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Assessment of Telecommunications Infrastructure and Activities in Niger

Potential Applications to Distance Learning

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Abstract: This report, based on research done in Niger and the US in March 1994, provides an overview of the communications options available in Niger It was written as a pre-cursor to potential distance learning activities and provides background documentation for the "Strategic Planning - Niger Applied Agricultural Research Project" report which was prepared by a related USAID Office of International Training (OIT) team in April 1994. The reports were prepared for USAID Niger under the Human Educational Resource Network Support (HERNS) Contract FAO-0071-I-00-3070-00/Work Order 5 administered by OIT.

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I. Introduction

A. Purpose: Background Information on Distance Learning Technologies

During the last several years, USAID has made a significant investment in human resource development in Niger. In-country seminars and conferences, graduate and technical training in the U.S. and third countries, as well as other formal and informal training activities have created a cadre of researchers, technicians, and leaders whose potential contribution to Niger's social and economic development cannot be underestimated.

Many agree that the effectiveness of this training is jeopardized when trainees return to an environment where it is difficult, if not impossible, to maintain contact with teachers, academic institutions, fellow students, or other professionals in their respective fields. In the developing countries where USAID makes the bulk of its training investments, participant trainees are virtually assured of finding themselves in that position when their training is completed

Most would also agree that some form of continuing education or training, either formal or informal, is an invaluable way to maintain or add to the value of an original training investment. This type of follow-up training is rarely done It is costly to provide continued training for large numbers of people Providing continued support or training for such large numbers of participants is clearly a difficult undertaking, especially when diminishing resources and changing agency priorities also cloud the horizon

To meet this challenge, there is clearly a need to look for alternatives to the classic training model, and "distance learning" is one of the alternatives that has emerged.

But how does one apply the concept of distance learning to the real world when there are so many distance-learning methodologies and technologies from which to choose. Many of those methodologies, though not all, employ some type of electronic equipment: computers, television, or radio Thus, many distance learning activities will obviously depend on the existence, availability, and cost of using those technologies.

Thus, the purpose of this report

> **to provide background information useful in future efforts to design programs, projects, or activities that employ distance learning technologies.**

B. Distance Learning Technologies

It is beyond the scope of this report to discuss distance learning technologies in detail. Instead, for a comprehensive discussion of these technologies, their potential applications, and a discussion of how to decide when, where, or whether to use them, the reader is referred to the "Training Technology Assessment Guide" listed in the bibliography

To provide some general orientation, however, a list of the distance learning technologies discussed in that report is reproduced here.

1. Print
2. Computer-Based Training
3. Interactive Videodisc
4. CD-I
5. CD-ROM
6. Digital Video Interactive
7. Educational Television
8. Teleconferencing
9. Radio
10. Video Cassettes

Missing from this list is a specific reference to **computer-based telecommunications**: electronic mail, on-line computer conferencing, file and other information exchange, via modem or electronic network

The referenced report devotes only a paragraph or two to using networked computers as a distance learning tool. But for many post-graduate trainees back in their respective countries, some type of computer telecommunications connectivity may be the best, most useful, and most economical way to provide some type of "continuing education" from a distance Given that

1) much of USAID's training has been targeted toward graduate-level programs, and that
2) the value of maintaining the contact between those trainees and their universities and professional colleagues abroad cannot be overestimated, and that
3) networking and telecommunications technologies are more and more becoming the "appropriate technology" for this type of contact, even in developing countries,

the inclusion of some type of "electronic connectivity" in the discussion of distance learning technologies surfaces repeatedly in the rest of this report.

Thus, this report attempts to provide background information of both a technical and anecdotal nature that will be useful to future efforts to design distance learning activities in Niger.

The remainder of the report is organized as follows:

Section II **Niger's Telecommunications Infrastructure**
This includes transmission systems for television, radio, and data communications, both domestic and international.

Section III **Potential Partners: Nigerien Institutions and Projects**
This section provides information on Nigerien institutions and projects that are either implementing a distance learning project, employing technologies useful in distance learning, or are potential collaborators in distance learning activities

Section IV **Potential Partners: International Institutions and Projects**
Section IV describes computer or other systems already (or soon to be) installed at recognized international institutions that might be potential collaborators in distance learning activities

Section V **Recommendations**
The last section gives recommendations that provide guidance on how to proceed with future design efforts

II. Niger's Telecommunications Infrastructure

A. OPT (Office de la Poste et des Telecommunications)

1. Microwave System

A microwave system linking Niamey and Zinder is Niger's principal method of telecommunications distribution for the most densely populated section of the country. a 200-kilometer wide band running east-west along the borders with Burkina, Benin, and Nigeria

Using a system of 12 relay stations, microwave forms the "trunk" of the OPT telephone and telex service outside Niamey

In addition, this microwave link serves as the primary distribution system for ORTN's (Office de Radio et Television du Niger) system of radio and television transmitter installations throughout the southern part of the country (see section II.C)

Vast, sparsely populated areas remain devoid of any telecommunications services at all. Other sub-regions with sufficient populations to justify telecommunications services are served exclusively via satellite links

2. Satellite Communications

The OPT has leased (at least) one transponder on Intelsat 512 (series IV-A) to provide telecommunications coverage to areas outside those served by the microwave system described above Intelsat 512 is located at 1 degree west longitude (almost directly above Niamey) and is the same satellite that carries USIS video and text transmissions, described in section IV.E.

Breakdown of the OPT's earth station system:

Ground Stations with downlink service

Tchintabaraden *Agadez *Niamey *Diffa Birma

*These three ground stations also have uplink capability; they can also transmit signals up to the satellite for reception by other earth stations.

B. STIN (Societe des Telecommunications Internationales au Niger)

STIN (Société des Télécommunications Internationales du Niger) is a company (partly owned by the government) which provides international telecommunications services for Niger. These services include. telephone, telex, telegraph, leased data circuits, and packet-switched data transmission

For the purposes of this report, one of STIN's most interesting services is its packet-switched data network called NigerPac. While it is perfectly possible to connect computers in different parts of the world via regular dial-up telephone lines, packet-switched data networks (PSDN) carry computer data around the world on a network especially designed for data, not voice, transmissions These systems are variously called packet or X.25 networks

NigerPac

NigerPac is linked to virtually all other international public data networks around the world via the International Transit Node (Noeud International de Transit) in Paris Accessible networks include Transpac (France), Dialcom, Tymnet, Compuserve, and SprintNet (US), DataPac (Canada), as well as networks in the U K , Asia, and several other African countries (Senegal, Cote d'Ivoire, Mali, etc) NigerPac allows users to connect with other computer systems that subscribe to one of the supported networks listed above.

As an example, CompuServe, MCI Mail, and ATT Mail are widely used electronic mail services in the U S It is easy to connect with those services from Niger using NigerPac

ORSTOM has linked the computer systems of its research sites in Africa and France by connecting a computer at each site to the local X.25 network. These interconnected computers can then exchange data over the X 25 network, allowing users at each site to send and receive mail or files with ease. This system is described in section IV.C and Appendix F.

C. ORTN (Office de Radio et Television Nigerien)

ORTN (Office de Radio et Television au Niger) describes its mission as follows: to provide broadcast radio and television service in eight languages to the approximately 7,000,000 citizens of Niger located throughout the 1,247,000 square kilometers of the country. Since the bulk of the country's population is located in a 200 kilometer-wide band running east-west along the southern edge of the country, the goal translates largely into covering that zone. ORTN's system seems to do that reasonably well, in addition, links to other more remote locations are also assured via satellite

ORTN provides four major broadcast services.

1) Shortwave radio service
2) Standard AM radio service (medium wave)
3) FM radio service (VHF)
4) Television (VHF)

Radio

Standard Services

ORTN produces programs for two different broadcast services· *Chaine 1* and *Chaine 2* Program content on both of these "channels" is mostly the same; but each carries the same programs in different languages. Given these language differences, Chaine 1 and Chaine 2 broadcasts are sometimes beamed to different parts of the country, depending on where the population that speaks a particular language is most numerous

Chaine 1 or *Chaine 2* programs are carried on all three of ORTN's radio broadcast services: shortwave AM, and FM If one thinks of a *chaine* as being a distinct radio station (though not exactly true, that is more or less the case) there are two "stations," one for each *chaine,* on shortwave, AM, and FM.

Twenty-four hour service is not provided; broadcasts are divided between two periods: 6:30 a.m. - 3 00 p.m (daytime service) and 6.00 p.m. - 11:00 p.m. (nighttime service)

1. Short wave radio

ORTN's shortwave transmitters are located in Niamey; the following table describes how Chaine 1 and Chaine 2 are broadcast, both during the day and at night:

Error! Bookmark not defined.	Daytime Frequency/Power	Nighttime Frequency/Power	Beamed toward:
Chaine 1	7 155 Mhz/20 kilowatts	3.260 Mhz/20 kilowatts	60 deg. east Agadez
Chaine 2	9.705 Mhz/50 kilowatts	5.020 Mhz/20 kilowatts	90 deg. east Zinder/Diffa

These combinations of frequency, power, and signal direction effectively allow listeners throughout Niger to hear either *Chaine 1* or *Chaine 2*. However, because of the beam headings in the last column, *Chaine 1* broadcasts are usually stronger in the northern and eastern parts of the country, while *Chaine 2* may be easier to receive in the east

2. AM Radio (medium wave)

ORTN's medium wave (standard AM) broadcasts cover the southern part of the country from five transmitter locations Niamey, Gaya, Tahoua, Maine Sowara, and Diffa.

Error! Bookmark not defined.	Frequency
Chaine 1	1.126 khz
Chaine 2	1 505 khz

The same Chaine 1 and Chaine 2 programs are carried in both the AM and shortwave bands at the same times (simulcast).

3. FM broadcasting (VHF)

Niger also operates an extensive service in the standard VHF-FM broadcast band (88-108 Mhz). Because of the limited range of VHF emissions (theoretically line-of-site), many transmitters are needed to provide FM band coverage for ORTN's entire service area. ORTN provides this service through an extensive network of 16 transmitter sites. Program audio is distributed to those sites either directly from ORTN studios (transmitters in Niamey), by retransmitting another transmitter's signal (translator station), from OPT's microwave relay system or via satellite

The following is a list of FM transmitter locations throughout the country:

FM Radio Transmitter Sites

Niamey (3)	**Dosso**	**Dogom Doutchi**	**Birni Konni**
Madawa	**Tahoua**	**Tchintabaraden**	**Maradi**
Agadez	**Tessaoua**	**Zinder**	**Diffa**
Nguigmi	**Birma**		

Each of these transmitters operates on a different FM frequency. According to ORTN technicians it is possible to listen to ORTN FM broadcasts all the way from Niamey to Ngiuigmi by tuning from one transmitter to another as one travels from west to east

Fixed and Mobile Radio Production Facilities

There are three radio/audio production studios located in Niamey and 6 located outside the capital in Dossa, Tahoua, Maradi, Zinder, Diffa, and Agadez. ORTN is also capable of producing live remote radio broadcasts from any location with line-of-sight access to the OPT's microwave relay system Microwave is used to relay audio back to a transmitter facility for broadcasting

4. Error! Bookmark not defined. Television

ORTN's national television service "Tele-Sahel" is on the air for four hours per day --- 7:00 p.m. - 11:00 p m. --- providing a variety of news, entertainment, and occasional sports programming to a viewing audience throughout most of Niger's populated areas.

National Service

ORTN provides broadcast television service via a distribution system similar to the one used for FM broadcasts described above. both microwave and satellite links are used to send program video and audio to transmitter sites around the country for broadcast to a sub-zone of ORTN's service area:

Television Transmitter Sites

Niamey	**Tera**	**Tillaberie**	**Dosso**
Gaya	**Dogon Doutchi**	**Birni Konni**	**Tahoua**
Bouza	**Maradi**	**Dakoro**	**Tchintabaraden**
Tessaoua	**Zinder**	**Tanout**	**Diffa**
Nguingmi	**Ingann**	**Agadez**	**Arlit**
Birma			

International Television Service

ORTN is also fully capable of receiving television signals from a variety of international sources in Europe, the United States, and elsewhere in the world. These signals can be received by OPT ground stations from a variety of international satellites---Intelsat, Arabsat, and others---and routed to ORTN for rebroadcast via its normal television system.

Television Formats, Standards, and Facilities

ORTN-Niger employs the SECAM format for all television production and broadcasts, but claims to have extensive experience with translating between SECAM and other standard video formats (including NTSC and PAL) both during live broadcasts and for the purpose of converting video tapes

ORTN uses standard 3/4" professional video tape for studio and remote production. It has two operational television studios in Niamey which, given the limited programming provided by ORTN (four hours per day), would seem to be underutilized.

Remote Production and Satellite Uplinks

ORTN has one "car de reportage" (mobile production van) equipped with portable cameras and videotape recorders This mobile unit can produce live remote broadcasts by using the OPT's microwave system to send video and audio back to the studio in Niamey. The range of this system is limited to areas where a line-of-sight connection to an OPT microwave station can be made

ORTN does not yet have the mobile uplink equipment necessary to produce live mobile programming via satellite from any location in the country. ORTN can, however, produce live broadcasts from Agadez and Diffa Those locations, along with Niamey, enjoy OPT satellite uplink stations that allow them to beam live video and audio to the same satellite used for ORTN television distribution. Only mobile remote production from those locations is possible at this time, however, since there is no television studio facility in either Agadez or Diffa.

III. Potential Partners: Nigerien Institutions and Projects

A. INRAN

The Institut de la Recherche Agronomique du Niger (INRAN), thanks in large part to past assistance from USAID, has a fairly extensive installation of computers and peripheral equipment.

26 Compaq 386-class computers, 2-4 megabytes RAM, 100-300 M hard drives.
10 portable/laptop computers (80286/80386) for use by researchers in the field.
10 older model desktop machines (8088/80286) used mainly for secretarial and word-processing chores
7 laser printers
Several dot-matrix printers
5 color plotters

The Division of Statistics and Informatics, which manages INRAN's computer systems, has adopted a decentralized philosophy in its deployment of computer resources each of the institute's "services" and each regional research center (CERRA) has a "salle informatique" and an individual responsible for its management and maintenance

Computers at INRAN are used mainly for analysis of research data, presentation of results, word processing, and management of the institute itself At the present time INRAN has no telecommunications infrastructure in place, but they are in the process of requesting bids for LAN hardware and software that will include 5 separate networks at the General Direction, Soils Laboratory, DECOR, and research centers of Kollo and Maradi.

Final decisions are just now being made, but INRAN will probably choose to install Ethernet 10BaseT as a transmission medium using Novell network operating system software. Long-range plans call for the eventual interconnecting of the individual LANs, but no definite timeframe is yet in place

Electronic mail

INRAN subscribes to the ORSTOM-RIO e-mail system described elsewhere in this document. At the present time, only the Director General and Scientific Director have access to the account, which is still in an evaluation phase. The director of the computer center said that plans called for installation and use of e-mail on the LAN system as soon as the LAN is in place.

The computer center is also in possession of one or two modems which were used by a contracting team from Texas Tech University during the implementation of a USAID-funded

project at INRAN. One of those modems is now used for access to the RIO mail system; the other is used occasionally for fax transmissions.

Dr. Adam Abdoulaye, a former USAID participant trainee, is the Scientific Director of INRAN, an experienced computer user, and is also currently in charge of the Division of Statistics and Informatics which manages the institute's computer systems.

B. SNIS

SNIS (Société Nationale de l'Informatique Sanitaire) is equipped with approximately 30 PC-compatible computers and assorted peripherals used to collect and analyze public health statistics, produce newsletters and other documentation, and to train Ministry of Health personnel

Two former USAID participant trainees, Dr. Mounkaila Abdou and his assistant Moukaila Noma, are assigned to SNIS (Société Nationale de l'Informatique Sanitaire). Both are knowledgeable computer users and have a good idea of how computers can be used to improve the efficiency and quality of SNIS's work SNIS enjoys a collaborative relationship with Tulane University (USAID project), so it also has some resources to work with.

SNIS has plans to acquire a modem in the near future that they hope to use to demonstrate how health statistics and data can be distributed, processed, and redistributed to decision-makers and planners in various Ministry departments. They even plan eventually to have regional health offices equipped with modems so that raw data and statistical information can be sent to SNIS more quickly and efficiently

Dr Mounkaila and Mr Moukaila also expressed an interest in installing a local area network at SNIS headquarters to link PCs there and provide for easier sharing of files and peripheral equipment; however, that is more of a long-term goal than a short-term reality for the moment, since other priorities are more pressing

Both expressed interest in somehow being connected to the Internet They spoke of the usefulness of being able to obtain up-to-date information on tropical disease research from the World Health Organization's Internet node (TDR-Scientist@who ch).

C. University of Niamey

1. Distance Learning Project - Projet Formation à Distance

A University of Niamey professor has been working with a French organization on a distance learning project since 1992. The *Ecole Internationale de Bordeaux* (EIB) has a department called the *Agence de Cooperation Culturelle et Technique* (ACCT) which undertakes projects creating linkages between institutions in francophone countries around the world.

One of their projects is CIFFAD (Consortium International Francophone de Formation a Distance). In 1991 the project initiated its activities in Senegal, Mali, and Guinee; fifteen other countries were added in 1992, including Niger.

The result was a 10 million CFA grant to the University of Niamey to assist in undertaking distance learning activities within Niger. The project's first effort was a 1992 project to provide 'recyclage' for secondary school teachers (lycee level) in teaching the French language. 97 French teachers were trained.

In 1993 an additional 5 million CFA was granted to continue the activity and extend its reach to the 'college' level The target audience for the second phase was mainly located in the 'zone urbaine' of Niamey, but in 1994 the same program will be extended to teachers in other regions around the country.

The project's future beyond the end of 1994 is unclear.

Methodology

The project's methodology called for the use of:

1) Written materials
2) Audio cassettes
3) Video cassettes
4) Radio programs

Written materials

Project personnel at the University (principally the project director himself) was responsible for developing all materials used in the training. Part of the initial 10 million CFA grant went to purchase a Macintosh computer and a photocopier which were used in training materials development and reproduction.

Audio cassettes

Audio cassette tapes were also produced that complemented the written training materials. These cassettes were sent to the trainees in the field.

Video cassettes

There was an attempt to produce video-taped lessons as well as part of the curriculum, but the project director admitted that this was not very successful. Project personnel had no particular experience in video production; neither did they have access to the kind of equipment necessary to create quality video productions.

Radio programs

The project also used the local radio system to broadcast some lessons. This was generally more successful than the attempts at video production.

INDRAP collaboration

INDRAP (Institut National de Documentation. Recherche, et Animation Pedagogique), an agency of the Ministry of National Education, Higher Education, and Research, worked with the Distance Learning Project in producing its radio programs and audio cassettes. INDRAP has a fairly long history of using the radio system for dissemination of information in its weekly program "La Voix de l'Enseignement," broadcast every Wednesday on ORTN

INDRAP had also received assistance from ACCT in the past, outside the context of the Distance Learning Project The DLP director and Director of Research felt that INDRAP, which has its own recording studio and printing facilities, would continue to be a valuable partner in any future distance learning activities

Successes and Problems encountered

Project participant trainees were given a written examination at the end of the training period, as well as filling out evaluation questionnaires provided by project staff Though no written report was available at the time of this writing and no hard data was examined, the project director said that trainees did well on the exams and had given positive feedback on the training's materials and methodology.

The main complaint by the trainees was that the training did not lead to any kind of a formal diploma or certificate recognized by the government personnel system. So even though the training was praised and generally regarded as very useful, it did not serve to improve the participants general standing in the civil service, or lead to a promotion or a raise in salary.

The Director of Research said he felt it was important to examine the ways that future training programs of this type might be sanctioned by the ministry so that trainees would receive some kind of official recognition of having completed the course, which could be noted in their personnel records and used to evaluate promotions or other personnel decisions in the future.

The other complaint was that trainees felt that the two-month training period was generally too short.

Future of the project

It is unclear at this time whether ACCT will continue to support this type of activity in Niger or not, and, if so, just what level of support they can provide. The first project grant of 10 million CFA (1992) dropped to 5 million in the second year (1993) 1994 activities will be conducted with money remaining from these initial grants, but the future beyond that is uncertain. With the amount of annual grants dropping each year, it would appear at the very least that the project has little likelihood of expanding its activities, if they do not cease entirely.

2. University of Niamey: Computer Systems and Activities

The University of Niamey has very little in the way of computer equipment, expertise, or training programs. The total number of computers at the entire university is probably less than twenty, although there is no central service or department with an up-to-date inventory for the entire institution.

Three university professors¾two from the Department of Mathematics (Faculté des Sciences) and one from the Faculté des Lettres¾have undertaken an initiative on their own to setup a university computer center and establish computer training program. Since these three have no official title commensurate with their efforts to create a computer department, this report will to them as "program organizers " At the present time, their efforts are aimed mainly at faculty and administration, not students, since they say the vast majority of faculty and staff have no computer experience at all.

The program organizers have designed and submitted to the Dean of the Faculté des Sciences a three-phased plan

1. **Establish a university computer center.**
   This is a simply a central place where all university computer equipment can be centralized, maintained, and shared under one roof A small room in the Math Department has been dedicated to this use, at present it has approximately 10 microcomputers, the most powerful of which are four 486SX/25 Bull computers with 80 megabyte hard disks The center also has one laser printer, one Bull 80286 computer with a 40-megabyte drive, and 4 Goupil PC-compatibles with no hard drives The center has practically no software at all, including no documentation for the DOS/Windows installed on the Bull 486 machines. Other software includes a used copy of Turbo Pascal 5 5, a pirated copy of Clipper with no documentation, and Microsoft Word for Windows (the original floppy disks of which were stolen).

2. **Establish a software development center to create applications for the university.**
   While knowing full well that commercial software will accomplish most of the computing tasks the university needs, the organizers not only hope that creating software will give them some valuable experience, but also that having custom software with the university's name on it will attract favorable attention from university administrators

3. **Establish a desktop publishing facility to produce all of the university's documentation, reports, etc.**
Again, this is partly a public relations ploy aimed at the university administration, but it could also be a money-saver for the university. The main goal is to train secretaries and clerical staff in desktop publishing skills.

Current Training Efforts

In the meantime, training programs in DOS for Beginners have been organized for four interested groups of professors four hours per week for four weeks. When that is finished, there will be a follow-up training in word-processing.

As mentioned above, other individual training for some university secretarial and administrative staff have failed due to less-than-enthusiastic participation and support from administrators.

Other Donor Assistance

The Cooperation Française and University of Lausanne in Switzerland have donated some computer equipment to the university in the past under the aegis of various projects. This equipment is now scattered around the university, sometimes simply gathering dust. At the present time there is no established plan for the use of what meager computing resources are available

"The Italians" (it is unclear exactly what organization) have also agreed to donate a modem to the fledgling computer program It has not yet been received, but even when it is, the problem remains that many of the university's phones have been off for several months because the bills have not been paid by the National Treasury

Telecommunications Possibilities

The computer program's organizers are anxious and excited about the possibility of establishing e-mail links with other universities, either in Africa or elsewhere, but are discouraged by how long they think it might be before they're plans take them that far

Even so, program organizers do have some limited telecommunications experience· in 1990 NigerPac, in order to attract customers when it had just commenced operations, provided modems and open access to certain institutions in Niamey Thus, the computer program organizers had a free NigerPac account for about three months which allowed them to experiment with the system and gain a bit of experience They demonstrated some rudimentary

understanding of telecommunications potential and, as mentioned above, dream of establishing some type of e-mail link with other institutions.

While aware of the concept, the program organizers know little about establishing a local-area network This is an area in which they could benefit greatly from some basic training.

IV. Potential Partners: International Institutions and Projects

A. ICRISAT

ICRISAT (International Crops Research Institute for the Semi-Arid Tropics) was founded in 1972 under the aegis of the Consultative Group on International Agricultural Research (CGIAR), an informal association of public and private sector donors which supports some 18 international ag research centers around the world ICRISAT-Niger has an impressive facility with a team of some 300 international scientists, researchers, and other personnel ICRISAT-Niger actually consists of two locations· the research station located about 30 kilometers outside of Niamey, and a Training and Visitors Complex (TVC) in Niamey itself.

ICRISAT has a broad base of computer users and technicians (more than 150 PC-compatible computers), but has less experience with telecommunications than one might expect at an international institution of scientists and researchers

One explanation is ICRISAT's poor access to standard telephone service. Though the ICRISAT TVC in Niamey does enjoy reliable phone service, the Nigerien OPT (Office of Post and Telecommunications) has installed no lines in the area of the ICRISAT station outside the capital, where the only connection to standard telephone service is a 30-kilometer microwave link to Niamey ICRISAT technicians are not satisfied with the quality of this link, which they say is frequently out of service due either to atmospheric conditions or other unexplained problems ICRISAT is trying to work with the local PTT to find a better way to satisfy the station's telecommunications needs, but administrative obstacles and technical problems have impeded progress.

ICRISAT also has two accounts with NigerPac 1) a dial-up account used mainly for e-mail connections from the research station via the microwave telephone line, and 2) a dedicated 9600 bps leased line at the TVC. At this time, the leased line is used mainly for backup e-mail connections and some experimentation.

ICRISAT has no network to link their 150+ PC-compatible computers, though plans are well under way to install one on the research station site A bid from a local firm for a 10BaseT-Ethernet system, including two fiber-optic backbones and two Novell file servers, has been accepted, and installation is scheduled to begin soon When that system is up and running (probably by the end of 1994) ICRISAT will be in a better position to expand its telecommunications activities ¾ if the problem of access to reliable telephone or data communication services is finally resolved.

Once the network is in place, automating electronic mail service will be a high priority, though improving data transfer capabilities with ICRISAT and other CGIAR facilities around the world is also an important task for the immediate future.

ICRISAT has a "centralized" e-mail system using CGNET ¾ "centralized" because, without a local area network, e-mail users must send and receive messages through an e-mail operator. The operator collects messages from users either on paper or floppy disk, then performs a manual batch transmission to CGNET once a day. At the same time, incoming mail is downloaded, printed, and distributed on paper. While this system works, it does not offer the flexibility users will enjoy once their PCs are networked and e-mail operations are automated on a mail server.

CGNET is an electronic mail service that was the result of a 1983 pilot project to develop a computer based messaging system for CGIAR institutions A limited number of users in eight CGIAR centers around the world and the CGIAR Secretariat in Washington participated in the pilot phase That number has now increased to several hundred users in 56 institutions around the world, and now includes several non-CGIAR research centers, donor agencies, and universities Administration of the mail service has also been transferred to a private company named CGNET Services International, and access has been expanded via gateways to the Internet and BITNET in the U.S , DASNET and NetNorth in Canada, EARN in Europe, JANET in the U K , JUNET in Japan, and some commercial e-mail providers like MCI Mail

Connection to CGNET is accomplished via Dialcom, a private commercial data network in the United States. ICRISAT-Niger usually makes this connection via its dial-up NigerPac account. Again, the poor telephone link to the ICRISAT station sometimes makes this difficult Though inconvenient, the e-mail connection must sometimes be made via the leased line in Niamey.

B. AGRHYMET

One former staff member calls the AGRHYMET station in Niamey a "high-tech oasis" in the Sahel This is no exaggeration. There is little question that AGRHYMET has assembled the most sophisticated computer and electronics equipment of any organization in the country, perhaps in the entire Sahel, outside of the international telecommunications infrastructure itself.

AGRHYMET receives and processes imagery from two different satellite systems. NOAA and Meteosat It goes without saying that performing such operations requires computer horsepower of impressive proportions, and a short visit like the one undertaken while preparing this report is hardly sufficient for describing the system in detail. The following thumbnail sketch merely scratches the surface of the sophistication and power of AGRHYMET's systems:

Hardware·

1 Five VAX mini-computers with approximately 12 gigabytes of disk storage.
2 Dozens of PC-compatible computers, several with storage capacities in the gigabyte range
3. A Meteosat reception system which during the rainy season receives up to 25 megabytes of remote sensing imagery data per day, in addition to weather faxes and other meteorological data
4 A NOAA satellite reception system which during the rainy season receives up to 150 megabytes of imagery data per day.
5 Two Unix systems (Sun)
6 A 9-track tape archiving system, including a library of several gigabytes of satellite imagery data dating back to 1982.

Other information about network software, protocols, and hardware:

TCP/IP (Transport Control Protocol/Internet Protocol) running over Ethernet 10Base2 connects many of AGRHYMET's systems Further information

1 The VAX/VMS systems run DEC-Net, network software for Digital Electronic Corporation equipment.
2 The network in ORSTOM's sub-office, co-located on the AGRHYMET station, is linked to one of AGRHYMET's VAX computers via an Ethernet bridge (see the section describing ORSTOM systems for more information)
3 There are two Lantastic local area networks, one used exclusively for training, the other for backups and printer-sharing in the GIS lab.
4. NFS (Network File System) software allows file-sharing among some of the nodes on various sub-networks, even between different operating systems.

5. AGRHYMET also has a NigerPac 9600 bps (X.25) leased line.
6. Weather information from other sites in Africa (temperatures, etc.) also enters the center on a separate low-speed circuit.

In addition to the above installed hardware, AGRHYMET will soon be installing INMARSAT portable ground stations in Niamey and other national centers throughout the Sahel. Initial installations will be in Niamey and Ouagadougou.

The INMARSAT systems will be used primarily to distribute imagery data from Niamey to the national centers AGRHYMET found INMARSAT's 9600-bps data service, which operates much like a dial-up telephone channel) to be the most economical means to distribute these multi-megabyte files. INMARSAT also provides a 56-kbps service (for a higher fee) which can serve as an upgrade path at some point in the future

INMARSAT also provides some limited video transmission capabilities

C. ORSTOM

ORSTOM-Niamey computer systems

ORSTOM (the French government's overseas research agency) has a well-developed computer network at its two sites in Niamey: one at ORSTOM headquarters on the plateau, and a secondary location at the AGRHYMET station just on the other side of the Niger River.

At its main office, ORSTOM has more than 20 PC-compatible computers and a Sun Microsystems file server running on an Ethernet local area network. The PC workstations are all running MS-DOS while the server runs UNIX, they share files using Sun's NFS (Network File Server) protocol This Sun network server is also linked to the international X.25 packet-switched network using a synchronous modem and leased line to NigerPac More on that in a moment

The ORSTOM office at AGRHYMET has another Sun file server and several other PCs also linked on an Ethernet LAN. In addition, this ORSTOM sub-network is linked to one of AGRHYMET's VAX systems (elsewhere on the station) which is also linked to NigerPac's X 25 network Therefore, theoretically the two ORSTOM sub-networks (the one at headquarters and the other at AGRHYMET) can communicate via this X 25 circuit In practice, however, this connection is rarely used because administrative arrangements for sharing the costs of the X.25 line have not yet been settled between ORSTOM and AGRHYMET

RIO (Réseau Informatique de l'ORSTOM)

For its broader telecommunications implications, more important than these local area networks (LAN) is the broader wide-area network (WAN) to which they are linked RIO (Réseau International de l'ORSTOM) During the past seven years, ORSTOM has been steadily developing RIO to link its research sites and offices in France and West Africa. ORSTOM offices in Senegal, Niger, Togo, Cote d'Ivoire, Paris, ORSTOM headquarters at Montpellier, and several other sites are now operational on RIO, most of them via X 25 packet-switched networks run by local PTTs Within the last few months, ORSTOM has developed user agreements and rate schedules to make RIO service available to non-ORSTOM users Non-ORSTOM use would ostensibly be mainly for electronic mail.

RIO has grown slowly into a very functional wide-area network designed to facilitate connection and expansion using available technology (X 25 packet-switched networks) while keeping costs to a minimum An added benefit is that RIO uses network protocols (TCP/IP) that have become an international standard for linking the computer systems of thousands of academic, research, and other institutions around the world.

The Montpelier node is the most important on RIO; it acts as a central clearinghouse for all electronic mail on the network and is linked directly to the Internet via Transpac, France's public packet-switched network. ORSTOM technicians in Niamey have no information on the exact nature of this connection, but the integration of RIO into the Internet is greatly facilitated by the use of Unix servers (which use the Internet's TCP/IP network protocol) on all network nodes. For the moment, only the Montpelier node enjoys full Internet access (use of FTP, Telnet, and other standard TCP/IP applications), but all RIO nodes can easily exchange information on the Internet, via the Montpelier gateway.

RIO nodes in Africa use differing methods to establish a connection with the Montpelier server. Most use dial-up or leased line access to packet-switched networks provided by local PTTs; a few still use dial-up telephone lines, or call neighboring countries where a packet-switched network exists.

The primary use of the RIO WAN at the present time is for electronic mail and file transfers The server at Montpelier headquarters is the main control node for all of RIO's e-mail operations. In other words, all e-mail to and from other RIO sites in Africa passes through Montpelier To give a concrete example, the ORSTOM RIO node in Niamey sends and receives e-mail in the following way. the mail server in Montpelier connects with the Sun server at ORSTOM-Niamey three times per day via the X 25 networks mentioned above Montpelier initiates this connection and thus is billed for the entire transaction at a rate lower than if Niamey had connected to Montpelier

During each connection, the Montpelier server forwards the mail it has stored for Niamey since its last connection and Niamey sends to Montpelier all mail it has stored for other destinations. Once it arrives in Montpelier, mail outbound from Niamey is forwarded immediately to its ultimate Internet destination.

See Appendix F for a complete description of the conditions and rates of using ORSTOM's electronic mail service on RIO Appendices B, C, and D also examine the costs ORSTOM's electronic mail services compared to commercial e-mail via NigerPac and dial-up phone lines.

Advantages and Disadvantages of RIO

Advantages:

- Employs widely used communications standards and network protocols.
- By creating a broad user base and taking advantage of lower connection rates from Europe, spreads fix costs while keeping variable costs to a minimum.
- Creates a direct link (e-mail) between users in Africa and important research, academic, government, and other institutions around the world (via Internet)

- Costs compare favorably with other e-mail access (see Appendices B, C, and D. for cost comparisons.)

Disadvantages:

- Future depends on ORSTOM's ability to maintain an institutional presence in Africa into the foreseeable future. Also, their willingness to continue offering access to RIO by non-ORSTOM users

D. FEWS (Famine Early Warning System) Project

The Famine Early Warning System (FEWS) is a USAID-funded project the goal of which is to monitor conditions throughout Africa that may lead to crop and food shortages, and subsequently to famine. FEWS collects information about impending famine conditions for policy makers and responsible officials that can be used to avoid food security crises before they arise.

The FEWS office in Niamey is significant to this study because it uses a form of e-mail called FidoNet, which is used extensively in some African and developed countries. FidoNet is an informal network of bulletin board services (BBS) that implement a public-domain store-and-forward e-mail system, generally using normal dial-up telephone lines

The FEWS office in Niamey is part of the Fido system put into place to allow FEWS offices around Africa to communicate with each other, and with FEWS headquarters in Washington, on a timely basis The Fido BBS at FEWS headquarters in Washington periodically dials into the other Fido systems in Africa and elsewhere (via standard telephone lines) in order to send and receive mail either destined to or waiting on those systems This store-and-forward polling is accomplished automatically by software and can be configured to make phone calls late at night or at other times when rates are lowest

At the time of this study, the Fido server in Niamey was not operational, the computer on which it was installed was having disk problems. However, in general, the system works well for the FEWS project's communications needs according to project personnel in Niamey, Fido allows staff members to keep current on information of general interest to all FEWS offices, and to exchange e-mail with other FEWS personnel. For budgeting purposes, nearly all telephone costs are paid by the central node, since all calls originate from Washington, therefore the system is very cost-effective for field offices and for the project in general.

The FEWS office is the only Fido system operational in Niger Using it as a Fido point for the general public does not appear to be an option for the moment it is unclear how accounting for such a setup would be handled, and the FEWS office in Niamey does not have personnel in place with sufficient free time to administer a public system. Also, unless it was possible to create a "subsidized" public access system, with a central node calling into Niger regularly from outside the country, a Fido system for international e-mail using dial-up lines would not appear to be cost effective given current phone rates (see Appendices B, C, and D for e-mail cost comparisons).

As for e-mail within Niger, costs would be much lower, making Fido a more cost-effective alternative, however, there seems to be very little general knowledge about Fido in Niger at this time Any attempt to start a public access system would involve starting from scratch, and again, without a subsidized central node to handle international calls, international e-mail on Fido would be expensive

E. USIS

The American Cultural Center in Niamey, like other USIS posts in Africa and the rest of the world, is equipped with a parabolic antenna and the electronic equipment needed to receive television broadcasts and other information via satellite from USIA in Washington. Though these installations are often referred to as TVROs (Television Receive-Only) systems, this is something of a misnomer since, in addition to television broadcasts, USIS also receives transmissions of textual information from USIA-Washington over the same link

Description of USIS telecommunications systems:

WorldNet and other television feeds

The most frequent use of the USIS satellite downlink is to receive and record news and features programs, usually produced by American networks, news organizations, or public television studios Some of these broadcasts are received on a regularly scheduled basis; evening news programs are one example Other programs are sent as they are released or otherwise made available to USIA, documentaries fall into this category On occasion, even certain sporting events of international interest may also released for one-time, non-commercial showings by USIS overseas

In addition, USIA-Washington also produces and broadcasts live programs to Africa and elsewhere that allow for interactive commentary, questions, and dialog between guests in a studio in Washington and live audiences viewing in Cultural Center auditoriums abroad. These programs are often WorldNet dialogs or other types of round-table discussions and conferences organized and produced by USIA

USIS accomplishes these interactive sessions by maintaining an open telephone line between the viewing site and the production studio in Washington during the entire broadcast· in other words, the viewing audience abroad both sees and hears via satellite what is happening in the studio in the U S., while the audience's questions and comments (with no accompanying video) are sent back to the studio on a normal dial-up telephone line

Reception of textual information

While its name evokes an image of less modern technology, the USIS "wireless file" is also transmitted via satellite The "wireless file" is a bulk transmission of textual information consisting of several types of documents and other material sent by USIA-Washington to USIS posts abroad messages to overseas staff, news reports for staff and embassy use, press clippings and articles from American newspapers, press releases and articles written by USIA writers, etc.

These documents are transmitted in ASCII (standard computer text) format, on an audio sub-carrier of the satellite transponder that carries the television broadcasts described above. This text-transmission system is not only an efficient use of excess capacity on the satellite link, it also puts this often time-sensitive information into the hands of USIS staff overseas much more quickly than it would come through standard telex, mail, or State Department cable channels.

In Niamey, USIS staff often convert some of these text documents to WordPerfect format for printing or distribution to news organizations, government officials, or other interested U S. government agencies at post.

F. Africa Distance Learning Demonstration Project

A description of this project is attached in Annex F. The reader is referred to that annex for more detailed information.

This demonstration, which is scheduled to take place early in 1994, is slated to include selected targeted audiences in Zimbabwe and Kenya only. If the project is successful, however, USAID-Niger may wish to explore involvement in an actual pilot or operational phase.

It is noteworthy that satellite television will be used to deliver training to the target audiences. Also, several of the training topics in the demonstration phase could be applicable to training in Niger Agribusiness, Tropical Animal Diseases, and Telecommunications in particular. In addition, Texas A&M, one of the project's lead institutions, is located in a region of the United States (dry, semi-arid) where agricultural research collaboration with INRAN, ICRISAT, and others might bear fruit for Niger.

V. Recommendations

A. Activities with USAID participant trainees

Several former USAID participant trainees were contacted while compiling this report. Discussions with them resulted in a sharing of information about the findings of this report, as well as the participants' needs and concerns about continuing their training and maintaining professional contacts in their respective fields.

One thing that interested nearly every participant was the possibility of using electronic mail to maintain and develop new professional contacts Several participants had used e-mail extensively while completing their studies in the U.S Of particular interest t ı some of them was the possibility of connecting to the Internet via ORSTOM-Niamey's RIO node.

One participant (Kondo Boubacar, Ministry of Finance, M S Computer Science, Ball State) even said he planned to contact other members of the USAID participant alumni association to assess the interest in forming a group to obtain an e-mail account at ORSTOM He seemed to think interest would be high

Recommendation: Follow-up with USAID Alumni Association members to see if there is a need for technical or other assistance in establishing e-mail links with the U.S.

Options:
1. Internet e-mail on ORSTOM's RIO network.
2. Possible lower cost group rate negotiated with NigerPac to allow USAID participants to connect with a commercial service like CompuServe via NigerPac at lower rates
3. FidoNet link with either FEWS or SAFIRE projects

Costs comparisons of various ways to access e-mail services are provided in Appendices B, C, and D.

B. University

Distance Learning: Referring to the description of the University of Niamey's Distance Learning Project above, there might be a possibility of collaboration. The current donor's future involvement with this project is unclear at this time (ACCT from the Ecole Internationale de Bordeaux).

The project has already expressed the need for technical assistance in video production and materials development Other areas of collaboration might also materialize Certainly any

distance learning activities with the University of Niamey should not be planned without at least making contact with the director of this project.

Recommendation: Conduct more information gathering on the exact nature of this project's activities, including an evaluation of its success/failure At least in initial stages, include project personnel in general discussions of distance learning in Niger, and certainly concerning anything involving the university. Depending on the exact nature of a particular distance-learning effort, collaboration might be possible and fruitful.

Computer Telecommunications: The individual professors (in the Math and Education Departments) who are attempting to create a computer center and computer training program at the university are in dire need of help on a number of fronts· technical training, hardware and software procurement, training of trainers, and support from the university itself

The author was impressed with the efforts they have made on their own, and by the fact that, during long discussions, they never asked for any help at all They are determined to do something useful whether anyone assists them or not. Having said that, given the general shape of the university and government finances in general, the environment in which they are trying to make things happen is highly discouraging

What better way to conduct "distance learning" than by using telecommunications to conduct training on telecommunications? This is merely one subject area in which university personnel could benefit from technical and training assistance These individuals are not necessarily potential partners in a distance learning effort, but they would be motivated and grateful trainees in the short term, and potential full partners in the long run.

Recommendation: A concrete recommendation is hard to provide But future training project design should not neglect the important void these individuals are trying to fill at the university Those trying to establish a computer program are really trying to move a mountain and could use some help If they succeed in creating a real computer center and viable computer training at the university, a long-term partner for "distance learning," at least insofar as telecommunications activities are concerned, will have been created at the same time.

C. Potential Collaboration with USIS

One potential distance learning idea that comes up repeatedly is the possibility of some type of remote classroom via television from a U S. university or institution. Courses could be aimed at students at the university, continuing education for former USAID participants, or for others

Although it was not possible to assess the costs of such an activity in Niamey, establishing a live television link between the U.S. and Niger is certain to be extremely expensive, and unlikely to be cost effective.

One alternative to buying time on an international satellite specifically for such an activity would be to use down time on the USIS-WorldNet satellite link. There are times of the day when the USIS channel is not in use; there might be a possible for collaboration between USIS and USAID in sharing the costs of that link for the purpose of distance learning activities between the U.S and Niger

Further, if such a program were indeed possible, its impact could go well beyond Niger's borders. Programs might be set up that would interest participant trainees in countries throughout Africa or throughout the Sahel For example, a lecture series on agricultural research in arid lands (including participation by ICRISAT), a multi-part training program in telecommunications for universities throughout the world, etc

The decision about USIS satellite usage would not be made in Niamey, however Satellite use is controlled in Washington, and any collaborative agreement would have to be set up between USAID and USIS at that level

Recommendation: Explore with USIS Washington the possibility of using down time on the WorldNet system to conduct interactive training sessions for USAID participants (and perhaps others) overseas If a cost-sharing arrangement can be made for satellite time, this would almost certainly be less costly than trying to lease satellite time on a special arrangement for such a program Using existing USIS facilities could also be more cost effective than trying to create a parallel program or system from scratch

D. Private Radio Stations

The Nigerien government has recently begun to issue licenses to individuals wishing to set up a private radio station As of this writing, no stations have been established, but 15 licenses have been issued.

For distance learning activities within Niger, these stations might be good potential collaborators: in most cases they will likely be scrambling for some type of programming to put on the air, operating outside of a bureaucracy (ORTN) they might be easier to work with than the government radio system; paying such stations for air time for worthwhile educational purposes might be an indirect way to subsidize them, and indirectly support their establishment as commercially viable enterprises.

Recommendations: In the event that a distance learning project is established to reach a widely dispersed audience within Niger, explore the extent to which newly established private radio stations might play a role in broadcasting such educational programming.

In the early going, these stations are unlikely to provide widespread national coverage like the ORTN system; nonetheless, it might be worth trying to work with them for the reasons stated above One contact in this area is Yousoufou Amadou Tidjani, B.P. 361, Niamey (tel. 72.32 52) He was interviewed during the preparation of this report and was very interested in this concept He already has an authorization to establish a private radio station, but is looking for funding for materials and equipment He had made contact with USAID to see if there was any possibility for assistance

Mr Tidjani is by no means the only possibility, however. The *Conseil Superior de la Communication* (CSC) is the body that issues private radio licenses They could be contacted for the names of other private radio entrepreneurs

E. ICRISAT/INRAN

Given some of the topics to be addressed by the Africa Distance Learning Demonstration Project (biotechnology, agribusiness, tropical animal diseases, etc) ICRISAT and INRAN would seem to be good potential partners for those activities, if they should be extended to West Africa (Current ADLDP activities are centered in East Africa See Appendix E for more information)

Recommendation. Research the activities and accomplishments of the ADLDP and see to what extent Niger might have a role as a partner in the project's distance learning activities Texas A&M and Prairie View A&M Universities are the lead institutions on the project, it might be useful to contact responsible individuals at those institutions to explore avenues of collaboration.

F. AGRHYMET

AGRHYMET's systems are so advanced technologically that it's almost hard to envision productive collaborative relationships between them and the other institutions visited. Its satellite imagery reception equipment, NOAA and Meteosat, are not directly useful as a way to distribute distance learning information (unless the definition is stretched to include the satellite imagery itself) For international communications, it uses the same means as everyone else telephone for voice and NigerPac for data, though that will change when their INMARSAT system is up and running

However, AGRHYMET may have some distance-learning needs of its own: for example, it has personnel that is widely scattered throughout the Sahel in various national AGRHYMET centers.

AGRHYMET is sometimes criticized for bringing the best of these local staffs to Niamey, leaving the least qualified (perhaps least well trained) behind. Thus, some AGRHYMET staff are wondering how to provide better training or information or both to a widely dispersed audience in several different Sahelian countries.

The INMARSAT system will help to meet an important information dissemination need when it starts to distribute satellite imagery data to national AGRHYMET centers. The system, which will initially run at only 9600 bps for data transmission, is capable of much higher data speeds (56kbps) and even some video transmission It is unclear exactly how that technology could be put to use as distance learning tools, but creative thinkers would probably find a way.

Recommendation: Open a dialog with AGRHYMET staff to discuss how distance learning might respond to some of the institutions training needs Given their leadership in technological areas, they could be a good partner in applying technology to training needs.

G. ORTN

ORTN should not be neglected as a possible distributor radio and television as part of any distance learning program for trainees within Niger

ORTN broadcasts television for only four hours per day (19 00-23 00), ORTN radio is on from 6 30-15 00 and 18 00-23·00 There seems to be little reason that ORTN's television and radio distribution system could not be used for distance learning activities outside (or sometimes even during) those normal broadcast hours

There may be creative ways to pay for this as well ORTN officials expressed their willingness to consider providing television and radio time in exchange for donations of needed equipment and materials This in-kind arrangement could be interesting

In addition, ORTN owns and operates two television studios (both in Niamey) and 9 radio studios (three in Niamey and six others scattered around the country) At the very least, these facilities could be used for educational or distance learning productions, whether they were broadcast live or recorded for later playback on video or audio tape players. Again, there may be some creative ways to pay these production costs

Recommendations: Consider using ORTN radio and television either for broadcast or production of training materials in any future distance learning activities. As and added benefit, ORTN personnel could also learn some useful educational television production skills in the process

VI. Appendices

A. ELECRONIC MAIL CONNECTING WITH COMMERCIALS SERVICES VIA NIGERPAC

B. ORSTOM ELECTRONIC MAIL ILLUSTRATIVE MONTHLY COST FROM NIAMEY

C COMMERCIAL ELECTRONIC MAIL ILLUSTRATIVE MONTHLY COST FROM NIAMEY

D COMMERCIAL ELECTRONIC MAIL ILLUSTRATIVE MONTHLY COST VIA DIRECT-DIAL

E AFRICA DISTANCE LEARNING PROJECT DEMONSTRATION PROJECT

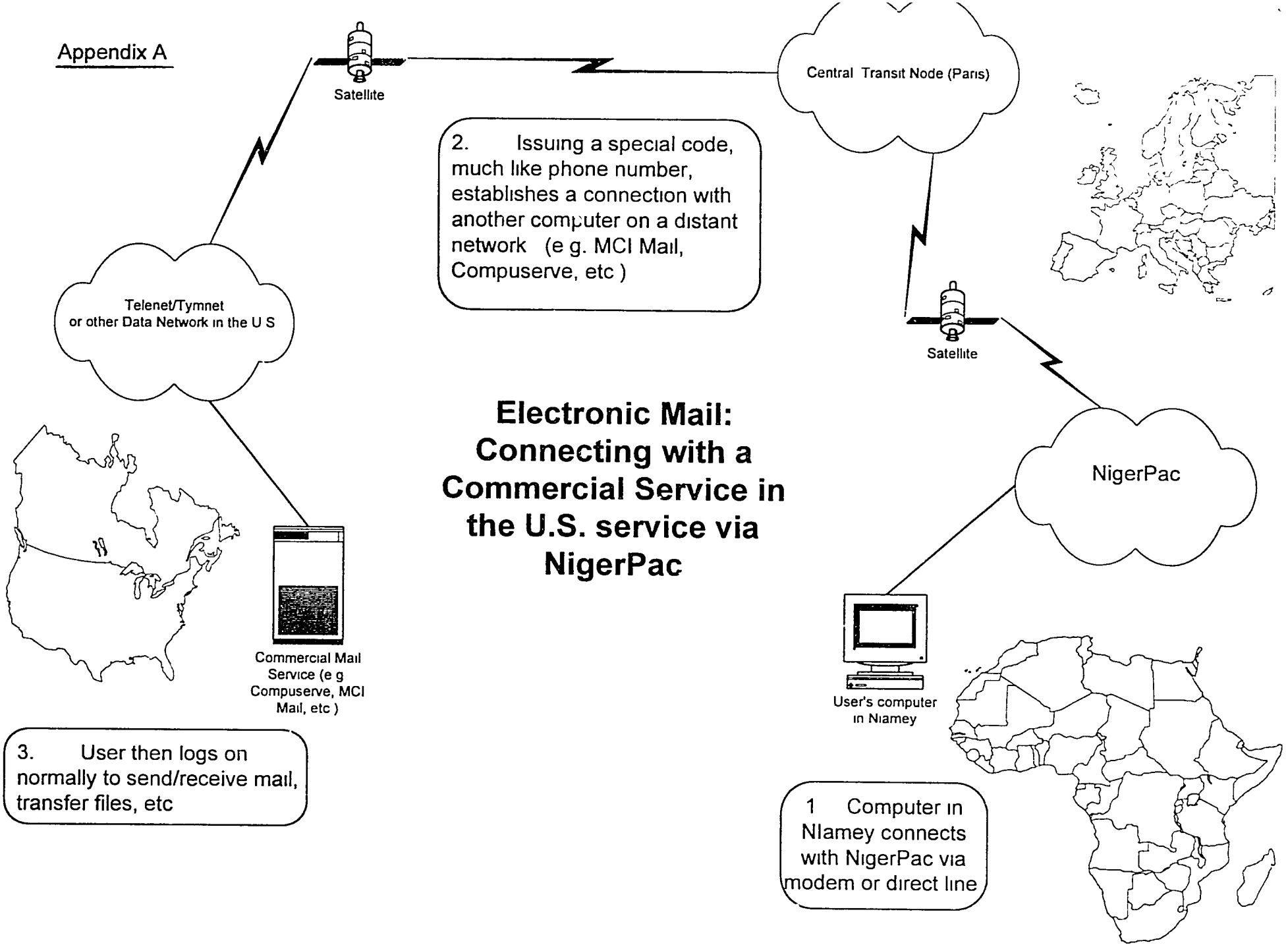
F CHARTE RELATIVE A L'UTILISATION DU RIO (RIO CHARTER)

G COSTS OF ONE-WAY SATELLITE TELEVISION BROADCAST. US TO NIGER

H PERSONS CONTACTED

Appendix A

Electronic Mail: Connecting with a Commercial Service in the U.S. service via NigerPac



ORSTOM Electronic Mail: Illustrative Monthly Cost from Niamey
(with and without NigerPac access to ORSTOM-Niamey mail server)

Assume:	ORSTOM Annual fee	10,000	
	ORSTOM charge per kilobyte	200	CFA
	Number messages per month:	**30**	
	Avg. size of each message:	**1.5 k**	(2 5 K = about one page of text)
	Access time per session (NigerPac)	**2 minutes**	(time required to log on, send/receive mail, log off)

Estimated ORSTOM charges

Monthly fixed fee (annual fee / 12)		833	
Total volume (kilobytes)	**45**		
Volume charge (Volume x CFA/kilobyte)		9,000	
Monthly Total		**9,833**	**Monthly Total without NigerPac account (user must go to ORSTOM for e-mail access)**

Estimated NigerPac charges

Monthly charge (dial-up line)	6,900	
Volume charge (Volume x CFA/kilobyte)	540	
On-Line (timed) Charge	840	(assume 9600 baud and one log-on per message)
Monthly Total	**8,280**	

Total (ORSTOM and NigerPac)	**18,113**	**Monthly Total with NigerPac account (user can dial in from home or office)**

Monthly Cost vs. Messages/Month

No Messages	ORSTOM	NigerPac	Total Monthly Cost
10	3,833	7,360	**11,193**
20	6,833	7,820	**14,653**
30	9,833	8,280	**18,113**
40	12,833	8,740	**21,573**
50	15,833	9,200	**25,033**
60	18,833	9,660	**28,493**
70	21,833	10,120	**31,953**

Commercial Electronic Mail: Illustrative Monthly Costs from Niamey
(CompuServe used as an example; other mail services are comparably priced)

Assume:	CompuServe Monthly Fee	10 00	
	Supplemental overseas network access	0 21	per minute
	Exchange Rate	580	CFA = $1
	Number messages per month:	**30**	
	Avg. size of each message:	**1.5 k**	(2 5 K = about one page of text)
	Access time per session	**2 minutes**	(time required to log on, send/receive mail, log off)

Estimated Compuserve charges

Basic services fee per month	10 00	**(Basic services should cover most e-mail needs)**
Supplemental network charge	12 60	
Monthly Total	**22.60**	
	13,108	**CFA**

Estimated NigerPac charges

Monthly charge (dial-up line)	6,900	
Volume charge (Volume x CFA/kilobyte)	3,825	
On-Line (timed) Charge	7,800	(assume one log-on per message)
Monthly Total	**18,525**	

Total CompuServe and NigerPac **31,633**

Monthly Cost vs. Messages/Month

	CompuServe		NigerPac	Monthly Total (CIS+NigerPac)
No. Messages	($)	CFA	CFA	CFA
10	14 20	8,236	10,775	**19,011**
20	18 40	10,672	14,650	**25,322**
30	22 60	13,108	18,525	**31,633**
40	26 80	15,544	22,400	**37,944**
50	31 00	17,980	26,275	**44,255**
60	35 20	20,416	30,150	**50,566**
70	39 40	22,852	34,025	**56,877**

Commercial Electronic Mail: Illustrative Monthly Costs from Niamey via Direct-dial Connection

(CompuServe used as an example; other mail services are comparably priced)

Assume:	CompuServe Monthly Fee	10 00	
	Per minute charge for call to U S	1,440	CFA / minute
	Exchange Rate	580	CFA = $1
	E-mail sessions (calls) per month	**30**	
	Access time per session	**2**	**minutes** (time required to log on, send/receive mail, log off)

Monthly Cost vs. Messages/Month

Messages per month	CompuServe Monthly Fee ($)	OPT Monthly Charges (CFA)	OPT Monthly Charges ($)	Monthly Total (CFA)
10	10 00	28,800	49 66	**34,600**
20	10 00	57,600	99 31	**63,400**
30	10 00	86,400	148 97	**92,200**
40	10 00	115,200	198 62	**121,000**
50	10 00	144,000	248 28	**149,800**
60	10 00	172,800	297 93	**178,600**
70	10 00	201,600	347 59	**207 400**

CATHY ROSE OIT 703-875-1...
Mr. Keith Simmons AFR/SWA

9/22/93 with COMSAT rep

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Appendix E

Africa Distance Learning Demonstration Project

This joint initiative of Texas A&M University, Prairie View A&M University, and COMSAT is to demonstrate the educational possibilities that can be provided to Africa using distance learning techniques. Two countries will be targeted - Zimbabwe and Kenya. "Downlink" sites will be set up in Harare, Zimbabwe and Nairobi, Kenya. Texas A&M will transmit selected "modules" via satellite over a 5 day period. Each "module" will be 1 1/2 - 3 hours in length and will contain a general overview of selected subjects. Possible subjects of educational importance to Africa include: Family Literacy; Tech Prep, Biotechnology; Agribusiness and Technology Transfer; Tropical Animal Diseases, Telecommunications and Ecological Tourism.

It is hoped this demonstration can expand into an established satellite-based network that continually delivers educational television to the African people. Satellite technology is an effective way to provide quality education to children and adults in remote areas. The increased potential for educational advancement and instruction provided by a coordinated satellite delivery system will assist in improving the economic competitiveness of Africa, especially among its children.

The Africa Distance Learning Demonstration Project proposes to send a team of educational professionals, in the Fall of 1993, to Africa to help formulate the context of the program ideas and to identify a target audience for each. Then, in early February, 1994, Texas A&M University will uplink from it's College Station campus a week long series of live, interactive satellite demonstration programs to the previously identified target audiences in Zimbabwe and Kenya. This demonstration will illustrate the effective potential of satellite telecommunication and distance learning techniques as applied to specific educational needs of the target audiences.

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Program Topics
Africa Distance Learning Demonstration Project

Family Literacy - increasing literacy skills in the parent, as well as the child

This program operates on the belief that it is important for the parent or primary care-giver to not only place a high value on the acquisition of literacy skills by all members of the family, but to also take an active role in the child's educational efforts in order for the child to be prepared to function in his or her social and academic community. In essence, the more literate the parent becomes, the more likely he or she will be to foster the necessary at-home and school-related attitudes and behaviors which will support the child's educational development.

Tech-Prep - a strategy to create a world-class work force that is highly skilled, adaptive to new technologies and responsive to the needs of the community.

The mission of Tech-Prep is to have students exit high school or the community/technical college with three options: (1) marketable skills that allow for immediate employment; (2) the academic credentials to pursue higher education; or (3) both, so that the student can earn a living during a pattern of lifelong learning. The Tech-Prep effort will establish an integrated education, training and employment delivery system that develops clear career paths to the workplace. The integrated delivery system will be created through development of comprehensive programs, implemented in the schools and colleges, to provide the specific sophisticated occupational skills required for employment in today's internationally competitive workplace.

Biotechnology - developing solutions to some of the world's agricultural problems.

This module will discuss and highlight increasing yields by improving production and decreasing disease while reviewing the successes and limitations of the traditional methods of agriculture. Also included will the an explanation of the basis for biotechnological procedures used as well as highlights of some applications of benefit to Africa in Agriculture and Medicine.

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Agribusiness - The focus is on effective transfer of technology modeled on the successes of the U.S. land-grand system of extension activities. The emphasis will be agricultural extension methods, agribusiness planning, and marketing Specific topics will deal with sustainable agriculture and farming practices that reduce cost of inputs and sustain production in the long run while enhancing the natural resource base. Economically viable and environmentally sound soil, crop and pasture management technologies including conservation tillage, agroforestry, integrated nutrient management, integrated pest management and integrated watershed management will be introduced and discussed.

Tropical Animal Diseases - This module is intended to provide an understanding of health management for improved livestock productivity Specific content will emphasize:

- Development of optimal disease control methods for food producing animals.
- Strategies for environmental stability through the optimal use of chemicals for parasite control
- Meat inspection and food safety
- Disease diagnosis in the field and in the laboratory

Telecommunications - A seminar on Telecommunications in the '90's. Subjects to be discussed include: Distance learning using digital technology; integration of digital networks and distance learning; digital transmission, videoconferencing technology; plus data network design and management Speakers will give insight to each subject and suggest usages that will facilitate the flow of information not only within the country but to the world

Ecological Tourism -Sustainable development has become a global movement. This module will emphasize wildlife conservation through integrated resource management and integrated community development. The goal is to build an economic base that allows development and implementation of policies and procedures that prevent further destruction of the natural resources, and preserve the country's ecology and enhance tourism as a major source of foreign exchange earning.

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Appendix F

CHARTE

relative à l'utilisation du RIO

ETANT PREALABLEMENT EXPOSEE,

la volonté commune des Instituts de recherche des pays en développement et des pays d'Europe, des Organisations Non Gouvernementales (ONG) et d'autres organismes publics ou privés, qui oeuvrent pour le développement, de renforcer et organiser les échanges d'information et de données scientifiques,

CONSIDERANT,

que l'ORSTOM a mis au point et développé un réseau informatique dénommé RIO, membre du réseau mondial INTERNET, conçu pour faciliter la coopération et la communication régionale et internationale, entre les différents partenaires,

que l'ORSTOM souhaite répondre favorablement aux demandes formulées par les Instituts de recherche, Universités, grandes écoles, et ONG, qu'ils soient partenaires ou non de l'ORSTOM, d'utiliser les services qu'offre ce réseau,

IL EST PROPOSE CE QUI SUIT :

ARTICLE 1 OBJET

La présente Charte fixe les principes et règles d'utilisation du réseau qui sont applicables aux ONG, aux instituts de recherche, aux établissements d'enseignement supérieur, publics ou privés des pays en développement ou développés qui souhaitent disposer de moyen de communication électronique ou désirent accroître leur potentiel de communication et d'échange d'information à caractère scientifique

ARTICLE 2 DESTINATION

Le réseau est exclusivement destiné à promouvoir la circulation des connaissances scientifiques et techniques

L'organisme qui adhère à la présente Charte s'engage à en respecter la destination et à ne pas utiliser le système informatique à des fins commerciales ou lucratives

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ARTICLE 3

Dans les conditions fixées par les présentes, l'ORSTOM fait bénéficier ses partenaires et les organismes qui en feront la demande d'un service de communication électronique. Outre la réalisation des échanges mentionnés aux articles 1 et 2, ce service leur permettra :

• d'aider à l'organisation de débats, conférences, colloques ou séminaires,

• de mettre en oeuvre des actions de recherche ou de formation participant à l'accroissement des connaissances scientifiques et à leur transfert au profit des scientifiques ressortissants des pays mentionnés à l'article 2.

Dans la mesure de ses possibilités, l'ORSTOM pourra proposer d'autres types de services sur le réseau (par exemple, un accès à des bases de données nationales ou internationales).

ARTICLE 4 : ACCES AU RESEAU

Les organismes adhérents peuvent accéder au réseau soit à partir des installations et équipements existants dans les représentations ou dans les Centres ORSTOM, soit directement, à partir des installations qu'ils mettraient eux-mêmes en place.

ARTICLE 5 : ADMINISTRATION DU RESEAU

5 1 L'administration générale du réseau relève de l'Unité Informatique de l'ORSTOM Montpellier (service RIO)

Cette dernière se charge .
• de la maîtrise et de la surveillance technique du réseau,
• de l'établissement d'un relevé des consommations,

5.2 La participation aux frais comprend une partie fixe (abonnement) correspondant aux frais de location des ligne et d'entretien des équipement et une partie variable (consommation) qui dépend du volume de données envoyé ou reçu (des autres réseaux) par l'adhérent Elle est comptabilisées par le responsable technique du réseau au Centre ORSTOM de Montpellier

Les détails techniques de la facturation sont précisés dans l'annexe technique et financière jointe

5 3 Une gestion locale du réseau, répondant à un principe de proximité est retenue
En conséquence, l'Unité Informatique de Montpellier se charge de la gestion du réseau, lorsque le siège ou l'établissement des adhérents et des abonnés est situé en Europe.

A l'étranger ou dans les DOM-TOM, les Représentants de l'ORSTOM sont localement responsables de la gestion administrative et financière du réseau.

- gestion administrative :

les Représentants sont donc les interlocuteurs privilégiés des organismes adhérents dont le siège ou l'établissement est situé dans les pays où ils se trouvent.

Les demandes d'adhésion sont directement adressées aux représentants de l'ORSTOM. Ces derniers, après avoir recueilli l'avis favorable de la Mission Technique Informatique, font signer la convention au nouvel adhérent.

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4/6

Les adhérents s'adressent aux représentants de l'ORSTOM pour toutes les questions relatives à l'utilisation (notamment lorsque les adhérents et abonnés accéderont au réseau grâce aux équipements des centres ORSTOM), et au fonctionnement du réseau

- gestion financière .

les organismes adhérents versent leur contribution auprès du régisseur local de l'ORSTOM

ARTICLE 6 : SECURITE

6 1 Les organismes adhérents s'engagent à collaborer avec les services de l'ORSTOM pour garantir la sécurité du système et à se conformer aux exigences d'utilisation et de gestion du réseau qui leur sont communiquées.

Ils se portent garant de l'emploi du système par leur personnel

6 2 Les organismes adhérents se chargent de l'inscription des personnes qui désirent bénéficier du service qu'offre le RIO.

Ils communiquent au centre ORSTOM, le nom des abonnés qu'ils ont inscrits

Dans le cas d'une utilisation directe d'un ordinateur de l'ORSTOM, un formulaire d'inscription individuel, du même type que celui joint en annexe et sur lequel il est fait mention de l'engagement à se conformer aux obligations de la Charte, est rempli par chaque abonné

6 3 L'accès au service s'effectue par l'intermédiaire d'une boîte aux lettres protégée par un mot de passe personnel et strictement confidentiel L'abonné ne doit en aucun cas le divulguer.

ARTICLE 7 : MODIFICATIONS

En cas de modifications apportées à la présente Charte, les organismes adhérents en seront informés au moins trois mois à l'avance

Dans les quinze jours suivant la réception des nouvelles propositions, les organismes adhérents notifieront leur accord aux représentants de l'ORSTOM

fait à . . .., le..... ....

signature du représentant de l'organisme,
précédée de la mention "lu et approuvé"

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CONVENTION

ENTRE

L'Institut français de recherche scientifique pour le développement en coopération (ORSTOM) établissement public français à caractère scientifique et technologique, ayant son siège au 213, rue La Fayette 75010 Paris, et représenté par son Directeur Général, Monsieur Gérard WINTER,

ET [1]

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

désigné ci-dessous l'établissement adhérent.

ARTICLE 1 - OBJET

L'ORSTOM, autorise l'établissement adhérent à bénéficier des services RIO à partir de[2].

L'établissement adhérent déclare avoir pris connaissance des principes et des conditions de fonctionnement du réseau inscrits dans la Charte et son annexe (ci-jointe), et en approuver les termes

ARTICLE 2 - ACCES AU RESEAU

l'établissement adhérent accédera au réseau à partir du (des) site(s) suivant(s) : [3] . . . . . .

. . . . . .

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[1] indiquer ici le nom de l'établissement, son statut juridique, son siège, le nom et titre de son représentant légal
[2] indiquer la date de mise en application de la convention
[3] indiquer les sites qui seront utilisés par l'adhérent (adresse électronique et localisation de chaque site)

ARTICLE 3 - PARTICIPATION AUX FRAIS

Une participation aux frais est demandée à l'établissement adhérent selon les modalités définies dans l'annexe technique et financière ci-jointe

Un état mensuel des consommations pourra être fourni par courrier électronique.

Le non paiement ainsi que le non respect de la destination de ce service pourra entraîner l'interruption des prestations, dans les quinze (15) jours après notification écrite de l'ORSTOM

En cas de révision de la tarification, l'établissement adhérent en sera informé trois mois (3) avant sa mise en oeuvre effective.

ARTICLE 4 - DUREE - MODIFICATIONS

La présente convention est conclue pour deux ans à compter de la date de début des prestations Durée pendant laquelle l'ORSTOM s'engage, à assurer, dans la mesure de ses moyens, la continuité du service

Elle est renouvelable par simple échange de lettre.

Sous réserve d'un préavis de quinze (15) jours, l'établissement bénéficiaire peut demander la résiliation de la convention

fait à .. . ., le ....

Pour l'ORSTOM

Pour ....

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Annexe technique et financière à la convention d'utilisation du RIO

1 Définition

Le réseau informatique RIO a été mis en place par l'ORSTOM (Mission informatique). Il constitué par des ordinateurs reliés les uns aux autres par des liaisons télécom Ce réseau o des services de communication électronique *messagerie, forum, transmission de données*

l' réunit des *sites informatiques* Chaque site comprend un ordinateur principal, le *serve* Celui ci est généralement relié à de nombreux postes de travail au sein d'un *réseau local* serveur assure la communication avec les autres sites du RIO

Le RIO est relié à un ensemble très vaste comprenant près d'un million de sites dans plus d pays les *"réseau recherche-éducation"* (academic and research network)

Le RIO et les autres réseaux "recherche/éducation" ont pour but de promouvoir les écha d informations scientifiques et techniques entre les établissements, de favoriser les relat directes entre partenaires de la communauté scientifique internationale

2 Les sites du réseau RIO

Le RIO comprend des sites gerés par l'ORSTOM et des sites gérés par des partenaire l ORSTOM ayant adhéré à la charte

LOCALISATION	ADRESSE electronique
Montpellier (France)	orstom orstom fr
Bondy (France)	bondy orstom fr
Paris (France)	paris orstom fr
Villefranche sur Mer (France)	villefr orstom fr
Noumea (Nouvelle Calédonie)	noumea orstom fr
Port-Vila (Vanuatu)	vanuatu orstom fr
Papeete (Polynésie française)	tahiti orstom fr
Victoria Mahe (Seychelles)	seychel orstom fr
Pointe-a-Pitre (Gouadeloupe)	pointap orstom fr
Cayenne (Guyanne française)	cayenne orstom fr
Dakar Hann (Senegal)	dakar orstom sn
Dakar Thiaroye (CRODT) (Sénegal)	isra orstom fr
Dakar Bel Air (Sénégal)	belair orstom sn
Dakar ENSUT (Sénegal)	ensut ensut sn
Bamako (Mali)	bamako orstom ml
Ouagadougou (Burkina-Faso)	ouaga orstom bf
Bobodioulasso (Burkina-Faso)	bobo orstom bf
Abidjan (Côte d'Ivoire)	abidjan orstom fr
Niamey (Niger)	niamey orstom fr
Lomé (Togo)	lome orstom fr
Brazzaville (Congo)	brazza orstom fr
Yaoundé (Cameroun)	yaounde orstom fr
Antananarivo (Madagascar)	tana orstom fr

Le site de Montpellier est le site central du RIO Les adresses électroniques des sites éti seront progressivement modifiées "fr" sera remplacé par le code ISO du pays considere

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3 La circulation des messages

L'information circule sous forme de *"message électronique"* Nous appelons ici *message*, un courrier électronique personnel, une contribution à un forum électronique ou un fichier de données préparé pour être transmis Nous parlerons donc indifféremment de message ou de courrier pour désigner l'information qui circule sur le RIO, même lorsqu'il s'agit de forum ou de fichier de données

Chaque utilisateur dispose d'une boîte aux lettres électronique Celle-ci contient les messages reçus Son accès est protégé par un code d'accès et un mot de passe individuel Ce dispositif garantit la confidentialité des informations

3 1 LES MTA

Sur chacun des serveurs, un programme informatique appele *"agent de transport du courrier"*, (MTA pour "mail transfert agent") assure les fonctions de centre de tri et de *publipostage* .

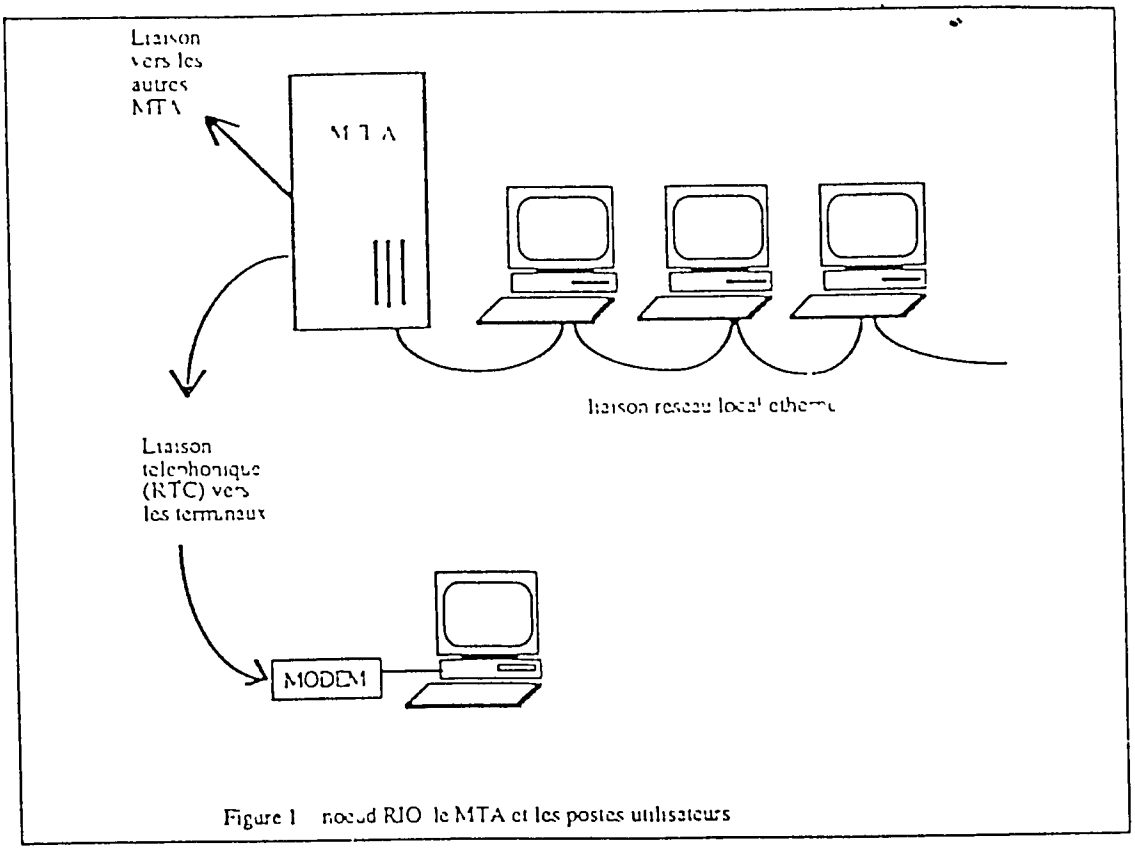

Figure 1 noeud RIO le MTA et les postes utilisateurs

Il collecte le courrier émis dans sa zone

- les messages émis à partir des ordinateurs installés dans le réseau local du MTA,
- les messages émis à partir d'un terminal ou micro-ordinateur muni d'un modem raccordé à ce MTA par téléphone

Il groupe les messages par lot et les transmet à d'autres MTA en fonction de leurs destinations finales

Il recueille les lots de messages provenant d'autres MTA, assure leur distribution s'il est le destinataire final, les réoriente vers d'autres MTA sinon

Il recopie autant de fois que nécessaire les messages destinés à plusieurs personnes (publipostage)

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Il vérifie le déroulement de toutes ces opérations, et avertit l'utilisateur et le responsable du système des anomalies qu'il détecte

Entre le lieu de création et de destination, le message parcourt un chemin qui peut traverser plusieurs MTA Les chemins d'acheminement des messages constituent le *plan de routage* Celui-ci est choisi de manière à optimiser les coûts globaux et la fiabilité de l'ensemble Actuellement toutes les liaisons internationales transitent par le MTA de Montpellier

3 2 LES ETAPES PARCOURUES PAR LE COURRIER

a) Le message est crée (saisie directe ou inclusion d'un fichier) par l'expéditeur, sur un micro-ordinateur ou un terminal

b) lorsqu'il est terminé, il est *reçu* par le MTA expéditeur qui appose un "*cachet*" indiquant l'origine, la date, l'heure, l'adresse électronique et le nom de l'expéditeur Ce cachet constitue l'*en tête* du message Le MTA vérifie la validité syntaxique de l'adresse du destinataire et le retourne immédiatement à l'expéditeur s'il détecte une anomalie

c) si le destinataire est local, le message est immédiatement place dans la boîte aux lettres correspondante

d) sinon, il est transporté vers un autre MTA et de proche en proche vers le MTA du destinataire

e) le message est enfin distribue par le MTA du destinataire, s'il est adressé à plusieurs destinataires il est alors dupliqué (publipostage) Si le destinataire est inconnu (aucune boîte aux lettres a ce nom) il est retourné à l'expéditeur avec une mention de non-distribution Le responsable du système informatique est averti de l'anomalie mais ne dispose pas du contenu du message qui reste confidentiel

f) Enfin, le message est lu par le destinataire losque celui-ci ouvre sa boîte aux lettres Il peut alors être détruit ou conservé dans un fichier informatique

4 Les charges financieres

Le RIO occasionne des coûts d'investissement et de fonctionnement

Dans le coût d investissement, il faut compter l'acquisition des ordinateurs et des logiciels, les frais d'installation du materiel les developpements logiciels et les coûts de raccordement aux services de telecommunication

Les coûts de fonctionnement comprennent l'alimentation electrique (ordinateurs et climatisation), les frais d'utilisation des lignes de telécommunication (abonnement et consommation) et les frais de maintenance

Le financement des depenses de fonctionnement est obtenu par la participation des utilisateurs qu'ils soient internes a l'ORSTOM ou qu'ils appartiennent à un organisme partenaire

5 Le calcul de répartition des charges

5 1 frais de transmission

Sur le serveur central de Montpellier, un programme informatique enregistre pour chaque message, son origine, sa destination et le nombre de caractères transmis Tous les mois, il calcule la consommation de chaque utilisateur en appliquant les règles suivantes

• imputation si l'envoyeur appartient au réseau RIO le coût lui est imputé

• coût il est calculé par liaison entre 2 MTA, il est proportionnel au nombre de caractères transmis Le barème suivant est appliqué

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liaisons	coût en FF (pour 1000 caractères)
a) Montpellier vers les sites "académiques" (edu, bitnet, com .)	gratuit
b) France / DOM par Transpac sur ligne directe	0,30
c) France / DOM par Transpac via un PAD public	0,50
d) France / TOM par Transpac sur ligne directe	1,00
e) France / TOM par Transpac via un PAD public	1,50
f) France / Afrique par X25	2,00
g) France / Afrique par RTC	4,00

• Destinataires multiples un même message envoyé, en même temps, à plusieurs destinataires, n'est compté qu'une fois par MTA destinataire

5 2 Acces aux services Transpac

L'acces au RIO à travers Transpac en mode PCV (3613, 3621, 36062424) donne lieu a une reimputation de ce service au tarif appliqué par France télécom (base 3614) Soit 0,70 FF la minute pour les 3613, 3621 et 1,40 FF pour le 36062424

L'acces au RIO à travers Transpac en mode kiosque professionnel (3616 ORSTOM) ne donne lieu à aucune facturation de l'ORSTOM

5 3 Frais fixes

L abonnement est fixe à 300 FF par an et par utilisateur à partir du 1/1/94

Les organismes de recherche scientifique et les établissement d'enseignement supérieur des pays en developpement conservent le bénefice de l anciens tarifs 100 FF par an et par utilisateur

6 La participation aux frais

Les organismes signataires de la convention RIO s'engagent à participer au frais de fonctionnement sur la base du calcul indiqué ci-dessus Cette contribution s'effectue de la maniere suivante

En debut d'année civile, ou au moment de son adhésion, l'organisme paye à l'ORSTOM un montant forfaitaire Celui-ci intègre les frais fixes et une avance sur consommation avec un minimum de 5 comptes par convention

- 1500 FF pour les pays en voie de developpement (soit 300 FF par compte 100 FF frais fixes, 200 FF avance sur consommation) ,

- 2500 FF pour les autres (soit 500 FF par compte 300 FF frais fixes, 200 FF avance sur consommation)

Si ce crédit est dépassé dans l'année, l'organisme recevra une facture correspondant a ce dépassement

Si le crédit n'est pas épuisé en fin d'année, il sera reporté sur l'exercice suivant

Un état mensuel des consommations est fourni par courrier électronique

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MTI 2 0 5

Demande d'ouverture de compte sur le Réseau informatique "RIO"

NOM en MAJUSCULES)

Prenom

Discipline scientifique (ou service administratif)
(Cette rubrique figurera dans l'annuaire du reseau Une liste indicative figure au dos de ce formulaire)

Pour les agents de l'ORSTOM	N° action budgetee (AB) N° d'agent (voir 1ere ligne de la feuille de paye)
Pour les agents d'un organisme ayant passe une convention avec l'ORSTOM	N° de convention Organisme

Je demande l'ouverture d une boite aux lettres électronique sur le réseau RIO J'ai pris connaissance des conditions generales d'utilisation du RIO (" charte relative a l'utilisation du RIO" pour les agents non ORSTOM) et je m'engage a en respecter les termes

Date et signature du demandeur

A remplir par l administrateur du reseau

Adresse electronique du beneficiaire

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Appendix G

Costs of One-Way Satellite Television Broadcast: US to Niger

Background

When a television signal is distributed via satellite it must first be transmitted by an earth station to a satellite in space (uplink), then back down to a receiving station somewhere else on the earth (downlink) Uplink and downlink transmissions are distinct "space segments" and are billed separately If the signal must also travel along a path on the earth, via microwave or fiberoptic cable for example, such a link is called a "ground segment" and is also billed separately by the vendor

Uplink provider services

Unless a user owns and operates a satellite earth station with uplink capabilities, the services of an uplink provider are required Uplink providers are often able to provide ground-segment services, production facilities, and a wide range of other services as well

Several uplink providers in the Washington, DC area were surveyed to gather cost data for this report Given the hypothetical nature of this exercise, some providers were unable (or unwilling) to provide detailed costs for non-specific service, in other words, it was difficult to give a true cost picture without knowing when, how often, from where, and for how long an uplink service was needed The following illustrative budget was compiled using the minimum service cost (uplink transmission only) estimates provided by a firm called Washington International Teleport in the DC area

Example: A television program is being produced live at a studio somewhere outside Washington, DC for broadcast to Niamey, Niger The television signal must first be sent from the studio to an uplink station in Alexandria, VA via microwave (one ground segment), retransmitted to a satellite over West Africa (one space segment uplink), from which it is retransmitted to an earth station in Niamey (another space segment downlink)

Cost Breakdown

The above example generates the following costs

1 **Uplink provider** - studio-to-uplink-station (ground segment)
2 **Uplink provider** - transmission to the satellite
3 **COMSAT** - for the uplink
4 **STIN (Soc. des Telecom. du Niger)** - for the downlink

To simplify the following budget, the ground segment from the studio to the uplinking earth station is left out of the example·

Illustrative Per-Hour Costs of US-Niger Television Transmissions

Uplink provider service (Washington Int Teleport rates)	$125 for the first 10 minutes $5 for each additional minute
COMSAT - uplink	$111 for the first 10 minutes 10 for each minute thereafter
STIN - downlink	$1200 for the first 10 minutes $1927 for the remaining 50 minutes of an hour

Based on these rates, the per-hour cost of transmitting television from the US to Niger would be:

Uplink provider	$125 for the first 10 minutes 250 for the remaining 50 minutes
Uplink (COMSAT)	111 for the first 10 minutes 500 for the remaining 50 minutes
Downlink (STIN)	1200 for the first 10 minutes 1927 for the remaining 50 minutes
	---
Total	**$4113 per hour**

Variability of Costs

The above example assumes 1 one-hour transmission roughly once every 2-4 weeks Per-hour costs could be lower for programs that are broadcast more often, in other words, prices should go down as use increases In addition, it is unknown to what extent STIN would be willing to negotiate with USAID to lower its downlink rates, which seem extremely high

Other Costs

It should also be noted that these estimates <u>only account for transmitting a television signal from one place to another</u> No assumptions are made concerning production costs (video production, editing, studio time, etc) which, for high-quality television productions, are likely to be substantial

Appendix H

Persons Contacted

Name	Agency	Additional Information
Jim Anderson	Director, USAID-Niger	
Mike Sullivan	USAID	
Gaston Kaba	USAID	Mr Kaba and Mr Yorontou know how to contact the rest of the people on this list
Abdou Yorontou	USAID Training Office	Their assistance was invaluable in the preparation of this report
Shirley Stanton	USIS	Spoke about using USIS WorldNet system for USAID training or teleconferencing activities
Youssouf Bouahim	Systems Manager, USAID	
Istefanas Salaou	Systems Admin , USAID	
Andrew Jacobsen	AGRHYMET	
Andrew Stansioff	AGRHYMET	
Ousmane Moussa	Professor of Math, University of Niamey	Group of three professors who are trying to start a computer program at the university
Boubacar Maiga	Computer Scientist, University of Niamey	"
Galy Kadir Abdel-Kader	Professor of Pedagogy, University of Niamey	"
Chinkafa Hachimou	Directeur Technique, ORTN	Very helpful, provided a lot of detailed information about ORTN, as well as OPT systems
Tahirou Ayounga	Directeur Commercial, OPT	
Dr. Sidikou Oumarou	Directeur de la Recherche, Ministry of National Education	Met together with Tandina Ousame concerning Distance Learning project at the university
Tandina Ousmane	Faculte des Lettres et Sciences Humaines, University of Niamey	Director of the Distance Learning Project at the university
Adam Abdoulaye	Scientific Director, INRAN	USAID participant Oversees INRAN division responsible for computers

Dade Haya	Director, Computer Center, INRAN	
Koroni Massani	Directeur de l'Informatique, Ministry of Finance and Planning	
Gregoire Ouoba	Director of Informatics, ICRISAT	
Roger Stern	Statistician, ICRISAT	
Issa Lawali	Informaticien, ICRISAT	
Mark McGuire	Director, Famine Early Warning System (FEWS) project	Former USAID contractor at AGRHYMET FEWS has FidoNet point in Niamey
Dr. Mounkaila Abdou	SNIS (Societe Nationale d'Informatique Sanitaire)	USAID participant Interesting in expanding SNIS telecom capabilities
Moukaila Noma	SNIS (Societe Nationale d'Informatique Sanitaire)	USAID participant Same as above
Youssoufou Amadou Tidjani	Private Radio Entrepreneur, Niamey (72 32 52)	Discussed using private radio as vehicle for distance learning activities He has a license for a private radio station, but no yet on the air
Julien Bonfort	ORSTOM	Systems manager for ORSTOM computer system, including RIO e-mail network
Koundo Boubacar	Direction General des Impots, Ministry of Finance and Plan (72 23 66)	USAID participant (BS, Computer Science), very interested in Internet connectivity for Alumni Associations