

PN.ABM-607 Jim, - FYJ - Le
79734 u: Africa
Drugs
Telecom
Telecom
Project

**TEAM REPORT
TECHNICAL NEEDS ASSESSMENT
FOR
SOUTHERN AFRICA TELECOMMUNICATIONS**

Based on field visits

July 24 - August 13, 1992

Sponsored by

Office of Foreign Disaster Assistance

and

Bureau for Africa

U.S. Agency for International Development

Washington, D. C.

August 24, 1992

Contents

- I. Executive Summary and Recommendations
- II. Introduction and Scope of Work
- III. Methodology
- IV. Findings, Conclusions, and Recommendations
 - A. Need for Improved Communications
 - B. Tracking Problems
 - C. Findings and Conclusions
 - D. Recommendations
 - E. Description of Recommended System
 - F. Coordination With World Food Program

Annexes

- A. List of Persons Contacted
- B. Country Reports
 - 1. Zambia
 - 2. Zimbabwe
 - 3. Malawi
 - 4. South Africa (Ops Center)
 - 5. Mozambique
 - 6. Tanzania
 - 7. Italy (Rome, WFP HQ)
- C. Technical Annexes
 - 1. Software
 - 2. Hardware
 - 3. Reliability of Telephone Lines
 - 4. Satellite Options for Future (V-Sat, Inmarsat, Satellite)
 - 5. Security Considerations

I. EXECUTIVE SUMMARY

A three-person technical telecommunication Needs Assessment Team visited five countries in Southern Africa (Zambia, Zimbabwe, Malawi, Mozambique, and South Africa) and the headquarters office of the World Food Program in Rome beginning in late July 1992 to assess telecommunications needs and options in respect to the Southern African Drought Emergency (SADE). The needs assessment was undertaken at the direction of the SADE Steering Committee which is co-chaired by the Deputy Assistant Administrator's of the Food and Humanitarian Assistance (FHA) and Africa (AFR) Bureau's respectively. Several reports had emphasized the need for improved communications to facilitate coordination of drought-related assistance.

The Needs Assessment Team found that, with the exception of USAID/Harare, all organizations contacted believed that improved communications could be helpful to improve coordination and efficiency in the movement of food and other emergency assistance, especially during the upcoming crisis period beginning in October. Several organizations also believed that improved data communications could play a vital role in helping to coordinate drought assistance, both in the crisis period ahead and during the rehabilitation and recovery phase. This is an important issue for the Africa Bureau as it attempts to deal with the longer-term effects of the SADE on the economies of the region in its regional policy and planning perspective in the coming months.

The Needs Assessment Team found no unmanageable technical or logistical problems which would prohibit the establishment -- within the next 60 days -- of a small, low-cost, efficient data communications network linking the major organizations concerned with drought relief activities. It also found that in all posts with the possible exception of Lilongwe it will be possible, within the next six months or so, to establish useful data links between the USAIDs in the region and with AID/W via "tail circuits" linked to the Embassys' satellite channel. These links will provide direct LAN to LAN communications, such as already exist in Africa with Nairobi, Pretoria, Kampala, and Abidjan. The Needs Assessment Team has concluded, after talks with WFP HQ in Rome, that there is a zero percent chance that communications can be improved in the desired time period without direct A.I.D. intervention.

In discussions with WFP in Rome it was concluded that immediate action is required by A.I.D. and WFP to collaborate on the setup of a data communications network based on Fidonet technology. This technology facilitates the transfer of messages, spreadsheets, graphs, maps, data files, imagery, etc. rapidly and efficiently over regular phone lines, even poor ones. The Team's own tests plus the experience of others (FEWS, Care) show that such a plan is workable providing that primary links are made outside the region, i.e., to the U.S. or Europe, since phone service on these routes is far better than between countries in the region. This concept is the basis for the team's recommendations. The structure of the Network is meant to reinforce the existing pattern of information flows. Accordingly, highest priority should be given to activating nodes in the corridor groups, national working groups, port authorities, railroads, and WFP offices. A minimum of 30 days is necessary to procure and prepare equipment, an additional 2-3 days to train and install nodes will be required.

USAID/Harare had strong reservations concerning any proposed AID interventions in telecommunications to improve coordination of SADE emergency assistance efforts. Their argument belongs to the school of "if it ain't broke don't fix it." The Needs Assessment Team was told by USAID Harare that "things are working well now" (and, therefore) "there is no need for A.I.D. intervention" (which would only) "cause disruptions to a process which already is working".

Nonetheless, the team found little agreement elsewhere with USAID/Harare's assessment of the situation. For example, the USAID/Lusaka director said, "I've been requesting this type of assistance from AID/W for months", the managing director of the Beira Corridor Group said "things could be helped immensely by better communications", and WFP in Harare said "there is a lack of planning information on grains being committed by donors to recipient countries, and so there is no coordination on food aid flows".

In addition, USAID/Harare appears to be arguing either to limit or restrain the coordination and operational role of WFP and SADCC viz-a-viz informal coordination among the SADE corridor groups that is now taking place. As the Needs Assessment Team learned later in WFP Rome and AID/W the situation is more complex. There are certain responsibilities that have been delegated as part of the joint UN/SADCC Appeal for the SADE and in agreements signed with donors including the U.S. and perceptions on the part of the UN, donor community and SADCC with regard to the coordination role of the various institutional players. USAID/Harare, for example, is itself in the process of signing a grant with the World Food Program which specifically highlights the need for improved communications, and since the WFP itself has for some months been pre-occupied with ways to improve communications in the region (although has as yet no implementation plan apart from the recommended joint effort with A.I.D. described in this report).

It is not the function of this report to make recommendations concerning coordinating and operational roles of significant institutional actors in the SADE. A.I.D. senior Management should assess this situation in deciding on a future course of action, given apparent conflicts, as the stakes are very high.

SUMMARY OF RECOMMENDATIONS

1. A.I.D. and the World Food Program should collaborate on the setup of a skeleton data communications network based on Fidonet technology, linking the major organizations involved in drought assistance activities. This network should be up and running within the next 60 days.
2. A.I.D. should take the lead in procurement of equipment and software, and in arranging for technical assistance to operate a "hub" in the Washington area. A.I.D. and WFP should field two joint teams to six southern African countries (Zambia, Zimbabwe, Tanzania, Malawi, Mozambique, and South Africa) within 30 days. These teams should, in each location, install the hardware/software in selected sites and train at least two persons to operate the data station.
3. WFP should make arrangements to take over operation of the data network, including the hub operation, within the next six to nine months.
4. Embassy-leased satellite channels are available in five of the six countries (and, possibly, in the sixth--Malawi). In these countries, tail circuits should be installed between the Embassy and USAID offices, high-speed modems procured and shipped through Embassy channels, and circuits set up to permit direct LAN-to-LAN links among the USAIDs in the region and with AID/W within the next six months.
5. Rail authorities in the region should work together to define an integrated communications system to facilitate the collection and sharing of vital information on rail movements, and to put such a system in place on an emergency basis.
6. USAIDs and WFP offices in the region should evaluate the need for additional FAX machines at strategic sites to facilitate the exchange of information needed to assure food distribution within each country. Other communications needs associated with food tracking and distribution should also be assessed and, to the extent possible, met.
7. Over the next 12 to 18 months, A.I.D. (Bureau for Africa, OFDA, and Food for Peace) should examine alternatives for a high-capacity regional telecommunications network using newly available satellite technology: this could provide each USAID in the region with voice, teleconferencing, E-mail, and high-speed data transmission capability at considerable savings over existing OE expenditures for telephone calls and FAX transmission.

(For full list of Recommendations see Section IV.D.)

II. INTRODUCTION AND SCOPE OF WORK

A three-person team visited five countries in Southern Africa (Zambia, Zimbabwe, Malawi, Mozambique, and South Africa) and the headquarters office of the World Food Program in Rome beginning in late July 1992 to assess telecommunications options in respect to the ongoing drought. This initiative was taken in response to observations/recommendations contained in an OFDA report¹ dated May 15, a trip report by David Joslin dated July 8, and observations made by recent travelers in the region: all suggested that better communications were needed to improve management of drought-related assistance.

The specific purpose of the team visits was:

- (1) to **gather data** on existing communications mechanisms used to exchange drought-related information, and to *identify key communications constraints* which impact negatively on efforts to provide timely warnings and drought-related assistance;
- (2) to **determine the feasibility of upgrading existing systems** by providing a means to exchange data sets and messages rapidly -- in electronic form -- between and among the key organizations involved in drought-related efforts: host governments, PVOs/NGOs, the principal donor countries, and regional and international organizations.
- (3) to **recommend specific solutions**, i.e., means of improving existing communications capability *rapidly and at low cost*; specifically, to recommend interventions which could be operational in 90 days or less, as well as longer-term options which might be implemented over the next one-to-two years.

General Information on the Team Visit

The team visit was sponsored jointly by A.I.D.'s Bureau for Africa and the Office of Foreign Disaster Assistance. The team members consisted of one DH management/computer systems specialist, a contract data communications specialist, and a former A.I.D. senior foreign service officer with long African experience (team leader). Work was to be completed NLT August 21, 1992, including presentation of findings and recommendations to the AID/W Task Force on the Southern Africa Drought.

The team's mandate included all feasible systems for data and message transfer: international telephone systems, packet-switching networks, A.I.D./U.S. Embassy networks, and low-cost satellite-based systems. Emphasis was put on *digital systems*, i.e., those which permit computer-

¹ *Southern Africa Drought Assessment*, OFDA, May 15, 1992 (draft).

to-computer transfers of messages, documents, and data sets (including relatively large data files). Voice capability and teleconferencing received less emphasis, since these are clearly of secondary importance to the rapid transfer of messages and data sets.

While the primary purpose of the visits was specifically drought-related, the team also attempted to address key concerns for possible future telecommunications initiatives, especially in ensuring that the system(s) it might recommend be -- insofar as possible -- compatible with, and perhaps even a part of, future systems.

In each of the African posts visited, the team also explored the possibilities for improved communications between USAIDs in the region and with AID/W, using satellite channels already leased by the Department of State. Discussions were held with USAID Executive Officers and with Embassy communications personnel, with the approval of DTSP0. Recommendations for follow up action by each post are contained in this report.

III. METHODOLOGY

A team approach was used in each visited country, using semi-structured interviews, field visits, group discussions, and examination of available documents. Additionally, in each country visited tests were made in sending data packets over existing phone lines from hotels and from the USAIDs. Data from these tests were discussed with field personnel, and formed the basis for the team's conclusions concerning what is and is not possible in terms of existing phone connections.

Design Requirements. In terms of design parameters, the Team tried to identify options that:

- (1) responded to felt needs;
- (2) were based on existing channels of communication;
- (3) were quickly adoptable and easily absorbable; and
- (4) were flexible in nature.

The anticipated logistics problems are very near at hand. The Team's recommendations in Section IV.D. below are devised in such way as to allow implementation before the anticipated problems occur. The pressure of time dictates an approach that buttresses existing logistical operations, and yet is simple enough to be readily implemented given existing human capabilities and technical/logistical constraints. It should also be recognized that the need for data communications will extend well beyond the upcoming logistics "crunch". Thus, the design (to the extent possible) should be flexible enough to incorporate a broader range of needs over time.

Data Collection. The following form was used to guide discussions in each organization visited.

AFRICA DROUGHT COMMUNICATIONS SYSTEM - DATA COLLECTION FORM

COUNTRY: _____ CITY: _____ DATE: _____
ORGANIZATION: _____ ADDRESS: _____
PHONE: _____ FAX: _____ DATA: _____

PERSON(s) CONTACTED: _____

ROLE OF ORGANIZATION IN DROUGHT RELIEF: _____

PRODUCTS: MEMOS FAX SPREADSHEETS REPORTS
 LETTERS STUDIES CABLES TELEX
 NEWSLETTERS DATA FILES MAPS GRAPHICS
 OTHER (specify): _____

PRIMARY MEANS OF INFO EXCHANGE ON DROUGHT:
 TEL FAX TELEX CABLE MAIL
 DATALINK (specify type): _____

OVERALL ASSESSMENT OF NEED FOR IMPROVED COMMUNICATION LINKS:
 ACUTE SOME NEED LITTLE NEED

DESCRIPTION OF MOST IMPORTANT GAPS IN PRESENT SYSTEM (i.e., what is most needed that does not now exist): _____

PRESENT DIGITAL EQUIPMENT:

- computer (number, type) _____
- modems (type, speed, protocol) _____
- printers _____
- UPS (switching or full time) _____

PRESENT STAFF CAPABILITY:

- No. of computer professionals (programmers/sysops/repair)
- No. of staff engaged in data communications full/pt. time

BASED ON ABOVE, INTERVIEWER'S ASSESSMENT OF REAL NEED FOR IMPROVED DIGITAL COMMUNICATIONS CAPABILITY: _____

(continue on back if required)

INTERVIEWER(s): WT BK DL DATE: _____ TIME: _____

Interviews were generally, although not invariably, done as a team. It was often necessary to split up the team to reach a variety of organizations within the available time frame.

In all, over 50 individuals representing 30 organizations in six countries were interviewed.

Additional research was done in the U.S. with computer hardware and software suppliers, power supply engineers, telecommunications experts, and with the Communications Satellite Corporation in Washington, D.C.

Time did not permit a thorough exploration of all potentially useful communications modes, particularly those involving direct satellite links. However, it was believed that the pressing time constraints essentially ruled out a satellite option for the immediate future, although options over the longer term seem attractive (see Recommendations section).

IV.A. ASSESSING THE NEED FOR IMPROVED COMMUNICATIONS

Based on the Telecommunications Team's visits it became evident that there is a wide divergence of opinion as to the need for -- and means of providing for -- improved communications in the region. Previous reviews had all indicated that there was a need, and that the need was acute. Indeed the Regional Logistics Advisory Center (RLAC) in Harare was originally conceived as a coordinator of transport-related information:

"A key element of transport efficiency relates to coordination and information sharing between recipients and providers of goods, as well as transporters, freight forwarders, and other players involved in the movement of cargo from origin to destination. To assist with this critical function WFP and SADCC have established a joint Regional Logistics Advisory Centre (RLAC) in Harare.

A coordinated information network in the southern Africa region will:

- Monitor food needs and imports;
- Relate tonnage and timing to port and corridor capacities;
- Monitor shipments, berth availability, vessel sizes, and unloading at ports and transfer to respective corridor transport systems;
- Establish links between buyers and port, rail, and road authorities;
- Ensure that grain purchases and routing are systematically scheduled;
- Monitor corridor operations;
- Identify bottlenecks and needed assistance; and
- Disseminate information." ²

The A.I.D.-financed SARP grant to WFP which is to be signed by the end of this month includes several specific references to improving information flows and the exchange of information among key organizations.

USAID/Zambia and the Zambia National Grain Marketing Board provided additional positive reinforcement for the telecommunications project. In fact, when the telecommunications team explained its mission which was to explore options for communications and not the immediate installation of a communications system, the AID Mission Director expressed frustration with AID/W, stating that "I've been asking for assistance from AID/W for months and now it's going to take 30-90 days?, if you can't install a system immediately, we are not interested."

The Beira Corridor Group explained that most communications take place by telephone, fax or in person and the exchange of electronic data would greatly enhance staff productivity. In Malawi the WFP representatives believe that most information (that they are involved with) begins in Zimbabwe; they have difficulty communicating with Harare by fax or telephone. WFP

² from "SADCC/WFP Logistics Advisory Centre Project"

also expressed concern with the lack of communications available to the four ports of entry.

When the team visited SPOORNET, the South African Railroad association, we were asked to install the technology immediately and to examine the possibilities of expanding the scope of our assessment to include the border crossing stations and key strategic points in-country.

In Mozambique the Drought Coordinator was skeptical upon the team's arrival. He was concerned that "the technology would increase workload." However, once demonstrated he insisted that the system be installed immediately and that USAID staff be trained.

Thus, while the team's mission was only to conduct a needs assessment, the need for improved telecommunications was so acute, the team was prevailed upon to install nodes in two countries (this was all that could be done, as the Team was carrying only two high-speed modems for testing during the field visits).

Yet there is significant reluctance on the part of the Harare Mission to "empower" the RLAC by providing direct assistance in upgrading its communications capability. This reluctance seems to stem from the following considerations:

- disappointment in the performance of the RLAC to date;
- a sense that things are working pretty well without the RLAC;
- concern that providing assistance to the RLAC in setting up a data communications capability (other than through the yet-to-be-signed SARP grant) would undermine the broad objectives sought in the SARP grant; and
- fear that sharing of timely data electronically might somehow encourage non-players to get involved in a way that would be disruptive.

Since USAID/Harare is a very important organization in the southern Africa drought relief drama, its concerns cannot be dismissed. It is incumbent on the Team to point out, however, that there appears to be a zero percent chance that needed improvements can/will be made in time to be useful unless A.I.D. intervenes and does so immediately.

But are improvements really needed? We think so. So, too, did most everyone we met on the six-country trip. Those who seemed most concerned were often those closest to the problems: SPOORNET, CFM, the WFP offices and headquarters. In addition, the SARP grant to WFP contains language emphasizing the need to improve regional communications and information sharing. The OFDA Drought Assessment Team Report report highlighted the need. A trip report by the A.I.D. Food Aid Attache in Rome emphasized the need. PVOs are sufficiently concerned that they are setting up their own data communications network.

Partisan views aside, it is hard to shake the logic that improved sharing of information can be helpful to a process which is multi-centric, uncoordinated, and very likely to come under severe stress within the next several months. There is no command and control organization. Hopes for the RLAC to assume such a role have dimmed. Multiple players are making decisions, often independently: the operators make them hourly and daily; the donors and others make them less frequently but with no less ultimate importance. Analysts provide assessments and forecasts: best and worst case scenarios. Their analyses should be buttressed by comprehensive, timely data. **In such a situation it is perhaps not too extravagant to suggest that a functioning data communications network linking the major players could itself assume some of the functions of a command and control system, by providing each "commander" with a current readout on the regional situation, so that his/her decisions need not be taken in relative isolation.** In effect, the communications system becomes something of a safety net in the absence of a centralized command and control authority.

It is against this background that we make the proposal for a quick-startup, basic data communications network for southern Africa (see Section IV.D.). The structure of the network is based on existing pattern of information flows; it will not introduce new players or change existing roles. Given the software selected by the team, messages sent through the network can only be read by those specifically designated by the senders. Unwarranted actions taken by any member of the network because of access to information would naturally result in their being excused from the loop by no longer having that kind of information addressed to them.

IV.E. TRACKING PROBLEMS

"One of our submarines is missing" ... Soviet Ambassador to Washington in The Hunt for Red October.

While food deliveries in the southern Africa drought crisis in 1992 are not done by submarine, most other forms of sea, land, and even air transport are now or are likely to be employed during the next few months. A major problem faced by the operational people seems to be keeping track of ships, trains, and trucks which carry the lion's share of drought-relief commodities.

Ship's schedules are reported by donors, shipping agents, owners and, sometimes, other sources (e.g., the U.S. Coast Guard's AMVER system). Often, information from one source directly conflicts with that from another source. Definitive information is hard to come by, except when ships are about to make port. As transit times are long (see next page), it is often difficult to predict arrival times. There are several possible solutions to the problem, one of them quite obvious.

All ships carry high-frequency SSB communications equipment ("High Seas Radio") capable of communicating over very long distances. Many now carry satellite-based communications systems. However, there is no central civilian authority charged with the tracking of ships on the high seas. The USCG's Automated Merchant Vessel Reports (AMVER) system is purely voluntary; many ships simply fail to report regularly or at all. Ship's schedules are often changed, even while enroute from one port to the next. They rarely communicate with port authorities at their destination, until they are very close in. Owners and shipping agents are more likely to be kept informed or themselves initiate changes, though not invariably.

Just how serious the ship-tracking problem really is in the context of the current drought operations is difficult to determine. SPOORNET does a pretty good job of tracking ships based on often conflicting information; WFP/Johannesburg attempts to add some realism to the process by communicating directly with donors (including AID/W) and others.

If better information on ship arrivals is required, an obvious way of obtaining it might be to use the worldwide net of maritime coast stations (HF/SSB radio) to communicate directly with ships at sea and determine their ETAs. These can be accessed through the HF coast stations' "marine operators" located in New Orleans (WLO), Miami (WOM), Portishead (England), Cape Town (South Africa), Buenos Aires (Argentina), and elsewhere. No new equipment would be needed; just enough budget and determination to obtain the needed information through regularly placed shore-to-ship telephone service.

Sea Routes for Relief Commodities

BETWEEN CAPE TOWN AND...	NUMBER OF DAYS @ 13 KNOTS AVERAGE SPEED	DISTANCE IN NAUTICAL MILES (1 nm = 1.15sm)
NEW ORLEANS, LA.	23.5	7300
MONTREAL, QUEBEC	23.0	7100
BRISBANE, AUSTRALIA	22	6945
BORDEAUX, FRANCE	19	5835
WALVIS BAY, RSA	2.25	700
PORT ELIZABETH, RSA	1.25	422
EAST LONDON, RSA	1.75	550
DURBAN, RSA	2.5	800
RICHARD'S BAY, RSA	2.75	885
MAPUTO, MOZAMBIQUE	3.25	1060
BEIRA, MOZAMBIQUE	4 75	1490
DAR ES SALAAM, TANZ.	8.0	2502

The table above illustrates the distances and average transit times for ships carrying food and other relief commodities for the southern Africa drought. On average, a ship from North America or Europe takes about three weeks to make the journey. Better information on a ship's position during the trip would assist in calculating more accurate ETAs, and in planning docking, unloading, and transport operations.

Trains represent a similar but perhaps a more urgent problem. Each SADCC country has some sort of tracking system for its trains, but capabilities vary widely from one country to the next. Sharing of information between countries is often faulty.

South Africa (SPOORNET) has a very sophisticated system which tracks each train and each wagon by computer, making extensive use of data communications links to keep information

current. Zimbabwe also has a computer-based system, but tracks only at the train level, not individual wagons in the train. Since wagons are often added and subtracted at various waypoints, there is no effective way of tracking freight movements within countries other than South Africa. Further, such information as is available is not always shared amongst the various rail authorities. For example, CFM (Mozambique's railway) prepares a daily report of train movements by wagon and tracks the number of days wagons spend in Mozambique (worst case: one wagon had been in Mozambique since February). CFM uses this information as a management tool to track problems, but does not routinely share these data with other rail authorities in the region. Rail authorities in South Africa and Malawi complained that once a train leaves their borders it effectively "is lost", sometimes for 12 days or more. SPOORNET reported the same problem. This considerably complicates the job of planning future freight movements based on expected availability of empty (returning) cars. As the amount of food in the system grows over the next few months, this problem can be expected to assume greater proportions.

SPOORNET believes that the situation could be rapidly improved through the use of PC-based data communications links with 15-20 sites in the region, **assuming that telephone or telex lines exist at these locations**. These points would feed data which could be compiled by SPOORNET to yield an overall picture of grain movements in the region, information which could be immediately shared with any concerned organization in the region.

It would thus seem important to have the rail authorities in the region work together to define an integrated communications system which would facilitate the collection and sharing of vital information on rail movements, and to put in place the major elements of such a system on an emergency basis, i.e., to be operational within the next 60 days.

IV.C. FINDINGS AND CONCLUSIONS

1. Most, though not all, persons contacted believe that there is an immediate need to improve communications in the region amongst the principal organizations involved in drought assistance activities. The team and the World Food Program are convinced that there is an unmet need for data communications to support these activities.
2. There is a zero percent chance that the need will be met within the critical time period (i.e., the next few months) without direct A.I.D. assistance. Only A.I.D. has the technical wherewithal and the administrative flexibility to respond appropriately.
3. Failure to act now...this month...will result in a de facto decision NOT to improve communications during the upcoming critical period, since it would be impossible to complete procurement, shipment, and training in sufficient time to be useful.
4. There are no unmanageable technical or logistical barriers to implementing an efficient, effective data communications system in the region within the critical time period.
5. Costs associated with implementation of the recommended data communications system are modest (less than \$100 thousand for hardware and software plus travel costs for two persons for three weeks). Operating costs over the next six months are expected to be less than \$96 thousand, almost all for technical support and operation of the hub and for long-distance phone charges from Washington. (Note that phone costs in the field missions are expected to drop dramatically as a result of the proposed system.)
6. The World Food Program proposes to take over management of the communications system within the next 6 to 9 months, fully integrating it with their plans for ICC system implementation in the future. A.I.D.'s role is to work together with WFP personnel to set up the system in the field and to manage it from Washington for a limited time period. Management involves running a "hub" in the Washington area which serves as an automatic relay point between all stations on the network. It is envisioned that when WFP takes over, the hub might be moved, possibly to Canada or Mexico.
7. The proposed system is fully compatible with other systems now in operation and contemplated for the future; in the event that a decision is made a year from now to implement a satellite-based communications system, the present investment is safeguarded since the same equipment and software could be used to transmit data over satellite channels.
8. USAIDs in all posts visited expressed an interest in establishing data links with one another and with AID/W through the satellite channel leased by the Department of State and available to USAIDs. With the possible exception of Lilongwe, such a linkup is feasible for implementation within the next few months; timing is in some cases dependent on the ability of local PTTs to install the necessary tail circuits between the Embassy and USAID. Implementation of this option will require the procurement of specialized modems compatible

with Embassy equipment, and other associated hardware/software.

IV.D. RECOMMENDATIONS

1. Key organizations in the southern Africa region, as identified by the USAIDs and by the World Food Program (WFP), should be provided the means to exchange information rapidly in digital form to assist in drought-relief operations.
2. Provision of such means should be jointly sponsored by A.I.D. and the World Food Program.
3. This should be done in an immediate time frame, i.e., within the next 60 days so as to provide for effective means of information exchange during the upcoming crisis period.
4. In order to keep operating costs low, maximize reliability, and achieve full operation within the next 60 days, a dedicated E-mail network with a control hub located (initially) in the U.S. should be implemented.
5. To ensure rapid startup, a system based on the use of existing phone lines (international direct dialing or IDD) should be implemented. In exceptional circumstances where vital communications are impossible using existing means, provision should be made for either radio links (HF or VHF as appropriate) or satellite links (Inmarsat, V-sat, or Satellite systems).
6. To maximize efficiency and minimize costs while using phone circuits (IDD), powerful, reliable E-mail software (such as *Front Door, ver. 2.1 C*) should be used in conjunction with state-of-the-art high-speed (v.32/v.42bis) modems.
7. To ensure system reliability and to reduce troubleshooting costs, each point on the network should be configured in exactly the same manner, i.e., should have identical hardware and software setups. The Team's experience in dealing with existing hardware/software in several field sites strongly supports this recommendation.
8. Embassy-leased satellite channels should be linked with USAIDs in the region over "tail circuits" as soon as possible to serve as backup in the event of disruptions in IDD systems as well as to permit direct LAN-links to AID/Washington and to other similarly equipped missions in the region (Nairobi, Kampala, Abidjan, and Pretoria).
9. Over the long term (next 12-24 months), the Africa Bureau should undertake a detailed study of the cost-savings and other efficiencies which could result from the setup of a satellite-based regional telecom system for USAIDs in Africa. Such a system would provide reliable voice, teleconferencing, fax, E-mail, and high-speed data communications to all equipped missions in the region. New low-cost satellite alternatives (such as V-sat) would likely result in considerable savings to the OE accounts in Washington and in the field, and would help in making understaffed missions in the region more productive.
10. To achieve reliable international data communications within the region and between the

U.S. or Europe and southern African countries, electronic bulletin boards are neither **necessary nor desirable** providing that a powerful E-mail system is installed (e.g., *Front Door*). Telephone lines between countries in the region as well as those to Europe and the U.S. are not generally reliable enough to support the relatively long connect times required in using a bulletin board in an operational context.

11. An appropriate organization in the region should be charged with the regular collection and dissemination of information from/to all key organizations in the region, in such fashion as to provide a current "big picture" view of the overall situation. Electronic data transmission should be employed in this endeavor to speed both data collection and dissemination functions, thereby providing a sound basis for operational analyses and decision making. WFP, working with the Regional Logistics Advisory Center (RLAC) in Harare, seems best placed to carry out this important function.

12. Many organizations in the region -- particularly those most involved in day-to-day operations -- sometimes lack even a simple fax machine (e.g., the Ministry of Agriculture in Zambia which has overall coordinating responsibility for food movements and distribution in the country). Fax machines should be provided to key organizations wherever there is either: (1) no need for digital communications; or (2) where a fax machine would facilitate data collection from other organizations which themselves lack digital capability but have a fax machine. For organizations having an important information **distribution** function (e.g., the Beira Corridor Group), a sophisticated fax system such as the HP Laserjet Fax coupled with a laserjet printer (total cost about \$1750) would be highly desirable to facilitate rapid and high quality fax distribution, especially to non-digitally equipped organizations.

13. Rail authorities in the region should work together to define an integrated communications system to facilitate the collection and sharing of vital information on rail movements, and put the major elements of such a system in place on an emergency basis, i.e., to be operational within the next 60 days.

14. The above recommendations pertain principally to the process of moving food to the region and to the country of destination. Communications needs in relation to **in-country food distribution** need to be addressed as well. The team was not able to focus on this issue due to time constraints in completing the present scope-of-work. It was evident, however, that there are significant problems and needs which have not yet been addressed in some countries in the region. The WFP, USAIDs, and host governments need to evaluate carefully the additional in-country communications requirements to carry out successful internal food distribution over the next six months. In some cases, adequate solutions will undoubtedly require the provision of fax machines, radio telexes, VHF and HF radios, or other equipment not already available.

IV.E. DESCRIPTION OF RECOMMENDED SYSTEM

Purpose. To facilitate rapid exchange of information amongst the principal operational organizations involved in southern Africa drought relief activities, and to provide a means of linking them to organizations having analysis, oversight, and programming responsibilities.

Discussion. There is at present no effective means for exchanging operational, analytical, programming, and integrated "big picture" information among the many organizations concerned with drought relief activities. While some exchange is done via telephone, fax, courier, and telex, this is at best accomplished only at high cost (manpower plus telephone and other charges). At worst, it isn't done at all due to a lack of practical means.

Time and other pragmatic constraints prohibit any consideration of setting up a system to directly connect all involved individuals and organizations. However, a major improvement can be thought of in terms of linking the principal players, both the "operators" and the analytical groups, programmers, and coordinators. This might be done as follows.

Operators: link the principal railways and corridor groups; they are already communicating more or less efficiently with port authorities, shipping agents, freight forwarders, etc., though not well amongst themselves.

Other Groups: link the World Food Program Offices (including the Logistics Advisory Center in Harare), the national groups (e.g., grain marketing boards), and USAID offices in the region.

The above-mentioned groups, numbering about 20, would conceptually comprise the backbone of an information exchange network encompassing data needed for programming, analysis, and decision-making. The network concept appears particularly appropriate in a context where decision-making is largely decentralized: there is no single authority carrying out, in military terms, the command, control, communications, and intelligence (C³I) functions. Rather, there is a relatively large number of loosely-linked groups each going its own way. That the system appears to be working fairly well at the moment says more about stress on the system (or relative lack thereof) than it does about what is likely to happen over the next months as misfires, foul-ups, bottlenecks, accidents, and other such occurrences become more frequent as the system is required to move much larger quantities of grain than ever before. In particular, one can expect in-country food distribution problems to multiply, causing backups and disruptions which will ripple through the entire transport system.

It is against this background that OFDA, FEWS, Dave Joslin, the World Food Program, the Telecommunications Team, and many others have stressed the need to improve communications capabilities in the region. Indeed, the new SARP grant to WFP stresses the need for improved communications (though the budget does not reflect this).

A Proposed Data Communications Network. It is hereby proposed that a joint WFP/AID effort be launched immediately to put in place by October 15 a data communications network linking the major organizations concerned with drought relief operations.

Such an undertaking would involve setting up data communications facilities at a minimum of 24 sites in seven countries and one "hub" in Washington as identified below:

- | | |
|----------------------|--|
| Zambia: | <ol style="list-style-type: none">1. National Bulk Grain Board/USAID (already established)2. Zambia Railways3. WFP Office in Lusaka |
| Zimbabwe: | <ol style="list-style-type: none">1. LAC/Harare (includes WFP)2. USAID3. Beira Corridor Group4. Zimbabwe Railways5. National Group6. (FEWS...already established) |
| Malawi: | <ol style="list-style-type: none">1. WFP Office in Lilongwe2. USAID3. National Group |
| Mozambique: | <ol style="list-style-type: none">1. WFP Office in Maputo2. USAID3. CFM: Mozambique Railways4. National Group |
| South Africa: | <ol style="list-style-type: none">1. WFP Office in Johannesburg2. SPOORNET (S. Africa Railways)3. USAID Office in Pretoria |
| Tanzania: | <ol style="list-style-type: none">1. WFP Office in Dar es Salaam2. Tanzania Railways3. National Group |
| Rome | <ol style="list-style-type: none">1. World Food Program2. FODAG |
| Washington: | <ol style="list-style-type: none">1. (Hub, probably for convenience located in Rosslyn, Va.) |

Twenty-four sites is a manageable number, both in terms of quick startup and operation. A larger number would considerably complicate things, both technically and logistically.

How It Would Work. The network would be established using off-the-shelf hardware and software, installed by joint A.I.D./WFP teams who would simultaneously provide training for a minimum of two persons at each site. Actual transmittal of messages and files would be done routinely through the "hub" located in the U.S. The hub station would "poll" all network sites 4 to 8 times daily to pick up messages/files and to deliver messages/files destined for that site. This system is recommended for the following reasons:

- reliability:** phone connections between the U.S. and southern Africa are far more reliable than between countries in the region;
- economy:** phone calls from the U.S. are about 1/3 the cost of calls from abroad to the U.S. and Europe; they are also far less expensive than phone calls from Europe to southern Africa; and
- efficiency:** a hub operation can be quickly set up in the U.S. (there are several such models already in operation), and can be staffed by a systems professional who will ensure the efficient functioning of the overall system, identifying problems and assisting network users as needed.

Nothing in the above proposal prevents any member of the network from communicating directly with any other member, without passing through the hub, if he/she should so desire. Neither does the proposed system inhibit any network station from communicating with organizations outside the network, through Fidonet, Internet, or other network system. There may be times when such communication is highly desirable. For example, all U.S. PVOs are now being linked through Fidonet to InterAction; they could thus easily be linked into the proposed system if desired.

The Cost. **Hardware & software:** maximum of \$4,500 per site, or under \$100 thousand overall, including backups.

Technical assistance: A.I.D. and WFP would each bear the costs of two persons for three weeks in southern Africa.

Operating Costs: Virtually all operating costs associated with the system would be borne by Washington, since most calls would originate from the hub. The estimated cost for Washington is \$6,000 per month for telephone and \$10,000 per month for office space, supplies, and technical support for the hub operation. This system can be expected to cause a precipitous drop in the phone/fax expenses of many participating organizations, particularly the USAIDs and WFP offices. As one comparative note, the USAID office in Maputo spends about \$12 thousand per month on phone calls alone.

A.I.D. costs would extend for a six-to-nine month period, following which the World Food Program would arrange to continue operation of the system. At this

time, the hub would likely be moved outside the U.S.

Hardware/Software Requirements at Each Data Site

1. **Computer.** 220v/240v AC model Dell, Zeos, or similar 386DX-33 computer with SVGA monitor, 130 mb hard disk, dual floppy drives, 4mb RAM, DOS 5.0. (\$2200)
2. **UPS.** 220/240 volt AC 50 cycle input/output, 600 va capacity smart UPS (e.g., Item #450722 at CompUSA) (\$479)
3. **Modem.** ATI ETC-e external v.32/v.42bis high-speed modem (\$300)
4. **Software.**
 - a. *Front Door* E-mail software (commercial version...\$300)
 - b. *Word Perfect* version 5.1 for DOS (\$225)
 - c. *MS-DOS* version 5.0 (installed on hard disk)
5. **Cables.** Modem cable (\$10) and parallel printer cable (\$10)
6. **Automatic telephone switching device.** Switches automatically to modem when receiving a computer call...for use only with shared phone line (\$115).
7. **Printer.** HP Laserjet IIP+ (model AB: 220v/240v AC, approx. \$800).

Maximum cost per site: \$4,500.

Evaluation of the System. After three or four months of operation, the system should be evaluated in terms of its functionality and contribution to improved coordination and decisionmaking. WFP and USAID will want to evaluate the concept in terms of its applicability elsewhere (already those concerned with Eastern Europe and Somalia are evidencing interest in the proposed system.) January-February 1993 would seem an appropriate time to initiate such an evaluation.

IV.F. COORDINATION WITH THE WORLD FOOD PROGRAM

Summary of Discussions Between WFP/Rome and the A.I.D. Team

1. The A.I.D. telecommunications team found that WFP/Rome had already begun its assessment of the communications requirements between its headquarters in Rome and its offices in 11 southern Africa countries, including its logistics office in Johannesburg. The WFP data management group and the computer services group were in the process of studying the most appropriate means of improving communications, and had already begun consideration of a data communications system based on international direct dialing (IDD). The WFP groups were very pleased, therefore, to exchange information with the A.I.D. team and, following intensive discussions, shared virtually all the same conclusions regarding what seemed possible and feasible within the short (less than 60 days) and medium (up to 1 year) timeframes.
2. The decentralized coordination structure of organizations involved in Southern Africa drought management activities (Harare, Johannesburg, corridor groups, etc.), increases the need for effective and fast means of communication, particularly in the next few months as existing transportation and communications systems will be stressed considerably to collaborate closely on the delivery of the projected food amounts.
3. WFP/Rome and the A.I.D. team agreed on the technical and practical feasibility of establishing -- in a very short timeframe -- a small and relatively efficient data communications system within the region which would link WFP field offices, concerned USAIDs, the Logistics Advisory Center in Harare and, possibly, certain corridor groups with one another and with WFP/Rome.
4. WFP/Rome urged the team to provide immediate assistance to establish a direct data communications capability between the LAC in Harare and HQ in Rome, seeing this as its highest priority at the moment.
5. After intensive technical discussions, WFP and the A.I.D. team agreed on technical specifications for a proposed data communications system, to include MS-DOS based PCs, v.32/v42bis modems, flexible E-mail software (Front Door), and appropriate UPS equipment. It was agreed that a minimum of two days training should be provided to at least two persons at each installed site.
6. WFP and the A.I.D. team shared the view that formal approvals for the proposed system should be obtained as quickly as possible in Rome and Washington, and that two joint WFP/A.I.D. teams be fielded rapidly to install the equipment and provide necessary training, so as to have a fully operational system within the next 30-60 days.
7. It was determined that the proposed system was fully compatible with the WFP-ICC communications system, and represented a fast-startup solution to meet needs of the current crisis. Later, when X.28 lines become available in each country, the WFP field offices may

decide to shift to a more direct ICC capability. However, even as this is done over the next few years, WFP will retain the technical capability to interface with the proposed data communications system (based on Fidonet technology).

8. WFP and the A.I.D. team agreed that in view of the urgency of acting quickly and most efficiently, it would be desirable for AID/W to handle the initial procurement of equipment and technical assistance to run the system for a limited time period (6-9 months), after which WFP would assume overall management responsibility for the system. Depending on its experience with the proposed system, WFP might choose to use the same technology elsewhere in Africa or in other locations around the world.

9. It was agreed that while AID/W is best positioned to arrange for the necessary³ U.S. procurement, technical assistance for the joint installation/training teams should be supported from multilateral funding already available to WFP.

³ **necessary**, due to the requirement to act very quickly and the ability of U.S. suppliers to ship "same or next day"; also **desirable** because of the much reduced cost (e.g., an ATI ETC-e high-speed modem costs \$299.95 on the street in Washington; it is well over \$1,000 in Rome).

Annex A. List of Persons Contacted

NAME	TITLE	COUNTRY	ORG
Fred Winch	Mission Director	Zambia	USAID
Neil Walker	Nat'l Grain Board	Zambia	NGB
Sebastian Kopulande	Sr. Priv. Secy	Zambia	Office of VP
Eric Waymer	Communications	Zambia	U.S. Embassy
Tony Mornement	Coordinator	Zambia	WFP
Margaret Carver	Communications	Zambia	U.S. Embassy
Mary Ann Epley	Executive Officer	Zambia	USAID
David Morton	Regional Coordinator	Zimbabwe	WFP
Bruce Ralston	Professor of Geography	Zimbabwe	UTenn.
Rick Corsino	Coordination	Zimbabwe	SATCC
Mike Jones	Coordination	Zimbabwe	WFP
Roger Buckland	Regional Coordinator	Zimbabwe	SATCC
Sam Mintz	Coordinator	Zimbabwe	USAID
Ted Morse	Mission Director	Zimbabwe	USAID
Bothwell Majasi	Systems Manager	Zimbabwe	USAID
Margaret McCarthy	Executive Officer	Zimbabwe	USAID
David Zausmer	Managing Director	Zimbabwe	Beira Cor Group
Mark Traxler	CPO	Malawi	U.S. Embassy
Carol Peasley	Mission Director	Malawi	USAID
Charlie Clark	Drought Relief team	Malawi	WFP
Jean-Marc Mangin	Drought Relief team	Malawi	WFP
Mr. Dalriple	Overall Coordinator	Malawi	WFP
Scott Covert	Executive Officer	Malawi	USAID
Kurt Rockman	Agr. Dev. Officer	Malawi	USAID
Peter K. Pohland	Dy. Res. Representative	Malawi	World Bank
Mamadi Diani	Director	Washington	AMEX
Janice Weber	Deputy Director	S.Africa	USAID
Cap Dean	Director	S.Africa	USAID
Colin Robers	Dir, Computer OPS	S.Africa	SPOORNET
Heimo Mikkola	FAO Representative	Mozambique	FAO
Cheryl McCarthy	Program Officer	Mozambique	USAID
Darell McIntyre	AG Officer	Mozambique	USAID
Jack Williams	Director	Mozambique	USAID
Ricardo Daniel	Regional Director	Mozambique	CFM
Heimo Mikkola	FAO Representative	Mozambique	FAO
Mark Latham	Director of Operations	Mozambique	WFP
David Joslyn	AID Representative	Rome	USAID
Catherine Bertini	WFP Director	Rome	WFP
George Simon	Data Mgt Group	Rome	WFP
Enrique Lorenzoni	Chief, Computer Ops	Rome	WFP
Keith Burberry	Computer Operations	Rome	WFP
Kubilay Esenbel	Director of Operations	Lesotho	WFP

Annex B. Country Reports

1. Zambia

A. Contact: Winch, Fred, USAID Mission Director Lusaka

1. Date: July 28, 1992

2. Role of Organization In The Drought:

Active role. Have provided two people to the Bulk Commodities Imports Board.

3. Products:

Letters, Spreadsheets, cables, faxes, reports. Need information on transportation mainly, and the performance of the ports and corridors.

4. Primary Means of Exchange:

Telephone, FAX

5. Need:

Acute

6. Gaps in Present System:

Communications with the port in DAR ES SALAAM. Critical. Cannot make contact.

7. Present Digital Equipment:

a) Computers: 15 WANGs, varying types and drive capacity.

b) Modems: none

c) Printers: 4

8. Computer Professionals: 2 at the commodity import board

9. Staff in Data Communications Full Time: 0

Notes:

Zambia mission needs more reliable communication links to:

- USAIDS in the region
- WFP
- SADCC
- OPS Center in Johannesburg
- National Bulk Commodity Imports Board
- Directly with ports,
- Tanzania Harbor Authority
- Daily reports from SA ports
- Performance information on ports

AID Zambia has asked the National Bulk Commodities Import Board to be involved in monitoring and selecting ports for food aid distribution.

The National Bulk Commodities Import Board has a tracking system in place to track Zambia's shipments, however poor communications with the railroads, ports, and WFP.

In Zambia Fred Winch expressed that his needs were immediate, and could not wait. If he had to wait, then the whole process would be useless for the drought. So, we set up a station with FD running. This will allow them to communicate with Bruce Ralston, the transportation person in Tenn. as well as Harare.

TESTING MODEMS & SOFTWARE

PCANYWHERE - 30% successful Problem was that the connects over international lines had to be sustained for a longer period, allowing time for line noise and interference to overwhelm the signal. Does not have good enough error checking capabilities, and quick enough transfer times to be useful over the poor line quality encountered.

FRONT DOOR - 70% successful connects. High error checking rates, and the ability to wait while lines settled down before attempting to send data.

Test message was sent directly to Zimbabwe from Lusaka. The problem is mainly availability of international lines. The advantage of FD is it's ability to call over and over again unassisted. It took two days to get a line between the two countries, which indicates that a more reliable method should be established.

2. Zimbabwe

A. Contact: Sam Mintz, Mission Transportation Expert

1. Role in the Drought:

Assisting in coordinating transportation. Not directly involved in issues. Monitoring.

2. Products:

Letters, Spreadsheets, cables, faxes, reports. Need information on transportation mainly, and the performance of the ports and corridors.

3. Primary Means of Exchange:

Telephone, FAX

4. Need:

Moderate

5. Gaps in Present System: None

Notes:

Not able to test the lines from the mission.

B. Contact: Zausmer, David, Managing Director, BCG Limited
Harare, Zimbabwe

1. DATE: JULY 31, 1992

2. Role of Organization in the Drought:

Active role. Help to ensure the smooth flowing activities of the port.

3. Products: Letters, Spreadsheets, faxes, reports

4. Primary Means of Exchange:: Telephone, FAX.

5. Need: Acute

6. Gaps in Present System:

Communications with the WFP, Railroads and other corridor groups.

7. Present Digital Equipment:

a) **Computers: 1 Macintosh**

b) **Modems: none**

c) **Printers: 1**

d) **UPS: 0**

8. Staff: 2

9. Computer Professionals: 1

10. Staff in Data Communications Full Time: 0

Notes: The distribution of their reports now go by driver or fax to the Transport Minister, and to the WFP. He also flies to Beira each week taking down the reports. Once it is sent somewhere, it must be re-typed into the computer in order for it to be manipulated.

Also needs a copier with a sorter. At present it takes staff time to sit down and sort out all the piles of paper. There is also a need for a sophisticated FAX machine capable of "broadcasting".

C. Contact: World Food Program Logistical Center, Rick Corsino, Mike Jones, Roger Buckland
Harare Zimbabwe

1. Date: JULY 31, 1992

2. Role of Organization in the Drought:

Active role. Informing major donors, and disseminating information from them. Regional center for WFP activities in the region. Informs the ports and railroads on activities.

3. Products:

Letters, faxes, reports, databases. Specifically, a weekly regional shipping report which is faxed to:

grain boards, ports, donors and railroads.

4. Primary Means of Exchange: Telephone, FAX.

5. Need: Acute

6. Gaps in Present System:

Unreliable communications with other WFP offices, railroads, ports, grain boards and corridor groups in the region.

Telephone system in Zimbabwe is hopeless, difficult getting faxes out or dialing out transport report. Takes 3 days.

Lack of planning information on grains by donors to be able to effectively plan grain shipments and transportation.

Railroads are tracking things themselves, however outside own corridor don't know what is happening. Savings to be able to postpone a shipment.

7. Present Digital Equipment:

a) Computers: 4 IBM PC's

b) Modems: 0

c) Printers: 1

d) UPS:

8. Staff: 4

9. Computer Professionals: 2

10. Staff in Data Communications Full Time: 0

Notes:

WFP has a food aid tracking system on the mainframe in Rome, which they download files from to a PC based system. This system tracks shipping and commodities. The information is garnered from:

- major donors,

- WFP officers in recipient countries
- Corridor groups

The LAC staffs major activities include:

- Interprets Shipping & Port data
- Tracks from ports to final destination overland (problems tracking within a country)
- Follow up outputs of analysis.
- Answer ad hoc questions, eg.. EC asked them where they should send their grain for the most effect.

Beira corridor sends daily telex for each grain marketing board. This system is not in place for DAR or N'kala.

WOULD LIKE TO:

Hook database in Rome (FAIS and INTERFAIS) to Harare, & Johannesburg. They tried to get an x.25 line, no luck.

Want eventually to use the International Computing Center Work Station program to hook up. It uses commercial communications networks, with the transfer point being based in Hong Kong.

Advantages: Software is free to anyone. Everything goes through Rome, but after the drought it should go through SADCC.

3. MALAWI

A. Contact: Charlie Clark, Jean-Marc Mangin, Mr. Dalriple, World Food Programme, Malawi

1. Date: August 2, 1992

2. Role of Organization in the Drought:

Active role.

3. Products:

Letters, Spreadsheets, telexes, faxes, reports

4. Primary Means of Exchange:

Telephone, FAX

5. Need: Acute

6. Gaps in Present System:

Communications with the distribution centers within the country, don't know how much has arrived in the country. Need digital contact with the Grain Marketing Board. Aren't getting information from Harare. Information they get takes a lot of time to update.

Must get information to Harare to update the INTERFAIS system.

7. Present Digital Equipment:

a) **Computers:** 6 PC's

b) **Modems:** none

c) **Printers:** 2

d) **UPS:** none

8. Staff: 8

9. Computer Professionals: 0

10. Staff in Data Communications Full Time: 0

Notes:

Needs a modem link to other WFP. Top level people spend hours faxing reports out. Meetings are conducted on data that is months old.

They need modem contact with:

SADCC
OPS Center in Johannesburg
ADMART Grain Marketing Board
Directly with ports,
Tanzania Harbor Authority
Daily reports from SA ports

5. MOZAMBIQUE

A. Contact: WFP

1. Date: 8/7/92

2. Role of Organization in the Drought:

Active role. Monitoring port movements and airlifts of food.

3. Products:

Letters, Spreadsheets, telexes, faxes, reports

4. Primary Means of Exchange:

Telephone, FAX

5. Need: Acute

6. Gaps in Present System:

Can't communicate with Harare the Regional Information Center. WFP has a hand in re-directing shipments at the port. Must get information to/from Harare to update the INTERFAIS system. Easier to Fax to them, then for them to fax to Mozambique.

7. Present Digital Equipment:

a) Computers: i5

b) Modems: none

c) Printers:

d) UPS: none

8. Staff in Data Communications Full Time: 0

Notes:

Need internal communications system.

IN-Country Difficulties:

Physical: Difficulties getting phone line put in. Getting better with an Italian project. Remote areas are impossible to reach.

There are radio and telex networks in major cities.

UNDP E-Mail might be available to tap into.

6. South Africa

A. Contact: Colin Roberts, Director SPORNET, Johannesburg, South Africa

1. Role of Organization in the Drought:

Assisting in coordinating train transportation from the ports to the countries in the region.

2. Products:

Spreadsheets, faxes, telex, reports. Need information from ports to borders, and then tracking of train car movement in other countries.

3. Primary Means of Exchange::

Telephone, FAX

4. Need: Acute

5. Gaps in Present System:

Trains are well tracked while in South Africa. Once they have crossed the border, SPORNET has no idea where their train cars are until they cross another international border.

6. Present Digital Equipment:

a) **Computers:** multiple

b) **Modems:** 10

c) **Printers:** multiple

d) **UPS:** yes

7. Staff: 10

8. Computer Professionals: 3

9. Staff in Data Communications Full Time: several in SPORNET

Notes:

SPORNET is a very capable entity. It's main problem is communication with the other countries. They have no communication once their trains have crossed the borders, which makes planning for empty cars coming back, and unloading waiting shipments virtually impossible.

7. Rome Italy

A. Contact: Keith Burberry, George Simone, WFP HQ

1. Role of Organization in the Drought:

Assists in coordinating and monitoring donor food aid transportation and logistics.

2. Products:

Spreadsheets, faxes, telex, reports. Need information from WFP offices in regional countries to update INTERFAIS database, keeping donors aware of food movements.

3. Primary Means of Exchange::

Telephone, FAX

4. Need: Acute

5. Gaps in Present System:

Existing phone system in Rome is very poor and expensive making contact with the field difficult.

Do not have file transfer capabilities to the field.

6. Present Digital Equipment:

a) **Computers:** multiple

b) **Modems:** unsure

c) **Printers:** multiple

d) **UPS:** yes

7. Staff: 6

8. Computer Professionals: several

9. Staff in Data Communications Full Time: several

Notes:

Rome has access to several commercial e-mail systems, however they are not located in all the countries in the Southern Africa Region, in many cases x.25 lines are not available in these countries. They need an interim, cost effective solution to make these connections.

C. TECHNICAL ANNEX

I. PHONE LINES

In general, the phone lines throughout the Southern African region fall under the following categorization, except where noted.

A. RELIABILITY

The Reliability of the phone connections was based on the number of times connected in a 10 call trial period. The numbers of trials varied with the countries, however we were able to get a fairly accurate picture of the capabilities.

The scale was as follows:

<u>SCALE</u>	<u>RATING</u>
1-2 connects in 10 times tried	POOR
3-5 connects in 10 times tried	FAIR
6-8 connects in 10 times tried	GOOD
9-10 connects in 10 times tried	EXCELLENT

1. INTERNATIONAL CALLS OUTSIDE THE REGION

In general, during the day, the regular phone systems fell in the FAIR range. This means that the systems are fairly reliable in terms of completing international calls to the U.S. and local calls during working hours, 50% on average, except Zimbabwe and Malawi. However, at night, the reliability rates of these phone systems increased from 50% to 70% overall raising the phone systems ratings to the GOOD range during night hours.

The great exceptions to this were the phone systems in Malawi and Zimbabwe. The phone system in Malawi was extremely difficult to use even for local calls, as trunk lines were constantly jammed. The connect rate in Malawi was approximately .5% during working hours for both local and international connects. We were told that the Government of Malawi was in the process of upgrading their existing phone system, and it would reach the AID office in early August. However, if this does not occur, the existing phone system in Malawi during work-day hours is not adequate enough for timely data transmissions. However, the night-time connect rates were near the 70% connection norm of the other countries with a 65% connection rate.

We were not able to actually test the reliability of the lines from the USAID mission in Zimbabwe, but were told by the WFP office that their connection rates for international calls were approximately 10% during the day, and roughly 60% in the evening.

2. INTERNATIONAL CALLS WITHIN THE REGION

International calls within the region were practically impossible between countries without operator assistance. With operator assistance, the connect rates were roughly 1 in 7 tries or 14%.

B. QUALITY OF LINE CONNECTIONS

The quality of line connections was again based on the number of minutes that a line remained static free during a 10 minute modem transmission trial. The scale was as follows:

SCALE	RATING
1-2 minutes of static free connect time	POOR
3-5 minutes of static free connect time	FAIR
6-8 minutes of static free connect time	GOOD
9-10 minutes of static free connect time	EXCELLENT

Overall, the rating fell in the FAIR range for connects during both work day hours and evening hours. This transmission rate is adequate in that the average connect time necessary to transmit an average file of 20K is 5 seconds.

Essential Requirements of an Electronic Data Exchange Capability

There are five essential requirements for implementing a sophisticated electronic data exchange capability (meaning one which is reliable, powerful, and requires very little human support). These are:

- a dedicated desktop or laptop computer, preferably of recent vintage (386 or 486-based);
- appropriate E-mail software;
- a high-speed modem;
- a phone line, preferably a dedicated 1040 clean line; and
- trained operators, preferably at least two who have received 1-2 days training plus occasional support over time.

These requirements assume that one wishes to optimize both cost and efficiency using existing phone lines.

Computer: Any MS-DOS desktop or laptop computer will do, provided it has a hard disk and at least 384k RAM. It is desirable, however, to employ a recent 386 or 486 machine, both to speed up program execution time and to avoid "serial port overrun" which can result from the very high throughput achievable with the new modems (up to 38.4 kbps). An acceptable alternative is to replace older serial chips with the new 16550 family of UARTs having internal buffering, either a NS16550AN or a NS16550AFN chip. The cost is about \$15 to \$20 mail order in the U.S. A color monitor is not required but is useful. As of July 1992, a 25-mHz 386-based computer complete with hard disk and color monitor can be had in the U.S. for less than \$1500. Some suggested brands include: AST, Dell, EPS Technologies, Gateway 2000, Swan, Zeos, and others of similar price and quality.

An uninterruptable power supply (UPS) is essential, both to ensure continuous performance during periods of electricity outage and to protect the computer and associated equipment from dangerous powerline transients. Several acceptable types are available in any large computer outlet. A capacity of 300 watts is the minimum requirement; greater capacity is better since you get both the ability to run additional equipment (e.g., a printer) and longer service during power outages. These units cost from about \$300 to \$1000 at discount stores in the U.S. One "bullet-proof" alternative is to use a sophisticated inverter running off a couple of truck batteries full time, recharging the batteries with a simple battery charger whenever the house current is available. This alternative gives you absolute protection for the equipment and can give very long service during power outages, the time being determined by the number of truck batteries linked together in parallel. This is a bulky but very dependable and workable solution. An appropriate inverter would be one of the series made by Heart Interface, Trace, and other

companies in the U.S. These inverters provide highly regulated and filtered 120-volt AC 60 cycle current from any 12-volt battery, and are built for continuous use at their rated capacities. Heart's 1800-watt model would be suitable for an environment having up to 3-4 computers, printers, and a fax machine. It costs about \$1500 discount.

E-mail Software. There are several choices, here, depending upon the system or network(s) with which one intends to connect. Probably the most well known and potentially useful E-mail protocols is that associated with Fidonet, a very extensive (over 18,000 users worldwide) network originally developed for amateur use. Several software packages are available which permit one to hook up with Fidonet. One of the most powerful of these is called Front Door, available both as a free package for personal use and as a \$300 package for commercial/government use. Front Door is a very sophisticated package technically, and is highly functional in the rapid exchange of messages and files over telephone lines -- even poor ones. It is a bit tricky to set up initially, requiring someone who is quite familiar with its idiosyncracies. Once set up and with minimal training, however, it becomes a very powerful tool for automated data exchange. Its features are seemingly limitless: suffice it to say that you can do whatever you are likely to want to do with this software, for the most part with **unattended** fully automatic operation.

A High-Speed Modem. There are several choices here, since many new modems show up on the market every month. It is desirable to have a modem classified as v.32/v.42bis and which performs well even over poor ground lines and satellite links. In a recent comparison of 14 such high-speed modems, the ATI model ETC-e (\$300 at CompUSA in the Washington area) performed exceptionally well over even poor lines. Others which might be appropriate are those manufactured by Hayes, US Robotics, Intel, and others. An external modem is preferable to an internal one since it may easily be used with different computers if required.

A Phone Line. This should be a direct line (not through a switchboard) and should of preference be both a 1040 line (relatively clean for data transmission) and be dedicated 100% of the time to the data application. These last are not absolutely essential, since any direct line will work reasonably well (though perhaps with reduced throughput) and it is possible to use the same line for both voice and data communications. If this is to be done, it is best to fit a simple switching device which senses a tone and switches to the modem (thereby locking out voice use until it is done). These cost under \$70 in the U.S.

Trained Operators. The training requirement is minimal, but very important to reduce down time. Given a few hours instruction, almost any reasonably experienced computer operator (even a secretary with only word processing experience) can be made to be functional in using Front Door to send and receive both messages and data files. Ideally, at least two persons at each installed site should be trained. As the Fidonet network expands in Africa (as it is doing quite rapidly), there will be multiple users in each country who can serve to reinforce one another on technical matters as well as for backup communications when equipment failures occur.

Reliability of System. Equipment available today is extremely reliable, given proper installation and care. Computers should be installed in air-conditioned offices whenever possible and should invariably be fitted with a good quality UPS with power conditioning capability to ensure a clean source of AC power. Given the above conditions, equipment should be kept up and running 24 hours per day to facilitate 2-way transfers of data at any time. If for any reason it becomes impossible either to keep the computer equipment cool or to provide it with filtered, regulated AC power, it should be used only for short periods of time to minimize overheating (which damages the solid-state devices in its circuits) and damage to sensitive devices caused by voltage transients.

Perhaps the device most prone to failure in the past has been the hard disk. The typical hard disk today carries a MTBF (mean time before failure) rating of 150,000 hours...more than 17 years of 24-hour operation. In this context, **operator failure** seems a much more likely occurrence!

A Look to the Future. All of the above considerations apply equally to upgrades in the foreseeable future in the mode of transmission, whether by microwave, fibreoptics, or satellite. A system set up now using existing phone lines can be used in exactly the same manner when newer and better transmission systems become available. The same hardware, software, and operators can perform exactly the same way, though probably with increased efficiency since the newer transmission methods permit higher data rates and more reliability (as well as voice capability).

The Bottom Line. Nothing is lost in investing now. Much is to be gained in terms of more timely data availability for analysis and decisionmaking, reduced management overhead, and greatly reduced phone, fax, and courier costs. 2

1/4

SOUTHERN AFRICA DROUGHT REGION

PHONE LINE RELIABILITY

AVE. NUMBER OF CONNECTIONS MADE PER TRIAL

August, 1992

	Int'l Connects Working Hours	Int'l Connects Evening Hours	Regional Connects Working Hours	Regional Connects Evening Hours
Malawi	POOR	GOOD	POOR	POOR
Mozambique	GOOD	GOOD	POOR*	FAIR*
South Africa	GOOD	EXCELLENT	FAIR*	FAIR*
Zambia	FAIR	GOOD	FAIR*	FAIR*
Zimbabwe	POOR	FAIR	POOR	POOR

SCALE	RATING
1-2 connects in 10 times tried	POOR
3-5 connects in 10 times tried	FAIR
6-8 connects in 10 times tried	GOOD
9-10 connects in 10 times tried	EXCELLENT

Notes:

- Calls were based on direct dial connections without operator assistance.
- * In Mozambique, Zambia & South Africa, poor regional connection were due to phone systems in other countries, not the local system.

45

SOUTHERN AFRICA DROUGHT REGION

PHONE LINE QUALITY

AVE. LENGTH OF STATIC FREE CONNECTIONS

AUGUST, 1992

	Int'l Connects Working Hours	Int'l Connects Evening Hours	Regional Connects Working Hours	Regional Connects Evening Hours
Malawi	FAIR	GOOD	POOR	FAIR
Mozambique	GOOD	GOOD	POOR	FAIR
South Africa	EXCELLENT	EXCELLENT	FAIR	FAIR
Zambia	GOOD	GOOD	FAIR	FAIR
Zimbabwe	FAIR	FAIR	POOR	FAIR

SCALE	RATING
1-2 minutes of static free connect time	POOR
3-5 minutes of static free connect time	FAIR
6-8 minutes of static free connect time	GOOD
9-10 minutes of static free connect time	EXCELLENT

Based on direct dial connections.