahmed 1 AY
Indonesia: Djatiluhur 2 DJ
Iran: S. Dr. Ghandy 2 AA
Iraq: Dujail 1 DL
Italy: Fucino 2 FO
Japan: Yamaguchi 1 & 2 YA
Jordan: Baqa 1 BQ
Kenya: Longonot 1 LG
Korea: Kum San 2 KS
Kuwait: Umm Al-Aish 3 UM
Lebanon: Arbaniyeh 1 AB
Libya: Tripoli 3 TP
Madagascar: Philibert Tsiranana 1 PT
Malaysia: Melaka 1 MK
Netherlands: Burum 2 BM
Nigeria: Lanlate 1 LA
Oman: Al Hajar 1 AL
Pakistan: Deh Mandro 1 DM
Philippines: Pinugay 2 PG
Qatar: Doha 1 DO
Romania: Cheia 2 CZ
Saudi Arabia: Riyadh 1 RI
Singapore: Sentosa 1 SN
South Africa: Pretoria 2 PR
Spain: Buitrago 2 BU
Sri Lanka: Padukka 1 PD
Syria: Sednaya 1 SY
Thailand: Si Racha 2 SR
United Arab Emirates: Dubai DU
U.S.S.R.: L'vov 1 LV
United Kingdom: Madley 1 & 3 MD
Zambia: Mwembeshi 1 MW

Standard B Earth Stations Antennas

Bangladesh: Talibabad TD
Botswana: Kgale 1 KG
Brunei: Telisai 1 TE
Burma: Rangoon 1 RN
Burundi: Bujumbura 1 BY
Cyprus: Makarios 2 MH
Djibouti: Ambouli 1 AM
• Malawi: Kanjedza 1 KJ
Maldives: Maldives 1 ME
Mauritius: Cassis 1 CS
Nepal: Sagarmatha 1 ST
Niger: Goudel 1 NI
Oman: Masirah MI
Rwanda: Kicukiro KC
Seychelles: Bon Espoir 1 BS
Somalia: Kaaman 1 KR
Tanzania: Mwenge 1 MG
Yemen, A.R.: Sanaa 1 SX
Yemen, P.D.R.: Ras Boradli RB

PACIFIC OCEAN REGION

Standard A Earth Station Antennas

Australia: Carnarvon 2 CA
Moree 1 & 2 MO
Canada: Lake Cowichan 1 LC
China: Peking 3 PE
Shanghai SH
Taipei 2 TI
Fiji: Suva 1 SV
France: L'Ile Nou (New Caledonia) LL
Hong Kong: Hong Kong 1 HK
Indonesia: Djatiluhur 1 DJ
Japan: Ibaraki 3 IB
Korea: Kum San 1 KS
Malaysia: Kuantan 1 KU
New Zealand: Warkworth 1 WA
Philippines: Pinugay 1 PG
Singapore: Sentosa 2 SN
Thailand: Si Racha 1 SR
United States: Brewster 1 BR
Jamesburg 1 JB
Paumalu 2 (Hawaii) PA
Pulantat (Guam) PL

Standard B Earth Station Antennas

Cook Islands: Avarua 1 AV
France: Papenoo (French Polynesia) PZ
Kiribati: Christmas Island CR
Nauru: Nauru NZ

Solomon Islands: Honiara 1 HO
Tonga: Nuku'Alofa 1 NF
United States: Pago Pago
(American Samoa) PO
Majuro (Marshall Islands) MJ
Palau (Caroline Islands) BT
Susupe (Saipan) SF
Vanuatu: Port Vila 1 PI
Western Samoa: Afiamalu 1 AU

DOMESTIC NON-STANDARD EARTH STATION ANTENNAS

Algeria: 15
• Argentina: 5
Australia: 57
• Brazil: 59
• Chile: 2
• Colombia: 8
Denmark (Greenland): 5
France: 2
India: 36
Libya: 5
• Mexico: 123
Morocco: 3
Niger: 3
Nigeria: 19
Norway: 6
Oman: 7
• Peru: 8
Saudi Arabia: 15
Sudan: 14
Thailand: 6
• Venezuela: 3
Zaire: 13

Additional Earth Station Antennas Planned for Operation in 1983

ATLANTIC OCEAN REGION

Standard A Earth Station Antennas

Belgium: Lessive 2
Benin
• Bermuda: Devonshire 2
Chad: Goudji 2
Portugal: Sintra 3
Qatar: Doha 2
United States: Roaring Creek 1
• Venezuela: Camatagua 4
Yugoslavia: Jugoslavija 2

Standard B Earth Station Antennas

Falkland Islands
France: Destrellan (Guadeloupe)
Iceland: Skyggnir 2
Lesotho: Ha Sofonia 1
Malta
Spain: Robledo 1
Swaziland: Ezulwini 1
• Turks and Caicos Islands: Grand Turk 1
United Kingdom: Goonhilly Downs 7

Non-Standard Earth Station Antennas

Canada: Toronto 1

INDIAN OCEAN REGION

Standard A Earth Station Antennas

Brunei: Telisai 2
France: Bercenay-en-Othe 4

Non-Standard Earth Station Antennas

Iran: Chah Bahar (Receive)

PACIFIC OCEAN REGION

Standard A Earth Station Antennas

Hong Kong: Hong Kong 4

Standard B Earth Station Antennas

Kiribati: Bairiki
Papua New Guinea: Port Moresby
United States: Finegayan (Guam)
Ebeye (Marshall Islands),
Hickam (Hawaii),
Ponape (Micronesia),
Truk (Micronesia),
Yap (Micronesia),
Kosrae (Micronesia)

PROPOSED DOMESTIC EARTH STATION ANTENNAS

Algeria: 21
• Argentina: 35
Australia: 6
• Brazil: 9
• Chile: 2
• Colombia: 8
Denmark: 3
India: 22
Libya: 14
• Mexico: 28
Niger: 1
Nigeria: 2
• Peru: 12
Saudi Arabia: 4
Thailand: 10
• Venezuela: 24

their domestic communication systems. Countries in the LAC region that have taken advantage of this opportunity to lease INTELSAT transponders for domestic purposes include Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela. (See Figure 7 for status of domestic leased systems.)

One particularly important development with regard to domestic services is the use of INTELSAT spot beams for domestic services. By using an INTELSAT spot beam, the power density of the area covered by the beam is increased significantly over the power density of an ordinary INTELSAT transponder, by a factor of about ten.[27] Mexico has been able to use an INTELSAT spot, beginning in 1982, and INTELSAT hopes to be able to increase the availability of spot beams for domestic purposes in the next few years.

At an International Satellite Communications Seminar in Lima, Peru, in May 1978, then-Director General of Intelsat Santiago Astrain suggested that "INTELSAT is studying the desirability of providing cost economies for systems designed to provide educational, health, and other social services either on a shared satellite system or a separate system designed to meet single country and regional needs. Further, he indicated that INTELSAT is considering the possibility of extended tests and demonstrations in South and Central Americas, Africa, the South Pacific and Asia for demonstrating capabilities in rural areas of these innovative services including educational television distribution, slow-scan educational television, two-way telephony, facsimile, and other data services such as remote access to international data banks."[28]

INTELSAT has also in the past indicated a willingness to consider a variety of arrangements to meet regional needs, including shared transponder leases, and sharing ownership of a satellite with a regional group, as it proposed to the Arab nations in the planning stages of ARABSAT.[29]

FIGURE 7

CURRENT STATUS OF DOMESTIC LEASED SYSTEMS

TRANSPONDER LEASES PROVIDING DOMESTIC SERVICES
(28 February 1983)

Country	Bandwidth	Type of Transponder
Algeria	36	GLOBAL
Argentina	54	GLOBAL
Australia	77	VA HEMISPHERIC
Brazil	216	HEMISPHERIC
	36	GLOBAL
Chile	18	GLOBAL
Colombia	18	GLOBAL
	18	V HEMISPHERIC
Denmark (Greenland)	18	GLOBAL
France*	36	GLOBAL
France	27	GLOBAL
India	144	V HEMISPHERIC
Mexico	108	IV SPOT
Morocco	36	GLOBAL
Niger	36	GLOBAL
Nigeria	108	GLOBAL
Norway	18	GLOBAL
Oman	36	GLOBAL
Peru	45	V HEMISPHERIC
Portugal	54	GLOBAL
Saudi Arabia	72	IVA HEMISPHERIC
Saudi Arabia	9	GLOBAL
Spain*	36	GLOBAL
Sudan	36	GLOBAL
Thailand	9	GLOBAL
Venezuela	72	V HEMISPHERIC
Zaire	36	GLOBAL

TOTALS

23 countries (2 Full-Rate (*), Remainder Pre-emptible)
1404 MHz Leased (Equivalent to 39.0 36 MHz Transponders)

COUNTRIES PLANNING TO EXPAND THEIR EXISTING DOMESTIC LEASED SYSTEMS

1. Algeria
2. Argentina
3. Australia
4. Brazil
5. Chile
6. Colombia
7. Mexico
8. Niger
9. Norway
10. Peru
11. Portugal
12. Thailand
13. Saudi Arabia
14. Zaire

ADDITIONAL COUNTRIES WITH APPROVED OR PRELIMINARY DOMESTIC LEASED SYSTEMS

Approved		Preliminary
China	- 45 MHz Hemi	Angola
Malaysia	- 36 MHz Hemi	Bangladesh
Libya	- 36 MHz Hemi	Bolivia
U.K.	- 3x72 MHz Spot (14/11 GHz)	Cameroon
		Ecuador
		Germany (14/11 GHz)
		Iran (14/11 GHz)
		Korea
		Pakistan
		South Africa

In addition to INTELSAT, satellite coverage of Central American and Caribbean nations is possible through some U.S. domestic satellites, whose footprints may extend that far south. These systems offer the advantage of a smaller, more focused footprint, which permits the use of less expensive earth stations.

2. **Planned Domestic Satellites in Latin America**

a. **Brazil**

Brazil's domestic satellite system, SBTS, scheduled to be launched in February and July of 1985, will consist of two geostationary satellites covering the entire country and providing the basic channels for telephone, data communication, telex, and television. Each satellite will have 24 36MHz transponders, operating in the 6/4 GHz band. The satellites are being constructed by Spar Aerospace of Canada and Hughes Aircraft Company, at a cost of $131.1 million. The Export-Import Bank guaranteed $42.5 million of the total cost. The earth segment "will use almost exclusively local technology"[30] and will be essentially an expansion of the existing INTELSAT-linked network. When the Brazilian satellites are launched, all cities in the country will be linked to the national telecommunication network.

b. **Mexico**

Mexico has let contracts with Hughes Communications for the construction of two satellites for its national communications system, with a planned launch date of 1985. Owned and operated by the Secretaria de Comunicaciones y Transportes, the satellites have four 14/12GHz transponders to be used for educational television services, and 18 6/4GHz transponders for television distribution, telephony, and a national data service. The Export-Import Bank has guaranteed a loan of $127.5, fully covering the cost to contractors. COMSAT General has been chosen as the engineering and consulting

company for the system. The country already has a complex of about 200 earth stations operating with INTELSAT IV, and plans to install an additional 2,000 earth stations, thus extending telecommunication service to population centers throughout the country.

c. **Argentina**

Argentina's national space agency (Comision Nacional de Investigaciones Espaciales—CNIE) recently sponsored a conference on satellite systems, paving the way for an expected 1984 decision on the construction of a domestic satellite system. At an estimated cost of $240 million, the "ARGENSAT" system would include two 24-transponder satellites and some 300 earth stations, and would be used for telephony, commercial and educational television, radio, rural telecommunications, telemedicine, and data transmission. The first satellite would probably be launched in early 1988.

d. **Other Domestic Systems under Discussion**

Various other Latin American countries have discussed establishing their own domestic satellite systems, with varying degrees of seriousness. Colombia actually came close to contracting for a system in 1982; Chile and Peru established a working group to study a dual domestic satellite project.

3. **Planned Regional Satellites**

In 1977 ASETA (the Association of the National Telecommunications Agencies of the Andean Area) conducted a pre-feasibility study for a regional satellite to serve the Andean Pact countries--Bolivia, Colombia, Ecuador, Peru, and Venezuela. The proposed "CONDOR" satellite would provide domestic coverage in each of the participating countries, thus helping to promote national integration and development. Services on such a satell would be likely to include national telephony services to remote areas and educational television service.

The previously mentioned international satellite communications symposium held in Peru in 1978 was actually called to examine the proposed Andean satellite system, and to compare it to other regional approaches. It was at that conference that delegates considered the plan for the Colombia SATCOL system, which was strongly considered for several years and was not finally put aside until 1983. At that time, the CONDOR proposal began once again to receive serious consideration.

In its August 1982 issue, the CETTEM Newsletter reported that "the Board of Directors of (ASETA) has decided to grant authorization to the Board of the Cartagena Agreement for the installation of a private regional use of voice and data transmission channels 24 hours daily. It will be headquartered in Lima and shall be connected with the national networks of Bolivia, Colombia, Ecuador, and Venezuela. It involves the combined use of satellites and microwaves....In addition to the networking of telex and telephone systems the Board will be able to interconnect the different computers existing in the sub-region, which will eventually include services such as facsimile for the immediate distribution of documents."[31]

4. Satellite Technologies Not Applicable to On-line Data Base Access

a. Low Earth Orbit Satellites

VITA (Volunteers in Technical Assistance) and AMSAT (the Radio Amateur Satellite Corporation) are preparing to demonstrate a low-cost communication satellite system for technical information transfer to and from developing countries. Their low earth orbit PACSAT, which will communicate to each earth station in the system at least twice each day, will function as a type of electronic mailbox. Each time it passes over an earth station it will be able to send or receive messages to or from that station.

Although this technology may be economically attractive for other kinds of information services, it is not appropriate for on-line data base inquiries. It would not be possible to conduct extensive data base searches, both because the satellite's on-board memory is not large enough to accommodate the necessary volume of data, and because the searches could not be conducted interactively in real time.

b. **Data Broadcast Systems**

Data broadcast systems that send data to small (two-foot) earth stations are currently operational in the U.S. and have undergone experiments in Europe, through the Intergovernmental Bureau for Informatics. Again, although the systems economics are good, the functions are inappropriate to the kinds of on-line data base systems under discussion. Data broadcast systems are economic where a central unit has an identical set of data to be sent to a large number of users. With on-line systems, each user is asking for a different set of data. Further, data broadcast systems are not interactive.

VI. DEVELOPMENT OF TELECOMMUNICATIONS FOR DATA SERVICES IN LATIN AMERICA

A. Overview of Current Status

Telecommunications authorities have three basic strategies at their disposal to provide facilities for data transmission: adaptation of existing telephone and telex networks; creation of special networks to handle data separately; and development of a computerized multi-service network, or Integrated Services Digital Network (ISDN) for combined delivery of voice, data, facsimile, telex, and other services. All three of these strategies are evident in facilities currently available or projected in the Latin American region.

Virtually every PTT in the region is able to provide leased circuits which can be conditioned for data transmission via the public switched telephone or telex network. Dialing, however, can pose technical problems for reliable international transmission of data on such lines. Use of leased lines may be shared in most of the countries. A flat rate is charged for lease of the line regardless of the volume of data transmitted or the time the line is in use. For users calling to consult data banks abroad, there are additional charges for value-added services performed by such computerized networks as TELENET, as well as a charge for use of the data base. Although leased line costs are high, leased lines are preferred by corporate users who transmit large volumes of unprocessed data at flat rates.

Several countries--notably Argentina, Brazil, and Mexico--have built data transmission networks with national coverage and an international gateway connecting into a value-added network such as TELENET or TYMNET. In Brazil and Mexico, circuit- and packet-switching are merged to form a network serving all urban centers in the respective countries. In Argentina, the entire system is packet-switched. Users are charged bit-rates on the basis of volume

of data transmitted per second. Rates for services based on volume are significantly lower for the moderate user than rates for leased lines.

Some countries--e.g., Panama, Barbados, Chile, and the Dominican Republic--have installed packet-switched data facilities in the principal city or cities. Information is lacking, however, on the extent to which these facilities are available to other than designated government and business users. Peru has a sizeable public switched data network, and Bolivia reportedly has data service in three principal cities.

The option of developing multi-service computerized facilities, known as Integrated Services Digital Networks (ISDN), figures in the planning and implementation of telecommunications in many of the countries of the region. In addition to the countries named above, Colombia and Venezuela have new installations in process that eventually will interface with ISDN, transmitting voice, data, facsimile, and other services to a user terminal via volume-sensitive public networks.

With regard to transmission of full text, a vital adjunct to data base services, it should be noted that Argentina is participating in the U.S. Postal Service's Electronic Mail Service (EMS) project. Brazil also uses the U.S. model for EMS and will assign high priority to developing a similar service for domestic mail.

The use of satellites for both international and domestic service has contributed to the dynamism that characterizes the Latin American telecommunications sector. Volume of traffic between Latin America and the U.S. increases each year, and satellite communication among the Latin American countries is also growing at an annual rate of 20 percent.

With regard to the Caribbean, which acounts for 20 percent of U.S. international telecommunications at this time, the level of service is uneven. A Caribbean network per se has yet to be developed.

Central America, on the other hand, despite hostilities in the area, has managed to make some progress in creating a Central American system linking all of the countries via submarine cable. The International Telecommunication Union has carried out a successful regional project to train telecommunications personnel from all five countries (Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica). A recent development is that Honduras has contracted for an earth station for links with the U.S. and Europe for voice, data, and television.

The profiles on Argentina, Brazil, Chile, Mexico, Peru, and Venezuela (see Appendix J) provide detail on the state-of-the-art of telecommunications in six important countries of the region. The current state of telecommunications technology in the region is summarized in Figure 8.

B. Inter-American Agencies Instrumental in Latin American Telecommunications Development

1. Inter-American Telecommunications Conference (CITEL)

CITEL is a specialized conference of the OAS funded by the Organization's Economic and Social Council. The heads of all telecommunications administrations in the Western Hemisphere are members of CITEL. As such it is the regional arm of the International Telecommunication Union (ITU), which now has a mandate to work in a regional mode. ITU has provided training to Latin American technicians, often using expertise available in countries in the hemisphere such as Brazil. ITU and CITEL have requested that the United Nations Development Program (UNDP) fund a regional training project in computerized management and other digital processes for Latin America en bloc. Because of CITEL's increasing responsibilities in the strategic telecommunications sector, the current CITEL chairman (from Mexico) and other telecommunications leaders have proposed that CITEL be elevated in

TELECOMMUNICATIONS TECHNOLOGY IN LATIN AMERICA

KEY: I = INSTALLED R & D = RESEARCH/DEVELOPMENT P = PROSPECTIVE

	MICROWAVE	TELEX	FIBER OPTICS	DOMSAT	CIRCUIT-SWITCH DATA NETWORK	PACKET SWITCH	TELETEX VIDEOTEX	EMS	CATV
ARGENTINA	I	I	I	I, R&D	(NC)	I	P	I	I
BOLIVIA	I	I		I ?	I ?				
BRAZIL	I	I		R&D I, P	I	I	R&D		
CHILE	I	I		I		I			
COLOMBIA	I	I	P	I					
ECUADOR	I	I		P					
MEXICO	I	I		I,P	I	I			I
PANAMA	I	I			I				
PERU	I	I		I,P	I ?	I ?			
VENEZUELA	I	I	I,P	I,P	I ?	I ?	I		
PARAGUAY	I	I							
URUGUAY	I	I							
CENTRAL AMERICA	I	I							
DOMINICAN REPUBLIC & ENGLISH CARIBBEAN	I	I			I				

the OAS structure to the status of an autonomous institute, such as IICA. Education and information services have figured in CITEL's agenda since the days of the Alliance for Progress.

2. Inter-American Development Bank (IDB)

The Inter-American Development Bank, which has fostered investment in Latin American telecommunications as a valuable instrument to promote regional integration, sees the 1980s as a period of great activity in Latin American telecommunications. In the IDB's opinion, many of the countries in the region have arrived at a stage of development where the availability of economical and reliable communications facilities are essential to sustain growth. The high price of energy will also necessitate substituting telecommunication for transportation. Rural telecommunications will continue to advance to keep pace with the national programs of rural development.

New technologies will play an important role in Latin America. These include conversion to digital switching and transmission, installation of data transmission networks, extensive application of microprocessors and use of optical fiber cables. The telecommunications administrations will be faced with the need to expand systems and services for the ever-increasing concentrations of population in urban areas at the same time they are planning and installing systems based on new technologies. The IDB plans to increase its support for sectoral studies and planning and for training of telecommunications personnel to help the administations meet these new responsibilities.

VII. SUMMARY OF PROBLEMS ASSOCIATED WITH ON-LINE DATA BASE ACCESS BY COUNTRIES IN THE LATIN AMERICAN/CARIBBEAN REGION

As indicated earlier in this report, the problems that developing country information agencies encounter in providing scientific and technological information to their client base in-country are more or less universal and are voiced repeatedly by the agencies concerned. These problems include:

A. Costs

- The equipment, information access, communications costs, and maintenance of data base access through telecommunications systems constitute serious investments of the limited resources of developing countries. Measuring the result of this investment is a critical, necessary, and difficult activity.

- Resolving questions relating to balance of payments problems due to data systems costs, data information system sustainability, and the costs of alternative approaches to satisfying the information needs of developing country users should be a constant objective of any assistance activity.

- It is not clear whether the costs for data base access through telecommunications will be paid through external subsidies or as the result of profitable research.

B. Institutional Problems

- Multiple agencies functioning with multiple purposes in a technologically complex area such as communications and data base access tend to be uncoordinated and thus, unlikely to develop the synchronous institutional understanding and behavior necessary for efficient, cost effective, information system development.

- Local and regional data base and communications availability, need, and quality are insufficiently understood or recognized as useful in comparison with externally generated data.

- Coordinating mechanisms between information service providers in the region are virtually non-existent, barring their ability to share costs, resources, and experiences in providing adequate and relevant scientific and technological information to their clientele.

- Regional policies are needed to address technical, financial, scientific, and educational questions in this complex and changing area.

C. Technical Problems

- The proliferation of technologies and the rapid change in equipment and its uses are injecting costly confusion into an already complex area.

- There is an insufficient systematic basis for matching the acquisition of technologies with needs, potential for addressing future growth, and ability to pay for and maintain services and equipment.

- Training is needed in information system design, operation, maintenance, and use, particularly in conducting efficient on-line data searches.

- There is a need to adapt data base access and telecommunications training and user guidance materials to the specific needs of developing country users. This often means creating levels of user-friendliness that operate across cultures and a broad range of technological familiarity.

- Cost-effective value-added telecommunications networks are needed, e.g., TELENET and TYMNET.

- Existing telecommunications links are often of insufficient quality for data transmission.

D. Data Base Problems

- Local data bases (e.g., on agricultural productivity, economics, health, population, and trade) are not well developed and are seldom appreciated in the same terms as are data and information from external sources. This holds even though the availability of local data is often the most critical factor in the success of development activities.

- Obtaining primary source documents, once a desired reference has been identified on-line, is a costly and often time-consuming process, taking from one week to several months.

- Actual document prices can be expensive in terms of developing country economics relative to foreign exchange and balance of payments.

- Many local operators, particularly those in business and non-research areas, are often unfamiliar with data base availability.

- The proliferation of data bases available on-line exacerbates the problem of knowing where to look to find the information needed at least cost.

- Language is a significant barrier in data base access, particularly because most material about on-line data searching is in English. This problem is compounded by the fact that the primary search technique for data base access involves "key word" data identifiers, which often have subtle differences in meaning.

VIII. RECOMMENDATIONS

The problems summarized above are obviously extensive and range across a number of areas involving a variety of actors and agencies. The recommendations that follow are derived not only from the research that was conducted in putting this study together, but also from conversations with information professionals working in the region and information and development professionals in a variety of international assistance programs. Some of these recommendations will be directed toward improving the capabilities of the Latin American/Caribbean region to access on-line data bases in the United States, others toward improving the availability of data bases that are locally produced and locally relevant.

A. Development Information Strategy Study

A two-level development information strategy study should be carried out. Data base access through telecommunications would be a focal element. Against this specific part of the information environment in the LAC region, the larger role of information related to development would be assessed. This study would focus on planning and development issues that would guide AID's long-range planning in fostering the development and sharing of scientific and technical data bases in the Western Hemisphere. The final product of the study would be a clearer working understanding of the role of data base telecommunications in the region, as well as a structured basis for considering the myriad of other issues related to the region's development information systems.

Specific tasks of the strategy study would be the following:

- Define issues and related policies that would support the improved use, effectiveness, and costs associated with data base access, telecommunications, and development information issues in general.
- Conduct a thorough inventory of activities in the Latin

American/Caribbean region related to the development of scientific and technological information networks.

- Create a data base on teleprocessing and telecommunications facilities for the development of computerized local and regional services to support all sectors of regional activities (e.g., agriculture, business development, culture, education, energy and environment, health services, and science). This data base would be designed to be self-maintaining after the strategy study project is completed.

- Lay the basis for establishing a permanent, self-supporting network of on-line data base users and information service providers in Latin America and the Caribbean, to meet regularly, with a regular means of information exchange.

- Establish a clearinghouse on on-line data base access that would collect and disseminate information on subjects such as training courses and instructors, manuals and guides for on-line searching, and studies and other experimental descriptions of on-line searching.

- Establish a regional ability to develop national organizations such as Mexico's SECOBI to coordinate on-line data access.

- Establish the basis for the provision of training courses in on-line data base search and other information and communication subjects.

B. **Regional Development Information Conferences**

Convene two meetings on development information in the region:

- An AID regional meeting co-sponsored with OAS/CITEL that would bring together the relevant actors in regional data base access and communications.

- A meeting on generic development information systems for AID bureau and mission personnel. This meeting would be designed as an interactive activity to assess and improve the information processes that support AID's development activities. This meeting could be co-supported by AID/S&T, PPC, and PRE.

C. **Data Base Promotion**

- Promote wider use of existing data bases by providing each information center in the NTIS network with an appropriately configured microcomputer and appropriate data base management software and, considering the difficulty of obtaining copies of primary documents, providing facsimile equipment in each information center so that the centers can share their resources more readily.

NOTES

1. United Nations Centre on Transnational Corporations, Transnational Corporations and Transborder Data Flows, p. 2.

2. Cuadra Associates, Directory of Online Databases, Volume 5, No. 1, Fall 1983, p. 5.

3. U.N. Centre on Transnational Corporations, Transborder Data Flows: Access to the International On-line Data-base Market (New York: United Nations, 1983).

4. Ibid., p. 4.

5. Ibid., p. 34.

6. Data in this table was relayed in a phone conversation with Nancy Grimes, DIALOG's Regional Director for Latin America, on February 14, 1984. Experiment was conducted in 1983.

7. John Page and Tibor Szentivanyi, Information Systems and Networks for Technology Transfer, p. 66.

8. U.N. Centre on Transnational Corporations, Transborder Data Flows, p. 138.

9. Organization of American States, CIECC/doc. 563/81 of 12 June 1981, "Improvement of Information Systems in the Region and Establishment of an Information Network in the CIECC Area." Also CEPCIECC/doc. 775 of 23 June 1982 on the same subject.

10. Marietta D. Shepard, Encuesta sobre Sistemas Nacionales de Informacion (Washington, D.C.: Organization of American States, unpublished paper).

11. Victor D. Martinez C., Desarrollo de los Servicios de Informacion Tecnica en America Latina y Perspectivas en la Decade de los Ochenta (Washington, D.C.: Organization of American States, November 1983).

12. Margaret I. Anderson, Estado y Perspectivas de las Telecomunicaciones en el Hemisferio Occidental (Washington, D.C.: Organization of American States, unpublished paper).

13. Marietta D. Shepard, "The Present State of Information Systems and Bibliographic Data Bases in Latin America and the Caribbean," presented at the Conference on the Transfer of Scholarly, Scientific, and Technical Information between North and South America, 1983.

14. Ibid., p. 1.

15. Nancy E. Grimes, "Online Search Training in Latin America," a paper presented at the National Online Conference, New York, April 1983.

16. Ibid., p. 5.

17. Ibid., pp. 6-7.

18. Caribbean Central American Action, Caribbean Basin Information Network, p. 25.

19. Marcus D. Ingle, "Evaluating the Appropriateness of Microcomputers for Management Applications in Developing Countries," pp. 36-39.

20. Telematics International, Technical Alternatives for the Provision of a CGIAR Data Transfer System, p. 9.

21. John Page, Informatics Techniques and Strategies for Information Transfer, p. 22.

22. James Martin, Future Developments in Telecommunications, pp. 154-155.

23. Ibid., p. 162.

24. U.N. Centre on Transnational Corporations, Transnational Corporations and Transborder Data Flows, p. 17.

25. U.N. Centre on Transnational Corporations, Transborder Data Flows, p. 43.

26. John Page and Tibor Szentivanyi, op. cit., pp. 58-59.

27. Norman Abramson, "Satellite Data Networks for National Development," p. 11.

28. Satellite Communications, July 1978, p. 34.

29. AID Rural Satellite Program, Uplink, #4, February 1984, p. 12.

30. Special Secretariat of Informatics of the National Security Council of the Presidency of the Republic of Brazil, Transborder Data Flows and Brazil, p. 34.

31. Center of Telecommunications for the Third World, CETTEM, Newsletter No. 5, August 1982, p. 4.

GLOSSARY OF TERMS

ASCII Coding: the American Standard Code for Information Interchange, a binary code that enables computers and word processors to communicate with each other.

Bandwidth: the range of frequencies available for a communications signal, with the difference between the highest and lowest frequencies of a band expressed in hertz (cycles per second).

Baud: the speed at which signals are transmitted, usually equivalent to the number of characters per second (cps) or bits per second (bps). Common baud rates for data communication are 300 baud (about 37.5 cps) and 1,200 baud (about 150 cps).

Burst transmission: characteristic of data communication, where computer users transmit and receive "bursts" of data, with periods of silence interspersed. This contrasts with telephone transmission, where the conversants talk or listen continuously.

Data: basic elements of information, such as numbers, letters, or symbols, which are processed or produced by computers or other mechanical means.

Data base: a select aggregate of a specific kind of information related to a specific area of interest, e.g., a catalog is a data base describing products for sale by one vendor.

Data base producer: a research organization, whether government, university, or commercial, that produces data bases, e.g., the U.S. National Library of Medicine produces MEDLARS, a data base on biomedical literature.

Data base vendor: a commercial entity that purchases and stores multiple data bases in a computerized storage system, making them available to consumers under a variety of fee structures. Examples are DIALOG, ORBIT, and BRS.

Domestic common carrier: a supplier that provides telecommunications services to the public, subject to regulation.

"Dumb" terminal: also called a teleprinter, a dumb terminal has no screen or storage capacity and therefore cannot perform functions such as data management or word processing. It does allow on-line computer access, provides electronic mail capability, and prints hard copy.

Earth station: an antenna on the ground electronically equipped either to receive signals from satellites, to transmit signals back, or both.

Facsimile: a method of transmitting images or printed matter by electronic means. The original image is scanned by the transmitter and converted to an electrical representation, which is transmitted over a communication facility. The signal is reconverted at the receiving end and duplicated on paper.

Geostationary orbit: an orbital path in the plane of the earth's equator. A satellite in geostationary orbit therefore remains fixed relative to the earth.

Interactive search: a process of searching a data base, using a computer to ask questions and receive answers, gradually refining the interrogation so as to receive the most relevant information from a data base or set of data bases.

ISDN: Integrated Services Digital Network, the telecommunications network of the future, which will provide for the delivery of voice, data, telex, facsimile, and other services over the same network.

Leased line (or private line): a facility for data transmission. Each line is reserved for the sole use of a single leasing customer. It is separate from the direct-dial network and provides a permanent and exclusive communication path for the subscriber.

Modem: a contraction of "modulator-demodulator." This device changes a computer's binary code, or digital pulse, into analog (audio) tones or sound waves so that data can be transmitted through telephone wires from one computer to another.

Multiplexing: the division of the transmission bandwidth for use by two or more signals.

On-line: connected to a telecommunications system.

Packet-switching: a data communications switching and transmission system whereby an input data stream is broken into uniform "packets." Each packet is transmitted independently through the network to maximize the utilization of transmission facilities, and at the receiving end the individual packets are resequenced and combined as necessary into the output data system.

Spot beam: a beam on a satellite antenna that can be directed to a particular subscriber area on the earth, much like a searchlight beam.

Switching: the facilities that permit users to be interconnected on demand. Most switching is done by telephone exchanges, although new types (e.g., burst switching) are being introduced for computer data and other forms of telecommunications.

Telex: a dial-up telegraph service that enables subscribers to communicate directly (temporarily) among themselves.

Transponder: the equipment in a satellite that receives a signal, amplifies it, changes its frequency, and retransmits it. Most satellites have more than one transponder.

Value-added service or value-added network: a service or network provided through an existing telecommunications channel, typically enhanced to use more efficient technologies that enable more information to be transmitted at less cost, or that provide new services such as message delivery and facsimile transmission.

BIBLIOGRAPHY

Abramson, Norman. "Satellite Data Networks for National Development." Presented at the International Conference on Critical Issues for National Computerization Policy, Honolulu, Hawaii, July 1983.

Aiyepeku, Wilson O. International Socioeconomic Information Systems: An Evaluative Study of DEVSIS-Type Programs. Ottawa: International Development Research Centre, 1983.

Atherton, Pauline. Handbook for Information Systems and Services. Paris: UNESCO, 197?

Bennett, J.M., and Kalman, R.E., editors. Computers in Developing Nations. Amsterdam: North Holland, 1981.

Board on Science and Technology for International Development. "Project Summary: Microcomputers for Developing Countries." Washington, D.C.: National Research Council, 1982.

Branscomb, Lewis M. "Computer Technology and the Evolution of World Communications." Telecommunication Journal, Vol. 47-IV, 1980.

Buttenklepper, Alfred. "A University's Multipurpose Information Center as a Response to Modern Technology in a Developing Country." In The Challenge of Information Technology, K.R. Brown, editor. North-Holland, 1983.

Caribbean Central American Action. Caribbean Basin Information Network: General Information Guide. Washington, D.C.: Caribbean Central American Action, 1983.

Caruso, Nicholas, and Caruso, Elaine. "Trainer: A Computer Tutorial for End-Users of Database Services." Presented at the ASIDIC Meeting, "Interfacing with the User," Charleston, South Carolina, March 1983.

COMSAT General Corporation. "Utilizing Existing Satellite Communications Systems for Gathering and Distributing Remotely Sensed Data: A Feasibility Study and Demonstration Experiment." Washington, D.C.: COMSAT, November 1976.

Consumer Reports. "Computers." Consumer Reports, September and October 1983.

Crane, N.R. "Public Data Network Services." Background Document for the Second Meeting of the UNISIST Working Group on Technology of Systems' Interconnection, Paris, December 1980.

Cuadra Associaties. Directory of Online Databases, Volume 5, Number 1, Fall 1983, Santa Monica, CA: Cuadra Associates.

DIALOG Information Retrieval Service. Database Catalog. Palo Alto, CA: DIALOG, July 1983.

Fanning-Firfer, Marina. An Evaluation of Scientific and Technical Information Distribution and Use in Latin America: The NTIS Program in Five Selected Countries. Arlington, Va.: InterAmerica Research Associates, 1982.

Franca, Paulo Bianchi, et al. "Computing in Brazil: Late Sixties." Prepared for the IEEE Computer Software Applications Conference, Chicago, 1982.

Garriott, Gary L., et al. Microcomputers for Information Resources Management: A Guide to the VITA System. Arlington, Virginia: Volunteers in Technical Assistance, 1983.

Griffiths, Jose-Marie. Application of Minicomputers and Microcomputers to Information Handling. Paris: UNESCO General Information Programme and UNISIST, November 1981.

Grimes, Nancy E. "Online Search Training in Latin America." Paper presented at the National Online Conference, New York, April 1983.

Herner, Saul, et al. A Brief Guide to Sources of Scientific and Technical Information. Arlington, Virginia: Information Resources Press, 1980.

Howell, T. "ESRIN--The ESA Establishment in Italy." ESA Bulletin, #27, August 1981.

Iagnemmo, Al. Microcomputer Characteristics. Washington, D.C.: Veterans Administration, July 1982.

InfoWorld Report Card. Menlo Park, CA: InfoWorld, September 1, 1983.

Ingle, Marcus D. "Evaluating the Appropriateness of Microcomputers for Management Applications in Developing Countries." Paper presented at the National Conference of the American Society for Public Administration, New York, April 1983.

Ingle, Marcus D.; Berge, Noel; and Teisan, Marcia. Acquiring and Using Microcomputers in Agricultural Development: A Manager's Guide. Washington, D.C.: U.S. Department of Agriculture, April 1983.

International Institute of Communications. The Use of Satellite Communication for Information Transfer. Paris: UNESCO General Information Programme and UNISIST, February 1982.

Jussawalla, Meheroo, and Chee-Wah Cheah. "The Economics of Transborder Data Flow." In Proceedings: PTC '83. Honolulu, Hawaii: Pacific Telecommunications Council, 1983.

Leeson, Kenneth W. "Computerization: National Strategies, International Effects." Presented to the Conference on Critical Issues for National Computerization Policy, Honolulu, Hawaii, July 1983.

Lerner, Rita G., and Mick, Colin L. Database Searching and Document Delivery via Communications Satellite. New York: American Institute of Physics, 1980.

Management Systems International. NTIS Baseline Data Collected During Mayaguez, Puerto Rico Conference, May 1983. Washington, D.C.: Management Systems International, August 11, 1983.

Martin, W.A. "Application of Videotex Techniques to a Major Information Retrieval System." ESA Bulletin, #29, February 1982.

Melrose, E., and Vernucci, A. "Data Broadcast to Microterminals via Satellite Using Spread-Spectrum Techniques." Space Communication and Broadcasting 1 (1983) 211-218.

Page, John. Informatics Techniques and Strategies for Information Transfer. Paper prepared for the Second Meeting of the UNISIST Working Group on Technology of Systems Interconnection. Paris: UNESCO, 1980.

Page, John, and Szentivanyi, Tibor. Information Systems and Networks for Technology Transfer. Paris: UNESCO, June 1978.

Perez-Vitoria, Augusto. "The First Ten Years of CICH-UNAM." In UJISLAA, Vol. IV, No. 3, 1982.

Sandoval, Armando. "Centro de Informacion Cientifica y Humanistica: A University Information Center in the Third World." In UNESCO Bull. Libr., Vol. XXXII, No. 1, January-February 1978.

Sandoval, Armando M., and Buttenklepper, Alfred. "A University Information Center as a Potential Unit of a Network." In Health Communications and Informatics 6:152-159 (1980).

Shepard, Marietta Daniels. "The Present State of Information Systems and Bibliographic Data Bases in Latin America and the Caribbean." Presented at the Conference on the Transfer of Scholarly, Scientific, and Technical Information between North and South America, Ann Arbor, Michigan, April 1983.

Slamecka, Vladimir. Information Transfer Between the U.S. and Developing Countries: An Assessment and Suggestions. Washington, D.C.: International Science and Technology Institute, April 1979.

Slamecka, Vladimir. Trade-offs in International Flows of Scientific and Technological Information. Washington, D.C.: Technical Advisory Board, U.S. Department of Commerce, September 1980.

Slamecka, Vladimir, and McCarn, Davis B. The Information Resources and Services of the United States: An Introduction for Developing Countries. Washington, D.C.: Coordinator, U.N. Conference on Science and Technology for Development, U.S. Department of State, 1979.

Special Secretariat of Informatics of the National Security Council of the Presidency of the Republic of Brazil. Transborder Data Flows and Brazil: Brazilian Case Study. New York: United Nations, 1983.

Sullivan, Karen Collamore, and Pigozzi, Mary Joy. Methods of Information Management in Selected Development Organizations: A Preliminary

Exploration. East Lansing, Michigan: Michigan State University, August 1981.

Telematics International. Preliminary Report on the Feasibility of a Data Transfer Network for the Consultative Group on International Agricultural Research. Menlo Park, CA.: Telematics International, July 1983.

Telematics International. Technical Alternatives for the Provision of a CGIAR Data Transfer System. Ottawa, Canada: International Development Research Centre, 1983.

Tenney, S. Dickson. Annual Report, Fiscal Year 1982: Transfer of Scientific and Technical Information to Latin America and the Caribbean. Washington, D.C.: Office of International Affairs, National Technical Information Service, 1983.

Trinidad and Tobago Telephone Company. Public Data Communications Service. Port-of-Spain, Trinidad: Trinidad and Tobago Telephony Company, 1983.

U.N. Centre on Transnational Corporations. Transborder Data Flows: Access to the International On-line Data-base Market. New York: United Nations, 1983.

U.N. Centre on Transnational Corporations. Transnational Corporations and Transborder Data Flows: A Technical Paper. New York: United Nations, 1982.

U.N. Economic and Social Council, Commission on Transnational Corporations. Transnational Corporations and Transborder Data Flows: Programme of Work and Progress Report. New York: United Nations, 18 June 1982.

U.N. Economic and Social Council, Commission on Transnational Corporations. Transnational Corporations and Transborder Data Flows: Progress Report, Report of the Secretariat. New York: United Nations, 28 April 1983.

U.N. Financing System for Science and Technology for Development. Technical Information Pilot System. 25 May 1983. New York: United Nations Development Programme, 1983.

UNESCO. Consultation on the Coordinated Development of National Information Systems in the Caribbean Region. Final Report and Recommendations. Paris: UNESCO, July 1980.

UNESCO. Consultation on the Coordinated Development of National Information Systems in the Caribbean Region. Working Paper. Paris: UNESCO, 1980.

UNESCO. "Information Systems and Access to Knowledge," from Second Medium-Term Plan (1984-1989). Paris: UNESCO, 1983.

UNESCO. List of Documents and Publications of the General Information Programme and UNISIST, 1977-1981. Paris: UNESCO, 1982.

UNESCO. "Synoptic Report of the Consultation Meeting on Transfer and Utilization of Information for Development in the 1980s: Main Problems and

Strategies for their Solution." Prepared for the Intergovernmental Council for the General Information Programme, Third Session, Paris, October 1981.

UNESCO Secretariat. "Towards Improved Information Transfer in Latin America and the Caribbean--The Role of UNESCO." Prepared for the Regional Seminar for Latin America and the Caribbean on Techniques for Information Transfer in Science and Technology, CONACYT, Mexico City, June 1979.

U.S. Agency for International Development. Amended Project Paper: National Technical Information Service, Latin America and Caribbean Regional Project. Washington, D.C.: U.S. Agency for International Development, July 1982.

U.S. Agency for International Development. USAID/NTIS/Technical Information Transfer Network: Objectives 1983-1987. Washington, D.C.: U.S. Agency for International Development, 1983.

U.S. Agency for International Development, Office of Development Information and Utilization. Proposal for a New Service to be Offered by AID to Improve LDC Access to U.S. Science and Technology. Third Draft. Washington, D.C.: U.S. Agency for International Development, July 1979.

U.S. Information Agency. "International Information and Communication Policy Research Needs--Working Paper." Washington, D.C.: Office of Research, USIA, October 3, 1983.

VITA and AMSAT. "Low Earth Orbit Satellites: Communications on the Cheap." Prepared for the Tenth Anniversary Colloquium of Development Forum, Paris, February 1983.

Wedlake, J.O. "Protocols to Access Public Data Networks." Paper prepared for the Second Meeting of the UNISIST Working Group on Technology of Systems' Interconnection. Paris: UNESCO, 1980.

A STUDY OF ACCESS TO ON-LINE DATA BASES FROM LATIN AMERICA AND THE CARIBBEAN

Appendixes

March 1984

Sandra Lauffer

Margaret Anderson

This study was prepared by the Telecommunications Program,

Academy for Educational Deveopment,

for the U.S. Agency for International Development (LAC/DR/EST),

under Order Number LAC-0000-0-00-3056-00

91

D E L E G A T E S

UNITED STATES

COLEMAN, Carolyn I.
Program Analyst
Agency for Internatinal Development
2201 C Street, N.W.
NE/TECH/HRST
Room 6746 NS
Washington, DC 20523
(202) 632-3228

GARRIOTT, Gary
Technical Advisor and Coordinator
Microcomputer Applications
Volunteers in Technical Assistance
1815 N. Lynn St., Suite 200
Arlington, VA 22209
(703) 276-1800
Telex/Cable: 440192 VITAUI (Telex) - VITAINC (Cable)

LAUFFER, Sandra
Telecommunications Program Officer
Academy for Educational Development
1414 22nd St., N.W.
Washington, DC 20037
(202) 797-7073

VENEZUELA

FILOSA, Erasmo
Director de Información de Científicas y Tecnológicas
Consejo Nacional de Investigaciones Científicas y Tecnológicas
(CONICIT)
Av. Principal Cortijos de Lourdes
P.O. 70617 - Los Ruices - 4to Piso
Maploca, Caracas, Zp 1071
239-0801
Telex: CONICIT 25500 and 25205

ZORRILLA, Edgar F.
Planificador Jefe III
Consejo Nacinal de Investigaciones Científicas y Tecnológicas
(CONICIT)
Av. Principal Los Cortijos de Lourdes
P.O. 70617 - Los Ruíces - 4to Piso
Maploca, Caracas, 2p 1071
239-0801
Telex: CONICIT 25.500

D E L E G A T E S

PERU

AYESTA C., Victor
Manager, Technical Information Center
ITINTEC
Avenida Morelli, Esq. Av. Las Artes, San Borja
Aptdo. 145
Lima
401040, Ext. 133
Telex/Cable: 20496PE

BARTONE, Carl
Research Coordinator (Representing PAHO)
Pan American Center for Sanitary Engineering & Environmental Sciences (CEPIS/PAHO)
Casilla 4337
Lima 100
35-4135
Telex/Cable: 21052 PE

RUBIO, Manuel
Director de Programas y Cooperación Internacional
Consejo Nacional de Ciencia, Tecnología CONCYTEC
Camilo Carrillo 214
Jesús María
P.O. 1984
Lima 100
23-52-78
Telex/Cable: 25023 PE

TRINIDAD

ARCHER, Jacqueline
Information Specialist
Caribbean Industrial Research Institute (CARIRI)
Tunapuna Post Office
Tunapuna (TT)
662-7161 - 64
Telex/Cable: 3438 CARIRI WG/--CARIRI, TRINIDAD

GUMBS, Barbara
Head, Technical Information Service
CARIRI
Tunapuna Post Office
Tunapuna (TT)
66-27161-64
Telex/Cable: 3438 CARIRI WG/--CARIRI, TRINIDAD

D E L E G A T E S

MEXICO

CEPEDA, Jorge
Director de Servicios
INFOTEC
Sn. Lorenzo 153-11
Col. del Valle
P.O. 19-194
México 12, D.F.
559-52-11
Telex/Cable: 1777569 - INFOME

NICARAGUA

CUAREZMA Roman, Noel
Director
Centro Nicaragüense de Información Tecnológica
Gasolinera Shell (Colonia Centro America)
50 metros al Norte
P.O. 316
Managua
71043/4 - 74662
Telex: 2064

PANAMA

ARBOLEDA, Hernán
Jefe, Programación General
Ministerio de Planificación y Política Económica
Edificio Ogawa
Avenida España
69-41-33, Ext. 193

CASTILLO, Mercedes
Ingeniera Industrial del Servicio de Información y
Extensión Tecnológica
Ministerio de Planificacion y Politica Economica
Edificio Ogawa
Avenida España
69-41-33, Ext. 164

BERN, Samuel
Asesor de Proyectos
Grupo de Tecnología Apropiada
Apartado 8046, Zona 7
Panama'
61-7353

D E L E G A T E S

HONDURAS

FREIJE Majia, Jose' Ricardo
Jefe, Dpto. Investigaciones Industriales
Banco Central de Honduras
A.P. 58-C
Tegucigalpa
22-3422

OLSON, Thomas
Coordinator of Documentation
Centro de Informacion Industrial
Universidad Nacional Autónoma de Honduras
Carretera a Suyapa
Tegucigalpa, D.C.
32-5557

RAMIREZ, Jose' L.
Director
Centro de Información Industrial
Universidad Nacional Autónoma de Honduras
Carretera a Suyapa
Tegucigalpa
32-5557

JAMAICA

CARROLL, Hugh
Librarian
Scientific Research Council
P.O. Box 350
Kingston 6
92-74471-4
Telex/Cable: "SCIENTIST"

SMITH, Merline E.
Head, Technical Information Division
Scientific Research Council
P.O. Box 350
Kingston 6
92-74471-4
Telex/Cable: "SCIENTIST"

DELEGATES

GUATEMALA

MARBÁN, Rocío
Head, Documentation & Information Division
ICAITI
Avenida La Reforma 4-47, Zona 10
P.O. 1552
Guatemala City
310631/35
Telex/Cable: 5312 ICAITI GU

MARTÍNEZ, Luis
Jefe, Depto. de Ciencia y Tecnología
Secretaria General del Consejo Nacional de Planificación Económica
Edificio Ministerio de Finanzas—Centro Civico
12° Nivel
Guatemala City
51160/9 - 24774 - 531388

MIRANDA Barrios, Herbert
Director, Centro de Información a la Construccion—CICON
Centro de Investigaciones de Ingeniería
Universidad de San Carlos de Guatemala
Ciudad Universitaria, Zona 12
Guatemala City
760790, Ext. 373

PELLECER, Julio
Consultant
2° Calle 46-60, Zona 7
P.O. 304
Guatemala City
910662

PÉREZ, Jose' Antonio
Director de Planificación Global
Secretaria General del Consejo
Nac. de Planificación Economica
Edificio Ministerio de Finanzas Públicas
Nivel No. 12
Guatemala City
24774

GUYANA

STEPHENSON, Yvonne
University Librarian (Director)
University of Guyana
Turkeyen
P.O. 841
Georgetown
54841, Ext. 226
Cable: UNIGUY

D E L E G A T E S

ECUADOR

VELÁSQUEZ, Jaime
Director
Instituto Investigaciones Tecnológicas
Izabela Católica y Beintimilla
Politécnica Nacional
P.O. 2759
541794 - 241127
Telex/Cable: 2650 Espona

EL SALVADOR

ALVARADO Meléndez, Germán Roberto
Jefe Servicio de Información Tecnológica de CENAP
CENAP
13a C. OTE. No. 124
San Salvador
22-77-40

AZCUNAGA Sánchez, Milagro del Rosario
Presidente CENAP y Coordinadora Proyecto de OEA
Centro Nacional de Productividad (CENAP)
13a C. OTE. No. 124
San Salvador
22-77-09

GUATEMALA

AQUINO, Jorge
Asistente de Información--Servicio de Información Industrial
Instituto Centro Americano de Investigación y Tecnología Industrial
(Coordinador del Proyecto: Licda. Rocío Marbán)
Avenida Reforma 4-47, Zona 10
P.O. 1552
Guatemala City
310631/5-317476

CHANG LAU, Gustavo
Jefe del Servicio de Información Técnica
Instituto Técnico de Capacitación y Productividad
Calle Mateo Flores 7-51, Zona 5
P.O. 2568
Guatemala City
313530/310177

D E L E G A T E S

DOMINICAN REPUBLIC

LLAUGEL, Felípe Antonio
Encargado de Procesamiento de Datos
Instituto Dominicano de Tecnología Industrial
Avenida Nuñez de Caceres
P.O. Box 239
Santo Domingo
(809) 566-8121

LÓPEZ, Miriam
Coordinadora Proyecto "Diseño del Sistema Nacional de Información Científica y Tecnológica"
Oficina Nacional de Planificación (ONAPLAN)
Edificio de Oficinas Gubernamentales
Piso #13
Avenida Francia esquina Leopoldo Navarro
Santo Domingo
(809) 682-1553

MORALES de Liz, Mercedes
Encargada Banco de Datos
Oficina Nacional de Estadística
Edificio de Oficinas Gubernamentales
Piso #8
Avenida Francia esquina Leopoldo Navarro
Santo Domingo
(809) 688-3187/685-1566

PAPEJA, Efraín
Consultant OAS
OAS-Dominican Republic
Edificio de Oficinas Gubernamentales (Dpto. Ciencia y Tecnología)
Piso #13
P.O. 1424
Santo Domingo
(809) 632-1553

ECUADOR

BOHORQUEZ de la Torre, Ildefonso
Director del Servicio de Información Técnica SIAT
Cendes
García Aviles 217 i 9 de Octubre
P.O. 5833
Ecuador
307628
Telex/Cable: 3608

D E L E G A T E S

COSTA RICA

CERDAS, Max
Director del Departamento de Información y Documentación
Consejo Nacional de Investigaciones Científicas y Tecnológicas
10.318. San Jose' CR.
Zapote
53-15-10
Telex/Cable: 3338 Coni

MIRABELLI, Gerardo
Director, Centro Información Tecnológica
Instituto Tecnológico de Costa Rica
P.O. Box 159
Cartago
51-53-33, Ext. 2262
Telex/Cable: 8013 ITCR CR

RUÍZ, Manuel E.
Analista Programador
IICA
CIDIA-IICA
P.O. Box 55
Coronado 2200
San Jose'
29-02-22
Telex/Cable: 2144 IICA/IICA San Jose'

ZAGLUL Slon, Jose' A.
Vicerrector de Investigación y Extensión
Instituto Tecnológico de Costa Rica
P.O. 159
Cartago
51-53-33, Ext. 2215
Telex/Cable: 8013 ITCR CR

DOMINICAN REPUBLIC

ENCARNACION, Samuel
Director, Nacional de Estadística
Secretariado Técnico de la Presidencia
Edificio Oficinas Gubernamentales
Piso 9
Avenida Francia Esquina Leopoldo Navarro
Santo Domingo
(809) 689-1266

D E L E G A T E S

ARGENTINA

RIMSKI-KORSAKOV, Andrés
Technical Information Officer
Instituto Petroquímico Argentino
Callao 220 - 7° Piso
Buenos Aires

BARBADOS

WILLABUS, Clifford G.
Systems Programmer
Caribbean Development Bank
P.O. Box 408
Wildey, St. Michael
(809) 426-1152
Telex/Cable: Caribank

BOLIVIA

GARVIZU T., Carlos
Jefe de Departmento "Servicio de Información Técnica Industrial"
Dirección General de Normas y Tecnología
Avenida Camacho 1488
Casilla 4430
La Paz
372047 - 377309

PAREDES CADIMA, Carlos F.
Asesor en la Dirección de Ciencia y Tecnología
Ministerio de Planeamiento y Coordinacion--Bolivia
Avenida Arce No. 2147
P.O. Box 3116
La Paz
374914 - 373427

BRAZIL

ARAUJO, Jose' Fabio M.
Professor
Federal University of Rio de Janeiro
Nucleo de Computacas Eletronica
Universidade Federal do Rio de Janeiro
Caixa Postal 2324
Rio de Janeiro
290-3212, Ext. 286

F A C U L T Y

BATTY, David
President
CDB Enterprises, Inc.
11608 Gilsan St.
Silver Spring, MD 20902, U.S.A.
(301) 593-8901

BATTY, Gayle
Vice President
CDB Enterprises, Inc.
11608 Gilsan St.
Silver Spring, MD 20902, U.S.A
(301) 593-8901

WASSERMAN, Paul
Professor
University of Maryland
Hornbake Building #4101
College Park, MD 20742, U.S.A

APPENDIX A

ORGANIZING COMMITTEE

HARASIC, Oscar
Principal Specialist
Organization of American States
1889 F Street, N.W.
Washington, DC 20006, U.S.A.
(202) 789-3371

HOUNSELL, John
Foreign Affairs Analyst
NTIS
5285 Port Royal Road
Springfield, VA 22161, U.S.A.
(703) 487-4819
Telex: 64617 NTIS-SFD

POST, Frank
Foreign Affairs Officer
NTIS
5285 Port Royal Road
Springfield, VA 22161, U.S.A.
(703) 487-4819
Telex: 64617 NTIS-SFD

TEJADA, Miguel
Senior Specialist
Organization of American States
1889 F Street N.W.
Washington, DC 20006, U.S.A.
(202) 789-3371

TENNEY, S. Dickson
Foreign Affairs Officer
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161, U.S.A.
(703) 987-4819

APPENDIX B

QUESTIONNAIRE

Name

Organization

Street Address

Country

On-line Data Bases

1. Do you ever seek information from on-line data bases other than NTIS?

   If so, please specify whether these data bases are regional, national, or international.

2. How do you contact on-line data bases?

   ____international long-distance telephone
   ____telex
   ____international telecommunications network such as TELENET or TYMNET (if so, please name the network you use_____)
   ____mail, directly to the data base supplier
   ____through an information broker.

3. Which data bases do you use most frequently? What percent of your searches are NTIS searches?

4. Which data bases do you feel are most relevant and useful to you and your clients?

5. Other than bibliographic information, what are the two kinds of information most frequently requested by your clients?

6. What are the main reasons you do not use on-line data bases more frequently?

7. How do users outside of your capital city get data base access?

8. Who are your clients?

9. Who refers your clients to you?

10. What other domestic and foreign information resources do they use?

11. Are you familiar with those resources?

12. Do you refer clients to those resources?

13. Do you know of other agencies or associations in your country which regularly access on-line data bases with whom you might collaborate for data access? If so, who are they?

14. How often do you meet with them to discuss common areas of concern?

15. How do you get information about recent advances in automated information services in your country?

16. What organizations have you identified as prime potential users of an on-line data base access service?

17. Is training available in your country on how to conduct on-line data base searches? If so, who provides such training?

18. What percent of documents ordered as a result of on-line searches you conduct are microfiche and what percent are paper copy?

19. From whom do you obtain these documents?

20. How long does it take you to obtain copies of these documents?

Telecommunications

21. What is the telecommunications cost of a data base search from your country to the U.S.?

From your country to another country in Latin America?

22. Does your government provide any special discounts or special tariffs for data transmission? If so, please describe.

23. Is the quality of the telecommunications link adequate for good quality data transmission?

24. Describe transmission difficulties you have experienced with reference to data base use or other microcomputer use.

25. Are there regulatory restrictions on data flow into and out of your country? If so, what are they?

26. Are there local government restrictions on connecting customer-owned equipment to the telephone lines?

27. Does your phone company provide "dial-up" data transmission service?

28. How do you get information about progress and plans for improved telecommunication services for your country?

Microcomputers

29. Does your organization have a microcomputer that is used or could be used to access data bases?

30. If so, who is its manufacturer and what model is it?

31. What are your primary needs for a microcomputer?

32. Which people in your organization are designated or would be designated to work with a microcomputer? (Indicate their positions or titles.)

33. Are those people fluent in English?

34. Who are the major suppliers of microcomputers in your country?

35. Do they have adequate maintenance and repair facilities, as well as spare parts?

36. Is training on how to operate microcomputers available in your country? If so, who provides such training?

37. If you were to acquire a microcomputer, in what office would it be located?

38. Is that area relatively dry_____?
free of dust_____?
air conditioned_____?

39. Do you have a reliable power supply in the facility where you would keep a microcomputer?

40. Is the power supply protected against sudden surges?

APPENDIX C

QUESTIONNAIRE RESPONSES BY OAS/NTIS SEMINAR PARTICIPANTS

1. Do you ever seek information from on-line data bases other than NTIS? If so, please specify whether these data bases are regional, national, or international.

BARBADOS Caribbean Development Bank	Yes, regional, international
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Yes
CHILE INTEC/Chile	Yes
CHILE CONICYT	Yes
COLOMBIA Colciencias	Yes, international
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Yes, international
COSTA RICA Instituto Tecnolo. de Costa Rica	Yes, international, national
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Yes, national
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Yes, international
ECUADOR Cendes	Yes, international
ECUADOR Instituto Invest. Tecnologicas	Yes, international

EL SALVADOR Centro Nacional de Productividad (CENAP)	Yes
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Yes, international
GUATEMALA ICAITI	yes, all
GUYANA University of Guyana Library	Yes, international, regional
HONDURAS Banco Central de Honduras	Yes, international
HONDURAS Centro de Informacion Industrial	No, except by mail
JAMAICA Scientific Research Council	Yes, international
MEXICO INFOTEC	Yes, national, international
NICARAGUA Centro Nica. de Informacion Tecnologica	Yes, international
PANAMA Grupo de Tecnologia	Yes, international
PERU CONCYTEC	Yes, regional, international
TRINIDAD CARIRI	Yes, international
VENEZUELA CONICIT	Yes, international

2. How do you contact on-line data bases?

BARBADOS Caribbean Development Bank	TELENET, TYMNET
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Mail
CHILE INTEC/Chile	TELENET, TYMNET
CHILE CONICYT	Through ECOM, an intermediary which has TELENET access. Hopes to have direct access soon.
COLOMBIA Colciencias	Telex, mail, information brokers
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Telephone, telex, Value-added network (both TELENET and TYMNET), mail
COSTA RICA Instituto Tecnolo. de Costa Rica	International telephone calls. Starting next year will have TYMNET
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Mail, information broker
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Telex, mail
ECUADOR Cendes	International telephone

ECUADOR Instituto Invest. Tecnologicas	Telephone
EL SALVADOR Centro Nacional de Productividad (CENAP)	Mail
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Mail, information broker
GUATEMALA ICAITI	Telephone, telex, TELENET, TYMNET
GUYANA University of Guyana Library	Mail, information broker
HONDURAS Banco Central de Honduras	Information broker
HONDURAS Centro de Informacion Industrial	No computer
JAMAICA Scientific Research Council	Mail
MEXICO INFOTEC	TELENET
NICARAGUA Centro Nica. de Informacion Tecnologica	Information broker
PANAMA Grupo de Tecnologia, Apropiada	Mail
PERU CONCYTEC	Long distance phone, telex, mail TELENET (thru CITIBANK)

TRINIDAD	
CARIRI	Telephone, telex (unsatisfactory) TELENET (soon), mail, information broker
VENEZUELA	
CONICIT	TELENET

3. Which data bases do you use most frequently?
What percent of your searches are NTIS searches?

BARBADOS Caribbean Development Bank	Not many have been done
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Chemical Abstracts, NTIS, Food Science and Tech. Abstracts, Engineering Index, Bibliography, Agricultural, Applied Science and Tech. Index, British Tech. Index, SITI Data Base
CHILE INTEC/Chile	Chemical Abstracts, NTIS, Engineering Index (10% are NTIS)
CHILE CONICYT	Sci Search, ERIC, Compendex (Engineering Index)
COLOMBIA Colciencias	50%
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Dialog, Orbit, NTIS (80%)
COSTA RICA Instituto Tecnolo. de Costa Rica	Agricola, Compendex, Medline, NTIS, (minimum NTIS)
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	

DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	95% NTIS
ECUADOR Cendes	Dialog, especially science and technology statistics, NTIS on microfiche
ECUADOR Instituto Invest. Tecnologicas	Data bases in the Lockheed system, SDC, FUINCA (Fundacion de la Red de Informacion Cientifica Automatizada (Spain)
EL SALVADOR Centro Nacional de Productividad (CENAP)	SIATES (principally CAITI) INFOTEC, NTIS 20%
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	NTIS, Develop NTIS 20%
GUATEMALA ICAITI	Chemical Abstracts, Predicasts NTIS 2-5%
GUYANA University of Guyana Library	British Lending Lib., Indiana University of Pennsylvania
HONDURAS Banco Central de Honduras	NTIS
HONDURAS Centro de Informacion Industrial	NTIS (80%)
JAMAICA Scientific Research Council	NTIS Control Data

MEXICO INFOTEC	NTIS
NICARAGUA Centro Nica. de Informacion Tecnologica	
PANAMA Grupo de Tecnologia Apropiada	VITA
PERU CONCYTEC	20% NTIS
TRINIDAD CARIRI	Biosis, Compendex, Food Science and Technology Abstracts
VENEZUELA CONICIT	Dialog NTIS 5%

4. Which data bases do you feel are most relevant and useful to you and your clients?

BARBADOS Caribbean Development Bank	Too early to say
BOLIVIA Direccion General de Normas y Tecnologia, SITI	See #3
CHILE INTEC/Chile	Chemical Abstracts, NTIS, Engineering Index
CHILE CONICYT	CA Search, Energynet, Environmental Bibliog., Medline, ERIC, NTIS, Sci Search, Superindex, Ulrich's International Periodical Index
COLOMBIA Colciencias	NTIS
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Dialog, Orbit, NTIS, Agrinter
COSTA RICA Instituto Tecnolo. de Costa Rica	Agricola, Bi/Data Time Series, NTIS, Casearch, Compendex, Food Science and Tech. Abstracts, Medline, Management Contents
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Numerical data bases
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	NTIS, FSTA, Chemical Abstracts, Compendex (Engineering Index)

ECUADOR Cendes	Science and technology data bases, environmental affairs, aquaculture, prices and markets for products, transfer of tech., commerce
ECUADOR Instituto Invest. Tecnologicas	Applied science and technology, e.g., NTIS, FSTA, Energyline
EL SALVADOR Centro Nacional de Productividad (CENAP)	NTIS, AMTID, SIATES, INFOTEC
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Food manufacturing industry, chemical products, textiles, leather, wood, metal
GUATEMALA ICAITI	#3, and subject-specific data bases
GUYANA University of Guyana Library	
HONDURAS Banco Central de Honduras	Data bases on food, industrial chemistry, agro-industry, markets
HONDURAS Centro de Informacion Industrial	NTIS
JAMAICA Scientific Research Council	NTIS, Science Citation Index, Chemical Abstracts
MEXICO INFOTEC	

NICARAGUA Centro Nica. de Informacion Tecnologica	
PANAMA Grupo de Tecnologia Apropiada	
PERU CONCYTEC	Depends on user needs
TRINIDAD CARIRI	Biosis, Chemical Abstracts, NTIS, Compendex, FSTA
VENEZUELA CONICIT	Scientific and economic

5. Other than bibliographic information, what are the two kinds of information most frequently requested by your clients?

BARBADOS Caribbean Development Bank	Assistance in problem solving
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Technical reports, international norms, equipment and machinery manufacturers, technical assistance
CHILE INTEC/Chile	Economic data, directory of manufacturers
CHILE CONICYT	Statistical data, economic data, sources of finance, science and technology
COLOMBIA Colciencias	Documents, articles from specialized magazines, reports
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Statistics, facts
COSTA RICA Instituto Tecnolo. de Costa Rica	Catalogs of machinery and equipment, numerical info (statistics, projections)
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Statistics, maps
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Processing and technology

ECUADOR Cendes	Producer prices, distributors of machinery and equipment
ECUADOR Instituto Invest. Tecnologicas	Prices of equipment and products
EL SALVADOR Centro Nacional de Productividad (CENAP)	Norms, patents, inventories
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Processors and providers of primary material and equipment
GUATEMALA ICAITI	Prices, suppliers
GUYANA University of Guyana Library	Technical reports, statistics, conference proceedings
HONDURAS Banco Central de Honduras	Market statistics, selective information dissemination
HONDURAS Centro de Informacion Industrial	Microfiche
JAMAICA Scientific Research Council	Science and technology products, processes, equipment
MEXICO INFOTEC	Patents, standards, technicial information

NICARAGUA	
Centro Nica. de Informacion Tecnologica	Market information, technological (prices of machinery and equipment)
PANAMA	
Grupo de Tecnologia Apropiada	"How-to" documents, feasibility studies
PERU	
CONCYTEC	Development technologies, agriculture, aquaculture, fish culture, foodstuffs, chemistry
TRINIDAD	
CARIRI	Business information markets, equipment manufacturers
VENEZUELA	
CONICIT	Economics., statistics

6. What are the main reasons you do not use on-line data bases more frequently?

BARBADOS Caribbean Development Bank	
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Manual searches are costly, time-consuming, not always productive enough to warrant investment
CHILE INTEC/Chile	None
CHILE CONICYT	Cost
COLOMBIA Colciencias	No on-line service
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Financial
COSTA RICA Instituto Tecnolo. de Costa Rica	Cost
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Lack of automized communication
ECUADOR Cendes	Economics

ECUADOR Instituto Invest. Tecnologicas	Costs, particularly telephone charges
EL SALVADOR Centro Nacional de Productividad (CENAP)	Lack of publicity on available services, little research demand in country
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Physical facilities for equipment, their cost, language
GUATEMALA ICAITI	Telecom costs
GUYANA University of Guyana Library	Foreign exchange
HONDURAS Banco Central de Honduras	We don't have on-line access, so must access manually
HONDURAS Centro de Informacion Industrial	With mail, time involved; needs are more immediate
JAMAICA Scientific Research Council	
MEXICO INFOTEC	Costs, training
NICARAGUA Centro Nica. de Informacion Tecnologica	

PANAMA	
Grupo de Tecnologia Apropiada	Small market, lack of interested businessmen and professionals who want to invest in information
PERU	
CONCYTEC	Cost in dollars, devaluation of Peruvian currency
TRINIDAD	
CARIRI	Poor telephone system, cost, no in-house computer
VENEZUELA	
CONICIT	None

7. How do users outside of your capital city get data base access?	
BARBADOS Caribbean Development Bank	No access
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Only through SITI
CHILE INTEC/Chile	Use INTEC as intermediaries
CHILE CONICYT	Through public network, mail, or specialized centers
COLOMBIA Colciencias	Telex, mail, telephone
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	No access outside of urban areas
COSTA RICA Instituto Tecnolo. de Costa Rica	Normally through the Silent 700 and national telephone network
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Telephone or mail, personal visits
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Letters, special forms we have created for this process
ECUADOR Cendes	Letters or phone
ECUADOR Instituto Invest. Tecnologicas	Telephone, mail

EL SALVADOR Centro Nacional de Productividad (CENAP)	Mail
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Only those in capital city
GUATEMALA ICAITI	Knows of none
GUYANA University of Guyana Library	Come to city
HONDURAS Banco Central de Honduras	Through intermediary information institutions
HONDURAS Centro de Informacion Industrial	Have to go through CII
JAMAICA Scientific Research Council	Through SRC
MEXICO INFOTEC	Through their own terminals and telephone lines in Mexico City
NICARAGUA Centro Nica. de Informacion Tecnologica	Through CENIT
PANAMA Grupo de Tecnologia Apropiada	No access
PERU CONCYTEC	Telephone and mail

TRINIDAD	
CARIRI	Leased data or via dial-up facilities
VENEZUELA	
CONICIT	Telephone and mail

8. Who are your clients?	
BARBADOS Caribbean Development Bank	LDCs in English-speaking Caribbean
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Industrial and scientific communities, research institutions, students
CHILE INTEC/Chile	Industrial businesses, government research institutions
CHILE CONICYT	Universities, R&D institutes, higher education government, businesses, individuals
COLOMBIA Colciencias	Scientific community, researchers
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Researchers, private companies, government employees
COSTA RICA Instituto Tecnolo. de Costa Rica	Businesses and researchers
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Researchers, investors, commercial users, officials (government)
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Industrialists, students, researchers

ECUADOR Cendes	Businessmen, engineers, researchers, government offices
ECUADOR Instituto Invest. Tecnologicas	Researchers, professors, universities, students, industry
EL SALVADOR Centro Nacional de Productividad (CENAP)	Researchers, professionals, technicians, students
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Medium and small industrial enterprises, agroindustry, investors, professionals
GUATEMALA ICAITI	Research staff, entrepreneurs
GUYANA University of Guyana Library	Academics, researchers, students, policy makers, decision makers
HONDURAS Banco Central de Honduras	Private sector, government, universities, information centers in the region
HONDURAS Centro de Informacion Industrial	Entrepreneurs, technicians, students, professionals
JAMAICA Scientific Research Council	SRC's technical staff, industry, information-based organizations, science and technology community
MEXICO INFOTEC	Industry, government, education

NICARAGUA	
Centro Nica. de Informacion Tecnologica	Productive sector, government institutions
PANAMA	
Grupo de Tecnologia Apropiada	Program directors of private enterprises, professionals from government, university students, farm organization leaders
PERU	
CONCYTEC	Government, armed forces, industry, universities, researchers
TRINIDAD	
CARIRI	Industry, government
VENEZUELA	
CONICIT	Scientific and industrial researchers

9. Who refers your clients to you?	
BARBADOS Caribbean Development Bank	Technical information nodes in each country
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Regional offices of Ministry of Industry, Commerce and Tourism, through promotion activities
CHILE INTEC/Chile	Our users, word of mouth, promotion
CHILE CONICYT	The users themselves, diffusion
COLOMBIA Colciencias	Inter-institutional communication
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Our users, and they pass the word around
COSTA RICA Instituto Tecnolo. de Costa Rica	Center has promoted on-line searches of ORBIT and DIALOG
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	National statistics office is well known
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Satisfied users, promotion
ECUADOR Cendes	Promotional materials

ECUADOR Instituto Invest. Tecnologicas	Personal contact, simple marketing system
EL SALVADOR Centro Nacional de Productividad (CENAP)	National institutions with which CENAP in contact; users; publicity in periodicals, seminars, conferences
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Technical personnel, professionals who have contact with business users, promotion
GUATEMALA ICAITI	
GUYANA University of Guyana Library	
HONDURAS Banco Central de Honduras	Visits, distributing pamphlets
HONDURAS Centro de Informacion Industrial	Previous users, promotion
JAMAICA Scientific Research Council	Science and technology information network members, word of mouth, exhibitions, marketing efforts
MEXICO INFOTEC	Our own promotion

NICARAGUA	
Centro Nica. de Informacion Tecnologica	Our other clients
PANAMA	
Grupo de Tecnologia Apropiada	
PERU	
CONCYTEC	Advertising and word of mouth
TRINIDAD	
CARIRI	Past users, those with knowledge of our services
VENEZUELA	
CONICIT	

10. What other domestic and foreign information resources do they use?	
BARBADOS Caribbean Development Bank	VITA, Control Data, TIS Canada, CARIRI (Trinidad)
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Information centers, document centers, knowledge of professional staff, public organizations, laboratories, professional organizations
CHILE INTEC/Chile	National Institute of Statistics, PROCHILE, Chamber of Commerce, UNIDO
CHILE CONICYT	CNRS (Centre National de la Recherche Scientifique) British Library Lending Division (BLLD), Library of Congress, Engineering Society Library (Japan), National Research Council (Canada), British Council, CAICYT (Argentina) Colciencias, IBICT (Brazil), etc.
COLOMBIA Colciencias	BLLD, CNRS (France) ISI (Institute for Scientific Information)
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Technical information centers, industry, agriculture (cattle included), marine sciences, INFOTERRA, international organizations like UNIDO, FAO, IICA, CIDIA

COSTA RICA Instituto Tecnolo. de Costa Rica	Library of Congress, BLLD, National Research Council , National Agricultural Library, WIPO
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Libraries and information centers of national organizations, other countries, and international organizations
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Embassies, official organizations
ECUADOR Cendes	INTIB, OEA, FAO, VITA, Orbit, Tropical Development and Research Institute, Chemical Abstracts, national university libraries, research institutes
ECUADOR Instituto Invest. Tecnologicas	(By mail or telex) Chemical Abstracts, FSTA, Science Citation Index, etc.
EL SALVADOR Centro Nacional de Productividad (CENAP)	Libraries, national research centers (agriculture, coffee), Spanish Ministry of Industry and Energy
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	National: CEMAT, ICAITI, INCAP, ICTA, IICA, CICON, universities. International: NTIS, Develop, Latin American Information Service.

GUATEMALA ICAITI	Local information services, government offices, their own contacts
GUYANA University of Guyana Library	MEDLARS, CARIRI, overseas and local libraries
HONDURAS Banco Central de Honduras	Information centers in other countries in the region, government agencies, Intermediate Technology Industrial Services (UK), Tropical Products Institute, Tropical Dev. & Research Institute, BLLD, INFOTEC (Mexico), USDA, EPA, German Appropriate Tech Exchange, etc.
HONDURAS Centro de Informacion Industrial	NTIS, Information Center of National Bank, Center for Industrial Development, Center for Industrial Agricultural Doc., university library
JAMAICA Scientific Research Council	Jamaican Bureau of Standards, U.S. Patent Office, UK Patent Office, Tropical Products Institute
MEXICO INFOTEC	All kinds
NICARAGUA Centro Nica. de Informacion Tecnologica	Documentation centers
PANAMA Grupo de Tecnologia Apropiada	People with expertise, local or foreign technical people

PERU	
CONCYTEC	Several
TRINIDAD	
CARIRI	Technical journals, trade fairs, trade associations, consultants, scientific institutions abroad
VENEZUELA	
CONICIT	Libraries and document services

11. Are you familiar with those resources?

BARBADOS Caribbean Development Bank	Yes
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Yes
CHILE INTEC/Chile	Yes
CHILE CONICYT	Yes
COLOMBIA Colciencias	Yes
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Yes
COSTA RICA Instituto Tecnolo. de Costa Rica	Yes
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Yes
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Yes
ECUADOR Cendes	Yes
ECUADOR Instituto Invest. Tecnologicas	Yes

EL SALVADOR Centro Nacional de Productividad (CENAP)	Yes
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Yes
GUATEMALA ICAITI	Some
GUYANA University of Guyana Library	Yes
HONDURAS Banco Central de Honduras	Yes
HONDURAS Centro de Informacion Industrial	Yes
JAMAICA Scientific Research Council	Yes
MEXICO INFOTEC	Yes
NICARAGUA Centro Nica. de Informacion Tecnologica	Yes
PANAMA Grupo de Tecnologia Apropiada	N/A
PERU CONCYTEC	Relatively
TRINIDAD CARIRI	Yes

VENEZUELA	
CONICIT	Yes

12. Do you refer clients to those resources?

BARBADOS Caribbean Development Bank	Contact them on behalf of clients
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Depends
CHILE INTEC/Chile	Yes
CHILE CONICYT	Yes, when convenient for user
COLOMBIA Colciencias	Yes
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Yes
COSTA RICA Instituto Tecnolo. de Costa Rica	No, because our users don't know how to use them efficiently
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Yes
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Sometimes
ECUADOR Cendes	Occasionally
ECUADOR Instituto Invest. Tecnologicas	Yes

EL SALVADOR Centro Nacional de Productividad (CENAP)	Locally: Yes, or request materials on loan; International: CENAP handles all requests
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Yes, national
GUATEMALA ICAITI	Sometimes
GUYANA University of Guyana Library	Yes, local
HONDURAS Banco Central de Honduras	Yes, but most prefer to do it through us
HONDURAS Centro de Informacion Industrial	Yes
JAMAICA Scientific Research Council	Yes
MEXICO INFOTEC	Yes
NICARAGUA Centro Nica. de Informacion Tecnologica	Yes
PANAMA Grupo de Tecnologia Apropiada	Yes, we give them lists of specialists
PERU CONCYTEC	In some cases

TRINIDAD	
CARIRI	Yes
VENEZUELA	
CONICIT	Yes

13. Do you know of other agencies or associations in your country which regularly access on-line data bases with whom you might collaborate for data access? If so, who are they?

BARBADOS Caribbean Development Bank	BLAIN (Barbados Library and Archives Information Network)
BOLIVIA Direccion General de Normas y Tecnologia, SITI	No
CHILE INTEC/Chile	ECOM
CHILE CONICYT	Yes: INTEC, ECOM, ENAP, National Catholic University of Chile
COLOMBIA Colciencias	OFA (Foundation for Medical Research)
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Technical Information Center
COSTA RICA Instituto Tecnolo. de Costa Rica	National Council for Scientific and Technological Research, Chamber of Industries of Costa Rica, National University Library, Costa Rica Institute of Electricity, Costa Rica Radio Corporation
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	INDOTEC, Centro de Informacion Cientifica y Technologica (subscriber but not on-line)

DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	No
ECUADOR Cendes	None
ECUADOR Instituto Invest. Tecnologicas	CENDES
EL SALVADOR Centro Nacional de Productividad (CENAP)	SITA (based in Guatemala, covers Central America); IBM offers facilities to other companies
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Yes, ICAITI
GUATEMALA ICAITI	Know of none
GUYANA University of Guyana Library	No
HONDURAS Banco Central de Honduras	No
HONDURAS Centro de Informacion Industrial	No, but the information center of the National Bank is thinking of acquiring one.
JAMAICA Scientific Research Council	
MEXICO INFOTEC	Yes

NICARAGUA	
Centro Nica. de Informacion Tecnologica	Yes, el Instituto Nicaraguense de Investigacion y Estudios Sociales (INIES)
PANAMA	
Grupo de Tecnologia Apropiada	All companies that have computers
PERU	
CONCYTEC	Yes
TRINIDAD	
CARIRI	National Energy Corporation, University of the West Indies
VENEZUELA	
CONICIT	INTEVEP

14. How often do you meet them to discuss common areas of concern?	
BARBADOS Caribbean Development Bank	Frequently
BOLIVIA Direccion General de Normas y Tecnologia, SITI	N/A
CHILE INTEC/Chile	Monthly, or more frequently
CHILE CONICYT	Has formed a working group--meets monthly
COLOMBIA Colciencias	Monthly
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Frequently, sometimes weekly
COSTA RICA Instituto Tecnolo. de Costa Rica	Never
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Twice a year
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	
ECUADOR Cendes	None
ECUADOR Instituto Invest. Tecnologicas	Sporadically

EL SALVADOR Centro Nacional de Productividad (CENAP)	None at the moment
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Occasionally or annually
GUATEMALA ICAITI	Occasionally
GUYANA University of Guyana Library	
HONDURAS Banco Central de Honduras	
HONDURAS Centro de Informacion Industrial	No arrangements yet, talk of more organized contact in 1984
JAMAICA Scientific Researc' Council	
MEXICO INFOTEC	Every two months
NICARAGUA Centro Nica. de Informacion Tecnologica	We are in the preliminary phase
PANAMA Grupo de Tecnologia Apropiada	No formal organization
PERU CONCYTEC	Coordinated meetings are being held under agreement signed with ENTEL

TRINIDAD	
CARIRI	Infrequently
VENEZUELA	
CONICIT	Quarterly

15. How do you get information about recent advances in automated information services in your country?

BARBADOS Caribbean Development Bank	National cooperation activities
BOLIVIA Direccion General de Normas y Tecnologia, SITI	There are some sources within the country
CHILE INTEC/Chile	Our institution is listed in the Directory of On-line Data Bases (Cuadra)
CHILE CONICYT	Through documents provided by services
COLOMBIA Colciencias	Mail and exchange
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	CONICIT in other countries, government information offices, IBI regional center, and the regional teaching center for the region
COSTA RICA Instituto Tecnolo. de Costa Rica	News from the services we subscribe to, periodicals
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Personal contacts at local agencies
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	NTIS Bulletins, periodicals

ECUADOR Cendes	IFLA findings
ECUADOR Instituto Invest. Tecnologicas	Through information services, e.g., Lockheed, SDC, FUINCA
EL SALVADOR Centro Nacional de Productividad (CENAP)	From suppliers of information equipment
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Contacts, correspondence, publications, bulletins
GUATEMALA ICAITI	Conversations
GUYANA University of Guyana Library	National Science Research Council, Institute of Applied Science and Technology, reports, seminars
HONDURAS Banco Central de Honduras	Equipment suppliers
HONDURAS Centro de Informacion Industrial	Only what is received by mail or through salesmen of computers, distributors
JAMAICA Scientific Research Council	Jamaica Computer Society, journals in computer field
MEXICO INFOTEC	Magazine subscriptions

NICARAGUA Centro Nica. de Informacion Tecnologica	
PANAMA Grupo de Tecnologia Apropiada	Magazines, trips, seminars
PERU CONCYTEC	Through embassies, personal contacts, and institutions in developed countries
TRINIDAD CARIRI	Conferences, seminars, visits to users
VENEZUELA CONICIT	Bulletins, conferences, visits

16. What organizations have you identified as prime potential users of an on-line data base access service?

BARBADOS Caribbean Development Bank	BLAIN, UWI
BOLIVIA Direccion General de Normas y Tecnologia, SITI	State and private industrial community, consultants, development corporations, scientific community, universities, research organizations
CHILE INTEC/Chile	See #8
CHILE CONICYT	Banks, universities, research institutions, scientific societies
COLOMBIA Colciencias	Universities, research centers, organizations, societies
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Associations, government agencies, professional colleagues, universities
COSTA RICA Instituto Tecnolo. de Costa Rica	Research centers, government institutions, private enterprises in research and development

DOMINICAN REPUBLIC Direccion Nacional de Estadistica	National statistics office, Secretary of State, Secretary of Agriculture, Public Works and Communications, National Institute for Water, Dominican Institute for Industrial Technology, Dominican Electrial Corp., Central Bank
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Industry, universities, government
ECUADOR Cendes	State petroleum organization, polytechnic institutes, fisheries ministry, ministry of industry, army, university, PLAMECA
ECUADOR Instituto Invest. Tecnologicas	National Petroleum Corp., Ministry of Public Health, and others
EL SALVADOR Centro Nacional de Productividad (CENAP)	Industry
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Small and medium businesses
GUATEMALA ICAITI	Information centers
GUYANA University of Guyana Library	University, government agencies, industry, state corporations
HONDURAS Banco Central de Honduras	Industry, government institutions, consultants

HONDURAS Centro de Informacion Industrial	Center of Industrial Development, Ministry of Economics, Peace Corps, Center for Agroindustrial Information, Institute of Housing, Sewage and Drainage
JAMAICA Scientific Research Council	30 members of the Science and Technology Information Network
MEXICO INFOTEC	Approximately 150
NICARAGUA Centro Nica. de Informacion Tecnologica	We have not determined these
PANAMA Grupo de Tecnologia Apropiada	Universities, organizations with national development programs, Panamanian educational system
PERU CONCYTEC	
TRINIDAD CARIRI	Local conglomerates, research agencies
VENEZUELA CONICIT	Science and technology researchers, universities, engineering companies, consultants

17. Is training available in your country on how to conduct on-line data base searches? If so, who provides such training?

BARBADOS Caribbean Development Bank	BLAIN
BOLIVIA Direccion General de Normas y Tecnologia, SITI	No
CHILE INTEC/Chile	No
CHILE CONICYT	Yes, by ECOM and University of Chile (especially libraries)
COLOMBIA Colciencias	IBM, Javeriana University
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Yes, through distributors, universities, CONICIT
COSTA RICA Instituto Tecnolo. de Costa Rica	No formal training program, (DIALOG did 5-day training in August 1983)
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	The National Statistics Office is interested in training
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	No
ECUADOR Cendes	No, but there are people trained in on-line retrieval

ECUADOR Instituto Invest. Tecnologicas	We received training on DIALOG conducted by FUINCA
EL SALVADOR Centro Nacional de Productividad (CENAP)	No
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Yes, ICAITI
GUATEMALA ICAITI	Yes, ICAITI
GUYANA University of Guyana Library	No
HONDURAS Banco Central de Honduras	Yes, principally IBM
HONDURAS Centro de Informacion Industrial	No
JAMAICA Scientific Research Council	Yes, UWI
MEXICO INFOTEC	Yes, SECOBI
NICARAGUA Centro Nica. de Informacion Tecnologica	No
PANAMA Grupo de Tecnologia Apropiada	No schools, GTA is planning to get training through VITA and NTIS

PERU	
CONCYTEC	No training, but think that CENDICYT could do it
TRINIDAD	
CARIRI	No, CARIRI has in-house information specialists trained abroad
VENEZUELA	
CONICIT	Yes, CONICIT

18. What percent of documents ordered as a result of on-line searches you conduct are microfiche and what percent are paper copy?

BARBADOS Caribbean Development Bank	No orders placed
BOLIVIA Direccion General de Normas y Tecnologia, SITI	See #2
CHILE INTEC/Chile	80% paper, 20% microfiche
CHILE CONICYT	100% paper
COLOMBIA Colciencias	30% microfiche, 70% paper
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	85% paper
COSTA RICA Instituto Tecnolo. de Costa Rica	5% microfiche
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	100% paper
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	We haven't done on-line searching
ECUADOR Cendes	At this time not doing on-line searches
ECUADOR Instituto Invest. Tecnologicas	Haven't requested any

EL SALVADOR Centro Nacional de Productividad (CENAP)	100% paper
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	All paper
GUATEMALA ICAITI	20% microfiche, 80% paper
GUYANA University of Guyana Library	Mostly hardcopy
HONDURAS Banco Central de Honduras	Mostly paper
HONDURAS Centro de Informacion Industrial	99% paper
JAMAICA Scientific Research Council	
MEXICO INFOTEC	Don't know
NICARAGUA Centro Nica. de Informacion Tecnologica	
PANAMA Grupo de Tecnologia Apropiada	
PERU CONCYTEC	50%/50%
TRINIDAD CARIRI	100% paper

VENEZUELA

CONICIT 90% paper, 10% microfiche

19. From whom do you obtain these documents?	
BARBADOS Caribbean Development Bank	
BOLIVIA Direccion General de Normas y Tecnologia, SITI	See #2
CHILE INTEC/Chile	NTIS, BLLD, Engineering Society Library, Patent Information Office (Holland), U.S. Government Printing Office, etc.
CHILE CONICYT	See #10
COLOMBIA Colciencias	NTIS, CNRS, ISI, BLLD
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Specialized information centers, libraries, data bases
COSTA RICA Instituto Tecnolo. de Costa Rica	See #10
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	From organizations related to the National Statistics Office
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	
ECUADOR Cendes	Research Council of Canada, BLLD

ECUADOR Instituto Invest. Tecnologicas	
EL SALVADOR Centro Nacional de Productividad (CENAP)	From centers mentioned in #1, and from NTIS
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Develop
GUATEMALA ICAITI	BLLD, U.S. Patent Office, data base suppliers
GUYANA University of Guyana Library	BLLD, IUP, NTIS
HONDURAS Banco Central de Honduras	USDA, U.S. Department of Commerce, ONUDI (Vienna), BLLD
HONDURAS Centro de Informacion Industrial	NTIS, INFOTEC, VITA, PCATT, SKAT
JAMAICA Scientific Research Council	
MEXICO INFOTEC	BLLD, NTIS, our agents
NICARAGUA Centro Nica. de Informacion Tecnologica	BLLD
PANAMA Grupo de Tecnologia Apropiada	

PERU	
CONCYTEC	
TRINIDAD	
CARIRI	Industry, government, researchers, BLLD, CISTI
VENEZUELA	
CONICIT	BLLD - 80% others - 20%

20. How long does it take you to obtain copies of these documents?	
BARBADOS Caribbean Development Bank	
BOLIVIA Direccion General de Normas y Tecnologia, SITI	BLLD - approxmately 20 days, others 5-7 weeks
CHILE INTEC/Chile	3-4 weeks
CHILE CONICYT	3-5 weeks
COLOMBIA Colciencias	30-60 days
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Varies from 1-3 days, to 15-20 days
COSTA RICA Instituto Tecnolo. de Costa Rica	3-4 weeks
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	1 week- 1 month
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	
ECUADOR Cendes	About 8 weeks
ECUADOR Instituto Invest. Tecnologicas	

EL SALVADOR Centro Nacional de Productividad (CENAP)	4 weeks
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	6 weeks
GUATEMALA ICAITI	2-3 weeks
GUYANA University of Guyana Library	3-6-8 weeks
HONDURAS Banco Central de Honduras	15-30 days average
HONDURAS Centro de Informacion Industrial	In Central America 10-30 days; from NTIS, 4-7 weeks, others 3-4 weeks
JAMAICA Scientific Research Council	
MEXICO INFOTEC	1-3 weeks
NICARAGUA Centro Nica. de Informacion Tecnologica	About one month
PANAMA Grupo de Tecnologia Apropiada	40 days maximum
PERU CONCYTEC	Varies from a week to 2-3 months
TRINIDAD CARIRI	2-4 weeks

VENEZUELA

CONICIT	8-10 days

21. What is the telecommunications cost of a data base search from your country to the U.S.? From your country to another country in Latin America?

BARBADOS Caribbean Development Bank	Subscription, $20.00; Installation $150.00; $.17/min., $.50 per kilochar.
BOLIVIA Direccion General de Normas y Tecnologia, SITI	No experience
CHILE INTEC/Chile	TELENET, U.S. $8/hour, plus $130/hour (local cost for international connection) average
CHILE CONICYT	$130/month to access TELENET, plus $8/hour connection in U.S., no experience with Latin America
COLOMBIA Colciencias	U.S. $50; LA-U.S. $80
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Approximately $50 or more; have not tried with other LA countries
COSTA RICA Instituto Tecnolo. de Costa Rica	$2/min ($120/hour; CA-$1/min; LA $2/min; with TELENET node access is $0.133/min, usage is $0.400/thousand characters
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	(Data provided by CODETEL) RD $15/hour, RD $15/kiloseg., 1 kiloseg. = 64 bytes x 10^3

DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Telephone is $1.07/min., ITT = $10/hour
ECUADOR Cendes	U.S. $100
ECUADOR Instituto Invest. Tecnologicas	In the neighborhood of $40 for 15 minutes by telephone (Ecuador-California
EL SALVADOR Centro Nacional de Productividad (CENAP)	Telephone: $8.00 for first 3 minutes, $2.00 each additional; telex $3.60/min.; sat. voice channel: $200 installation, $4,000 monthly
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	U.S. $1-2/minute; leased lines: cost of installation $1,000; monthly rental $400
GUATEMALA ICAITI	U.S. $120-180/hour (telephone or telex)
GUYANA University of Guyana Library	Cost of overseas phone call G $32.00 = U.S. $10.2/min
HONDURAS Banco Central de Honduras	Feasibility study being conducted for data line by TRT (which will be connected to data networks worldwide)

HONDURAS Centro de Informacion Industrial	$4,827/month for satellite connection, with local connect $7,000/mo. New VANs being negotiated - $.60 - .80 per 1,000 characters plus additional tariff
JAMAICA Scientific Research Council	Proposed rate $.40/min
MEXICO INFOTEC	U.S. $11-20 hour
NICARAGUA Centro Nica. de Informacion Tecnologica	
PANAMA Grupo de Tecnologia Apropiada	No figures available. Actual telephone cost is $100-200/hour
PERU CONCYTEC	Depends
TRINIDAD CARIRI	Approximately U.S. $300
VENEZUELA CONICIT	70% of the total cost

22. Does your government provide any special discounts or special tariffs for data transmission? If so, please describe.

BARBADOS Caribbean Development Bank	No
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Trying to obtain discount from PTT
CHILE INTEC/Chile	No
CHILE CONICYT	No
COLOMBIA Colciencias	No
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Yes, for training courses
COSTA RICA Instituto Tecnolo. de Costa Rica	No special rate
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	10% discount
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	No
ECUADOR Cendes	No
ECUADOR Instituto Invest. Tecnologicas	No

EL SALVADOR Centro Nacional de Productividad (CENAP)	No
GUATEMALA Servicio de Informacion Tecnica, INTELCA	No
GUATEMALA ICAITI	No
GUYANA University of Guyana Library	Yes, principle recommended by UNESCO has been accepted
HONDURAS Banco Central de Honduras	No
HONDURAS Centro de Informacion Industrial	No
JAMAICA Scientific Research Council	No
MEXICO INFOTEC	No. (NB: other source says government gives 75% discount to educational and cultural organizations)
NICARAGUA Centro Nica. de Informacion Tecnologica	No, eventually this may be negotiated with TELCOR
PANAMA Grupo de Tecnologia Apropiada	INTEL and TELENET are negotiating a network
PERU CONCYTEC	No

TRINIDAD	
CARIRI	No
VENEZUELA	
CONICIT	No

23. Is the quality of the telecommunications link adequate for good quality data transmission?

BARBADOS Caribbean Development Bank	Yes, access is available for transmission up to 9600 BPS
BOLIVIA Direccion General de Normas y Tecnologia, SITI	No experience
CHILE INTEC/Chile	Yes
CHILE CONICYT	Yes, very good, 2400 baud with trunk lines, 4800 with leased
COLOMBIA Colciencias	Yes
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Yes
COSTA RICA Instituto Tecnolo. de Costa Rica	Yes, very good, covers most of country
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Yes, up to speeds of 3200 BPS
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Yes, I think so
ECUADOR Cendes	Yes

ECUADOR Instituto Invest. Tecnologicas	Yes
EL SALVADOR Centro Nacional de Productividad (CENAP)	Yes, particularly on satellite transmissions
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	No
GUATEMALA ICAITI	Yes, most of the time
GUYANA University of Guyana Library	Not always
HONDURAS Banco Central de Honduras	Yes, 4800 BPS
HONDURAS Centro de Informacion Industrial	Only if the transmission speed is low. When the speed exceeds 1200 baud, transmission quality is low
JAMAICA Scientific Research Council	Yes
MEXICO INFOTEC	Yes
NICARAGUA Centro Nica. de Informacion Tecnologica	No
PANAMA Grupo de Tecnologia Apropiada	Generally, Yes

PERU	
CONCYTEC	Yes
TRINIDAD	
CARIRI	Not at moment, ongoing upgrade on equipment
VENEZUELA	
CONICIT	No, persistent problems with transmission quality, noise

24. Describe transmission difficulties you have experienced with reference to data base use or other microcomputer use.

BARBADOS Caribbean Development Bank	
BOLIVIA Direccion General de Normas y Tecnologia, SITI	See #23
CHILE INTEC/Chile	No problems
CHILE CONICYT	None
COLOMBIA Colciencias	Lack of equipment
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Interruptions, occupied lines
COSTA RICA Instituto Tecnolo. de Costa Rica	No significant problems
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Line congestion, noise levels on certain frequencies
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	No
ECUADOR Cendes	None
ECUADOR Instituto Invest. Tecnologicas	Noise (static)

EL SALVADOR Centro Nacional de Productividad (CENAP)	Others cite cut transmissions because of inadequate local plant
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Cutting of communication, impurities on the line causing distortion of data transmission
GUATEMALA ICAITI	Sometimes difficult to connect, line noise
GUYANA University of Guyana Library	Noise levels, poor quality of transmissions
HONDURAS Banco Central de Honduras	No experience
HONDURAS Centro de Informacion Industrial	N/A
JAMAICA Scientific Research Council	TYMNET interconnection proposed for 1984 (January)
MEXICO INFOTEC	No important problems
NICARAGUA Centro Nica. de Informacion Tecnologica	
PANAMA Grupo de Tecnologia Apropiada	Usual problems

PERU	
CONCYTEC	Lack of practice, problem with interconnecting at 1200 band
TRINIDAD	
CARIRI	Frequent breaks in transmission
VENEZUELA	
CONICIT	Quality of transmission lines, lack of equipment maintenance

25. Are there regulatory restrictions on data flow into and out of your country? If so, what are they?

BARBADOS Caribbean Development Bank	No
BOLIVIA Direccion General de Normas y Tecnologia, SITI	No
CHILE INTEC/Chile	No
CHILE CONICYT	No
COLOMBIA Colciencias	No
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	No
COSTA RICA Instituto Tecnolo. de Costa Rica	No
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	No
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	No
ECUADOR Cendes	No
ECUADOR Instituto Invest. Tecnologicas	No

EL SALVADOR Centro Nacional de Productividad (CENAP)	No
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	No
GUATEMALA ICAITI	No
GUYANA University of Guyana Library	No
HONDURAS Banco Central de Honduras	No
HONDURAS Centro de Informacion Industrial	No
JAMAICA Scientific Research Council	No
MEXICO INFOTEC	No
NICARAGUA Centro Nica. de Informacion Tecnologica	No
PANAMA Grupo de Tecnologia Apropiada	Don't know
PERU CONCYTEC	No, in principle
TRINIDAD CARIRI	No
VENEZUELA CONICIT	No

26. Are there local government restrictions on connecting customer-owned equipment to the telephone lines?

BARBADOS Caribbean Development Bank	No
BOLIVIA Direccion General de Normas y Tecnologia, SITI	No
CHILE INTEC/Chile	No
CHILE CONICYT	No
COLOMBIA Colciencias	No
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	No
COSTA RICA Instituto Tecnolo. de Costa Rica	No
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	The national phone company is a private company and controls equipment connections.
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	No
ECUADOR Cendes	No

ECUADOR Instituto Invest. Tecnologicas	No
EL SALVADOR Centro Nacional de Productividad (CENAP)	No
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	No
GUATEMALA ICAITI	No
GUYANA University of Guyana Library	Yes
HONDURAS Banco Central de Honduras	No
HONDURAS Centro de Informacion Industrial	Yes, it is presently not permitted to transmit data through telephone lines
JAMAICA Scientific Research Council	Restricted by local telephone lines
MEXICO INFOTEC	Previous authorization required
NICARAGUA Centro Nica. de Informacion Tecnologica	No
PANAMA Grupo de Tecnologia Apropiada	No

PERU	
CONCYTEC	No
TRINIDAD	
CARIRI	No
VENEZUELA	
CONICIT	No

27. Does your phone company provide "dial-up" data transmission service?

BARBADOS Caribbean Development Bank	Yes
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Yes
CHILE INTEC/Chile	Yes
CHILE CONICYT	Yes, good experience
COLOMBIA Colciencias	Yes
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	No
COSTA RICA Instituto Tecnolo. de Costa Rica	Yes, through Costa Rica Radio Company
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Yes, at local and national levels
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Yes
ECUADOR Cendes	No
ECUADOR Instituto Invest. Tecnologicas	Not at this time

EL SALVADOR Centro Nacional de Productividad (CENAP)	ANTEL does not provide this service
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	No
GUATEMALA ICAITI	No
GUYANA University of Guyana Library	No
HONDURAS Banco Central de Honduras	Will do so in future
HONDURAS Centro de Informacion Industrial	No, but doing feasibility study for data transmission through value-added networks
JAMAICA Scientific Research Council	Yes
MEXICO INFOTEC	Yes, provided through the Department of Communications and Transport
NICARAGUA Centro Nica. de Informacion Tecnologica	No
PANAMA Grupo de Tecnologia Apropiada	No

PERU	
CONCYTEC	Access on restricted basis, national data network not yet in operation
TRINIDAD	
CARIRI	Yes
VENEZUELA	
CONICIT	No

28. How do you get information about progress and plans for improved telecommunication services for your country?

BARBADOS Caribbean Development Bank	Government information releases
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Will stay in contact with telecoms enterprise
CHILE INTEC/Chile	Service providers
CHILE CONICYT	From ENTEL
COLOMBIA Colciencias	SNI (national information system)
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	From national agencies
COSTA RICA Instituto Tecnolo. de Costa Rica	Direct contact with the Costa Rica Inst. of Electricity and CR Radio Co.
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Personal contacts and institutions such as the telecoms entity
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Bulletins and visits
ECUADOR Cendes	Press notices, personal visits

ECUADOR Institut› Invest. Tecnologicas	From IETEL
EL SALVADOR Centro Nacional de Productividad (CENAP)	From the telephone entity, ANTEL
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Through the PTT, GUATEL
GUATEMALA ICAITI	GUATEL reports, development plans
GUYANA University of Guyana Library	News media
HONDURAS Banco Central de Honduras	From HONDUTEL
HONDURAS Centro de Informacion Industrial	Communication with chief of International Relations of HONDUTEL
JAMAICA Scientific Research Council	From JAMINTEL and Jamaica Telephone Co.
MEXICO INFOTEC	Lectures, visits to telecoms services
NICARAGUA Centro Nica. de Informacion Tecnologica	
PANAMA Grupo de Tecnologia Apropiada	(see #15)

PERU	
CONCYTEC	Contacts with national telephone company
TRINIDAD	
CARIRI	National telephone company
VENEZUELA	
CONICIT	Press, and telephone company

29. Does your organization have a microcomputer that is used or could be used to access data bases?

BARBADOS Caribbean Development Bank	No
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Not yet
CHILE INTEC/Chile	Yes
CHILE CONICYT	Yes
COLOMBIA Colciencias	On the way
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Yes
COSTA RICA Instituto Tecnolo. de Costa Rica	Has a Monroe OC 8820: - 128 kilobytes of memory - 2 disc drives for 5 1/4 discs - printer @ 60 char per sec - hard disc connect capability
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	No, but Radio Shack lets us use their equipment which can access all U.S. data bases
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Yes

ECUADOR Cendes	We have
ECUADOR Instituto Invest. Tecnologicas	No
EL SALVADOR Centro Nacional de Productividad (CENAP)	No
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Not yet
GUATEMALA ICAITI	Yes
GUYANA University of Guyana Library	No, univeristy has IBM 370
HONDURAS Banco Central de Honduras	No, but there is a mini computer
HONDURAS Centro de Informacion Industrial	Has been purchased in U.S., awaiting arrival in Honduras
JAMAICA Scientific Research Council	
MEXICO INFOTEC	Yes
NICARAGUA Centro Nica. de Informacion Tecnologica	In process of acquiring
PANAMA Grupo de Tecnologia Apropiada	Access, but not through GTA

PERU	
CONCYTEC	No for micros, Yes for minis
TRINIDAD	
CARIRI	Use of mini
VENEZUELA	
CONICIT	Yes

30. If so, who is its manufacturer and what model is it?	
BARBADOS Caribbean Development Bank	
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Radio Shack, Model 16
CHILE INTEC/Chile	TI Silent 700
CHILE CONICYT	2 ONTEL- OP 1/64 OP 1/15
COLOMBIA Colciencias	IBM -XT
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Wang LVP 2200
COSTA RICA Instituto Tecnolo. de Costa Rica	Has a Monroe OC 8820: - 128 kilobytes of memory - 2 disc drives for 5 1/4 discs - printer @ 60 char per sec - hard disc connect capability
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	In process of installing first national data base using Radio Shack system.
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Radio Shack Model 16

ECUADOR Cendes	Texas 770
ECUADOR Instituto Invest. Tecnologicas	
EL SALVADOR Centro Nacional de Productividad (CENAP)	
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	
GUATEMALA ICAITI	TRS-80 Model 1 (Radio Shack), Apple II+
GUYANA University of Guyana Library	
HONDURAS Banco Central de Honduras	Wang VS/80
HONDURAS Centro de Informacion Industrial	Radio Shack TRS-80 Model 16
JAMAICA Scientific Research Council	
MEXICO INFOTEC	HP-3000 Y terminal CDC full duplex
NICARAGUA Centro Nica. de Informacion Tecnologica	IBM/23 64K
PANAMA Grupo de Tecnologia Apropiada	Wang

PERU	
CONCYTEC	Wang LVP 2200
TRINIDAD	
CARIRI	DEC-PDP 11/34
VENEZUELA	
CONICIT	Ohio Scientific C3B, Superbrain QD

31. What are your primary needs for a microcomputer?	
BARBADOS Caribbean Development Bank	Automate library, housekeeping
BOLIVIA Direccion General de Normas y Tecnologia, SITI	On-line data access, systematize technical information, improve access
CHILE INTEC/Chile	To manage documents and data
CHILE CONICYT	Financial resource management
COLOMBIA Colciencias	Financial (fiscal) management
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Data base access, information processing, interconnection with other equipment
COSTA RICA Instituto Tecnolo. de Costa Rica	Administration, collection automation, mailing list maintenance
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	To manage statistical data
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Administration and research
ECUADOR Condes	Automate data bank of 5,000 documents and our library

ECUADOR Instituto Invest. Tecnologicas	Data base access, both from other countries and internally, i.e., 10,000 technical documents in the Technical Information Center, graduate theses from Ecuador's 17 universities
EL SALVADOR Centro Nacional de Productividad (CENAP)	Internal information requirements, data base creation and processing, better service
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	More efficient and complete search services, more rapid access, control of information center users, broader access
GUATEMALA ICAITI	Data base handling, library housekeeping, CAI
GUYANA University of Guyana Library	Data base access, organize and access local information, cater to local networks
HONDURAS Banco Central de Honduras	Data base creation, data retrieval, more efficient service
HONDURAS Centro de Informacion Industrial	Ease data retrieval, get control of users and publications
JAMAICA Scientific Research Council	Data base creation, word processing, on-line search, account management

MEXICO	
INFOTEC	Storage and retrieval of information, data processing, training
NICARAGUA	
Centro Nica. de Informacion Tecnologica	Organizing and retrieving national information, automating archives, automating client lists
PANAMA	
Grupo de Tecnologia, SITI Apropiada	65% Word Processing 15% Information Management 10% Housekeeping 10% Banking/Loans
PERU	
CONCYTEC	Dedicated to CENDICYT services
TRINIDAD	
CARIRI	Information retrieval, data base creation, record storage, on-line access
VENEZUELA	
CONICIT	Internal archives, administration

32. Which people in your organization are designated or would be designated to work with a microcomputer? (Indicate their positions or titles.)

BARBADOS Caribbean Development Bank	All managers of departments
BOLIVIA Direccion General de Normas y Tecnologia, SITI	SITI staff, programmers and systems analyst
CHILE INTEC/Chile	3 librarian/documentalists, 2 systems analysts, computer programmers
CHILE CONICYT	Engineer for information processing, 2 operators
COLOMBIA Colciencias	Chief of library, Director of Library, Documentalist
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Now, systems analyst; future, an operator and programmer
COSTA RICA Instituto Tecnolo. de Costa Rica	2 systems analysts coordinate micros with mainframes
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Radio Shack has an integrated program for 8 programmers--any person, executive or secretarial, can use the programs that have been developed locally

DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Data processing officers, Technical auxiliary
ECUADOR Cendes	Chemical engineers, architect
ECUADOR Instituto Invest. Tecnologicas	Professor in the polytechnic institute, Chief of the Technical Information Center
EL SALVADOR Centro Nacional de Productividad (CENAP)	Part-time computer technician to be hired next year; engineers in company will be trained
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Technicians in documentation and reference
GUATEMALA ICAITI	Two chemical engineers
GUYANA University of Guyana Library	Local consultants and trained staff
HONDURAS Banco Central de Honduras	Industrial engineers
HONDURAS Centro de Informacion Industrial	Persons in charge of documentation
JAMAICA Scientific Research Council	Technical information officer, librarians, research officers

MEXICO INFOTEC	Manager of data processing, manager of administration and finance, consultants, library
NICARAGUA Centro Nica. de Informacion Tecnologica	
PANAMA Grupo de Tecnologia Apropiada	GTA coordinator
PERU CONCYTEC	Director of CENDICYT
TRINIDAD CARIRI	All in technical information division, 5 information specialists, 1 engineer, 1 documentalist
VENEZUELA CONICIT	An engineer

33. Are those people fluent in English?

BARBADOS Caribbean Development Bank	Yes
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Yes
CHILE INTEC/Chile	Yes
CHILE CONICYT	No problem understanding
COLOMBIA Colciencias	Yes
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Yes
COSTA RICA Instituto Tecnolo. de Costa Rica	Not fluent
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Yes
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Yes
ECUADOR Cendes	Yes
ECUADOR Instituto Invest. Tecnologicas	Yes

EL SALVADOR Centro Nacional de Productividad (CENAP)	Yes
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Yes
GUATEMALA ICAITI	Yes
GUYANA University of Guyana Library	Yes
HONDURAS Banco Central de Honduras	It is mandatory
HONDURAS Centro de Informacion Industrial	Yes
JAMAICA Scientific Research Council	Yes
MEXICO INFOTEC	Yes
NICARAGUA Centro Nica. de Informacion Tecnologica	Yes
PANAMA Grupo de Tecnologia Apropiada	Yes
PERU CONCYTEC	Yes
TRINIDAD CARIRI	Yes

VENEZUELA

CONICIT	No

34. Who are the major suppliers of microcomputers in your country?

BARBADOS Caribbean Development Bank	IBM, NCR, Radio Shack, ICL, Burroughs, Wang
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Aria, Sobolcom, Sisteco, Coasin, Burroughs, Digitec, ADECO
CHILE INTEC/Chile	Burroughs, Osborne, Vector Graphics, CTP, Atari, Apple, IBM, Cromemco, Morrow, Canon, Sinclair, NCR, NEC, H-P, Ohio Scientific, Alpha Micro, Okidata, Condor, Ampex, IMS
CHILE CONICYT	IBM, DEC, Burroughs, Wang, ONTEL, others
COLOMBIA Colciencias	IBM
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Burroughs, IBM, Wang, Canon, Data General
COSTA RICA Instituto Tecnolo. de Costa Rica	Franklin, Canon, TI, Cromemco, Data General, IBM, Honeywell, Burroughs, Monroe, Wang, Basic Four
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Radio Shack (more than 300 installed in country)

DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Radio Shack, IBM, Wang
ECUADOR Cendes	Sharp, Burroughs, Wang, NCR, Texas Instruments, Olivetti
ECUADOR Instituto Invest. Tecnologicas	Cromemco, Alpha Micro, Texas Instruments, IBM, Apple, H-P
EL SALVADOR Centro Nacional de Productividad (CENAP)	IBM, NCR, EDP
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Apple, Radio Shack, Texas Instruments, Commodore, Zenith
GUATEMALA ICAITI	Several dealers
GUYANA University of Guyana Library	IBM (operates but does not promote micros)
HONDURAS Banco Central de Honduras	IBM, NCR, Wang, Basic Four, Radio Shack
HONDURAS Centro de Informacion Industrial	IBM, Wang, Radio Shack, NCR, Monroe, Basic Four
JAMAICA Scientific Research Council	IBM, NCR, Apple, Radio Shack, Southwest Technical, NEC

MEXICO	
INFOTEC	IBM, HP, Microdata, Digital, Apple, Radio Shack, LNW, Cromemco, NCR, Wang
NICARAGUA	
Centro Nica. de Informacion Tecnologica	IBM, Radio Shack, ENSEC (Empresa Nacional de Servicios de Computacion)
PANAMA	
Grupo de Tecnologia Apropiada	Canon, IBM, Onix , Wang, E. Balboe, Burroughs, Monroe, Franklin, Apple, Digital, Golden II, Basic Four, Osborne, Logicomsa, Atari, Radio Shack, NCR
PERU	
CONCYTEC	Wang, IBM, NCR, Apple, Commodore
TRINIDAD	
CARIRI	Most international suppliers
VENEZUELA	
CONICIT	IBM, H-P, Ohio Scientific

35. Do they have adequate maintenance and repair facilities, as well as spare parts?

BARBADOS Caribbean Development Bank	Not sure
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Yes
CHILE INTEC/Chile	Yes
CHILE CONICYT	Yes, very good
COLOMBIA Colciencias	Yes
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Yes
COSTA RICA Instituto Tecnolo. de Costa Rica	Good service and maintenance for hardware and software
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Radio Shack has repairmen on hand trained in U.S., all spare parts, and guarantees repairs in 48 hours.
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Yes
ECUADOR Cendes	Yes

ECUADOR Instituto Invest. Tecnologicas	Yes
EL SALVADOR Centro Nacional de Productividad (CENAP)	Yes, for IBM and NCR
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Yes
GUATEMALA ICAITI	Haven't tried them
GUYANA University of Guyana Library	Yes
HONDURAS Banco Central de Honduras	Yes
HONDURAS Centro de Informacion Industrial	Radio Shack has trained technician and some spare parts
JAMAICA Scientific Research Council	Everyone except Apple and Radio Shack
MEXICO INFOTEC	Yes
NICARAGUA Centro Nica. de Informacion Tecnologica	Yes
PANAMA Grupo de Tecnologia Apropiada	Yes, more or less
PERU CONCYTEC	Yes

TRINIDAD	
CARIRI	Reasonably adequate
VENEZUELA	
CONICIT	

36. Is training on how to operate microcomputers available in your country? If so, who provides such training?

BARBADOS Caribbean Development Bank	No, but micro users have formed the Barbados Computer Society
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Yes, National Computation Center, Center for Social Research, National Statistics Institute, Center for Advanced Studies, Center for Informatics
CHILE INTEC/Chile	Yes equipment providers and specialized institutions
CHILE CONICYT	Yes, all providers offer training, or local organizations
COLOMBIA Colciencias	IBM
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Yes, through distributors
COSTA RICA Instituto Tecnolo. de Costa Rica	Commercial schools offer short courses for micros, 3 universities have programs on computation
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Radio Shack has a training center that teaches programming, software uses, etc. Also has monthly publication for customers

DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Yes, through distributors and universities
ECUADOR Cendes	Yes, by distributors
ECUADOR Instituto Invest. Tecnologicas	Yes, by National Polytechnic School (Computer Sciences Post-graduate School)
EL SALVADOR Centro Nacional de Productividad (CENAP)	IBM and NCR, mainly
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Providers, private institutes
GUATEMALA ICAITI	Some dealers
GUYANA University of Guyana Library	No
HONDURAS Banco Central de Honduras	Yes, by the distributors
HONDURAS Centro de Informacion Industrial	Training for programming and analysis in distributor's company and private technical institutes
JAMAICA Scientific Research Council	Yes, private and government organizations
MEXICO INFOTEC	Yes, equipment providers and independent consultants

NICARAGUA	
Centro Nica. de Informacion Tecnologica	Yes, through distributors
PANAMA	
Grupo de Tecnologia Apropiada	A number of schools
PERU	
CONCYTEC	Yes, different institutions
TRINIDAD	
CARIRI	Very little, vendor supplied
VENEZUELA	
CONICIT	Yes, private institutions, universities, vendors

37. If you were to acquire a microcomputer, in what office would it be located?	
BARBADOS Caribbean Development Bank	Library
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Near library and existing data bases
CHILE INTEC/Chile	In library area
CHILE CONICYT	In computer room
COLOMBIA Colciencias	Library
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Area with restricted access
COSTA RICA Instituto Tecnolo. de Costa Rica	Office of automation unit of information center
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	In National Statistics Office
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Information center
ECUADOR Cendes	Special office

ECUADOR Instituto Invest. Tecnologicas	In technical information center office
EL SALVADOR Centro Nacional de Productividad (CENAP)	In the documentation center
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Office of Technical Information Service
GUATEMALA ICAITI	Information division
GUYANA University of Guyana Library	Library building
HONDURAS Banco Central de Honduras	In the Industrial Information Center
HONDURAS Centro de Informacion Industrial	Away from public access
JAMAICA Scientific Research Council	At SRC's Technical Information Service
MEXICO INFOTEC	Head of data processing
NICARAGUA Centro Nica. de Informacion Tecnologica	
PANAMA Grupo de Tecnologia Apropiada	Central location

PERU	
CONCYTEC	CENDICYT
TRINIDAD	
CARIRI	Technical information division
VENEZUELA	
CONICIT	

38. Is that area relatively dry? Free of dust? Air conditioned?	
BARBADOS Caribbean Development Bank	Yes, Yes, Yes
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Yes, Yes, No
CHILE INTEC/Chile	Yes, Yes, No AC
CHILE CONICYT	Yes
COLOMBIA Colciencias	Yes, Yes, No AC
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Not dry, but dust free and air conditioned
COSTA RICA Instituto Tecnolo. de Costa Rica	Yes, Yes, No AC
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Yes
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Yes
ECUADOR Cendes	Yes
ECUADOR Instituto Invest. Tecnologicas	Yes

EL SALVADOR Centro Nacional de Productividad (CENAP)	Yes
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Yes, Yes, Yes
GUATEMALA ICAITI	Yes
GUYANA University of Guyana Library	Yes, Yes, Yes
HONDURAS Banco Central de Honduras	Yes
HONDURAS Centro de Informacion Industrial	Yes, Yes, No AC
JAMAICA Scientific Research Council	Yes, Yes, Yes
MEXICO INFOTEC	Yes
NICARAGUA Centro Nica. de Informacion Tecnologica	Air conditioned
PANAMA Grupo de Tecnologia Apropiada	Yes, Yes, Yes
PERU CONCYTEC	Yes, Yes, No AC
TRINIDAD CARIRI	Yes, Yes, Yes

VENEZUELA

CONICIT	Yes, AC

39. Do you have a reliable power supply in the facility where you would keep a microcomputer?

BARBADOS Caribbean Development Bank	Yes
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Yes
CHILE INTEC/Chile	Yes
CHILE CONICYT	Yes, with special lines
COLOMBIA Colciencias	Yes
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Yes
COSTA RICA Instituto Tecnolo. de Costa Rica	Yes
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Radio Shack provides UPS (Uninterrupted Power Supply) for its equipment
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Yes
ECUADOR Cendes	Yes
ECUADOR Instituto Invest. Tecnologicas	Yes

EL SALVADOR Centro Nacional de Productividad (CENAP)	Yes, but voltage fluctuations and the "temporary situation" cause outages
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Yes
GUATEMALA ICAITI	Yes
GUYANA University of Guyana Library	No, but can get UPS
HONDURAS Banco Central de Honduras	Yes
HONDURAS Centro de Informacion Industrial	Yes
JAMAICA Scientific Research Council	Yes
MEXICO INFOTEC	Yes
NICARAGUA Centro Nica. de Informacion Tecnologica	Yes
PANAMA Grupo de Tecnologia Apropiada	Yes
PERU CONCYTEC	Yes
TRINIDAD CARIRI	Yes, standby generator available

VENEZUELA	
CONICIT	Yes

40. Is the power supply protected against sudden surges?

BARBADOS Caribbean Development Bank	No
BOLIVIA Direccion General de Normas y Tecnologia, SITI	Yes
CHILE INTEC/Chile	Yes
CHILE CONICYT	Yes
COLOMBIA Colciencias	Yes
COSTA RICA Consejo Nac. de Invest. Cientificas y Tecnologicas	Yes, with voltage regulator
COSTA RICA Instituto Tecnolo. de Costa Rica	Yes, with voltage regulator
DOMINICAN REPUBLIC Direccion Nacional de Estadistica	Yes, through UPS
DOMINICAN REPUBLIC Encargado de Procesamiento de Datos, INDOTEC	Yes
ECUADOR Cendes	Yes
ECUADOR Instituto Invest. Tecnologicas	Yes

EL SALVADOR Centro Nacional de Productividad (CENAP)	No
GUATEMALA Servicio de Informacion Tecnica, INTELCAP	Not enough
GUATEMALA ICAITI	Yes
GUYANA University of Guyana Library	No, but can get voltage regulators
HONDURAS Banco Central de Honduras	Yes
HONDURAS Centro de Informacion Industrial	Special protection not necessary
JAMAICA Scientific Research Council	No, but equipment available locally to protect
MEXICO INFOTEC	Yes
NICARAGUA Centro Nica. de Informacion Tecnologica	No, must use voltage regulator
PANAMA Grupo de Tecnologia Apropiada	Yes
PERU CONCYTEC	Working on stabilizing the current
TRINIDAD CARIRI	Protectors available locally

VENEZUELA	
CONICIT	Yes

APPENDIX D

DATA-BASE CONSULTATION SERVICES: THE CASE OF MEXICO*

A. Background

1. In March 1976, the National Council for Science and Technology (Consejo Nacional de Ciencia y Tecnología, (CONACYT)), in order to aid research and development in the Mexican scientific community and to meet its own information requirements, opened the Data-Base Consultation Service (Servicio de Consulta a Bancos de Informacíon, (SECOBI)). When first opened to the public, SECOBI provided access to 50 data bases with over 7 million on-line bibliographical references.

2. The creation of SECOBI was in compliance with what the Decree establishing CONACYT expressly instructed the Council to do, namely, to create a scientific information and documentation service. The inauguration of this service was the culmination of the efforts made by various agencies of the Government of Mexico in reviewing the availability and usage of the data bases accessible on computers in Mexico and elsewhere.

3. One of the most important developments was the assistance given by the International Labour Office at Geneva in 1974, when it provided a copy of the ISIS information-retrieval system. This enabled 15 public agencies in Mexico to familiarize themselves with the automatic processing of bibliographic references. At that time, information on petroleum was of particular importance. Petróleos Mexicanos, therefore, made contact with the New York Times Information Bank and a private telephone link between Mexico City and New York City was arranged to permit the usage of the information services of that system.

4. CONACYT co-ordinated and encouraged arrangements with enterprises in the public and private sectors to provide the scientific community with access to non-confidential information stored in their computers. Among these enterprises were the Bank of Mexico, the Ministries of the Navy, Labour and the Presidency, the National Fund for Workers' Consumption (Fondo Nacional para el Consumo de los Trabajadores, (FONACOT)), Nacional Financiera and TELEVISA, a private company that holds the concession for four television channels in Mexico. An account of the result of this co-ordination was given in a document entitled "Programme for the establishment of mechanisms for the exchanging of information among public-sector, educational and research agencies", which laid the foundations for a feasibility study of SECOBI as part of the National Scientific and Technological Information System. The study showed that it would be useful and economically feasible to have such a service in Mexico. It also showed what the operating costs of the system would be and it included a directory of the data bases then available in Mexico and abroad.

5. Sharing the data bases contained in computer systems and making more effective use of them requires the use of telecommunication systems. In that manner, access can be provided to a large number of users who may be physically remote from one another, while keeping operating costs down. CONACYT therefore secured financing in 1975 for the above-mentioned project and drew up the necessary contracts for the installation of a node in Mexico City with 30 access gates to the TYMNET data-transmission network. It also contracted for a second node that provided links with up to three computers in Mexico City by means of closed-circuit telephone lines connected to the same

*from Transborder Data Flows: Access to the International On-line Data-base Market (New York: United Nations Centre on Transnational Corporations, 1983), pp. 132-140.

network. The computers selected were those belonging to Petroleos Mexicanos, the Education Ministry and the Territory Studies Commission.

B. Services provided by SECOBI

6. SECOBI'S operations cater to two types of users. The first is the over-the-counter user, who utilizes the service sporadically and whose consultations are handled by SECOBI's own terminals. The second type includes terminal users who, because of the scope of their activities, the frequency of use, and a minimum service need of over 20 hours per month, require the installation of terminals in their own offices.

7. In the first case, persons with an enquiry are instructed at the offices of SECOBI about the general operation of the service, the type of result their enquiry will produce and the costs. The requestors are urged to exhaust all possible ways of finding the needed information in the libraries available. If SECOBI's services are still required, an appointment is made for an interview with an information-retrieval technician with whom users will work out the exact content and precise limits of the references to be consulted.

8. Clearly, the better-prepared a question is, the less system work-time will be required, a variable having a direct impact on costs. For this reason, and with the active co-operation of the user, the information-retrieval technician constructs a theme profile by identifying the most appropriate descriptors--using vocabularies and thesauri--and thereafter selecting the most suitable data bases for making the inquiry. At present, SECOBI has 10 offices in Mexico City and elsewhere, where specialists are available to provide the services mentioned above.

9. In order to make the over-the-counter service self-financing and to rationalize its use, there is a charge for all assistance. To determine the consultation fee, the time taken for the consultation is multiplied by the equivalent in Mexican pesos of the cost per hour in dollars of the data base consulted.

10. In the case of terminal users, a contract is drawn up between the institution requiring the service and SECOBI for the installation in the user's own offices of a terminal through which the user can access all information systems available. The user must then have an information-retrieval technician who will receive the manuals and other materials required to use the computer terminal and to gain access to each one of the systems. In this case, SECOBI provides sets of access codes, allowing centralized invoicing in the offices of SECOBI.

11. A fundamental aspect of the second service is the training provided on access to and utilization of data bases, from the basic to the specialized levels, in each of the six systems available. These courses are given often enough to allow users flexibility in their training. Normally, the courses are taught to users with a terminal contract, but they are also available to the general public and are announced periodically in the mass media.

12. A document-procurement service is also offered for both the references obtained by inquiries through the SECOBI terminal and those obtained by the user by other means. The procurement time varies between one and eight weeks,

depending primarily on whether the document can be found in Mexico or abroad. For those who need continuous and updated information on a specific subject, a selective information dissemination service (SEDISIN) is offered. It stores thematic profiles in the computer and periodically provides bibliographical references. Lastly, a document-translation service is offered, providing Spanish versions of the original, foreign language texts.

C. Assessment of performance

13. As stated earlier, there are two main types of consultation service, the over-the-counter and the installed terminals services. SECOBI can determine only the frequency and subject of the consultations made on its premises. In the case of installed terminals, only the total consumption in hours is known.

14. Over-the-counter enquiries increased from 230 users in 1976 to 2,078 in 1981, for an average annual growth rate of 55 per cent (see table 1). This is due largely to the advertising of the service and to the increase in the number of SECOBI offices from one in 1976, to 10 in 1981. It is noteworthy that the annual increase in enquiries has slowed down, largely because the number of users with their own terminals who provide local services to other persons has risen.

15. The effect of publicizing SECOBI's service to establishments of higher education emerges clearly from the data. In 1976, the percentage of students served was zero, whereas in 1981 it was 59 per cent (see table 1). As a result, students are the main users of the services, representing a total of 49 per cent of those served during the period 1976-1981. This is a notably higher figure than that for the private sector, the public sector or researchers. The subjects about which most consultations were made since SECOBI began offering its services were medicine, psychology, agriculture, chemistry and education (see table 2). Engineering was the most consulted topic in 1978, but then became relatively unimportant. Similarly, the subjects of pollution, biology, sociology and physics were seldom consulted.

16. SECOBI's document procurement service opened in 1977 as a supplement to the consultation service, since users continually complained that they could not locate the material referred to in a data base. Average annual growth in this service has been 37 per cent and at present an average of one document is procured for every over-the-counter enquiry (see table 3).

17. Although the mass communication media--television, radio, periodicals and magazines--have been used to advertise the services of SECOBI, the most effective method of explaining the usefulness of the service consists of demonstrations given on a portable terminal in the users' offices or to groups visiting SECOBI. Normally, over 120 such demonstrations a year are given (see table 3). Some 830 demonstrations have taken place since SECOBI was established in 1976. During the six-year period, 195 courses were given, with a total enrollment of 1,293 persons (see table 3). Although the number of courses has increased an average of 19 per cent annually, attendance figures show a 37 per cent upward change.

18. As stated earlier, details on the use of installed terminals are not available from the users, but the number of installed terminals is known. In 1981, a total of 118 such terminals were in use (see table 3), distributed throughout Mexico, with a heavy concentration in Mexico City and other

Table 1. Over-the-counter users, by user group, 1975-1981
(Numbers and percentage)

User	Year							Cumulative 1976-1981
	1975	1976	1977	1978	1979	1980	1981	
Private sector								
Number	-	81	159	110	147	279	166	942
Percentage	-	35.2	32.7	15.8	12.8	16.9	7.9	14.9
Public sector								
Number	-	74	107	101	143	79	125	629
Percentage	-	32.1	22.0	14.5	12.4	4.7	6.0	10.0
Students								
Number	-	-	40	301	601	914	1,226	3,082
Percentage	-	-	8.2	43.2	52.3	55.4	58.9	49.0
Researchers								
Number	-	55	82	134	190	178	166	805
Percentage	-	23.9	16.9	19.2	16.1	10.8	7.9	12.8
Others								
Number	-	20	97	50	67	197	395	826
Percentage	-	8.6	20.0	7.1	5.8	11.9	19.0	13.1
TOTAL								
Number	-	230	485	696	1,148	1,647	2,078	6,289
Percentage	-	100	100	100	100	100	100	55.3

Source: SECOBI.

Table 2. Consultation topics ranked, 1977-1981

Subject	1977	1978	1979	1980	1981
Medicine	-	6	1	1	1
Psychology	5	5	-	2	2
Agriculture	3	4	4	3	3
Chemistry	2	2	3	4	4
Education	1	-	2	5	-
Engineering	-	1	-	6	-
Pollution	-	3	-	7	-
Biology	-	7	5	-	-
Sociology	4	-	-	-	-
Physics	6	-	-	-	-

Source: SECOBI.

Table 3. Documents procured, demonstrations given, courses taught, course attendance and terminals installed, 1975-1981
(Number and annual growth rate)

Service	Year							Cumulative
	1975	1976	1977	1978	1979	1980	1981	1976-1981
Documents procured								
Number	-	-	574	1,113	1,952	1,828	2,016	7,483
Growth rate (Percentage)	-	-	-	93.9	75.3	-6.3	10.2	36.8
Demonstrations given								
Number	-	123	214	121	131	108	133	830
Growth rate (Percentage)	-	-	73.9	-43.4	8.2	-17.5	23.1	1.5
Courses taught								
Number	-	22	16	26	38	41	52	195
Growth rate (Percentage)	-	-	27.2	62.5	46.1	7.8	26.8	18.7
Course attendance								
Number	-	88	37	141	245	354	428	1,293
Growth rate (Percentage)	-	-	-57.9	281.0	73.7	44.4	19.4	36.8
Terminals installed								
Number	-	17	10	24	28	12	27	118
Growth rate (Percentage)	-	-	41.1	140.0	16.6	57.1	125.0	9.6

Source: SECOBI.

industrial cities. In 1981, 27 new terminals were installed.

19. The total number of hours of use recorded in the available statistics includes use by terminals in both the offices of SECOBI and elsewhere (see table 4). Although this is not the national total, it represents over 90 per cent of the use made of the data-base systems in Mexico. The DIALOG and ORBIT systems were introduced in Mexico by SECOBI in 1976. In 1981, they still accounted for the greatest number of hours of on-line use (see table 4). DIALOG, with 4,145 out of a total of 6,714 hours of use in 1981, is clearly the most attractive service, followed by ORBIT with 1,065 hours. Data Resources, Inc. occupied the third place, although it became available in Mexico only in 1980.

D. Obstacles

20. The first obstacle faced by a Latin American user of on-line data bases is language. Even before users retrieve data, a series of operations must be carried out and instructions followed, in a language which is foreign to them.

21. The entire first stage of data retrieval is generally less problematic to ordinary users, because specialists assist in the enquiry and provide guidance. The second step, however, during which it is necessary to work with the original document, usually presents a greater problem, because the document is usually written in a language foreign to the users and translation assistance may not be available. SECOBI has taken several steps to deal with this problem. First of all, the data-retrieval personnel servicing users is required to have a perfect command of English and sometimes of other languages as well. Thus, even when users have no knowledge of foreign languages, the required information can be obtained. Secondly, all data-retrieval personnel servicing users with installed terminals are asked to have a perfect command of English so that they can be given thorough training courses. And lastly, when users obtain the original document, translation assistance may be requested from the team of translators that has been established to deal with practically any language.

22. In order to facilitate the training of users, SECOBI has arranged that they be made familiar with terminals, the telecommunication process and data bases prior to a training course on any data-base system. An education programme is also now under way which will provide generic training in the use and operation of data bases, regardless of the system to which they belong.

23. The use of source documentation may also present a problem. Users have to be made aware that, through the help provided by SECOBI, documents can be obtained more quickly and at less cost than can be done by a specialized service. Still, waiting time can be significant. SECOBI's experience shows that between 30 and 40 per cent of the documents requested are kept in national documentation centres. To obtain the remainder, specialized companies abroad have to be used. The time required to obtain materials varies from one week in national centres, to eight weeks abroad. When users know that it may take up to eight weeks for documents to reach them, they may prefer to seek alternative information, even though it may not always meet their original requirements.

Table 4. Use of on-line data-base services, by service, 1975-1981
(Hours of use and annual growth rate)

Service	Year						
	1975	1976	1977	1978	1979	1980	1981
DIALOG							
Hours	-	488	843	1,061	1,614	2,913	4,145
Growth rate (Percentage)	-	-	72.7	52.1	25.8	80.4	42.2
ORBIT							
Hours	-	110	338	654	1,035	782	1,065
Growth rate (Percentage)	-	-	207.2	93.4	58.2	-24.4	36.1
New York Times							
Hours	-	-	-	103	152	187	220
Growth rate (Percentage)	-	-	-	-	47.5	23.0	17.6
Data Resources, Inc.							
Hours	-	-	-	-	-	353	552
Growth rate (Percentage)	-	-	-	-	-	-	56.3
BRS							
Hours	-	-	-	-	-	-	22
Growth rate (Percentage)	-	-	-	-	-	-	-
Questel							
Hours	-	-	-	-	-	-	10
Growth rate (Percentage)	-	-	-	-	-	-	-
Others							
Hours	-	-	-	-	-	-	700
Growth rate (Percentage)	-	-	-	-	-	-	-

Source: SECOBI.

E. Conclusions

24. The great majority of data-base producers are located in developed market economies and, therefore, the information in on-line data bases does not generally cover information on developing countries in either the desired range or the desired detail. This information gap cannot yet be be filled by the developing countries because of two major factors: one is the lack of human, material and financial resources; the other is a fear of becoming dependent. Efforts to rectify this situation must be made if the information flow to developing countries is to approach the quality and quantity of that to developed countries.

25. SECOBI is now in its seventh year of operation. With initial problems overcome, it has become accepted by the scientific community and by the private, public and academic sectors of Mexico. Its programmes and activities are growing steadily. It is widely regarded as a useful service for the country. SECOBI has proven to be a significant factor in improving data-base consultations in Mexico. As such, it has contributed to the recognition of the importance of information as a critical resource for development and has played an important role in helping to narrow the information gap.

RIL/JUNIO 1981/AÑO III/NUM. 2

NOTICIT

ORMACION TECNICA / CONSEJO NACIONAL DE INVESTIGACIONES CIENTIFICAS Y TECNOLOGICAS

NOTICIT
INFORMACION TECNICA / CONSEJO NACIONAL DE INVESTIGACIONES CIENTIFICAS Y TECNOLOGICAS

Directorio

PRESIDENTE	*Pedro Obregón*
VICEPRESIDENTE	*Ignacio L. Iribarren*
VOCAL PRINCIPAL	*Jesús M. Castañeda*
VOCAL PRINCIPAL	*Miguel A. Leyrisse*
VOCAL PRINCIPAL	*Romar A. Nava Carrillo*
VOCAL SUPLENTE	*José M. Delgado Ocando*
VOCAL SUPLENTE	*Pablo A. Pulido M.*
VOCAL SUPLENTE	*Mauricio Golinopen Yahr*
SECRETARIO EJECUTIVO	*Luis Enrique Alcalá*

Personal Directivo

CONSULTORIA JURIDICA	*Antonio De Pedro*
OFICINA DE COMUNICACION SOCIAL	*Carlos E. Reyna*
OFICINA DE AUDITORIA	*José Marcano*
OFICINA DE RELACIONES INTERNACIONALES (Encargado)	*Alvaro Rincón*
OFICINA DE PERSONAL	*José Guillén*
OFICINA DE ORGANIZACION Y SISTEMAS	*Carmen Beatriz de Baisa*
OFICINA DE PROGRAMACION Y PRESUPUESTO	*Eduardo Quintana*
DIRECCION DE ADMINISTRACION (Encargado)	*José Ordaz*
DIRECCION DE POLITICA CIENTIFICA Y TECNOLOGICA	*Marcel Antonorsi*
DIRECCION DE FOMENTO (Encargado)	*Graciela Sosa*
UNIDAD DE TRANSFERENCIA DE TECNOLOGIA	*Fanny Chalbaud*
DIRECCION DE EDUCACION Y DIVULGACION (Encargado)	*Juan Forster*
DIRECCION DE INFORMACION CIENTIFICA Y TECNOLOGICA	*Erasmo Filoso*

Consejo de Redacción

COORDINADOR	*Pedro Estacio*
REDACTORA	*Belitza Marín*
DISEÑO GRAFICO	*Pedro Manolis*
FOTOGRAFIA	*Elio Salas*

Oficina de Comunicación Social — CONICIT
Av. Ppal. de Los Cortijos de Lourdes, Los Ruices
Edf. Maplesa. Apartado 70817. Los Ruices
Caracas — Venezuela

Adscrito al Ministerio de la Secretaría de la Presidencia

El SAICYT o la evolución de una política en información científica y tecnológica

Por: **Pedro Obregón**

La información, desde tiempos inmemoriales, ha tenido gran relevancia en la dinámica de la sociedad, bien en aquella primitiva organización del clan, cuyos miembros expresaban sus deseos y sentir a través de la mímica, hasta nuestra moderna sociedad, en la que sólo basta acudir a los sistemas electrónicos para satisfacer la necesidad de estar informado.

Desde todo punto de vista, bien por el sólo hecho de concentrar conocimientos o por constituir una permanente herramienta de trabajo, la información, su registro, clasificación y difusión, ha sido objeto de atención por parte de hombres e instituciones.

En el ámbito de la ciencia y la tecnología, la información goza de un lugar destacado ya que permite la adquisición y actualización inmediata de los conocimientos y evita, por otra parte, la duplicidad de esfuerzos en el desarrollo de procesos de investigación.

Es así como, conscientes del papel que desempeña la información como instrumento del desarrollo, diversas instituciones dirigieron sus esfuerzos hacia la organización de un registro mundial de la información científica; tales esfuerzos condujeron, en cierta forma, a la creación de la Federación Internacional de Documentación, organización no gubernamental dedicada a la información y documentación científica y tecnológica a nivel internacional.

A partir de allí, asociaciones y organismos internacionales han desarrollado distintos aspectos de la información y documentación científica y tecnológica. La UNESCO, particularmente, ha auspiciado actividades encaminadas a establecer un Sistema Mundial de Información Científica que dió, como primer resultado importante, origen a la realización de la Conferencia Intergubernamental (París-1974) en donde se señaló a los Estados Miembros, en recomendaciones aprobadas por la Conferencia General, los lineamientos indispensables para establecer conceptos y objetivos, para la creación de los Sistemas Nacionales de Información/NATIS.

En lo que respecta a América Latina, diversos organismos se han abocado a resolver la problemática de la información científica y tecnológica, lo que ha dado como resultado la creación de entidades tales como el Sistema Interamericano de Información para las Ciencias Agrícolas/AGRINTER, el Sistema Andino de Información Tecnológica/SAIT y la Red de Información Tecnológica/RITLA, entre otras.

En Venezuela, las actividades tendientes a formar un Sistema de Información Científica y Tecnológica, han estado bajo la responsabilidad del Consejo Nacional de Investigaciones Científicas y Tecnológicas, organismo cuya Ley de creación le asigna acciones y responsabilidades relacionadas con las actividades de acopio y organización de la información científica y tecnológica.

En 1970, el CONICIT publica su primer documento sobre "Política Nacional relativa a la Investigación Científica y Tecnológica" y, en el mismo, se contempla la creación de un Centro Nacional de Información Científica que, posteriormente, da origen a la actual Dirección de Información Científica y Tecnológica del CONICIT. Entre 1974 y 1975, se efectúan, promovidos por este Consejo, una serie de encuentros sectoriales en diversas áreas, tales como Nutrición, Salud, Petróleo, Agricultura, Ecología, etc., y, en ellos, fue manifiesta la inquietud de los participantes en torno a los problemas de organización, procesamiento, recuperación y difusión de la información científica y tecnológica. Tal preocupación fue reiterada en el Primer Congreso Nacional de Ciencia y Tecnología (1975) donde se aprueban recomendaciones que refuerzan la organización del Sistema Nacional de Servicios de Información Científica y Tecnológica del país integrado por Bibliotecas Técnicas, Centros de Información, y las redes especializadas de información.

Basado en las recomendaciones anteriores, el CONICIT, a través de su Dirección de Información Científica y Tecnológica, se dió a la tarea de adelantar programas tendientes a establecer redes nacionales de información, organizadas por áreas, centros regionales de información para cubrir las necesidades de las regiones y centros de información especializados en función de las áreas prioritarias de desarrollo.

En la evolución de la política que, en materia de información científica y tecnológica ha venido adelantando el CONICIT, se ha concedido importancia a la materia, iniciándose, como consecuencia, el Proyecto Sistema Automatizado de Información Científica y Tecnológica/SAICYT, actualmente en implantación y cuyos objetivos, características, importancia y proyección, damos a conocer en esta edición del NOTICYT TECNICO.

equerimientos para una nidad de servicio

El servicio de búsqueda en línea utilizará en lo posible la infraestructura y los canales de comunicación establecidos para las unidades de información y su estructura será la siguiente: Una sección de procesamiento de solicitudes que se encargará de todo lo concerniente a la recepción de consultas, elaboración de estrategias de búsqueda y recuperación de la información y una sección de documentación que tendrá como función almacenar y recuperar la información de solicitudes ya procesadas.

Para asegurar una prestación eficiente del servicio, la unidad de documentación deberá contar en su acervo, con un buen número de las publicaciones periódicas indizadas en las bases de datos más utilizadas, para poder así suministrar a los usuarios la documentación requerida.

En el caso de no existir la infraestructura de una unidad de información, se deberán desarrollar de inmediato las secciones de procesamiento de solicitudes y la de documentación, así como la adquisición del fondo bibliográfico antes mencionado. En cualquiera de los casos se deben definir los mecanismos de obtención de documentos tanto a nivel nacional como internacional.

A través de la rastreadora de Camatagua, se efectuará la conexión internacional.

El SAICYT o la evolución de una política en información científica y tecnológica

Por: **Pedro Obregón**

La información, desde tiempos inmemoriales, ha tenido gran relevancia en la dinámica de la sociedad, bien en aquella primitiva organización del clan, cuyos miembros expresaban sus deseos y sentir a través de la mímica, hasta nuestra moderna sociedad, en la que sólo basta acudir a los sistemas electrónicos para satisfacer la necesidad de estar informado.

Desde todo punto de vista, bien por el sólo hecho de concentrar conocimientos o por constituir una permanente herramienta de trabajo, la información, su registro, clasificación y difusión, ha sido objeto de atención por parte de hombres e instituciones.

En el ámbito de la ciencia y la tecnología, la información goza de un lugar destacado ya que permite la adquisición y actualización inmediata de los conocimientos y evita, por otra parte, la duplicidad de esfuerzos en el desarrollo de procesos de investigación.

Es así como, conscientes del papel que desempeña la información como instrumento del desarrollo, diversas instituciones dirigieron sus esfuerzos hacia la organización de un registro mundial de la información científica; tales esfuerzos condujeron, en cierta forma, a la creación de la Federación Internacional de Documentación, organización no gubernamental dedicada a la información y documentación científica y tecnológica a nivel internacional.

A partir de allí, asociaciones y organismos internacionales han desarrollado distintos aspectos de la información y documentación científica y tecnológica. La UNESCO, particularmente, ha auspiciado actividades encaminadas a establecer un Sistema Mundial de Información Científica que dió, como primer resultado importante, origen a la realización de la Conferencia Intergubernamental (París-1974) en donde se señaló a los Estados Miembros, en recomendaciones aprobadas por la Conferencia General, los lineamientos indispensables para establecer conceptos y objetivos, para la creación de los Sistemas Nacionales de Información/NATIS.

En lo que respecta a América Latina, diversos organismos se han abocado a resolver la problemática de la información científica y tecnológica, lo que ha dado como resultado la creación de entidades tales como el Sistema Interamericano de Información para las Ciencias Agrícolas/AGRINTER, el Sistema Andino de Información Tecnológica/SAIT y la Red de Información Tecnológica/RITLA, entre otras.

En Venezuela, las actividades tendientes a formar un Sistema de Información Científica y Tecnológica, han estado bajo la responsabilidad del Consejo Nacional de Investigaciones Científicas y Tecnológicas, organismo cuya Ley de creación le asigna acciones y responsabilidades relacionadas con las actividades de acopio y organización de la información científica y tecnológica.

En 1970, el CONICIT publica su primer documento sobre "Política Nacional relativa a la Investigación Científica y Tecnológica" y, en el mismo, se contempla la creación de un Centro Nacional de Información Científica que, posteriormente, da origen a la actual Dirección de Información Científica y Tecnológica del CONICIT. Entre 1974 y 1975, se efectúan, promovidos por este Consejo, una serie de encuentros sectoriales en diversas áreas, tales como Nutrición, Salud, Petróleo, Agricultura, Ecología, etc., y, en ellos, fue manifiesta la inquietud de los participantes en torno a los problemas de organización, procesamiento, recuperación y difusión de la información científica y tecnológica. Tal preocupación fue reiterada en el Primer Congreso Nacional de Ciencia y Tecnología (1975) donde se aprueban recomendaciones que refuerzan la organización del Sistema Nacional de Servicios de Información Científica y Tecnológica del país integrado por Bibliotecas Técnicas, Centros de Información, y las redes especializadas de información.

Basado en las recomendaciones anteriores, el CONICIT, a través de su Dirección de Información Científica y Tecnológica, se dió a la tarea de adelantar programas tendientes a establecer redes nacionales de información, organizadas por áreas, centros regionales de información para cubrir las necesidades de las regiones y centros de información especializados en función de las áreas prioritarias de desarrollo.

En la evolución de la política que, en materia de información científica y tecnológica ha venido adelantando el CONICIT, se ha concedido importancia a la materia, iniciándose, como consecuencia, el Proyecto Sistema Automatizado de Información Científica y Tecnológica/SAICYT, actualmente en implantación y cuyos objetivos, características, importancia y proyección, damos a conocer en esta edición del NOTICYT TECNICO.

¿Qué es el SAICYT?

El desarrollo tecnológico alcanzado en el campo de la informática, ha hecho técnicamente posible la realidad de obtener cualquier tipo de información al instante. Ello es factible al disponerse de bancos de datos y contar con las computadoras necesarias que permitan su manejo.
La otra manera, es utilizando modernas técnicas de teleproceso que permitan el acceso a base de datos a distancia que es, precisamente, uno de los objetivos que se ha trazado el CONICIT a través del Sistema Automatizado de Información Científica y Tecnológica (SAICYT), actualmente en organización.

El Sistema Automatizado de Información Científica y Tecnológica, como su nombre lo indica, es un sistema que mediante la aplicación de modernas técnicas de telecomunicación permitirá el acceso automático a bancos de información científica y tecnológica, económica y comercial existentes en el mundo.

Dicho sistema es considerado sumamente importante, ya que su implementación facilitará el intercambio de información entre Venezuela y el resto del mundo, abaratando los costos de acuerdo a la demanda del servicio. Persigue, igualmente, mantener actualizados a quienes trabajan en el sector, propiciando el uso de la capacidad instalada en equipos de computación disponibles en el país y favoreciendo su optimización. Por otra parte, facilitará el acceso a la información que se genera en el país y permitirá la interconexión entre los centros nacionales de investigación, de docencia y empresariales.

El Sistema Internacional

Mediante el Sistema Automatizado de Información Científica y Tecnológica, el usuario tendrá acceso a las más importantes bases de datos de las redes de computación existentes en los EE.UU., Europa y Canadá. A tal efecto, el CONICIT ha establecido varios convenios con empresas norteamericanas para la prestación de este servicio, una de ellas es la DIALOG-SYSTEM (California) y la venezolana Computer Science Corporation/CSC, empresa que establecerá la conexión con el exterior.

El DIALOG-SYSTEM agrupa en su seno a la mayoría de las grandes bases de datos existentes en el mundo y cubre áreas tales como: medicina, biología, química, física, ingeniería, desarrollo industrial, contaminación, psicología, sociología, educación, política, economía, gerencia, patentes, etc. Posee 3 bases de datos en el área agrícola, 5 en bio-medicina, 52 en ingeniería y tecnología, 22 en economía y comercio, 23 en ciencias sociales y humanísticas y 17 en áreas multidisciplinarias.

Otro sistema con el cual se ha establecido convenio para obtener este tipo de servicios es el ORBIT, el cual posee 67 bases de datos en las áreas anteriormente mencionadas. En total, entre ambos sistemas, se dispone de 189 bases de datos.

La Red Nacional de Información Automatizada

El **SAICYT** contempla igualmente, la estructuración y organización de la Red Nacional de Información Automatizada. Con este sistema se persigue el establecimiento de una red de servicios que permita conectar a todas las instituciones científicas y tecnológicas venezolanas, poniendo al alcance de los potenciales usuarios la información contenida en los diferentes computadores existentes en el territorio nacional. De esta manera, el CONICIT pondrá a disponibilidad de los usuarios varias líneas conmutadas (de discado directo), mediante el uso de líneas muertas instaladas por la CANTV.

La red nacional dispondrá igualmente de bases de datos naciona-

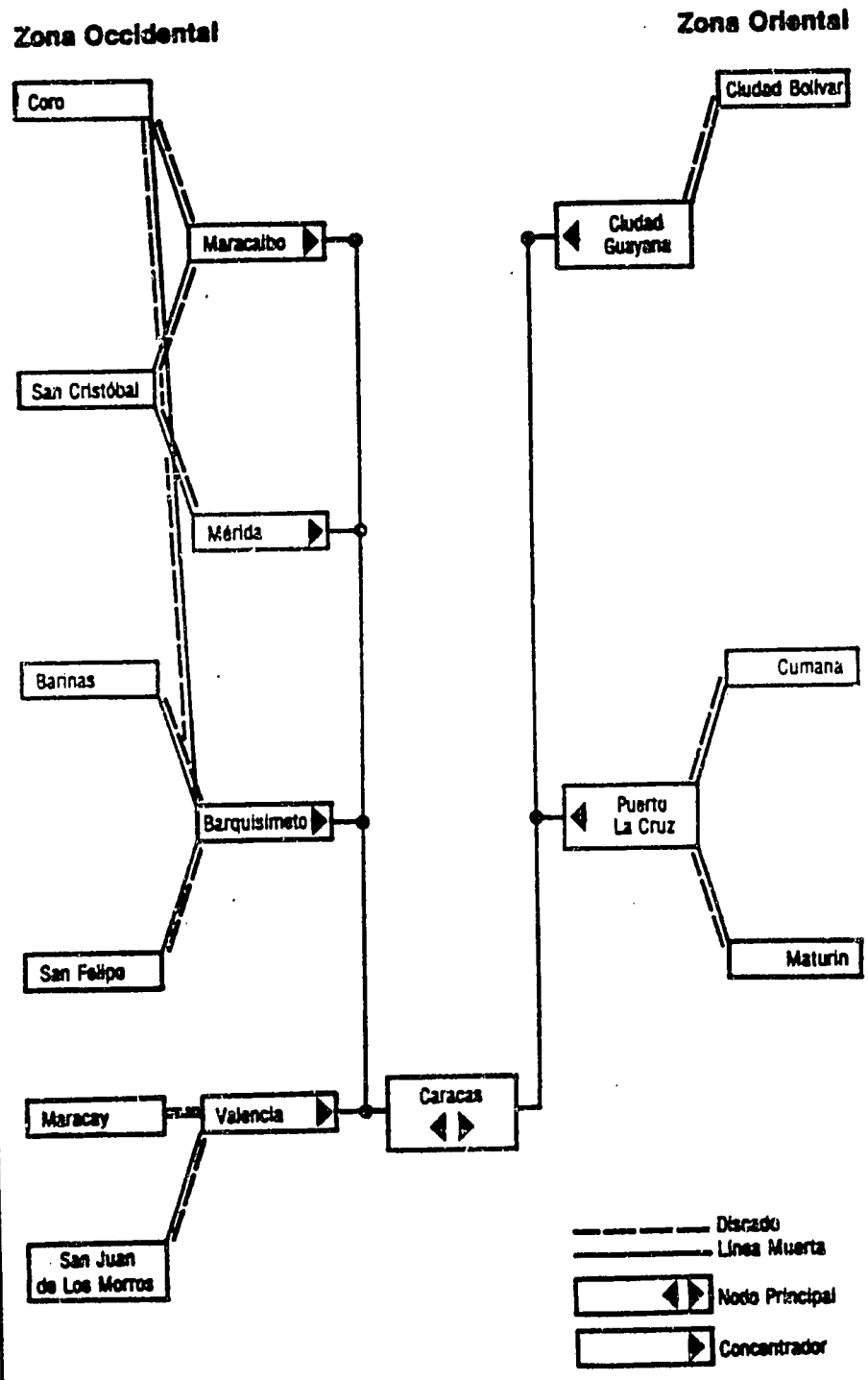
les que contendrán información sobre: **a/** Proyectos de Investigación en Curso **b/** Catálogo Colectivo de Publicaciones Periódicas y **c/** Bibliografía venezolana de Ciencia y Tecnología. Estas bases de datos facilitarán a los investigadores la labor de búsqueda de información en pocos minutos y desde diferentes lugares del país, para lo cual el CONICIT contará con un nodo de tele-comunicaciones (equipo que permite la interconexión entre los elementos del sistema) y líneas muertas dispuestas para las zonas Occidental y Oriental del país, con puntos de conexión en las ciudades de: Maracaibo, Valencia, Barquisimeto, Puerto Ordaz, Puerto la Cruz, Ciudad Bolívar y Cumaná. (ver esquema N° 1).

En ambas zonas, los usuarios de las ciudades no incluidas originalmente podrán tener acceso al nodo, discando a cualquiera de los puntos antes mencionados.

La red permitirá, además, la interconexión entre computadoras y/o terminales de diferentes regiones de nuestro territorio.

La Red Nacional de Información Automatizada garantizará, entre otras cosas, cobertura nacional; uso óptimo de los canales de comunicación con la consiguiente minimización de los costos; confiabilidad y seguridad, valga decir, calidad en la transmisión de los datos; versatilidad, esto es, capacidad para asimilar nuevos integrantes; modularidad, ya que podrían introducirse modificaciones sin que esto ocasione un cambio de diseño; normalización, puesto que la red obedece a criterios de estandarización que facilitan su articulación con las principales re-

Topología de la Red Nacional Esquema N° 1



des de EE.UU., Europa, Canadá y Latinoamérica.

El uso de la red también garantiza privacidad y confidencialidad, así como un estricto control sobre el acceso a la información. Este control sobre el acceso a la información está garantizado por normas de seguridad que no permiten el cruce de información, es decir, los usuarios dispondrán única y exclusivamente de la información que oportunamente soliciten.

Es de destacar que, desde el punto de vista técnico, está plenamente garantizado el funcionamiento de la red ya que se han tomado medidas para que, en el caso de que se presenten fallas en cualquiera de los elementos del circuito, no ocurra un colapso en la misma.

Servicios del SAICYT

Para la prestación del servicio a los usuarios, en lo referente al acceso a bancos en el exterior, el Sistema Automatizado de Información Científica y Tecnológica contempla varias modalidades, tales como: **atención remota** mediante discado directo. Para ello, la institución estará dotada de un terminal con modem, a través del cual se comunicará con Caracas, discando cualquiera de los números asignados. La otra modalidad es la **conexión dedicada,** para la cual el usuario deberá estar equipado de uno o varios terminales que estarán conectados con el nodo internacional de comunicaciones, lo que permitirá el acceso permanente, ya que tendrá una línea dedicada o exclusiva.

Aquellos organismos que no se hayan integrado al sistema, podrán hacer uso del servicio que presta el CONICIT. Igualmente, la Dirección de Información Científica y Tecnológica de este Consejo dictará cursos de entrenamiento a los usuarios.

La transmisión de datos

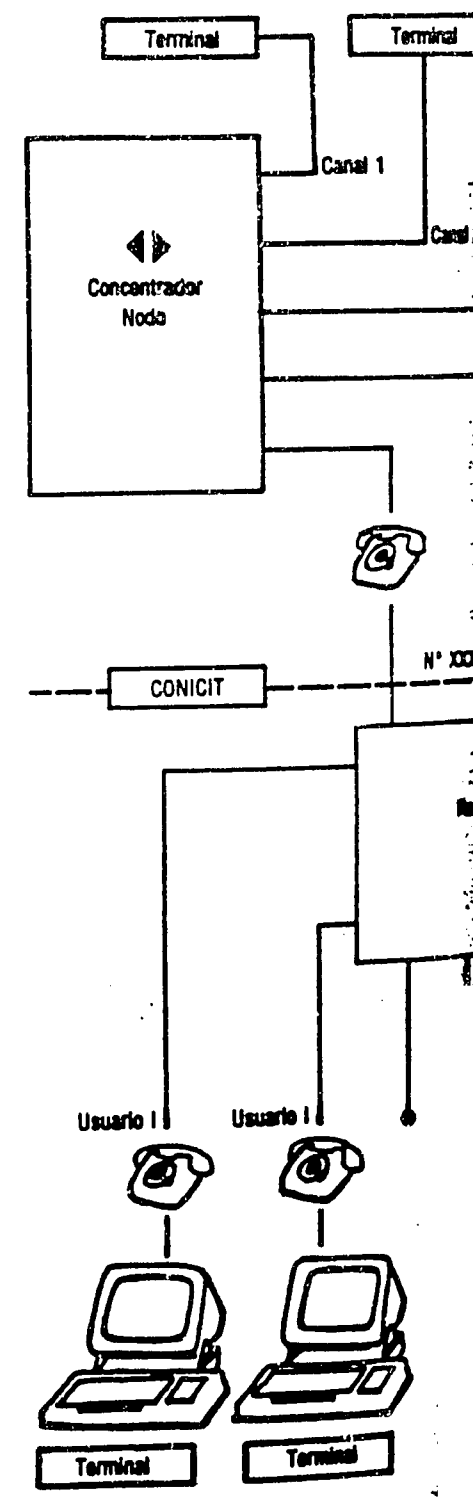
Este sistema de transmisión está constituido por un canal telefónico entre el CONICIT y la red de información en Estados Unidos. Dicho sistema consta de tres tramos: el primero de ellos está formado por un par de líneas muertas que conecta al CONICIT con el Centro Nacional de la CANTV; el segundo tramo, es un canal telefónico que forma parte del Sistema Internacional de Telecomunicaciones y que comunica la CANTV, en Caracas, con la Compañía de Teléfonos en los Estados Unidos; el tercero, desde la compañía mencionada hasta la red seleccionada en USA (ver esquema N° 2).

Cabe destacar que, la conexión internacional en Venezuela, se efectúa a través de enlace de microondas vía satélite, utilizando la rastreadora de Camatagua. En EE.UU. la rastreadora de Nueva York, es la que establece el contacto con la central telefónica de ese Estado, que comunica mediante línea dedicada con la red de información.

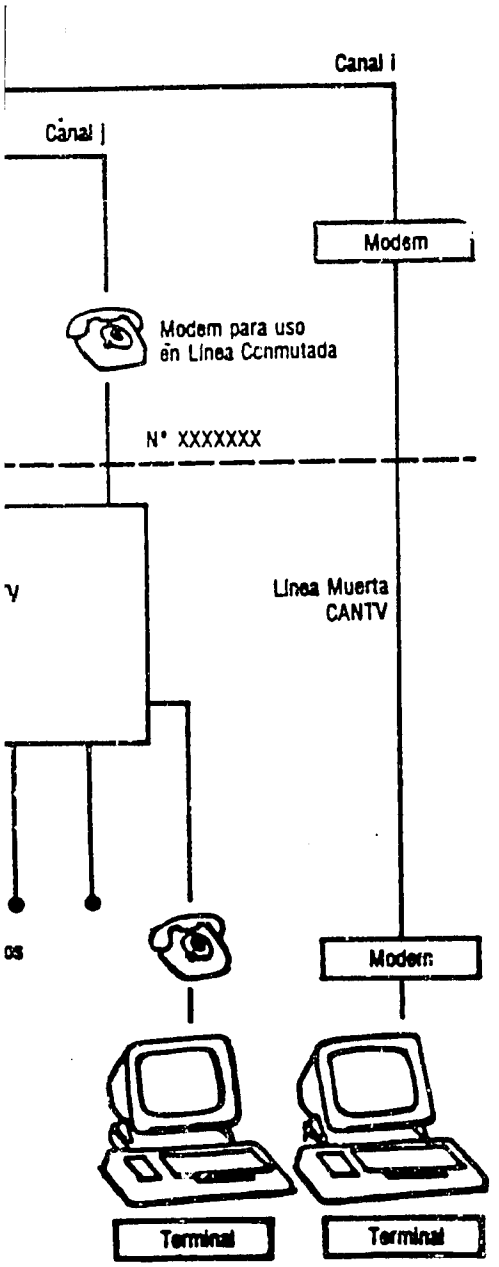
Costos/Inversión/en Equipos

Depende de los requerimientos de cada organismo en particular, pero de manera general se puede mencionar el equipo mínimo necesario para conectarse al sistema.

Configuración Básica del Sistema



Esquema No. 2



Costo en Bolívares

	Mínimo	Máximo
1 Terminal con pantalla	3.010,00	10.750,00
1 Modem (Convertidor de señales).	1.483,50	3.440,00
1 Impresor	3.010,00	12.255,00
Precio Promedio Estimado	Bs. 16.770,00	

Sin embargo, es de hacer notar que existen en el mercado modelos de terminales compactos que incorporan los 3 elementos antes mencionados en una sola unidad y cuyo precio es de aproximadamente 8.600,00 bolívares.

El único requerimiento específico es que los equipos cumplan con las normas emanadas del Comité Consultivo Internacional sobre Telefonía y Telegrafía (normas CCITT).

Estimación de costos por consulta

Factores que determinan el costo:

a/ Tiempo de enlace **b/** Base de datos accesada

Cálculo de costo estimado

Para lograr el "costo estimado promedio" del Servicio se tomará una consulta cuyo costo sea el mínimo y posteriormente una consulta cuyo costo sea el máximo:

Costo Mínimo:

Una consulta cuya naturaleza implique el uso de una de las bases de datos más baratas y cuyo tiempo de búsqueda sea el mínimo estimado: **10 minutos.**

Comunicación telefónica 10 min	120,00 Bs.
Base de datos 150 Bs. por hora de conexión.	25,00 Bs./10 min.
	145,00 Bs.

Costo Máximo:

Una consulta cuya naturaleza implique el uso de una de las bases más caras y cuyo tiempo de búsqueda sea el máximo estimado: **20 minutos.**

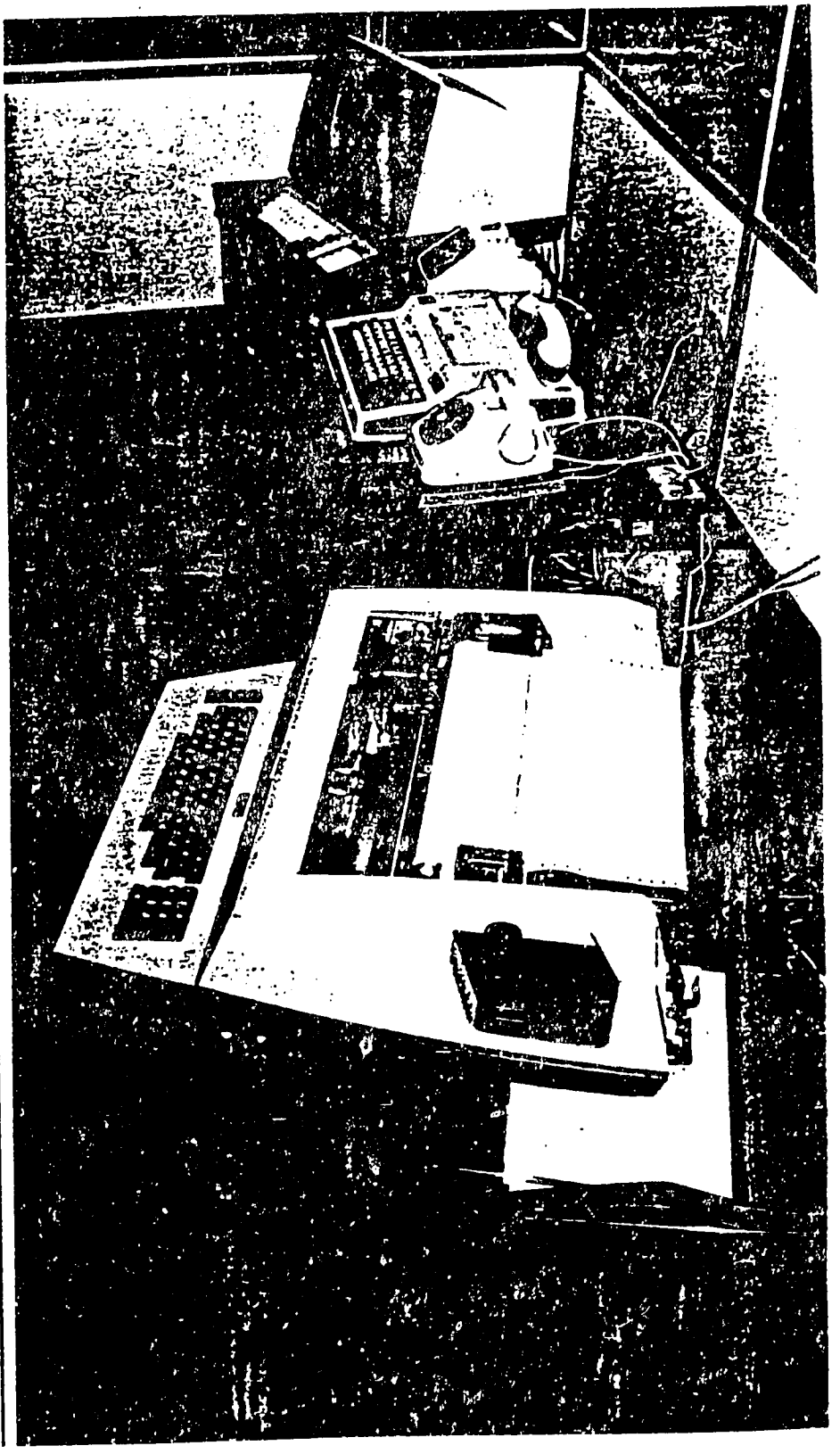
Comunicación telefónica 20 min.	240,00 Bs.
Base de datos 516 Bs. por hora de conexión.	172,00 Bs/20 min.
	412,00 Bs.

Entre estos dos extremos el costo aproximado de la consulta promedio es:

Comunicación telefónica 15 min.	180,00 Bs.
Base de datos 258 Bs. por hora de conexión.	64,50 Bs./15 min.
	244,50 Bs.

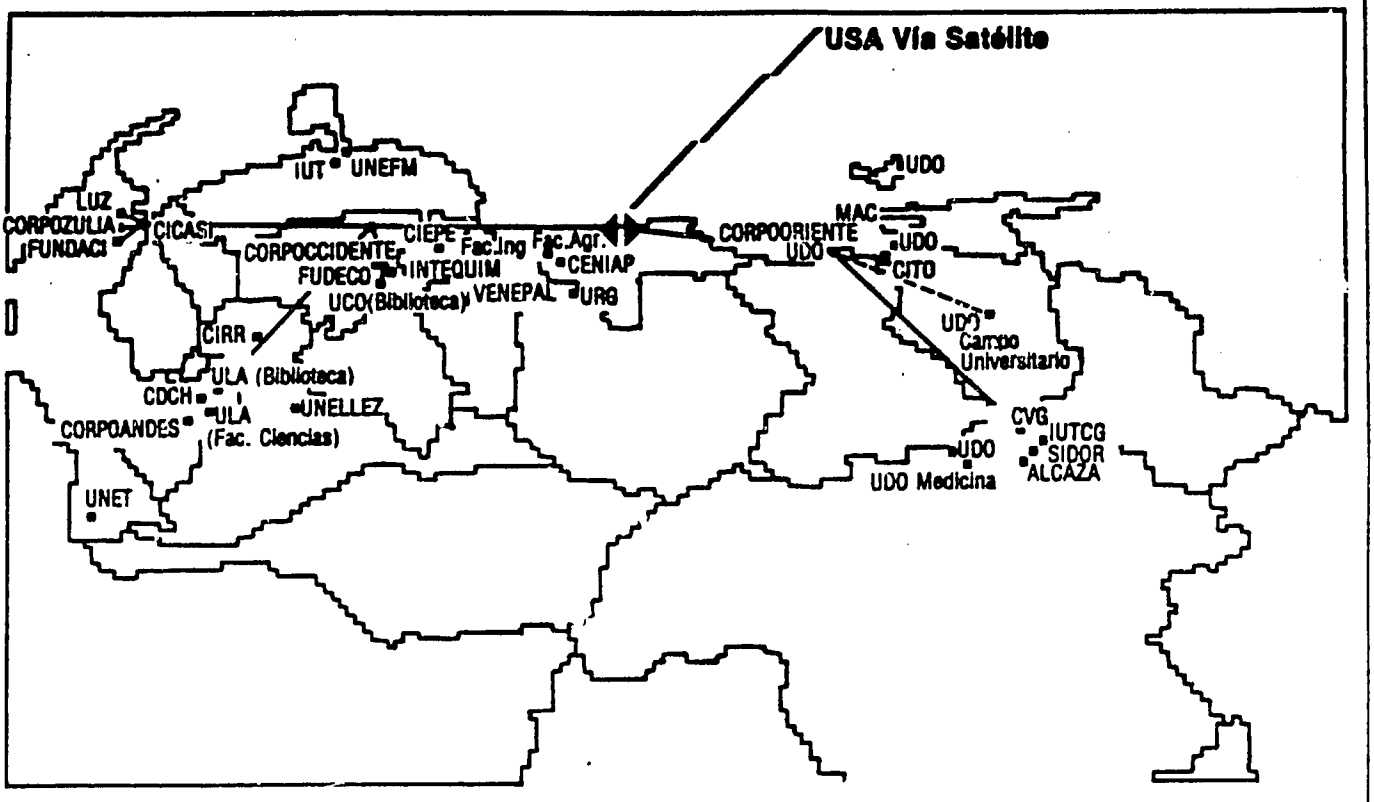
¿Cómo integrarse al sistema?

Las instituciones y personas interesadas en integrarse al sistema deberán manifestarlo por escrito al CONICIT y firmar una solicitud-contrato en el cual se comprometen a cancelar, a su presentación, las facturas correspondientes por el uso del Sistema. El CONICIT realizará los trámites necesarios para el otorgamiento del código confidencial que dá acceso al sistema y señalará el número telefónico en Caracas el cual deberá marcar el usuario para conectarse.

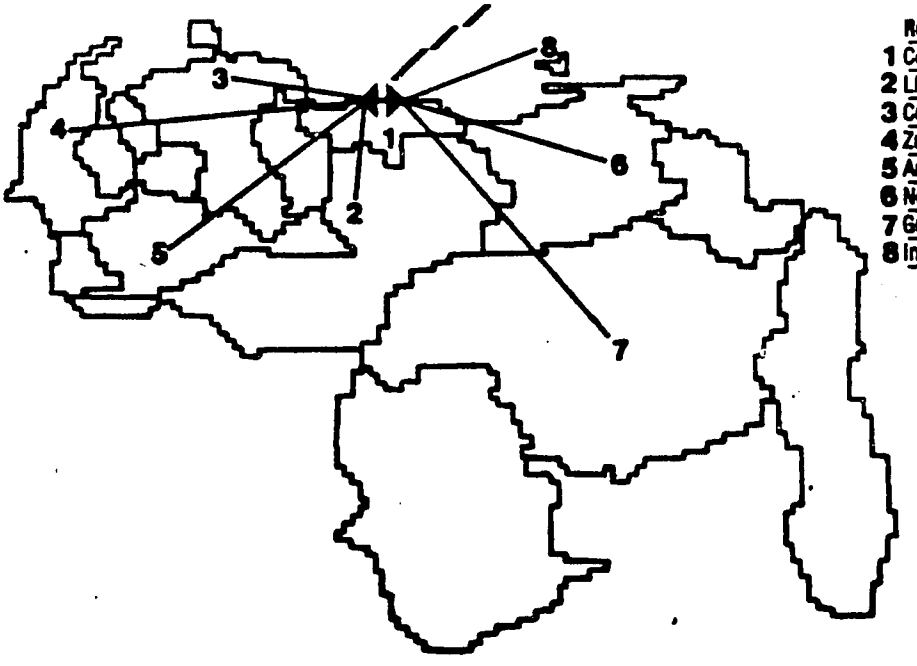


Un terminal con pantalla, el convertidor de señales y un impresor, el equipo mínimo necesario para conectarse al sistema.

Distribución de Centros de Investigación a Nivel Nacional



Distribución por Regiones de los Centros de Investigación y Desarrollo del País



Región	N° Centros de Investigación
1 Centro Norte Costera	292
2 Llanos Centrales	6
3 Centro-Occidental	16
4 Zuliana	28
5 Andina	37
6 Nor-Oriental	19
7 Guayana	8
8 Insular	2

Appendix F

ON-LINE DATA BASES CURRENTLY USED BY OAS/NTIS SEMINAR PARTICIPANTS

(Note: connect hour costs for BRS will be cited on the $35 per hour non-subscription base rate, to which is added the on-line data base royalty applicable in each instance. BRS has a range of off-line printing options; for purposes of comparison we will use the rate of $.10 per citation as the base rate, to which will be added the citation royalty. The off-line printing charges cited below for BRS will reflect the sum of those two figures.)

1. **AGRICOLA.** Representing the holdings of the National Agricultural Library in Beltsville, Maryland, AGRICOLA contains some 1,785,000 records. The file provides coverage of the worldwide periodical and report literature on agriculture and related subjects. It is available through DIALOG for $35 per on-line connect hour, $.10 per record printed off-line; and from BRS for $37 per connect hour and $.13 per record printed off-line.

2. **AGRINTER.** A regional information system of the Inter-American Institute for Agriculture Cooperation (IICA) in San Jose, Costa Rica, AGRINTER provides regional bibliographical data to the FAO's AGRIS data base in Rome through a network of agricultural libraries in Latin America and the Caribbean. It is thus a subset of the AGRIS system--subscribers to AGRIS have access to AGRINTER, although AGRINTER subscribers do not automatically have access to AGRIS. Material in AGRINTER tends to focus more on informal extension literature, such as pamphlets and brochures, than on the more formal documents found in the AGRIS system.

The products of AGRINTER include a printed index, "Indice agricola de America-Latina y el Caribe", published quarterly. Another service is the provision of AGRINTER in a magnetic tape format, retrievable for Selective Dissemination of Information (SDI) searches, retrospective searches, etc. IICA plans to distribute the tape to national centers that have computer facilities, and that will then create printed products for national constituencies. IICA would like to move from the printed indexes to computer-generated indexes. The cost of the printed index is $30 per year, SDI services are free. There is no on-line access at this time, although it has been discussed at various times. AGRINTER activites are supported by IDRC and the OAS, which is a primary funder of IICA.

Countries in the IICA/AGRINTER network as of January 1982 include Argentina, Bolivia, Brazil, Colombia, Costa Rica, Chile, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, Trinidad and Tobago, Uruguay, and Venezuela.

3. **BI/DATA TIME SERIES.** Updated quarterly, the BI/DATA TIME SERIES is a product of the Business International Corporation in New York and contains some 16,300 records. These records consist of as many as 317 economic indicators for 131 countries, not including the United States, presented in time series. Included are economic and marketing related activities such as production and consumption statistics, balance of payments, national accounts and demographics, and labor and international trade statistics. Sources of data include the United Nations, World Bank, International Monetary Fund, International Labor Organization, and the like. Available from DIALOG at $85 per on-line connect hour, $1.50 per record typed or displayed on-line or printed off-line.

4. **BIOSIS.** The BIOSIS System includes Biological Abstracts, Biosis Previews, and BioResearch Index. It is produced by Biosciences Information Service Philadelphia, Pennsylvania. It covers the entire life sciences including microbiology, plant and animal sciences, experimental medicine, agriculture, pharmacology, ecology, biochemistry, bioengineering, and biophysics. Database is over 1.6 million items (1978 figure), taken from over 3,000 serial publications, with an estimated growth rate of 240,000 items per year. On-line search services are available from DIALOG at $65 per on-line connect hour, $.15 per record printed off-line; from ORBIT at the same rates; and from BRS at $65 per connect hour and $.20 per record printed off-line.

5. **CA SEARCH** (CHEMICAL ABSTRACTS). The 5,900,000 records in the CA SEARCH (or CAS) data base contain the basic bibliographic information, plus keyword phrases and index entries, for all documents covered by the Chemical Abstracts Service of the American Chemical Society. It provides worldwide coverage of the chemical sciences literature from over 12,000 journals, patents from 26 countries, books, conference proceedings, etc., including biochemistry, organic chemistry, macromolecular chemistry, applied chemistry and chemical engineering, and physical and analytical chemistry. Available on-line from SDC/ORBIT for $65 per computer-connect hour, $.22 per record printed offline, $.13 per record printed on-line; from DIALOG for $68 per on-line connect hour, $.25 per record printed off-line, $.12 per record typed or displayed on-line; and from BRS for $61 per connect hour and $.22 per record printed off-line.

6. **COMPENDEX** (ENGINEERING INDEX). The COMPENDEX data base of some 1,174,000 records is the machine-readable version of the Engineering Index, which provides abstracted information from the world's significant engineering and technological literature. The COMPENDEX data base provides worldwide coverage of approximately 3,500 journals, publications of engineering societies and organizations, papers from the proceedings of conferences, and selected government reports and books. Available from DIALOG for $98 per on-line connect hour, $.40 per full record printed off-line, $.30 per full record typed or displayed on-line; from SDC/ORBIT for $98 per computer-connect hour, $.35 per citation printed off-line, $.25 per citation printed on-line; and from BRS for $85 per connect hour and $.32 per record printed off-line.

7. **DEVELOP**. Control Data's DEVELOP data base is an information resource and communication network designed to meet the information needs of developing agricultural and industrial economies. DEVELOP combines a systematic search-and-find operation with the storage-and-access capabilities of a worldwide computer network. Users can locate and share information about products, services, and sources of technical assistance in agriculture and food production, communications, education, energy, enterprise development, environment, food processing, health and medicine, housing, water, and other fields.

On-line access to the DEVELOP data base of over 15,000 documents is available through several fee arrangements. Large-volume users can pay a basic annual subscription fee of $3,000, which includes up to 200 on-line hours (about $15 per hour), available only at 300 baud. There is also an hourly use subscription arrangement for occasional users, $90 per hour with no annual fee attached; and off-line prints at $.30 per full record. Another

option, appropriate for medium-volume users, is a $500 annual subscription fee for the first year, $300 annually for second and subsequent years, plus an hourly access rate of $50 per hour. Finally, there is a private data base subscription service wherein Control Data staff work with the client to organize and make retrievable the client's own information and to provide access to both that information and the DEVELOP data base on-line. This service is available through special arrangement with the staff.

For users with no on-line capability, Control Data has instituted the DEVELOP Search Service. Clients can mail or telex requests to Control Data, which conducts the necessary search or supplemental research, and mails the response to the client. This service is $125 per request. Contact DEVELOP Search Service, Control Data Corporation, P.O. Box O, Minneapolis, Minnesota 55440, U.S.A.

8. **ENERGYLINE.** ENERGYLINE is the machine-readable version of Energy Information Abstracts (some 445,800 citations), a service of the Environment Information Center in New York. It provides a primary source for information relating specifically to energy. Data is drawn from many conventional discipline-oriented fields such as chemistry or engineering, but is incorporated into ENERGYLINE only as it relates to energy issues and problems. Coverage includes journals, books, Congressional committee prints, conference proceedings, speeches, and statistics. ENERGYLINE provides information on scientific, technical, socioeconomic, governmental policy and planning, and current affairs aspects of energy. Available from DIALOG for $90 per on-line connect hour, $.25 per full record printed off-line, $.15 per full record typed or displayed on-line; from ORBIT at the same rates; and from BRS for $80 per connect hour and $.20 per record printed off-line.

9. **ENERGYNET.** The ENERGYNET data base, also a product of the Environment Information Center, contains directory-type information on over 3,000 organizations and 8,000 individuals in energy-related fields. In addition to organization information, each record contains the names, addresses, and phone numbers of key energy contacts, and a narrative description of the organization's goals, where appropriate. Available from DIALOG for $90 per on-line connect hour, $.50 per full record printed off-line.

10. **ENVIRONMENTAL BIBLIOGRAPHY.** A service of the Environmental Studies Institute in Santa Barbara, California, the ENVIRONMENTAL BIBLIOGRAPHY contains some 216,000 records in the fields of general human ecology, atmospheric studies, energy, land resources, water resources, and nutrition and health. Useful to environmental researchers, chemists, land-use planners, librarians, etc. Available from DIALOG for $60 per on-line connect hour, $.15 per full record printed off-line.

11. **ERIC.** A project of the National Institute of Education, ERIC was initiated in 1966 as a data base on educational materials from the Educational Resources Information Center. It consists of two main files, Resources in Education, which identifies significant education research reports and projects, and Current Index to Journals in Education, an index of more than 700 periodicals of interest to the education profession, including information on counseling, management, rural education, testing, evaluation, etc. The file grows at a rate of some 30,000 citations a year. Many items can be lpurchased from the ERIC Document Reproduction Service in paper copy or

microfiche. Available from DIALOG for $25 per on-line connect hour, $.10 per full record printed off-line; from ORBIT for $35 per connect hour and $10 per record printed off-line; and from BRS at the same rate.

12. **FOOD SCIENCE AND TECHNOLOGY ABSTRACTS.** Produced by the International Food Information Service in Berkshire, England, FOOD SCIENCE AND TECHNOLOGY ABSTRACTS provides access to research and new development literature in areas related to food science and technology. Allied disciplines such as agriculture, chemistry, biochemistry, and physics are also covered. Disciplines such as engineering and home economics are included when relevant to food science. FSTA provides indexing to over 1,200 journals from over 50 countries, patents from 20 countries, and books in any language. Information in this data base supports research by scientists, technologists, marketing personnel, teachers, and scholars working in areas related to food science and technology. Available from DIALOG for $65 per on-line connect hour, $.15 per full record printed off-line.

13. **MANAGEMENT CONTENTS.** The MANAGEMENT CONTENTS data base provides current information on a variety of business and management related topics to aid in decision making and forecasting. Articles from over 400 U.S. and international journals, proceedings, and transactions are fully indexed and abstracted to provide information in the areas of accounting, decision sciences, finance, industrial relations, managerial economics, marketing, operations research, organization behavior, and public administration. Available from DIALOG for $80 per on-line hour, $.35 per full record printed off-line, $.20 per full record typed or dispklayed on-line; from ORBIT for $70 per on-line hour, $.35 per record printed off-line, and $.20 per record

printed on-line; and from BRS for $75 per connect hour and $.30 per record printed off-line.

14. **MEDLINE.** MEDLINE (MEDLARS ONLINE), produced by the U.S. National Library of Medicine, is one of the major sources for biomedical literature, with more than four million records. MEDLINE corresponds to three printed indexes: "Index Medicus," "Index to Dental Literature," and "International Nursing Index." MEDLINE indexes articles from over 3,000 international journals published in the U.S. and 70 other countries. Over 250,000 records are added per year, of which over 70 percent are English language. (Not available in Eastern Bloc countries.) Available from DIALOG for $35 per on-line connect hour, $.15 per full record printed off-line. BRS subscribers are given a special reduced rate of $15 per connect hour for the MEDLINE data base, plus a $4 per connect hour royalty charge. Non-subscribers are charged $35 per connect hour plus the $4 per hour royalty.

15. **NTIS.** The NTIS (National Technical Information Service) data base consists of U.S. government-sponsored research, development, and engineering, plus analyses prepared by federal agencies, their contractors, or grantees. It is the means through which unclassified, publicly available, unlimited distribution reports are made available for sale. State and local government agencies are now beginning to contribute their reports to the file, which now holds nearly one million records. The NTIS data base includes material from both the hard and soft sciences, including substantial material on technological applications, business procedures, and regulatory matters. Many topics of immediate broad interest are included, such as environmental pollution and control, energy conversion, technology transfer,

behavioral/societal problems, urban and regional planning. Available from DIALOG for $45 per on-line connect hour, $.15 per full record printed off-line; from ORBIT for $40 per on-line connect hour and $.10 per record printed off-line; and from BRS for $45 per on-line connect hour and $.10 per record printed off-line.

16. **PREDICASTS.** Based in Cleveland, Ohio, PREDICASTS includes a family of data bases known for comprehensive coverage of business and financial information. Data bases in the PTS family include:

PTS ANNUAL REPORTS ABSTRACTS, which provides comprehensive coverage of annual reports issued by over 3,000 publicly held U.S. corporations and selected international companies. Available from DIALOG at $120 per on-line connect hour, $.85 per full record printed off-line, $.80 per full record typed or displayed on-line; and from BRS for $95 per connect hour and $.50 per record printed off-line.

PTS F&S INDEXES, which covers both domestic and international company, product, and industry information. Contains information on corporate acquisitions and mergers, new products, technological developments, and sociopolitical factors. Available from DIALOG for $95 per on-line connect hour, $.25 per full record printed off-line, $.20 per full record typed or displayed on-line; and from BRS for $95 per connect hour, $.20 per record printed off-line.

PTS INTERNATIONAL FORECASTS, which contains abstracts of published forecasts with historical data for all countries of the world, including general economics, industries, products, and end-use data. Available from DIALOG for $95 per on-line connect hour, $.25 per full record printed off-line, $.20 per full record typed or displayed on-line; and from BRS for $95 per on-line connect hour, $.20 per record printed off-line.

PTS INTERNATIONAL TIME SERIES, which includes "Worldcasts Composites" and "Worldcasts Basebook." The former contains about 2,500 forecast time series consisting of about 50 key series for each of the 50 major countries of the world. Coverage includes population, GNP, per capita income, employment, productin or usage of major materials, products, energy and vehicles and other economic, demographic, industrial, and product data. The "Basebook" contains annual data from 1957 to date for aabout 125,000 series for all countries of the world, including production, consumption, price, foreign trade and usage statistics for agriculture, mining, manufacturing and services, as well as demographic and national income series. Derived from UN, FAO, OECD, EEC, and IMF sources. (DIALOG, $95 per on-line connect hour, $.40 per full record printed off-line, $.35 per full record typed or displayed on-line).

PTS PROMT, which abstracts information from newspapers, business magazines, government reports, trade journals, bank letters, and special reports throughout the world. Provides information such as acquisitions, capacities, end uses, environment, international trade, market data, new products, production, regulations, and technology. Covers products and services in the chemical, communications, computer, electronics, energy, fibers, food, instruments and equipment, metals, paper, plastics, and rubber industries. Available from DIALOG for $95 per on-line connect hour, $.40 per full record printed off-line, $.35 per full record typed or displayed on-line; and from BRS for $95 per connect hour, $.3 per record printed off-line.

17. **SCISEARCH** (Science Citation Index). SCISEARCH is a multidisciplinary index to the literature of science and technology, produced by the Institute for Scientific Information in Philadelphia, Pennsylvania. It

contains over 4.5 million records, including all of the records published in "Science Citation Index." SCISEARCH covers every area of the pure and applied sciences and includes 90 percent of the world's significant scientific and technical literature. Available from DIALOG for non-subscribers at $165 per on-line connect hour, $.25 per full record printed off-line; and for subscribers at $65 per on-line connect hour, $.15 per full record printed off-line. Tom DiRenzo of ISI reported at the Annual Meeting of the American Society for Information Science in October 1983 that developing countries with an annual per capita income of less than $1,000 are eligible for a 50 percent discount on ISI products. He also reported that both Brazil and Mexico use ISI tapes heavily.

18. **SUPERINDEX.** A data base geared toward the complex information needs of the scientific community, SUPE is a master index of back-of-the-book indexes from almost 2,000 professional-level reference books in science, engineering, and medicine, from over 20 major publishers. Available to BRS users at a flat rate of $60 per connect hour.

19. **ULRICH'S INTERNATIONAL PERIODICAL DIRECTORY.** Ulrich's contains references to more than 100,000 regularly and irregularly issued serials (periodicals) from 65,000 publishers in 181 countries. It allows access to any word of the title, frequency of publication, country where published, circulation, subjects, and names of abstracting and indexing services that cover the publication. It is a product of R.R. Bowker, New York. Available from DIALOG for $65 per on-line connect hour, $.20 per full record printed off-line; and from BRS for $75 per connect hour, $.20 per full record printed off-line.

20. **VITA** (Volunteers in Technical Assistance). VITA is a nonprofit organization that provides technical assistance to developing countries, with emphasis on small- and medium-scale technologies in renewabale energy applications, agriculture and food processing, water supply and sanitation, housing and construction, and small business development. VITA operates through a worldwide network of volunteers who offer their services for problem solving, on-site consulting, project planning, feasibility studies, etc. VITA maintains a specialized information collectin of some 40,000 documents from which it draws to answer questions received by mail. Plans are now in process for the use of a low-earth orbit satellite for information dissemination to VITA's clientele.

Smartmodem from Hayes Microcomputer Products

The Hayes Smartmodem contains a Z8 processor with 2K of ROM intelligence and has 17 option switches that are controlled through software. You need only an RS-232 cable and a direct telephone connection to put the Smartmodem into immediate operation.

I've always been fascinated with technology and have attempted to keep abreast of the latest gadgets in everything from photography to high fidelity, from automobiles to furniture, from television to computers.

Despite being a confirmed gadgeteer, I rarely discover anything so extraordinarily simple, useful and fascinating that I feel compelled to recommend that others immediately investigate it.

If your office has a PBX system, you can differentiate between pulse and touch-tone dialing with the modem.

When Hayes Microcomputer Products announced something called a Smartmodem, I must admit that I shrugged it off. I had used Hayes Micromodems for quite some time, and while I found them useful and dependable workers, I took mine for granted: It worked; what more could I need? A lot, as it turns out.

Features: The Smartmodem is a handsome modem packaged in a 1½ × 5½ × 10-inch "stackable" case. The unit uses a standard Bell 103 transfer system at any baud rate from 0 to 300 baud. (A Smartmodem that has transfer rates of up to 1200 baud is also available.) Full- or half-duplex operation is possible, as well as originate or answer modes. The unit performs auto-answer and auto-dial functions, should you need them. The unit is FCC-registered, meaning it can be directly connected with any modular-jack telephone system.

A closer look at the Smartmodem reveals a few features that you might not notice or expect in a low-cost modem unit. Inside, for instance, is a Z8 microprocessor with 2K of ROM "intelligence." Underneath, the cutouts show that there is a built-in speaker.

On the back panel, you find a volume control for the speaker. Behind the smoked-plastic front panel, seven light-emitting diodes monitor modem-ready, terminal-ready, send-data, receive-data, off-hook, carrier-detect and auto-answer functions.

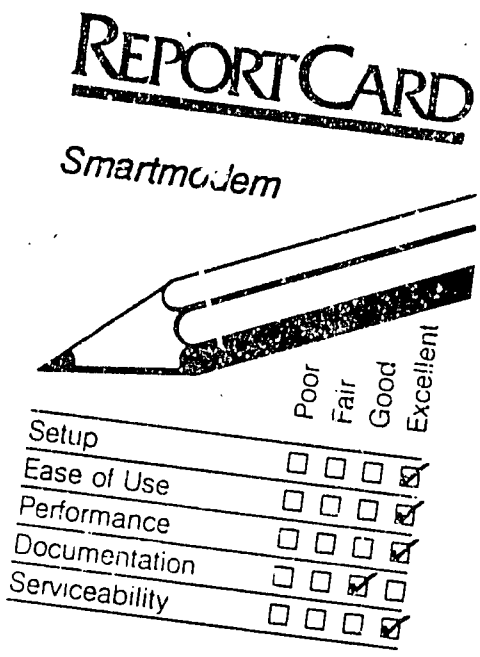
So far, nothing out of the ordinary—the Smartmodem has most of the standard features modem users desire.

But that Z8 processor really makes the Smartmodem, well, a smart modem. And the 17 software-settable option switches make it flexible.

You command the modem by sending simple ASCII command sequences. For instance, to dial a number and establish connection to a remote computer, you would type "AT D###-###-####" at your computer's console, substituting actual numbers for the # signs. The *AT* stands for attention, and the Smartmodem will usually manage to ignore things you type that don't start with or contain the AT command.

Performance: To check out the Smartmodem, I logged on to a remote computer that can work at variable baud rates. Using software that allowed me to switch baud rates in mid-conversation, I tried several baud rates. You haven't seen "slow" until you're logged on to a remote computer at 1 baud! The Smartmodem performed baud rate switches perfectly.

You can modify all of the timing parameters, such as how long you should wait for a dial tone before dialing. All worked as described in the manual. One unique feature relates to the switching between tradi-

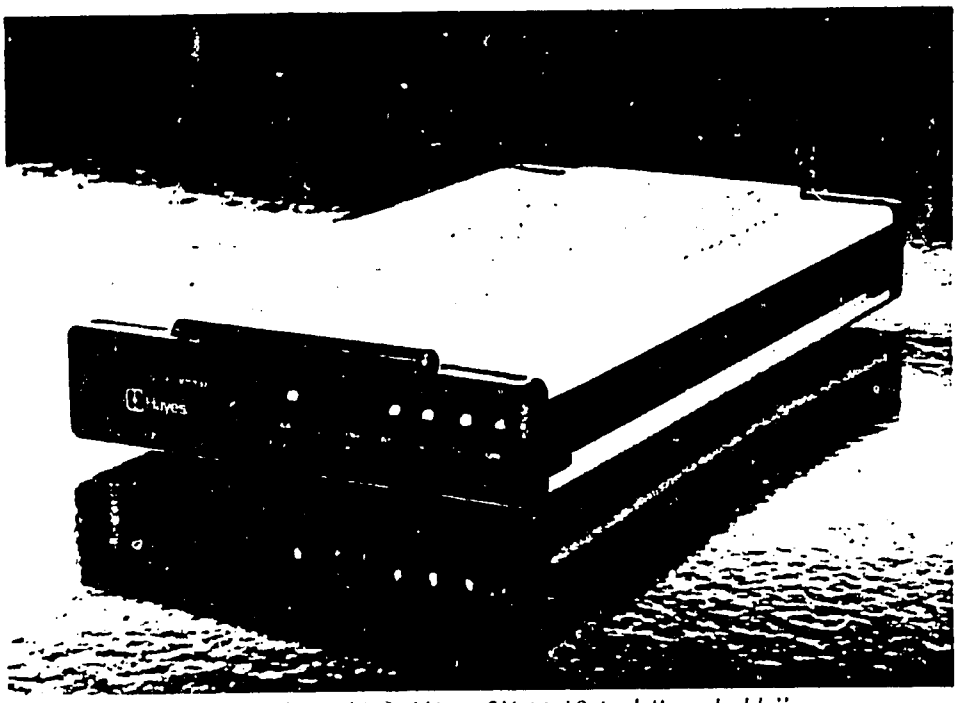


Features of Unit Tested

- *Serial, binary or asynchronous transmission; 7 or 8 data bits; 1 or 2 stop bits; full- or half-duplex; odd, even or nonparity modem*
- *Transfer rates of 0-300 baud*
- *Touch-tone or pulse dialing*
- *Seven LEDs for monitoring signal status*
- *Built-in speaker*
- *Z8 microprocessor and 2K ROM*
- *Bell 103-compatible*

Price: $289

Hayes Microcomputer Products, Inc.
5923 Peachtree Industrial Blvd.
Norcross, GA 30092
(404) 449-8791



The Smartmodem is packaged in a 1½ × 5½ × 10-inch "stackable" case.

tional pulse dialing and touch-tone dialing. If your office is on a PBX-type system, you can differentiate between the two. You might find it necessary to "dial" the PBX (usually the number 9), pause for a new dial tone and then proceed with the final dialing using the touch-tone method. The Smartmodem performed exactly as advertised, without producing any problems.

In short, the Smartmodem passed every test of its features I could think of.

Ease of Use: You have to try the Smartmodem to believe it—I've never used a modem that was so convenient to use.

That built-in speaker is a nice touch, for instance. The Smartmodem automatically plays the hookup dialogue through the speaker at the volume you set. You hear the number being dialed, and you hear if the remote unit is busy or if it's not. Furthermore, you can turn it off.

I accidentally found another asset of the Smartmodem. I make it a point to call various bulletin boards around the country to see what's going on. Unfortunately, numbers change and lines get disconnected. With my Micromodem I assumed that a bulletin-board system that didn't answer was busy. Not so with the Smartmodem—now I know why the connection wasn't made.

Imagine, if you will, sitting at your computer and instructing the Smartmodem to dial Remote Bulletin-Board Systems' All-Day, All-Night Dial-a-Computer. You hear the dial tone, the Smartmodem dial and the number ringing, and then you hear the operator saying, "I'm sorry, the number you have reached, ###-####, has been changed to ###-####."

That's exactly what happened on the third call I made with the Smartmodem. I would never have known this if I had used my Micromodem.

The ASCII text-command strings also make the Smartmodem quite simple to use. It took me only five minutes to write a BASIC program that automatically did all the preliminary work, redialed the phone if a connection was not made and saved the conversation in memory.

Documentation: Hayes' manual for the Micromodem series was one of the better pieces of hardware documentation when it first came out. With one qualification, the manual accompanying the Smartmodem is better than or equal to those of Hayes' earlier products.

My reservation is a picky one, but important. Every command is nicely described in the pocket-sized wire-bound booklet; every specification is carefully detailed; the manual is typeset, accurate and easy to read; and it even features some fine appendices. What the manual lacks, however, is some examples of how the Smartmodem fits into typical data-communications scenarios.

It would have been helpful, for instance, if there had been a chapter with examples of usage—perhaps one showing how to use the Smartmodem to log on to a large remote computer such as The Source, and including information on commands and common sequences.

The appendices include two such examples: "local networking with two Smartmodems" and "monitoring a low-speed data line." I found these merely mouth-watering morsels—I wanted more.

In all other respects, however, the Smartmodem documentation is first-rate.

Setup: You connect the Smartmodem to your computer with a standard RS-232 cable. A three-wire cable will do nicely, as a matter of fact, although you lose the ability to do things like turn the Smartmodem on and off using the data-terminal-ready line (DTR) and carrier detect by your computer. Neither of these last features is particularly necessary, but I can imagine some software that might make good use of them.

Serviceability: With all modems, the manufacturer must repair the unit in order for the Federal Communications Commission registration to remain valid. My past experience with Hayes' services has been good. The company has returned units promptly and without paperwork foul-ups.

The Smartmodem unit has a two-year limited warranty that covers the usual "defects in materials and/or workmanship" clause that we are all accustomed to seeing.

Summary: I was impressed by the Hayes Smartmodem. I used it on four computers, and it performed well. It is extremely convenient and eminently portable and requires only a three-wire RS-232 cable and a direct telephone connection to work.

Hayes also has a companion product, an RS-232 clock. Combining these, you end up with a "stack" that performs both auto-answer and auto-dial functions based upon the actual time.

Is the Hayes Smartmodem smart? I think so.

—Thom Hogan

Smartmodem 1200 from Hayes Microcomputer Products

Data communications is made simpler with a device such as the Hayes Smartmodem 1200. The Smartmodem is compatible with Bell 212A and 103 protocols, and is programmable. The unit is designed around the Zilog Z8 microprocessor and resides on two boards.

The modem is possibly the quintessential black box.

It is designed to sit unnoticed between a computer and phone line and to translate digital ASCII codes into acoustical signals that travel through the phone lines so a remote computer can interpret the code at the other end.

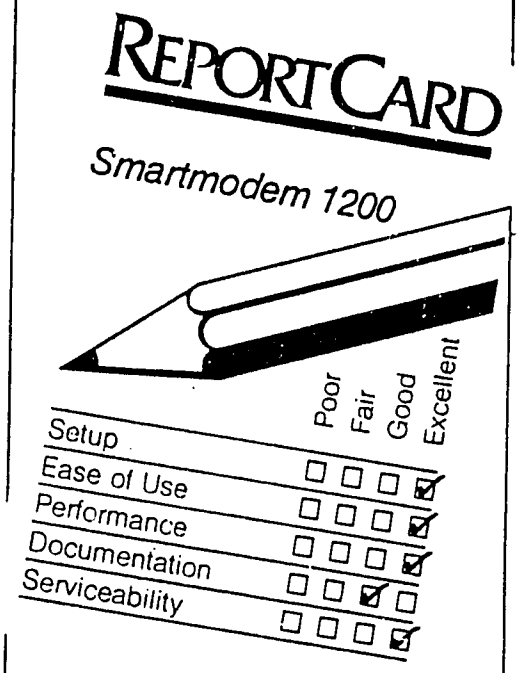
If it is reliable, the modem is an unsung hero. If it is not, or if the phone system between two computers is quirky and uncooperative, data communications becomes one of the greatest headaches personal-computer users experience.

Dramatic improvements in both the cost/performance aspects of modems and the degree to which modems are being integrated into personal-computer systems have taken place in the past year. It is safe to venture that within the next two years a modular phone jack will become a standard feature of personal computers. Now that modems have been successfully integrated onto single chips, why not?

Modems are doing more as well. The price of 1200-bps (bits per second) modems has fallen below the $600 level, and a new generation of intelligent modems have begun appearing that can function as stand-alone send/receive devices or include other integrated functions—clocks, memory, additional serial ports, additional intelligence that offers programmability—you name it.

Perhaps with the onset of digital communication links, the modem is destined for eventual obsolescence. It won't die an easy death, however; 1200-bps modems are beginning to proliferate, and I have heard hardware designers discussing the possibility of 9600-bps modems over voice-grade lines, using sophisticated military algorithms!

Several modem manufacturers have emerged as "names" in the personal-computer market as well. Both Hayes and Novation, long-time major forces in the Apple II modem market, offer stand-alone modems designed to function with a broad range of personal computers. (Stand-alone modems are devices that connect to computers through asynchronous ports.)



Features of Unit Tested

- *1200 bps and 0-300 bps speeds*
- *Bell 212A and 103 signaling protocol*
- *RS-232C port*
- *Auto-answer, auto-dial and auto-redial features*
- *Programmable capabilities.*
- *Eight front-panel status LEDs*

Price: $699

Hayes Microcomputer Products, Inc.
5923 Peachtree Industrial Blvd.
Norcross, GA 30092
(404) 449-8791

The Hayes Smartmodem 1200, which was introduced in the middle of 1982, is an elegantly designed piece of equipment. The most striking aspect of the Smartmodem 1200, for anyone accustomed to the vagaries of a generation of 300-bps acoustical modems, is the pure logic of its design.

The Smartmodem's design is so logical and natural that it is easy to use. You can address it directly from the keyboard of the personal computer, or you can instruct it with a series of commands that cover virtually any situation users face, and it is programmable.

You can embed the commands of the Smartmodem directly into a program on a personal computer, which permits you to have anything from automatic parameter control to automatic file transfer.

Significantly, it is a device that can be used immediately out-of-the-box by a novice, but it also contains enough power and flexibility for an experienced software designer to take advantage of its extensive programmability.

Features: The Hayes Smartmodem 1200 is a flat, self-contained unit, designed to sit on a desktop under a standard telephone or to be set on top of the Hayes Stack Chronograph.

The Smartmodem 1200 is compatible with the Bell System 103 and 212A protocols.

The unit itself is designed around the Zilog Z8 microprocessor and resides on two printed circuit boards inside an aluminum case.

It is small and slim in size, measuring 1.5 × 5.5 × 9.6 inches. The Smartmodem 1200 features full- and half-duplex modes; 1200 and 0-300 bps operation; automatically selected auto-answer, auto-dial and auto-redial capability for unattended operation; and touch-tone and pulse

dialing.

Additionally, the Smartmodem 1200 has an RS-232C interface and an audio monitor that allows the user to listen for busy signals and wrong numbers. As I already mentioned, it is programmable.

On the front panel of the Smartmodem 1200 are eight LED status lights that indicate the speed, the auto-answer mode, the carrier detect, the off-hook state, the receiving and sending of data, the terminal-ready mode and the modem-ready mode.

These lights are designed to give you a complete picture of the status of the modem at any time.

The back panel of the Smartmodem 1200 has an RS-232C interface, an on/off switch, a standard RJ11 modular phone connector and a volume control for the audio monitor.

By prying off the modem's front panel, you gain the possibility of altering the settings of seven configuration switches. These switches allow you to turn auto-answer on and off, turn modem response on or off, change the modem's response to commands from terse (numbers) to verbose (words), switch echo on and off, switch DTR (data-terminal-ready detect) on and off, switch carrier detect on and off and transform the RJ11 connector to RJ12 or RJ13.

The Smartmodem has its own simple command language that allows users to instruct the modem to dial, redial, use touch-tone or pulse dialing, escape to a local "command" state, set defaults, enable or disable the audio monitor and so on. Some of these commands allow the Smartmodem to alter in software its own switch and default parameter settings.

Performance: The Smartmodem 1200 that *InfoWorld* reviewed was tested with an IBM Personal Computer using the telecommunications program PC-Talk II. PC-Talk is a public-domain program written by Andrew Fluegelman. It is designed to work with the Smartmodem and allows you to store up to 60 telephone numbers and communication parameters.

During several months of testing, I regularly logged onto The Source, CompuServe and BBS systems. I transmitted files at 300 bps to a remote mainframe computer on a weekly basis and received articles electronically transmitted by outside authors.

Additionally, on a number of occasions I used the Smartmodem 1200 to download software from a Chicago-based IBM PC BBS using a prerelease version of PC-Talk III that supports Ward Christensen's Xmodem error-checking protocols. I successfully downloaded binary and ASCII programs ranging up to 68K at 1200 bps with no errors.

Throughout the test period the Smartmodem 1200 performed flawlessly.

To dial a number from the terminal, I first needed to enter the attention command AT in uppercase. This command precedes most commands. Next you type a D or dial command followed by a T or P command depending on whether you have a touch-tone or a pulse dialer. Then you follow that with the telephone number you want.

Thus a sample command might read: ATDT 856 9995< enter>. After you enter the command, the modem dials the number. If another modem responds, the Smartmodem 1200 detects the carrier and returns the ASCII string CONNECT. If, after a specified interval, there is no response, the ASCII string NO CONNECT is returned.

Command sequences can actually become quite elaborate. For example, you can describe a command string that instructs the modem to first pulse dial 9 and then touch-tone dial the phone number. Another example—you can write sequential commands transmitting phone number, ID number and password.

You have no command for altering transmission speed. Instead the Smartmodem 1200 senses the speed of the system with which you wish to communicate. It is necessary for you to preconfigure the speed of your hardware, either by switch or software command.

You can also program the Smartmodem to answer automatically. It is possible for you to program the number of allowable rings before it answers and to set other timing parameters.

This is ideal if you wish to set up a BBS system, or if you wish to perform automatic file transfer.

To take full advantage of the Smartmodem, you should write software that utilizes its programmability. Consider, for example, a program that would wake the Smartmodem up at 5:00 each morning, so that it could automatically dial The Source, log on and download the ten most recent news articles off the UPI wire and save the stories to a file on your personal computer's disk. Voila, you have a convenient electronic morning newspaper!

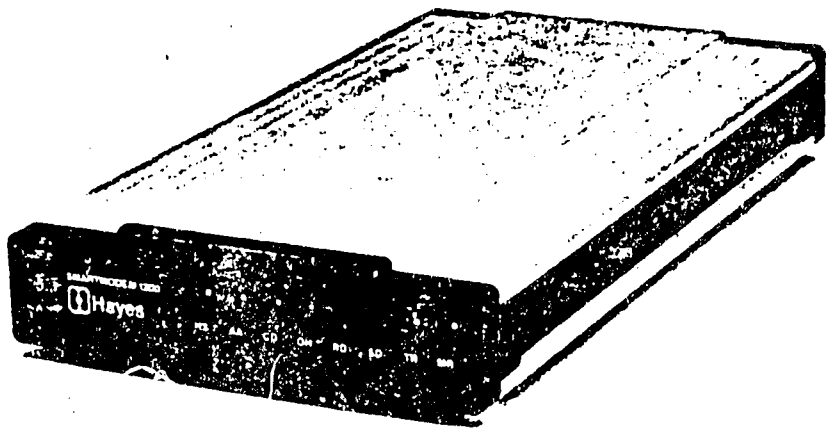
You can program the Smartmodem 1200 to answer automatically. You can program the number of allowable rings before it answers and set other timing parameters.

If left in operation for an extended period of time, the Smartmodem becomes quite warm, as its case appears to operate as an efficient heat sink. I encountered no heat-related problems during the review process, however.

InfoWorld's test was confined to writing several short basic programs that dialed and connected the Smartmodem to a remote computer.

One aspect of the Smartmodem's design that might be called into question is the Escape Code that allows you to go to a local command state while the modem is still connected. You might argue that this is a potentially dangerous command since ASCII character strings transmitted by a remote user or by a file being sent by the user might inadvertently trip the Smartmodem into a local state. You can alter or disable this parameter, however, so you can work around this problem. (Actually, you can alter or disable many of Smartmodem's parameters.)

Hayes has taken considerable care to select a sequence that cannot be duplicated easily. The default is three +++ characters surrounded by a



The Smartmodem 1200 is compatible with Bell System 103 and 212A protocols.

one-second interval.

I actually found this to be one of the most useful commands available from the Smartmodem. I used it frequently to go to a local state and execute the Hangup command to break a connection (ATHO).

During the review I used the Hayes exclusively connected to a direct Bell System line. Although I briefly attempted to connect it through a Mitel PBX, I was unable to dial out successfully.

According to a Hayes customer-support representative, PBX difficulties can be due to a number of different factors, including different locations for the tip and ring lines, the necessity for the PBX phone console to generate some proprietary code or peculiarities of the PBX central processor.

If you are planning on using a modem with an office PBX, be sure to check carefully with the manufacturer for special requirements.

Ease of Use: The Smartmodem 1200 is extremely simple for the novice to use. At its most elementary level, it requires only the ability to run a simple dumb-terminal program and enter a dialing command.

The entire range of commands that the Smartmodem offers is easy to understand and apply, and as you progress and gain experience, you will be tempted to try out more advanced features.

Documentation: The owners' manual for the Smartmodem 1200 is among the best in the industry. I withheld an "excellent" rating only because it does not contain an index, a minor flaw in this case.

The documentation easily spans the difficult gap between being readable and understandable for the novice and providing deeper values to a professional software and hardware designer. The manual is not an unwieldly monster, but rather a short and readable introduction to modems in general and to the Smartmodem 1200 in particular.

Principal sections of the owners' manual cover installation, fundamentals, dialing and commands. There are numerous clear charts, and a tear-out quick-reference card has been included.

The manual includes chapters on writing software for the 1200, chapters of background information on communication lines and modems and even an appendix on amateur-radio applications.

Serviceability: On one occasion I placed a call to Hayes to get information on the possibility of connecting the Smartmodem through an office PBX. I was promptly connected to a Hayes service representative who responded with a series of suggestions for connecting the modem to the telephone system. The ease with which you can call Hayes and get instant expert support is commendable.

Of special note is the fact that Hayes provides a two-year warranty with the Smartmodem 1200, far in excess of the industry's standard 90-day warranty.

Significantly, it is a device that can be used right out of the box by a computer novice.

The documentation contains a section titled "Return for Repair Procedure" that lists instructions for returning the Smartmodem for repair. Hayes asks owners to call customer service before sending the modem back.

Setup: Installing the Smartmodem is straightforward. You connect it with modular connector to the phone line and with an RS-232C cable to your computer or terminal. In some cases, it may be necessary to secure a modem eliminator if you have some unfortunate cable configuration.

In many cases you can determine if you have the correct cable by looking for a lit Terminal Ready light on the modem front panel.

You must also remember to set your hardware to the speed of the system you wish to communicate with.

Summary: The Hayes Smartmodem 1200 is a superbly designed piece of equipment. During my review, it performed flawlessly.

More important, it is one of those devices that stimulates the imagination by opening up a host of possibilities. I continually found myself wondering, "I wonder if I could do this or do that. . ."

What the Smartmodem 1200 needs now is a generation of intelligent software that will permit entirely transparent operation for the unskilled user. With equipment such as the Smartmodem 1200 and new multitasking 16-bit operating systems, the day of the electronic mailbox is not far off.

—John Mark

Microconnection from The Microperipheral Corporation

The Microconnection direct-connect modem enables Atari computers, as well as other microcomputers, to communicate with remote systems. With certain software additions, the Microconnection can receive files from electronic data bases and control ports.

The Microconnection from Microperipheral is a direct-connect modem that comes in several versions. The product I tested works with Atari 400 and 800 home computers, without requiring an 850 interface module.

You can also get versions of the Microconnection for the 850-equipped Atari, Osborne 1 and the TRS-80 Model I (bus-decoding), as well as an RS-232 version.

Features: The Microconnection comes with Tariterm, a software program the manual describes as "a terminal program for Atari 400 and 800 computers and the Atari bus-decoding Microconnection." This program enables the Atari to act as a terminal to a remote computer.

Microperipheral also has a couple of other programs that utilize the Microconnection. One of these is TSMART, which is a smart terminal program that allows you to receive programs and files from electronic data-base services and save this data for later use. Another program, Typer-A, allows the Microconnection to control an RS-232 standard input/output port.

Additional features of Tariterm include the ability to specify the right and left margins on the screen and whether to use the full- or half-duplex mode (as required by the system you connect to).

According to the documentation, you can select baud rate, word length parity and the number of stop bits with your software; Tariterm, however, does not support these features.

Performance: To use the Microconnection, you must first load the software. Loading the software is straightforward. Next, you connect the Microconnection and turn it on. Finally, you make the phone call and establish communication.

With the software loaded and running, I attempted to make a connection. After getting a few busy signals from a local bulletin board, I heard the phone ringing and hung up my phone. This accomplished the connection, and I was able to communicate with the remote system.

Ease of Use: The Microconnection itself is easy to use. The modem only has three buttons on the front. One is the power switch, which you leave on during use. You put the originate/answer switch in the originate position during use. You put the data/voice switch, which is initially in the voice position, into the data position as soon as you make a connection to the host computer, and then you leave it in that position for the rest of the time.

Although the Microconnection is simple to operate, it's not as easy to use as it could be for cassette-based systems. The design of the Atari peripheral port allows only one peripheral at a time. The disk drives have a built-in additional port that allows "chaining" (sequential connection) to another peripheral. The cassette recorder and the Microconnection do not have this feature.

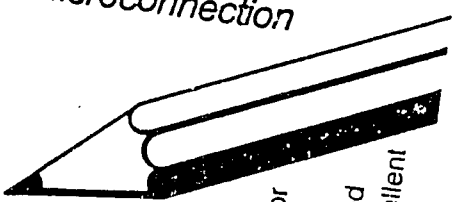
It would be a nice addition if you could connect the cassette recorder at the same time as the Microconnection. The present design requires you to first load the software and then remove the recorder before you can hook up the Microconnection. I would much prefer to have the Microconnection permanently attached.

Documentation: Although the infor-

The Atari peripheral-port design allows only one peripheral at a time. It would be nice if you could connect the cassette recorder at the same time as the modem.

REPORT CARD

Microconnection



	Poor	Fair	Good	Excellent
Setup	☑	☐	☐	☐
Ease of Use	☐	☐	☑	☐
Performance	☐	☐	☐	☑
Documentation	☐	☑	☐	☐
Serviceability	☐	☑	☐	☐

Features of Unit Tested
- *Atari 400 or 800*
- *BASIC Language Cartridge*
- *16K RAM*
- *410 Program Recorder*

Price: *$159*

The Microperipheral Corporation
2643 151st Place NE
Redmond, WA 98052
(206) 881-7544

mation that comes with the hardware and software is thorough, I found that I had to read the manuals carefully a few times before I could get the Microconnection to work.

The main reason I was confused was that the setup instructions for the Microconnection were in a users' manual, with a limited explanation of the software-loading procedure. The software-loading instructions were in a separate manual for the particular program, along with instructions for interacting with the program. It is not clear in the users' manual, where you learn how to connect the Microconnection, when you must switch over to the manual written for your version of the software.

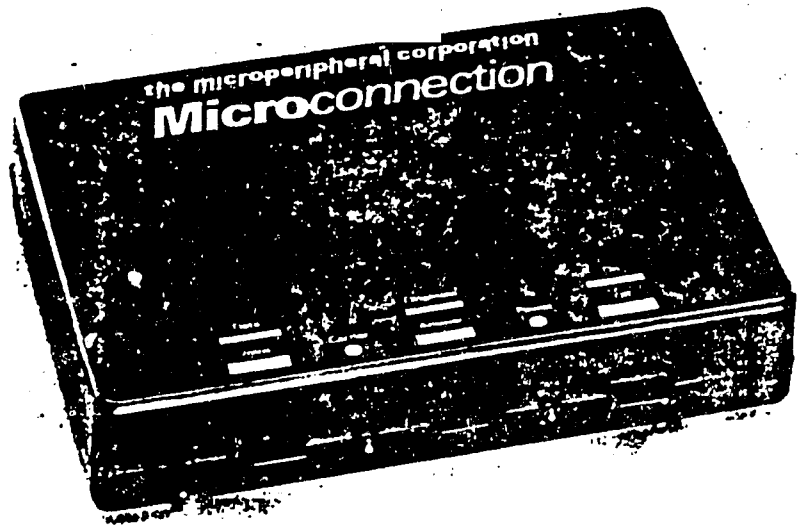
In fact, the users' manual indicates that it alone provides sufficient information to use the modem. It says, "This section will give you specific instructions for your computer." These "specific" instructions then advise you to "load the software . . . in the normal fashion." This is not thorough enough for the average home user. The users' manual should direct you to look in the software manual for your Microconnection version.

Microperipheral was responsive to my inquiries, promptly sending new software when I returned my defective cassettes.

Another problem is in the discussion of the auto-dial feature. Auto-dial is an option that allows the modem to automatically dial one or more preset phone numbers. The Tariterm manual includes instructions for using the auto-dial feature, and the Tariterm menu lists auto-dial. This option even gives a semblance of operating.

I spent a fair amount of time attempting to use the auto-dial feature. I looked through both manuals before I discovered that my version of the Microconnection does not support automatic dialing.

Only in a small section of the Microconnection users' manual, as opposed to the Tariterm manual, do you learn that the auto-dial option is unavailable for the bus-decoding version of the Microconnection.



The direct-connect Microconnection modem works with several computers.

Serviceability: The Microconnection's warranty is good for 90 days against failure due to defects in workmanship and components. For two years after the warranty period, you can return the modem to Microperipheral for repair and alignment at a fixed rate of $50.

The company was responsive to my inquiries. Microperipheral promptly mailed me new software when I returned my bad cassettes. Not so encouraging was a notice that came with the new software, informing me that the first 15 minutes of consultation would be free, after which I would be billed at a rate of $50 an hour with a $25 minimum. Although I do not know the policies of other peripheral manufacturers, this policy seems a bit strict for home-computer owners.

Setup: This is an area in which Microperipheral could improve the Microconnection in at least two ways. Both the power-supply connection and the telephone connection were more complicated than necessary.

When I hooked up the power supply of the Microconnection, I had to connect two wires to screws. Although this was admittedly not a difficult task, the bare wires could easily be a problem for the user who is not mechanically inclined. A naive user could inadvertently connect the wires so that they touch or make an incomplete connection. Although the power supply at the screw end does not provide enough current to be dangerous, the extra step is a possible source of trouble.

My other complaint with the setup procedure involves the telephone connection. The documentation suggests that almost everyone who uses Microconnection will have to purchase at least one additional piece of hardware. Although this additional hardware (a multiple-connection jack for the phone line or a universal phone line adapter) is not especially expensive, I was annoyed that I couldn't use my Microconnection until I had purchased another attachment to my modem. I think that Microperipheral could, by bulk purchasing, provide the necessary additional hardware without substantially increasing the cost of the Microconnection.

Summary: The Microconnection works well, despite some unfortunate design decisions. Minor revisions in the hardware design and a rewriting of the documentation would make the product completely satisfactory. Microperipheral should also consider releasing diskette copies of the software for the Atari owner equipped with disk drives.

—Clark N. Quin

Modem II from Radio Shack

Radio Shack's Modem II provides auto-answer and auto-dial features, under program or manual control, for TRS-80 computers. You'll need some new and customized software, though, to make the most of the capabilities of this Bell 103-type modem.

Several new modems have entered the market recently. The new low-end modems offer reliable operation at a reasonable price, and the higher-priced devices offer different and improved capabilities.

Radio Shack offers a line of modems designed to be used with its TRS-80 computers. The newest entry into that line is a modem providing automatic dialing and automatic answering under program or manual control; it's called Modem II.

Features: Basically, Modem II is a Bell 103-type modem capable of operating at 300 baud. It connects to the computer or terminal through an RS-232C port, so systems such as the TRS-80 Model III must have the serial-port option installed to use Modem II.

The modem is powered by a wall transformer and connects directly to the telephone system through modular plugs. If you're going to use Modem II in the Manual mode, you place it on the telephone line in series with a standard telephone instrument. You need no telephone instrument if you're only going to use it in the Automatic mode.

The modem automatically answers the telephone line and automatically dials numbers in response to commands the computer transmits to it through the RS-232C port. It operates in either the Originate or the Answer mode and in either full- or half-duplex. Six light-emitting diodes (LEDs) indicate the modem's operational status.

The device is housed in a plastic case that matches the gray cabinets of the TRS-80 line. Modem II is only about 2½ inches high, but it is not configured to physically support a telephone instrument. The switches are on the top, and the lights must be read from the top.

You can use Modem II manually as a "dumb modem," or you can program it to dial the telephone line using fast-rotary, slow-rotary or tone-dialing procedures. You can command the modem to perform a local-loop test, and you can use the switches to select Auto-answer, Originate or Answer-signaling modes, or to perform a remote-loop test with a second Modem II.

The device has a custom 8-bit microprocessor with a program contained in 1K of read-only memory (ROM).

In the automatic, programmed mode of operation, the microprocessor overrides the settings of the front-panel switches.

Performance: I have a favorite host computer in New Jersey that I call whenever I want to test the discrimination and staying power of a modem. When calling this number, you are almost guaranteed to have low signal levels, cross talk and strange popping sounds on the line. The combination of low signal levels and popping sounds frequently causes less capable modems to give up and disconnect. Modem II made it through this electronic gauntlet and performed well during an extended "New Jersey test."

The test functions built into the modem are comprehensive and provide you with some system troubleshooting capability. By setting the switches and reading the lights, you can determine if the terminal software and serial port are operating properly and if the modem's filters

The command-string requirements of the Modem II place a heavy burden on the smart-terminal software used to interface with the modem in the Automatic mode.

REPORT CARD

Modem II

	Poor	Fair	Good	Excellent
Setup	☐	☐	☑	☐
Ease of Use	☐	☑	☐	☐
Performance	☐	☐	☐	☑
Documentation	☐	☐	☑	☐
Serviceability	☐	☐	☐	☑

Features of Unit Tested

- *Bell 103-type modem (300 baud)*
- *On-board microprocessor able to respond to commands received over RS-232C data line*
- *Works with rotary- or tone-dialing systems*

Price: $249

Radio Shack
One Tandy Center
Fort Worth, TX 76102

and oscillators are aligned with those of another Modem II.

Ease of Use: I have always found the top of the computer to be an excellent place to put a modem. The placement

The Modem II can't be turned on until it hears the answer tone from a distant system on the phone.

of the controls and lights on the Modem II dictate that you must either place the unit next to the computer or that you must stand up to use it. Other than that, the controls are well marked, and initial setup is not difficult.

Modem II's Manual mode differs slightly from the manual operation of other modems. Most manual modems constantly listen for an answer tone from the distant end and turn on their own originate tone when they detect it.

The Modem II cannot be turned on until it hears the answer tone from the distant system on the phone.

The Modem II apparently only attempts to detect the distant end tone for the purposes of turning on its own tone during a two-second period after the power is applied. The entire power-on recognition and reply sequence takes Modem II about 8.6 seconds.

Most networks provide 20 seconds of answer tone. If they don't receive an originate tone within that time, they disconnect. Many electronic-message systems are set for a much shorter disconnect time. If you're operating a Modem II in the Manual mode, you must be prompt in throwing the power switch on when you hear the answer tone. A delay of only a second or two could result in disconnection.

You can instruct the Modem II to make itself available for programming in the automatic mode by either sending an asterisk down the RS-232C signal line or by creating a low condition on the DTR line in the RS-232C interface.

The modem responds immediately to a change in the DTR line, but you may have to transmit several asterisks before the modem recognizes the command.

If you use the asterisk to open the modem for programming, the software must look for an echo from the modem and retransmit the asterisk if it doesn't receive an echo.

Once the modem has entered the Program mode, you can command it to clear its memory, dial a number (using fast- or slow-rotary dialing or tone dialing), display the contents of the modem's memory buffer or conduct a local loop-back test.

The dialing command is the one you'll probably use most frequently. The D command is followed by the numbers to be dialed. You execute the dialing string by ending with the letter *X*. You can also insert pauses in the string to allow the modem to gain access to an outside line.

The Modem II does not accept the command-character string at the throughput speed normally associated with 300-baud transmission. The modem's input register is interrupt-driven, and the interrupt handling takes time. The modem must send each character in the command string, receive an echo and wait at least 33 milliseconds before it transmits the next character.

This requirement for measured and interactive transmission of the command string is further complicated by the requirement that the command string be sent in an 8-bit no-parity format. While 8-bit no-parity transmission is commonly used in message systems, many timesharing systems will only accept 7-bit even parity. You could be placed in the awkward position of having to change word length and parity to move from communicating with the Modem II to communicating with a host system.

These unique command-string requirements of Modem II place a heavy burden on the smart-terminal software used to interface with it in the Automatic mode. I know of no commercially available smart-terminal program that can reliably use a single keystroke (macro) to open this modem for programming and cause it to dial the phone. Modem II users must either develop or modify software to efficiently use the modem's auto-dialing capabilities.

Documentation: The Modem II manual is 33 pages long. It has a table of contents, but no index or glossary. It contains several clear illustrations of the switch positions to use for various modes of operation. The methods of connecting the modem to the telephone line and computer are also illustrated well. The manual provides flowcharts of the modem logic for the use of programmers writing modem-control software.

By setting switches and reading lights, you can determine if the serial port and terminal software operate properly.

The one unclear portion of the manual deals with command-string construction. The manual lists the commands and their functions, but readers need some examples of how the string is put together. The documentation never makes it clear exactly when you're supposed to enter certain commands into the line. A few examples would be a big help.

Serviceability: Traditionally, modems are low-maintenance items. Modem II operates without heating up and should be reliable. The modem uses small relays for dial pulse and line holding; these relays seem adequate for the job. Service is available through Radio Shack stores; the standard 90-day equipment warranty applies.

Summary: Modem II has the potential to become a useful device. But as the author of the Modem II manual candidly states: "When Modem II was designed, compromises were made between how much functionality could be packed into the ROM (it's only 1K!) and ease of programming." That statement is a good summary of this product's features. It takes some new and customized software to make the most of Modem II's capabilities.

—Frank J. Derfler, Jr.

Baby Blue from Xedex Corporation

Baby Blue, a circuit-board/program-disk package from Xedex, makes the IBM PC and IBM PC XT dual-processor machines. An updated version of the product, Baby Tex, works on the Texas Instruments Professional Computer and "all known compatibles."

Several periodicals have run front-page stories on the expected entry of "major" software houses into the 16-bit microcomputer-software market. Frankly, I'll believe it when I see it. Right now, when I look for software to run on my IBM PC, I see a number of warmed-over packages (many with serious bugs!) that don't really take advantage of the PC's capabilities.

At the same time, I can only afford to invest in one hardware system, and I want to be ready for the "major" programs if and when they come. A solution to this dilemma has been provided by the Xedex Corporation. It is called Baby Blue. (Xedex noted that a version of Baby Blue called Baby Tex has been released. A Xedex spokesman said that Baby Tex works on the Texas Instruments Professional Computer and all known compatibles.)

Features: The Baby Blue package includes both a circuit board and a program disk. The circuit board contains 64K of RAM and a Z80B processor. The RAM is available to both the 8088 processor in the PC and the Z80B. The software interfaces the Baby Blue's CPU into the PC. The IBM PC becomes a dual-processor machine that can run almost any software in the extensive CP/M-80 library while it waits for mature 16-bit software to emerge.

The 8088 CPU in the IBM PC sees the memory on the Baby Blue board as an additional 64K available for its normal use. The Baby Blue system is not recommended for installation on PCs that don't already have at least 64K of RAM installed. You can combine the memory on Baby Blue with additional memory cards to give the PC a 544K capability.

When the Baby Blue's Z80B CPU is activated, it can only access the 64K of memory on its card. The 8088 performs I/O functions for the Z80B, however. The 8088 and its memory also handle the overhead needed to perform the translation and routing of CP/M-80 programs. As a result, the Z80B runs quickly and suffers no penalty for being a "tenant" inside another system.

Physically, Baby Blue plugs into any of the PC's expansion slots. No modification of the PC, aside from setting the switches for the additional memory, is required. The circuit board is high quality and the memory consists of 64K chips.

Electrically, Baby Blue interfaces with all of the IBM peripheral-interface cards. Its Z80B works through the 8088 to utilize the disks, video cards and computer I/O ports.

The software provided by Xedex interfaces Baby Blue with the PC in two ways. First, it gives the PC the capability to read the old CP/M (CP/M-80) disks used by several different machines. Second, it attaches a header to CP/M-80 .COM programs that routes them to the Z80B in Baby Blue for execution.

The review version of Baby Blue was able to read disks prepared by the NEC PC-8000, DEC VT180 and Heath H-89 (40 tracks per inch). A note in the instruction manual explains that the menu of acceptable CP/M disk formats was originally intended to be larger, but that apparent hardware discrepancies on some PCs made some formats unreadable.

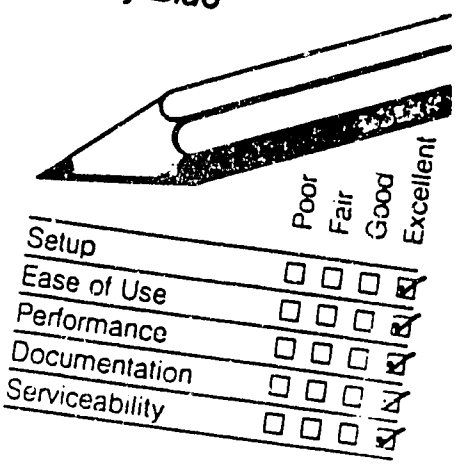
The people at Xedex told me that there have also been reports of problems reading the H-89 disks. Apparently, not all IBM PCs are created equal. This should come as no surprise. Early users of the TRS-80 and PET machines can tell many stories about different ROMs and operating peculiarities between seemingly identical machines. IBM users are sure to find more undocumented inconsistencies as the base of experience grows.

The Baby Blue software package includes a program to capture the data on the CP/M-80-formatted disk and to integrate .COM programs into the PC/Baby Blue system. The original CP/M disks are unchanged. You also get utilities to bind the special Baby Blue header to CP/M programs that might have been captured through the use of a communications program.

You use one utility to set the communications format that the PC uses. This utility works in the PC-DOS and is effective on 8088 programs, too. Use it to select between parallel and serial ports and to adust word length.

REPORT CARD

Baby Blue



Features of Unit Tested
- *Z80B CPU*
- *64K of RAM (nine 64 × 1 chips)*
- *Integrating software*

Price: $600

Xedex Corporation
222 Route 59
Suffern, NY 10901
(914) 368-0353

parity and baud rate.

Performance: Baby Blue performs in two roles: as a memory board and as a CPU plus memory. I can say little about its performance as a memory board except that it works. The memory board has no limitations and serves as an additional 64K of memory for the 8088.

I used the CPU features of Baby Blue in several different ways. In the first experiment, I used Crosstalk, a data-communications program available for both the PC and standard CP/M-80 machines from Microstuf. (Crosstalk is not included with the Baby Blue.) I loaded a PC-DOS version of Crosstalk into the PC and an appropriate version into a TRS-80 Model II running CP/M.

I hooked the two machines together through their RS-232C serial ports and transferred a number of .COM programs and WordStar files to the PC using the Verified File Transfer function of Crosstalk. The .COM files included a spelling checker, a spreadsheet and a number of short utilities.

Incidentally, you might violate a software license if you run the same copy of a program in two machines. The ethics of the situation are up to you. Technically, transferring the data is easy.

I specified a filename ending in .CPM for each .COM program I captured. I could have also used the Rename utility in PC-DOS to give each CP/M-80 program a .CPM file specification. Then I used a simple BIND *.CPM command to attach the Baby Blue header to each .CPM file. The BIND.COM program created a new .COM program from each of the exixting .CPM files.

I ran each of these programs and they performed nearly identically to the way they had performed on the Model II. The only noticeable differences in program operation came from differences in the PC hardware—disk-access time and scrolling of the memory in the video card—and not from the processor or DOS in use.

In a second test, I borrowed a disk of CP/M programs from the owner of a Heath H-89. I used the Baby Blue's binds the Baby Blue program heading to .COM programs coming from the CP/M-80 disk and writes them to a PC-DOS disk. You can use a single-drive system with little disk swapping.

The Convert utility worked as advertised on my PC, but, as I stated above, Xedex says that some users have encountered problems on some machines. Xedex now has available an improved sector-by-sector conversion program, which opens up about ten more disk formats for use as data sources. This program will handle CBASIC and DOS 2.0.

In summary, the Baby Blue system performed as advertised within the obvious constraints of the hardware and peripherals supporting the PC. It works efficiently as a Z80-based CP/M machine within the IBM PC chassis.

Alan Bowker, a Xedex executive, says that CP/M programs actually execute up to four times faster in Baby Blue than in comparable CP/M systems. The practical speed difference between systems is dependent upon many factors, particularly the amount of disk and I/O use, but certainly the Baby Blue is both fast and easy to use.

Potential buyers should note that software requiring specific hardware will probably not run in this dual-processor configuration, but the majority of CP/M-80 software will work fine in the Baby Blue/IBM co-processor machine.

Ease of Use: Two factors are important here: ease of installation and ease of operation. Installation of the Baby Blue hardware takes only minutes. The board fits into any PC expansion slot and no jumpers or other connections are required.

Installation of the software consists only of copying the master disk and making sure that the bind, header and Convert utilities are available to the system whenever they are needed.

Operation of the Conversion utilities is simple. There is no real "operation" of the hardware. If the system reads a program with the Baby Blue header, it executes it in the Z80B. If it reads a program without the header, it executes it in the 8088. Z80 and 8088 programs can be intermixed on the disk and run in succession with no

fied because the Baby Blue simulates the TeleVideo 950 terminal. This terminal is usually found as an option on the installation programs of most major software packages.

The original Baby Blue software worked with PC-DOS versions 1.0 and 1.05. When IBM released version 1.1, Xedex was forced to rewrite the header. Xedex provided the updated header to its registered owners within a reasonable time after DOS 1.1 was announced. Xedex charges $10 for an updated Convert program that will work with PC-DOS 1.1.

Xedex had to check thoroughly to ensure that the individual machine differences already discovered didn't affect the new software. Obviously, the integration of the two CPUs is dependent on the operating system. Future buyers should check specifically to ensure that the version of Baby Blue they purchase will integrate with whatever operating system is in use.

Documentation: The Baby Blue documentation is excellent. It consists of a 40-page document (printed on blue paper, of course) that includes pictures, illustrations, a table of contents, a good index and useful appendices. It is punched to fit into the ring binders of the PC operating manuals. It is written in a friendly style, set in professional type and filled with good information. A true purist might complain that it lacks schematics or logic diagrams, but I call it a first-rate manual.

Serviceability: Physically, the Baby Blue circuit board is not complex. The parts and materials are high quality and have no significant heat or power-consumption problems. Xedex provides a 90-day warranty on the hardware. It does not guarantee that the software will work with every program.

Summary: The Xedex manual for Baby Blue provides a good summary when it says: "We don't expect Baby Blue to hang around forever, although it will always be 64K of usable RAM." Someday programs written to take real advantage of the power of 16-bit processors will emerge. Until that day, Baby Blue costs more than a 64K RAM board, but it does a lot

Quadboard from Quadram Corporation

The Quadboard combines commonly needed IBM PC features on a single card, thus making efficient use of one of the PC's five expansion slots. Quadboard combines the functions of a clock, serial port, parallel printer port and RAM on a single card.

IBM says its Personal Computer has five expansion slots. In this case, IBM may be misusing the word *expansion*, because cards that play a vital role in the operation of the basic system occupy several of these slots.

The disk controller and video card occupy two slots in most systems, and the parallel-interface card takes a third. Additional RAM memory is often put on a fourth card, leaving only one slot for a serial port, game card, second CPU, hard-disk controller or any of the many other available functional cards.

One of the first companies to see a large market for this limited space was Quadram Corporation. It offers the Quadboard, which combines the functions of a clock, serial port, parallel printer port and RAM on a single card. It then added RAM-disk software to the Quadboard package.

Features: The Quadboard allows you to put the most commonly needed PC expansion features into one slot. It contains an RS-232C serial port that exactly duplicates the function of the $150 IBM serial card. The parallel-printer port emulates the parallel port found on the monochrome display board. You can use either of these ports as a second port to one existing in the system.

Two dip switches control the port selection and status. These switches also control memory size, memory bank selection and clock status.

The clock on the Quadboard is both a clock and a calendar. The Quadram distribution diskette contains BASIC and assembly-language programs that integrate the hardware clock with the system. You can make either of these programs part of an AUTOEXEC.BAT file so system time and date are set whenever you boot the DOS. The clock has an on-board rechargeable battery that can keep it alive for several months if the computer is not turned on.

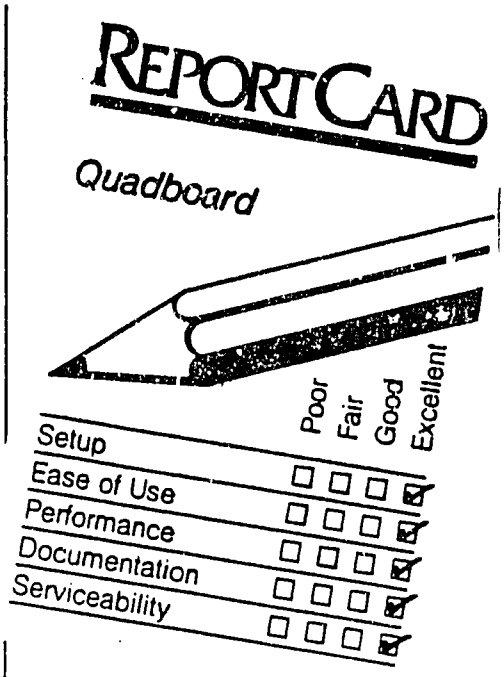
The RAM portion of the Quadboard holds nine 64K chips in four rows. The PC uses the ninth chip for parity checking. The RAM chips are in sockets and you can order the board in a 64K or 256K version. You can easily add chips to boards that are originally delivered with less than 256K.

The Quadboard's RAM would only be a lot of memory if it weren't for the addition of the QuadRAM-Drive program. QuadRAM-Drive provides what is generically known as RAM-disk operation. A portion of the system memory acts as a solid-state disk drive.

The system intercepts the operating-system calls to drive C or D (depending on how many drives are in the system) and sends them to the memory. The DOS acts as if it is reading and writing data to and from a fast mechanical drive. You must load program or data files into the RAM-disk each time you start or restart the system, but this can also be part of a AUTOEXEC.BAT file. A RAM-disk system such as QuadRAM-Drive can cut the running time of certain kinds of disk-intensive programs by 80% or more.

The disadvantage of RAM-drive systems is the need for discipline. Since the system is manipulating files in volatile RAM, you must save any new data to a mechanical disk drive before the system shuts down. If the system is shut off, crashes or suffers a power failure, you'll lose the files that were created only in the RAM-disk.

Fortunately, PC-DOS allows good cross-disk file creation and access, so it is possible to automatically write a created file to a mechanical disk while doing the normally time-consuming reads from the fast RAM-disk.



Features of Unit Tested
- *RS-232 serial port*
- *Parallel printer port*
- *Clock/calendar*
- *Expansion RAM in 64K blocks*

Price: $395 (with 64K RAM)
$595 (with 256K RAM)

Quadram Corporation
4357 Park Drive
Norcross, GA 33093
(404) 923-6666

Performance: The performance of the Quadboard is excellent in every way. Physically, the large board is sturdy and exhibits no hot spots. The parallel and serial ports use exactly the same addresses (and many of the same parts) as their IBM counterparts and operate with all standard software.

I used the serial port in a local loop with another system at 9600 baud with no problems. In addition, I used the parallel printer port with both the IBM printer and a Smith-Corona TP-1, with no difference from the IBM card. The connectors are exactly the same as those used on the IBM

boards, so you need no special adapters or arrangements.

One particularly useful feature is that you can designate the Quadboard ports as secondary ports to other ports in the system. Various software packages allow you to use two different printer or serial ports. The Quadboard serial port can operate as port 2 under PC-DOS 1.1. Some older boards that carry two serial ports cannot function under DOS 1.1 because of a change in the interrupts.

The clock/calendar operates with good accuracy. A trimmer capacitor is available to adjust the timing of the clock if it drifts. The clock power-on programs set the system time to the clock time.

The RAM set worked as it should. The chips on the two Quadboards that I saw were from Motorola. The QuadRAM-Drive software worked well with both PC-DOS 1.0 and 1.1.

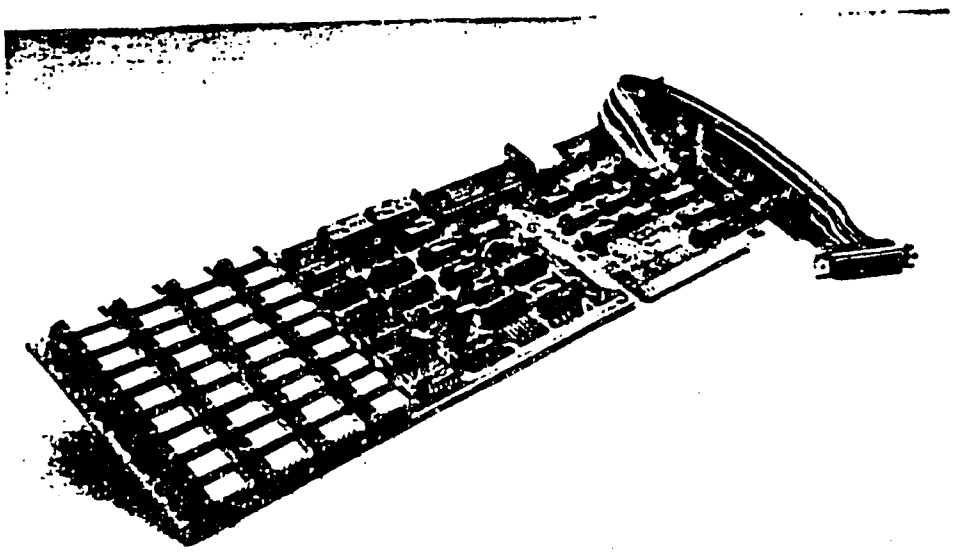
Ease of Use: You must consider both the ease of installation and of operation with a product like the Quadboard.

The installation is only a trifle more complex than the installation of most other IBM expansion cards. All installations require you to remove the PC's cabinet (two screws), remove one of the small back panels over the expansion port (one screw), insert the card and replace the screws. As with all memory cards, a Quadboard installation requires you to set the size of the system memory using one of the dip switches on the main system board. This only takes a moment, after you read the documentation.

Because there isn't room on the back panel of the Quadboard for the two DB-25 connectors you need for the printer and serial ports, the printer connector is routed off the board with a socket, header plug and ribbon cable.

A DB-25 socket on the end of the ribbon cable is designed to be mounted in the knockout hole found in the back panel of most PCs. (I say most PCs, because I understand several production runs came out without this knockout hole.)

To find this hole, follow your keyboard cable to the back of the PC. Directly above the keyboard and cassette plugs there is probably a rectangular snap-on cover. If it is there, you can install the Quadboard easily and neatly. If it isn't there, you can still run the ribbon cable out between the cabinet and the back panel, but it won't look as pretty.



Quadboard lets you put commonly needed PC expansion features into one slot.

In the Quadboards I saw, it was possible to improperly insert the header plug from the printer cable into the socket on the board. There was no key to distinguish top from bottom. The direction in which the cable came out of the plug gave you a good clue, but it was still easy to insert incorrectly. When I asked about this, Charlie Henderson of Quadram said that the company is now putting a dot of color on the socket and the board to show the proper orientation.

The installation of the Quadboard takes only a few minutes and requires no special knowledge aside from the directions in the manual.

The use of the Quadboard software is also quite simple. You use two programs, SETCLK and PWRUPCLK, to set the hardware clock and to integrate the hardware clock with the system time. The QuadRAM-Drive software is a small program with only one variable—the number of 32K blocks you use for the QuadRAM-Drive. All you do to use the QuadRAM-Drive is to type QD followed by the number of 32K blocks of memory you wish to use.

This software selection of the RAM-disk size gives you good flexibility, so you can operate your system with many different kinds of programs. If you are using a program with many arrays, you can allocate more RAM to the transient program area. If you need to access large data files, you can allocate the maximum amount of memory to RAM-disk. You always have to give the PC 64K to operate in, so the minimum RAM you need in a system using QuadRAM-Drive is 96K.

Documentation: Most of the documentation that I received was stamped "preliminary" or "under revision," but it still looked good. The manual covers installation and operation and is written in an easily understood manner. The operating manual is sized and punched to fit into the IBM documentation binders. If Quadram retains this manual, but expands the index, the documentation will provide a good guide to the use of the Quadboard.

Serviceability: If any of the major functions of the Quadboard fail, you have to send the board back to Quadram. It provides a one-year warranty on parts and labor. The memory chips are socketed, so you could do some troubleshooting by swapping chips, but you probably would not get warranty coverage. The other ICs are soldered in.

Summary: The Quadboard lets you add the most commonly needed expansion features to the IBM PC, while saving both space and money. The QuadRAM-Drive feature can greatly increase program execution speed in even a relatively simple system.

—Frank J. Derfler, Jr.

MicroBuffer E from Practical Peripherals

MicroBuffer E handles data sent to your Epson printer, freeing you and your computer to take on new tasks. You can even turn your computer off, once you have routed data to the MicroBuffer E. Setup of MicroBuffer shouldn't take more than ten minutes.

For all the high speed of a computer, there's still a lot of thumb-twiddling involved in using it. It begins when the program has done its work and the printer takes over. No matter that your computer is as fast as lightning and your printer snail-slow: Every race they've run up to now has been a tie.

This is where MicroBuffer E can help you. MicroBuffer E is a hardware spooler, or print buffer, that accepts data routed to your MX-80 as fast as your computer can send it, stores the data and then routes it to the printer.

Although a hardware print buffer accomplishes much the same thing as software spoolers, there are important differences.

Software spoolers send data intended for the printer to a disk file and then route that file to the printer. This is accomplished either through interrupts or when you use the keyboard. If you use the interrupt method, printing halts whenever interrupts are disabled, such as during disk I/O; and pressing the Break key can cause the spooler to lose characters.

With any software spooler, you must expend some effort to set up the files. A disk drive is tied up, and of course a reboot terminates software spooling.

Features: The MicroBuffer E comes as a 16K parallel, a 16K serial or an 8K serial plug-in board and draws the power it needs from the printer. The MicroBuffer E functions with the Epson MX-80, MX-80FT or MX-100 printers and is compatible with the Graftrax option.

MicroBuffer E completely frees the system. If the data you send to the buffer is larger than MicroBuffer E's capacity, your computer is tied up only until the backlog is pared down to the buffer's size. Keep in mind that the buffer must hold all of the spaces the program sends as margins, as well as printer control codes, carriage returns and form feeds. A 16K buffer equals a little less than four tightly packed, single-spaced pages.

Ease of Use: You'll find that the MicroBuffer E is totally transparent. You need only connect the buffer between the computer's parallel or serial port and the printer. Data sent to the printer is stored in the device and forwarded to the printer as it is able to accept it.

You, your computer and your disk drive are free to perform any other task. You can even turn your computer off, once you have routed data to the MicroBuffer E.

Documentation & Serviceability: The documentation is brief but adequate. It includes step-by-step installation instructions. Servicing should not be necessary, but if you have difficulties you can call the manufacturer's phone number, which is provided in the documentation.

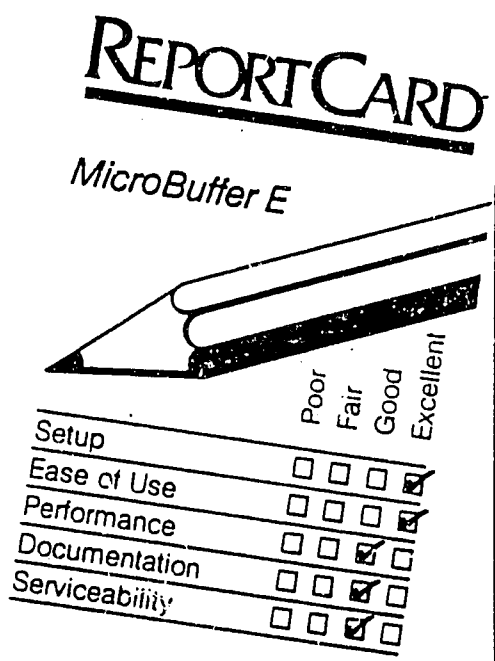
Setup: You'll need to remove the top of the MX-80 case to gain access to the printer's sockets. Insert the MicroBuffer E board into the auxiliary interface connector within the MX-80, hold it firmly in place with the four screws provided and replace the case. Route the printer cable to the MicroBuffer E rather than to its normal socket. The whole job shouldn't take you more than ten minutes.

The one disadvantage of the MicroBuffer E is that it covers the DIP switches of the printer. If you have change the switch positions, you must open the printer and remove the MicroBuffer E board before you can reach the switches.

Summary: I liked my evaluation copy of the MicroBuffer E so much that I decided to purchase one. It's a joy to be able to send a document to the printer with the press of a key, and still have a computer to work with while the printing is taking place. In addition, it's the lowest priced print buffer that I've seen.

I can begin to debug a program even while my computer is listing the source code, or use my word processor to create a new document before the old one has been put to paper.

—Dan Robinson



Features of Unit Tested
- *Epson printer*
- *Plug-in board*
- *16K parallel or 8K serial board*

Price: *$159 (16K parallel or 8K serial board)*
$179 (16K serial board)

Practical Peripherals, Inc.
31245 La Baya Drive
Westlake Village, CA 91362
(213) 991-8200

ElectroScreen from Privac

The Electro Screen Model BT-1 graphics-display board offers many of the features of a graphics terminal, at a lower cost. It is designed to work with SS-50 bus computers, but it can also be used with an Apple, TRS-80 or IBM PC if it is connected to a parallel port.

You never have time to be bored—that's the thing I enjoy the most about this business. Just when I had convinced myself that I would be staring at a video screen with a measly 1920 characters arranged in 24 80-column rows forever, the ElectroScreen graphics board arrived.

Privac's ElectroScreen Model BT-1 is a graphics-display board that plugs directly into the motherboard of SS-50 bus computers—Gimix, SWTPC, Smoke Signal, Helix and so on. You can also use it as a graphics display on other personal computers such as the Apple, IBM PC and TRS-80 by connecting it to a parallel port.

ElectroScreen comes alive acting like a TeleVideo 912 terminal but with one big difference—it displays 48 83-character lines, almost an entire typewritten page of text. Then, with a single control code you can switch into the graphics mode and draw lines and circles or plot the graphic representation of any mathematical equation.

You can also plot bar and pie charts with ease using BASIC or any other high-level language. Since the board contains its own 6809 microprocessor and more than 32K of RAM, you can also use it as an additional processor in your system.

We live in a visual world. We grew up with television. We understand images. This means we should have a better understanding of our computers and get more out of them if they present our calculations graphically.

Features: The ElectroScreen acts like an intelligent terminal when you turn it on. It lets you see 48 lines of 83 characters. If, however, you think the letters are too small and feel more comfortable with the more conventional 24 lines, it is easy to switch to double-height characters. You can also select double-width characters if you like your letters really big. This option gives you 24 lines of 42 characters.

The ElectroScreen lets you move the cursor to any point on the screen by specifying a pair of x,y coordinates. You can erase to the end of the line or end of the screen with special codes. Also, you can design alternate character sets and use them with the board.

When you use the graphics mode, the ElectroScreen allows you to move the cursor in terms of absolute coordinates or relative to its current position. To move it, you send commands made up of ASCII strings. You can use any coordinate between plus and minus 32767 on either the x- or y-axis.

You can draw solid lines or broken lines with variable-size segments or automatically generate a calibrated axis with tick marks.

It is easy to label your graphs because the Model BT-1 has character-plotting commands that let you print ASCII characters in 15 sizes in four different directions. You can also plot italic characters by setting a flag.

You can load your own 6809 programs into the ElectroScreen's memory and run them. In fact, a screen-dump program supplied by Privac lets you print a facsimile of your screen on an Epson MX-80 with Graftrax Plus.

The ElectroScreen has an eight-channel, analog-to-digital converter built in. This means that you can receive information from a switch, joystick, potentiometer or any other variable-voltage output device. This converter has a range of zero to five volts.

Usually, transportation of a

REPORT CA

ElectroScreen

	Poor	Fair	Good	Excell
Setup	☐	☐	☑	☐
Ease of Use	☐	☐	☐	☑
Performance	☐	☐	☐	☑
Documentation	☐	☐	☐	☑
Serviceability	☐	☐	☐	☑

Features of Unit Tested

- *SS-50 bus microcomputer*
- *NTSC video monitor with 30-l interlace scan, 12-MHz ban width and long-persisten phosphor (P-39)*
- *83-character × 48-line text di play*
- *TeleVideo 912 emulation mode*
- *Cursor movement to home a x,y addressing*
- *Erase capabilities to end of li and end of screen*
- *User-defined alternate charact sets*
- *STD syntax graphics*
- *Absolute and relative curs movements in the graphi mode*
- *Graphics commands sent board in ASCII strings*
- *15 different character siz printed in four directions*
- *Automatic axis generator*

Price: *$595 (with OS-9-bas drivers)*

Privac, Incorporated
3711 South George Mason Drive
Falls Church, VA 22041
(703) 671-3900

phics program from one system to other is a hassle, since the many ASIC interpreters that microcomter manufacturers supply always m to be slightly different. Addinally, no two display devices are actly alike. Manufacturers of the -50 bus have solved this problem. They have created a standard ntax—they call it STD—for aphics software. If you install an TD device driver in your plotter, u can plot the output of any plication-software packages that e this syntax.

You send a command to ElecoScreen, and other STD devices, by inting one ASCII letter followed by list of numbers separated by spaces. Most of the time, you simply use BAIC print statements to send your ommands.

The STD syntax uses a tenth of a illimeter as a standard physical easurement. This means that if you ove the cursor 254 points across the creen, you have moved one inch. This size was chosen as standard beause it is at the lower limit of the resolution of most hard-copy devices vailable today.

In addition to ElectroScreen, Privac can supply STD device drivers or many plotters built by Watanabe, Hewlett-Packard and Houston Instruments. If you have unusual requirements, Privac will supply custom device drivers as well.

When you plug the Model BT-1 into your SS-50 system, your processor sees only two 8-bit registers. The system does all graphics processing on board using a 68A09E microprocessor running at 1.5 MHz. ElectroScreen has 32K of screen-refresh memory, 2K of scratch-pad RAM and 6K of firmware built in. By changing a few jumpers, you can expand the scratch-pad RAM to 6K or use up to 20K of firmware. In other words, it's easy to adapt the board to your own needs.

Performance: The ElectroScreen performs as advertised. Its video level matches my Apple Monitor III perfectly. I must warn you, however, that you could find yourself in deep trouble if you try to use any old monitor with this graphics board.

To get the most satisfaction out of ElectroScreen, you need a monitor with a long-persistence phosphor. Privac is honest about this requirement in the manual, and the company recommends a P-39 phosphor to avoid screen flicker. Your monitor must also have a 30 Hz interlaced scan ability and a bandwidth of 12 MHz, and it should measure at least 12 inches diagonally.

Monitors with these specs can be expensive and usually start at $600. Fortunately, Privac learned that the Apple Monitor III (Model A3M0039) has a P-39 phosphor and recommends it to its customers. The Apple display costs $250. Teamed with the ElectroScreen, it gives you a cost-effective graphics-display device.

The ElectroScreen Model BT-1 is an excellent tool for getting you into the graphics game.

By comparison, a popular graphics retrofit from Digital Engineering for Lear Siegler and TeleVideo terminals sells for nearly $1000. When you add the price of the retrofit to the cost of the terminal, your investment approaches $2000.

Before I got my Monitor III, I tried the ElectroScreen with another monitor that used the standard P-31 phosphor. It flickered horribly when I used data in the 83-column-by-48-row terminal mode. The flicker wasn't too bad when I switched to 24 lines of double-height characters, however. The double-height characters are much easier to read, and the resulting 83 × 24 format is close to the 80 × 24 standard.

The ElectroScreen uses gold-plated Molex connectors—an important feature on an SS-50 board. The first SS-50 motherboard had tin connectors, and they failed almost immediately. Electrolysis caused them to be coated; after several months, the connections between the cards and the motherboard were wide open.

ElectroScreen passed the standard *InfoWorld* abuse test. It worked perfectly with no heat problems after nearly 12 hours of continuous operation on three consecutive days. In fact, it seems to run cool.

The ElectroScreen graphics display is fast. I ran a short program that draws 100 random lines on the screen. It took just over a second.

It runs slower in the terminal mode; I would compare it to a regular serial terminal running at 4800 baud. For most purposes, this speed is adequate. It might be a little slow if you expect to do a lot of work with a screen editor, however.

The video level coming out of the board is standard, and the signal looks good on a scope. When I switched my monitor between the ElectroScreen and another video board, I didn't need to adjust a thing. The brightness and contrast stayed the same. I didn't need to touch the horizontal- or vertical-hold controls, either. Often different video boards generate different horizontal sync frequencies, and you do need to adjust a monitor when you plug it in.

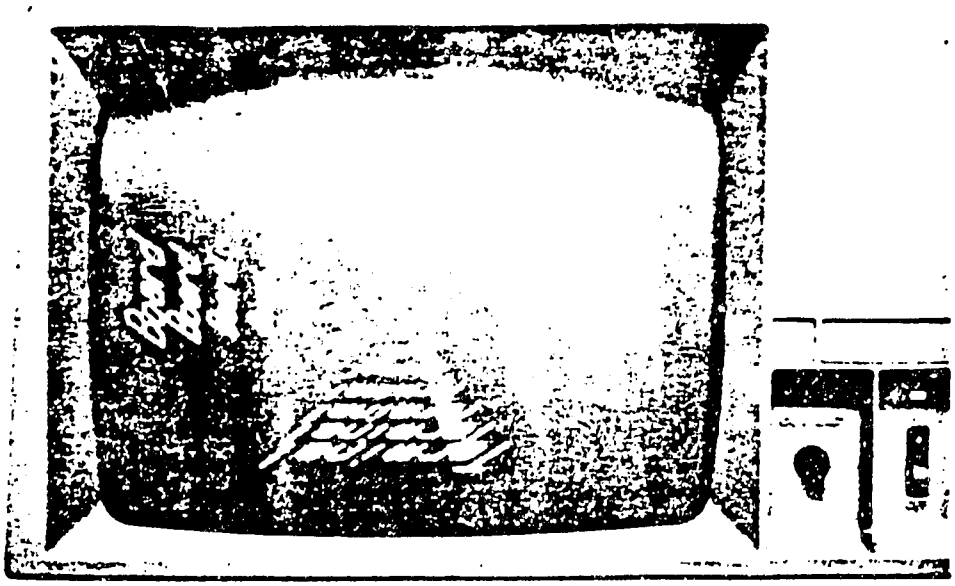
Ease of Use: Once you have plugged the ElectroScreen into your system, the firmware on the board takes over. There are no switches to throw or controls to adjust.

The firmware is easy to use. When you turn your system on, you see a clear screen and a slowly blinking cursor in the upper-left-hand corner of the screen. The driver program that you must install in your host system is short.

For example, to write to ElectroScreen from the FLEX operating system, you need only 16 bytes of 6809 machine code, and you can generate this code with an eight-line assembly-language program. To send a character to the ElectroScreen, once this driver is installed, you simply put the character in the 6809's A register and call the driver as a subroutine.

You can send single control codes to clear the screen and home the cursor, select single- or double-character heights or single- or double-character widths. To get your attention, the standard ASCII bell code causes the screen to flash twice.

You can send the standard ASCII escape character and additional characters when you want to select optional character sets, move the cursor anywhere on the screen, load a character set or binary program from a disk or jump to your own program. You do the same if you want to read



The ElectroScreen switches readily from text displays to graphics displays.

the output of the analog-to-digital converter on the board, erase to the end of the line or the screen and switch to the graphics mode.

When you enter the graphics mode, you use single-letter STD syntax commands to draw lines, position the cursor, write text in four different directions, change the size of the text or clear the screen.

I ran the four demonstration programs supplied with the board, typed in an additional half dozen that are mentioned in the users' manual and experimented with several of my own. In the process, I was unable to uncover any nasty surprises.

I did find a small bug in a supplied program that dumps the Model BT-1 screen to an Epson MX-80 printer with Graftrax. The program would stop after plotting only part of the screen on the printer. After a little study, I noticed that it always aborted with an end-of-file error.

As it turned out, when the drawing on the screen happened to have a character equal to the OS-9 operating system's end-of-file character in the first position on a line, the program would abort. When I set the end-of-file character in the ElectroScreen device driver to zero, the program worked well.

Documentation: The 54-page users' manual is easy to read and understand. It is well organized, and I found no misspelled words or grammatical problems. It gives you all the information you need to install and use the board.

Although there is no index, the table of contents is quite detailed and more than adequate for a manual of this size. After providing a general introduction to the role of graphics in small-computer systems, the manual gives a good description of the board.

The manual shows you how to install the board in your SS-50 bus computer and gives details covering everything you need—from host requirements to address selection and the required software. One chapter covers using the ElectroScreen as a main terminal or as an auxiliary display.

Additional chapters cover smart-terminal functions and the STD graphics-command syntax. The manual tells you, in great detail, about the use of the analog-to-digital converter. Twelve tutorial programs show how to exercise every available command.

It also covers several advanced topics—how to write your own 6809 programs so that you can upload and run them is one. It also shows you how to create your own character sets and upload them into the provided RAM. A sample program shows you how to use joysticks to draw freehand on ElectroScreen.

Finally, another section shows you tricks you can pull by changing the internal registers of the 6845 CRT controller. The manual gives you the purpose of each register and shows how to change them to make the screen scroll in four directions, operate in a two-page mode and display a 512 × 512-dot format. A short BASIC09 program listed in this section lets you experiment with these concepts.

Eight appendices give you compl hardware and firmware specifications, including details about the memory map, screen mapping, jumper options, connector-pin assi ments, the STD graphics syntax, ad ding more scratch-pad RAM and u ing the board in a stand-alone mod with any computer that has two pa allel 8-bit data ports available.

Serviceability: Privac warrants th ElectroScreen board for 90 days. During that time, it will repair any board that does not work properly and replace any bad parts free of charge. You must ship it to the com pany postpaid to get this free servic however.

Setup: If you own an SS-50 bus cc puter, installation is extremely eas All you do is plug the ElectroScree board into an empty 50-pin slot. I a small snag during installation, h ever. The plug that carries the vide signal from the board to your mor tor is not color-coded, nor does it have a key to prevent it from being plugged in backwards.

Fortunately, I didn't destroy an parts. The fact that it didn't work first time I turned it on was disappointing, however. I reported the problem to Privac, and the compa has promised to correct the proble

Summary: In this visually oriente age, it is also important to make it easy for people to understand data a busy manager grasps a problem more quickly by looking at a grapl display and saves a few minutes wl making each decision, he can save company many dollars over a year

The ElectroScreen Model BT-1 i an excellent tool for getting you in the graphics game if you own an S 50 bus computer. I have given it a p manent home in my Gimix microcomputer system.

For some people, it might even make sense to add a power supply, use a parallel port and run the Ele troScreen as a stand-alone graphic display with another personal com puter. Given the alternative—buyi a full-blown graphics terminal—ElectroScreen would be quite cost effective.

—Dale L. Puc

APPENDIX I*

Dos and Don'ts of Acquisition, Installation, and Use of Microcomputers

Planning

1. Determine what you need a mircocomputer to do for you. Then choose the software before you choose the hardware.

2. When considering the hardware, find out what others in your area are using and seriously consider purchasing that kind of equipment.

3. Have a plan for cleaning up the power supply.

4. Have a plan for training.

Purchasing

1. Explore your options. Talk to different dealers and have them show you how to set up the system and how to use it. Work with a friend or colleague.

2. Order all miscellaneous materials and supplies you need for one project year, especially extra documentation.

3. Purchase connector cables when you order the system.

4. When you first buy equipment, also buy the tools, spare parts, test equipment, and hardware manuals (with schematics).

Installation

1. Spend time with someone who has a similar system and learn how to put it together.

2. If possible, get assistance from someone who knows how to install the system.

3. Set up the whole system before plugging it in to the power supply. Plug in another piece of equipment (e.g., a lamp) into the outlet you intend to use for the system.

* from Marcus D. Ingle, "Evaluating the Appropriateness of Microcomputers for Management Applications in Developing Countries," a paper presented at the National Conference of the American Society for Public Administration, New York, April 1983.

Power

1. Provide electrical protection:

   - based on local network experience or knowledge;
   - in the light of budget needs.

2. Consider the use of an Uninterupted Power Supply (UPS).

3. Provide a non-fluctuating source of power to the equipment.

4. Dedicate a single line to your equipment, one that is pre-conditioned.

5. Provide common "earth" ground between all system components.

6. Condition your power appropriately.

7. Power on/off switches can fail. Consider unplugging your system when you turn it off instead of using a switch.

Hardware

1. If possible, consider buying one extra system for use during system breakdown or for possible spare parts.

2. Consider buying a diagnostic testing board for troubleshooting. (The Apple II E has one already built in.)

3. In a central unit with built-in monitor and keyboard, you lose some maintenance flexibility. If you have to send an item away for repair, it is often convenient to send only the sub-unit needing repair instead of the entire unit.

4. 48K of memory is adequate for running the packaged software most used in development projects. For most systems, when and if you need more memory, you can buy a "chip" or another "board" that contains additional memory.

5. For the average development project, the size of the data base can be fairly easily determined and the size of disk drives properly selected. Disk drive size is not a major variable in system selection--only if you are using a program that requires 8" disk drives, or if you have a large data base, would you consider large disk drives or hard disks.

Software

1. If it is not built into the system, and if possible, buy a diagnostic software package to test your system problems.

2. Buy interactive software packages.

3. Buy "how to" packages and use them as well as the tutorials to learn how to use particular kinds of software.

4. Buy only the software packages you need.

5. Learn one or two software packages at a time.

6. If your work involves a substantial amount of writing, give serious thought to getting a word processing program.

7. Games programs are good for training and for breaking down some of the initial resistance frequently encountered in development project situations.

Diskettes

1. Keep diskettes in their jackets.

2. Have extra blank, formatted diskettes available.

3. Make back-up copies of all diskettes—update and recopy as necessary.

4. Keep a card catalogue of files that appear on each diskette, or some other form of external retrieval system (e.g., print outs of disk directories that are dated and kept in file folders).

5. Use only felt tip pen to write on diskette labels—pressure on diskettes from ball point pen may damage them.

6. Keep your diskettes and records with you if you and others share the equipment.

7. Keep archive copies of diskettes in another location for safeguarding.

8. Recopy diskettes over a year old.

Maintenance

1. Whenever the system is opened for modification or routine maintenance, it should be turned off at the mains.

2. Take off all jewelry and touch metal before going inside the "turned off" system.

3. Do regular monthly maintenance.

4. When someone else is doing maintenance, watch and take notes on exactly what s/he is doing.

5. Inform yourself about computer maintenance by reading articles, equipment manuals, etc., and learn to diagnose problems.

6. Keep a maintenance notebook.

7. Know the different tolerance levels (concerning power and frequency requirements) for each piece of hardware, e. g.:
   - electrical power 220, plus or minus 5% to remain operational.
   - 50 CPS (frequency), plus or minus 5% to remain operational.

8. The microcomputer industry is rapidly establishing sales and service facilities in developing countries which will eliminate the need for individuals and projects to provide their own maintenance capability.

Environment

1. Do not eat, drink or smoke near equipment.

2. Protect equipment from food, drink, tobacco smoke or any foreign matter by keeping it covered with a lint free cloth when not in use.

3. Keep equipment cool.

4. If the equipment is in an air conditioned room, seal all windows shut, have a back up air conditioner available, have a spring on the door to keep it closed, use a wet bulb humidity measure and, if necessary, a dehumidifier in the room or inside the computer itself.

5. Keep the computer away from the air conditioner.

6. Provide an environment without static electricity—rubber mats under the machine, static free carpeting.

7. Provide adequate ventilation, e.g., fan blowing on computer or in room.

Supplies

1. Stock all fuses (of proper amperage) for all equipment.

2. Stock all needed supplies including diskettes, ribbons, cables, print heads, paper, transformers, etc., for a minimum of one year to the maximum life of the project.

3. Stock chips and boards as part of your spares kit.

Appendix J

PROFILES OF TELECOMMUNICATIONS DEVELOPMENT IN SELECTED LATIN AMERICAN COUNTRIES

I. MEXICO

A. Key Regional Role

Because of its strategic location in the Western Hemisphere, Mexico has been a prime mover in inter-American communications. It was Mexico that promoted the construction of the Pan American Highway and the creation of the Inter-American Telecommunications Network as a project of the Organization of American States.

Mexico also promoted the formation of the Committee for the Plan for Latin America, with members drawn from the International Telegraph and Telephone Consultative Committee (CCITT) and International Radio Consultative Committee (CCIR) of the ITU. The resulting close consultation among Latin American telecommunications administrations, with guidance from international experts, has enabled the Latin American countries to plan and install telecommunications facilities incorporating ITU-recommended standards that anticipate interface with advanced technology and international interconnectability.

As CITEL chair for 1984-88, Mexico will preside over the taking of many significant decisions impacting on telecommunications development for years to come in all of the Western Hemisphere countries.

B. Domestic Policy in Telecommunication

The Government of Mexico perceives telecommunications as an important instrument for economic and social development, for national security and for

integration of dispersed populations. Construction and modernization of services, including teleprocessing and satellite communications, is an ongoing and vital process responsive to the information needs of the tourist and petroleum industries and other industrial sectors.

Mexico's use of telecommunications to provide and/or enhance social services to a burgeoning population includes the provision of substantial subsidies to qualified academic and research institutions, with a discount of 75 percent in data transmission rates. Telecommunications are used extensively by the Social Security System for rural medicine, and by the Department of Transportation and the national system of Information on Epidemiology and Public Health.

C. Microwave and Satellite Communications

An extensive microwave and satellite network, used for domestic and international services, extends from Central America on the southern border to the U.S. on the northern border, linking all population centers in the country. The domestic satellite system to be launched at the end of 1985 is required because the microwave network has entered the last phase of its useful life. Satellite communications will not supplant microwave, however. Rather, each will be used for specific purposes and will provide back up to the other. Microwave will continue to be used for high volume telephony and for supporting satellite-beamed television. Satellite communications will be used for the distribution of television and also for rural and low-volume telephony.

In 1980 INTELSAT moved one of its satellites to 307^0 longitude and installed 200 earth stations to provide domestic services to Mexico. This is the largest domestic system in Latin America and one of the largest in the world. Seven of the earth stations and two portable stations both send and

receive signals. Mexico also leases a transponder to beam Mexican television programs to the U.S. 24 hours a day.

Plans for the Mexican satellite system, using the C and K Bands, include 2,000 earth stations, providing service to population centers throughout the country. Oil rigs, rural medical posts, and government stores selling basic foodstuffs at discount will also be equipped with earth stations. The satellite network will carry high school and open university courses to outlying areas. Some 200 additional receivers will be installed to receive commercial TV signals. The possiblity of forming a market for satellite services with Central American and Caribbean countries has been considered.

D. **Packet-Switched Public Network and Teleprocessing**

In 1983 packet-switched data transmission services were available over a public data network in 44 principal cities accommodating up to 2,000 terminals and computers. The Mexican hotel and transportation reservation system is the largest computerized data network in Latin America, with 2,000 terminals in nine countries.

Mexico also has a teleprocessing network, INFONET, which is tied in with the worldwide TYMNET and TELENET networks. The Department of Communications (Direccion General de Telecomunicaciones--DGT) operates INFONET under contract with the Computer Science Corporation of the U.S. DGT took over the business when the private sector was unable to meet the demand for computerized services. DGT operation of INFONET enables the Mexican Government to limit computer imports and to manage transborder data flow.

The INFONET network is made up of land lines and satellite links for world communication. Multiplexors located in Guadalajara, Hermosillo, and Monterrey are connected to a concentrator in Mexico City. From there data are transmitted to the U.S. for processing. The 44 cities served by the public

data network can access INFONET by placing a local telephone call.

E. **Data Transmission**

Until 1980 most data transmission facilities consisted of private leased lines operating at 1200 to 2400 bits per second (bps). Most of these lines are leased by industry and commerce, with the Federal Government and universities leasing the rest. Of the 152 networks in operation, 62 are national in scope, 55 local and 35 international. The networks are typically grouped around a computer, with most of the terminals located primarily in Mexico City, Monterrey, and Guadalajara.

F. **Telex**

The National Telex Network, with nodes in Mexico City, Monterrey, Hermosillo, Guadalajara, and Coatzacoalcos, interconnects 90 cities and towns located strategically throughout the country. The International Telex Network has more than 7,000 subscribers. Traffic with the U.S. and Canada travels by microwave. Communication with other countries is by satellite.

Telex rates are calculated on the basis of time (60 words per minute) and distance. International rates are substantially higher than domestic rates, however, because of federal surcharges.

II. BRAZIL

A. **Domestic Policy**

Among the countries of Latin America, Brazil has the most clearly-defined policy in all aspects of teleprocessed information and related services. In the upper tier of developing countries, it presents a model for protecting and supporting domestic telecommunications and computer industries and regulating transborder data flow. Detailed regulations on international reporting requirements have been put in place to restrict data transmission.

In 1972 TELEBRAS was created and charged with responsibility for planning, financial decisions, and research and development in telecommunications policy. A Coordinating Commission on Data Processing Activities (CAPRE) was founded in the same year to supervise the acquisition and use of computers by the Brazilian government and later to approve the import of any computer or component. Priority for approval was given to projects which would enhance Brazilian exports and transfer of technology. In 1979 the Special Secretariat on Informatics (SEI) was formed at the presidential level to regulate transborder data flow and teleprocessing services provided by foreign sources. Information services must apply to SEI for approval, which is granted after analysis of impact on privacy, economics, and national security concerns. Applications for services that can be provided within Brazil are generally denied.

According to SEI, telecommunications, information and teleprocessing must be developed in accord with four basic considerations: members of Brazilian society should have easy access to information; information resources should be concentrated as much as possible on Brazilian territory; relevant technologies must be mastered and decisions must be made on the basic of the national interest; and teleprocessed information services should be used and extended to enhance Brazilian culture and Brazilian democratic institutions. Incentives for the diffusion of computerized information include low-interest loans extended by a government bank for development.

Brazil manufactures computers and components and telecommunications equipment both for domestic use and for export. It produces software as well as hardware and conducts sophisticated research and development in telecommunications, including satellite communications. Having translated the Library of Congress MARCAL format into Portuguese, Brazil now engages in

exchange of magnetic tapes with the Library of Congress. Brazil has also developed important data bases in critical areas such as agriculture, medicine, and law for national and regional users.

B. **Satellite Communications**

In addition to making extensive international use of satellite communications, Brazil, since 1976, has leased INTELSAT transponders for domestic services. By 1982, 65 10-meter earth stations had been installed, with plans calling for construction of 18 more. The 18 on order will be 6-meter antennas appropriate for receiving signals from a more powerful satellite than INTELSAT uses. Eventually, thousands of these smaller earth stations will be constructed. Two satellites for the Brazilian SBTS domestic satellite system will be launched in 1985.

C. **Links With Other Countries in the Region**

Brazil has established basic tri-service (telephone, telex and telegraph) links with virtually all countries in the Western Hemisphere, including most of the English-speaking Caribbean. Communication with some neighboring countries is transmitted via INTELSAT to and from earth stations located along the extensive border. Communications with Argentina and Paraguay travel by land lines recently upgraded to facilitate transmission of television. Technical assistance and training in telecommunications are frequently provided to other Latin American countries by skilled Brazilian engineers under the International Telecommunication Union training program.

D. **Data Transmission Services**

1. Transdata

Brazil's Transdata public data transmission network, the first in South America, opened in 1980. It is a digital point-to-point/multipoint network based in Rio de Janeiro with 4,042 terminals located in 33 cities.

Optional speeds range from 1200 bps to 9600 bps, with charges based on speed and distance. The facilities are available for transmission 24 hours a day, seven days of the week.

Principal cities with transmission centers are Rio de Janeiro, Sao Paulo, Brasilia, Asasco, Santo Andre, Belo Horizonte, Fortaleza, Recife, Salvador, Porto Alegre, Curitiba, Campinas and Belem. Thirteen other cities also have access to the network.

Data bases developed in Brazil by government agencies and private industry can be searched using Transdata.

2. Interdata

Interdata is the name of Brazil's packet-switched data transmission network. With an international gateway in Rio de Janeiro, parts of the network began operating in 1983. Access is available via the public telephone network and the public telex network as well as via private lines. Rates of speed are 50, 300, and 1200 bps in the asynchronous mode. Rates are based on time and volume, not distance. Significant user savings gained by packet-switching are estimated at 60 percent.

Users can access U.S. and European data banks directly or via the TYMNET and TELENET links Interdata has established. Foreign users also have access to Brazilian data bases via the network. Connections with mainland China are also in prospect.

3. Telephone Network

In 1981 the switched telephone network was made available for data transmission. Modems, which can be attached directly or indirectly to the lines, can be rented from the telephone company or purchased by the user.

E. Telex, Teletext, and Other Services

Over 51,000 installed terminals comprise Brazil's telex network. The network includes use of interfaces and protocols that make it reliable for data transmission. Brazil is currently engaged in field trials of teletext, which is ultimately expected to replace telex as a transmission medium for full text copy and large documents.

Brazil offers a range of other services already in place or in process of development. These include polling, electronic mail, and telephone circuits that can transmit voice and data signals concurrently or alternatively.

IV. Argentina

A. Policy

One of the actions of Argentina's newly elected administration has been to initiate a study on a national policy for informatics. The study will examine a range of teleprocessing operations, including videotex. A videotex demonstration project, with OAS and Canadian participation, has been under consideration. The project would use the Canadian Telidon technology to create a publicly accessible cultural teleguide for the City of Buenos Aires. A training center for Latin American nationals is also a feature of the project.

B. Digital Belt of Optical Fiber

By 1983 Argentina had put into place South America's most advanced telecommunications facilities, including the largest total digital system using optical fiber.[43] The system relieves congestion from incoming and outgoing calls between Buenos Aires City and suburban areas. The system also allows direct communications among the exchanges of the Greater Buenos Aires area, which previously had to pass through the capital city.

C. **Satellite Communications**

Domestic satellite installations using INTELSAT facilities consist of 30 earth stations with 11-meter antennas plus the principal ground station in Balcarce with a 12-meter antenna. A second master station is under construction in Bosque Alegre. In addition there are five movable receivers. All ground stations receive and transmit signals for telephone, color television and radio, reaching all population centers of the country. Low-cost receivers may be added to receive direct broadcast satellite signals. All channels in the satellite sytem can communicate with each other using Demand Assigned Multiple Access (DAMA) digital technology.

Argentina is also considering construction of a national satellite system as part of a space plan which includes the processing of remote sensing data. The domestic satellite system would include two 24-transponder satellites and 300 earth stations. In addition to telephone and televison, the system would be used nationwide for radio, telemedicine, and data transmission.

D. **Public Data Transmission Network**

A public packet-switched network with national coverage and international gateway was inaugurated in late 1982. The network was built in response to demand for facilities to permit computer-to-computer connections. The network can be accessed by up to 3,000 terminals and computers by telephone or telex.

Data bases available for access via the network include general information, petroleum, geology, engineering, meteorology, oceanography, administration, business, finance, science, and technology. The data bases can be accessed by any user with an on-line terminal operating at 330 bps.

The packet-switched network was designed and constructed by ENTEL-Argentina with technical assistance from the National Telephone Company of Spain, which had previously developed an extensive data transmission network for Spanish scientific organizations, with connections to European and North American data bases.

E. Telex Network

In response to demand for telex service, Argentina built a star-shaped telex network with 46 terminals with access to international switched circuits. More than 8,000 lines accommodate simultaneous transmissions of three messages to 40 different locations. Design of the network permits installations of private networks among users.

F. Electronic Mail

Argentina and Brazil currently participate in field trials of the U.S. Postal Service Electronic Mail Service.

V. Venezuela

A. Optical Fiber/Digital Technology

Venezuela is constructing an optical fiber system encircling the capital city of Caracas. Some 140,00 digital telephone lines are being installed, many of them capable of transmitting data at a rate of 134 mbps.

The interurban network consists of 74,000 circuits, in addition to radio-linked (microwave and VHF systems) and coaxial cables. The international system includes three underwater cables with 2,100 circuits, two ground terminals, microwave links, and tropo-diffusion systems.

B. Satellite Communications for Rural Services

An INTELSAT domestic transponder lease has been used since 1982 for rural service. Twenty-four earth stations have been constructed for the system.

C. Videotex

Venezuela was the first country in Latin America to introduce public videotex service, using an adapted version of Canadian Telidon technology. Terminals have been installed in numerous public libraries where users can retrieve government-produced statistics. The limited programming made available for display on the terminals, however, has reportedly jeopardized continued use of videotex.

VI. PERU

A. Policy

Until recently telecommunications services in Peru have been concentrated in the coastal areas. In the next four years, however, Peru aims to double the number of telephones installed in all of its urban and rural population centers. The plan calls for automatization of more than 300 telephone switching centers and the expansion of telephone services to 749 communities previously without service. National policy is to use the telecommunications infrastructure as a means of socio-economic integration.

Integration is also a conscious policy of Peru in working with its Andean neighbors. Negotiation of subregional agreements among Bolivia, Colombia, Ecuador, Venezuela, and Peru for cooperation in economic and social activities owes much to the leadership of Peru.

B. Satellite Communications

One of the most recent Andean sub-regional agreements is the one that established ASETA, which drew up plans for a satellite that would deliver needed local services to isolated rural popuation centers as well as urban areas (see page 59). Subsequently, some of the Andean countries have explored alternative arrangements. Ecuador and Venezuela, for example, made plans to

use leased INTELSAT transponders for domestic services, and Colombia drew up plans for its own satellite. Peru, for its part, was reported to be considering a domestic satellite jointly owned with Chile, once a member of the Andean group. Since then, the idea of a regional system for domestic and regional services has resurfaced.

Meanwhile, Peru has made extensive use of satellite communications for conventional use. Since 1979, INTELSAT leased services have been used to link isolated communities in rural areas with Lima and with other urban centers. Increase in traffic required installation of a second ground station with 174 circuits in 1981. In addition, northeastern Peru has been the site of the U.S.-sponsored demonstration project in Rural Communication Services.

Inter-American traffic accounts for the bulk of Peru's satellite communications. In 1981, apart from the U.S., heaviest traffic was with Venezuela, Mexico, Argentina, Brazil, and Colombia. At that time most of circuits used were for telegraph and telex, as compared to telephone.

C. Data Transmission

Peru has a public data transmission network of recent construction, with nodes connecting Lima with Trujillo and Arequipa. Each of the nodes, including Lima, provides service to other cities, including Iquitos in the northeast. In addition to transmitting data, ENTEL-Peru provides a range of teleprocessing services, from systems analysis to software design and computer programming. The system was built as a stimulus to productivity in the education, health, nutrition, tourism, transportation, and business/industrial sectors, as well as an aid to defense and postal services.

Peru has proposed that the administrations constituting CITEL reduce rates currently charged for data services to encourage the use of public data networks. The proposal was made on the basis of an analysis of costs and

depreciation showing profits could still be made with lowered tariffs. The proposal, intended for regional coverage, was rejected by the United States representative to CITEL on the grounds that since rates are negotiated bilaterally, CITEL as a regional entity could not take action to change them.

D. Telex

Until 1979 telex service in Peru, operated by foreign-owned companies, was limited to international traffic to and from Lima. The new telex network provides for direct national and international communication. The microwave network is used to provide telex service to 42 urban centers, all of them interconnected.

VII. CHILE

A. Satellite Communications

Chile was the first country in Latin America to have an earth station for satellite communications. The Longovilo station was installed in 1968. Chile was also the first country to request domestic service from INTELSAT. Since 1977, the remote southern region has been linked by telephone to the rest of the country and has received television signals.

B. Microwave Network

A 4,000-kilometer microwave network provides service to all parts of the country. The network consists of 63 terminal stations and 52 repeaters. Communication with Peru and Argentina is by microwave as well as satellite.

C. Public Data Transmission Network

Since 1981 packet-switched data transmission service has been available in the cities of Santiago, Valparaiso, and Concepcion. The network provides communications for computers and data terminals at speeds up to 56,000 bps. The network, incorporating third generation multi-microprocessor

technology, is compatible with CCITT standards for public data networks worldwide. Operator for the network is Empresa Computacion (ECOM), an agency of the Chilean Government. The system was designed and built by GTE TELENET Communications.

D. **Telephony and Telex**

Automatic switching facilities for long distance calls within Chile connect the 18 cities with the largest population. Digital technology using two pairs of wires has been installed for long distance service and also in the area of Santiago, the capital city. The cities of Concepcion and Talca also have been equipped with digital installations.

All new facilities in process of installation anticipate the introduction of Integrated Services Digital Networks providing a variety of services including high speed data transmission and facsimile.

The telex network is made up of 21 switching centers, most of which operate automatically.