The study also concluded that it was very economical to lease lines directly from the Guyana and Trinidad field offices to the Caricom Secretariat and UN/ECLAC respectively. This would further enhance the resulting data network by incorporating the two institutions.

(ii) Small Island Developing States Network (SIDSNET)

The united Nations Conference on Sustainable Development for Small Island Developing States mandated the UNDP to undertake this feasibility study on the establishment of SIDSNET.

This will be an information sharing network and ensure that decision makers interested in the national development of the Small Island Developing States (SIDS) are well informed. It will provide the framework through which SIDS may share information, expertise, experiences and other resources. SIDSNET will build on already existing networks, information resources and infrastructure in the SIDS.
Some of the benefits identified by the feasibility study include;

- Provide and encourage greater connectivity with the Global community.
- Promote greater access to Oceanographic and Meteorological information.
- Promote the transfer of technology with other Developing and Developed Countries.
- Assist early warning of natural disasters, prevention, management and mitigation efforts.
- Provide a cost effective regional networking infrastructure.

The study stressed, however, that the local telecommunications service providers will be used wherever feasible. In addition, it requests that concessional tariffs for leased lines be applied for.

Nonetheless, other means of communications were identified. They include;

- The use of Low Earth Orbiting Satellites (LEOS).
- The use of Very Small Aperture Terminals (VSAT) as an alternative to leased lines.
- The use of the excess transponder capacity that is likely to be leased by the UN.

The report recommended the following :

- The programme begin as soon as possible and no later than July 1, 1995.
- That the SIDS take the initial steps to approach the donor community as soon as possible.

- The SIDS begin a program to increase understanding and awareness of SIDSNET.

It suggested a phased approach to the implementation of SIDSNET and the necessity to introduce subscription fees at the earliest stage to ensure the sustainability of SIDSNET. It is expected that the implementation will be over a period of five years. During which time, the first year will be solely financed by the donor community. This level will be reduced to 75% in the second year, 50% in the third and 25% in the fourth. In the final year the programme will be completely financed through subscriptions by the SIDS.

(iii) Disaster Emergency Response Management System (DERMS)

The DERMS project is being funded by UNDP. The CARICOM Secretariat is the Executing Agency while CDERA has been designated as the Implementing Agency. Its Development objective is to assist Caribbean countries to reduce the impact of natural and technological disasters through national and regional capacity building for disaster management. One of its three immediate objectives is to improve the networking capabilities among CDERA members states through the strengthening of data collection and data communication networks.

Two outputs are expected in this regard. They are;

- A data communications network linking CDERA, Sub-regional focal points, NDOs, Regional and International agencies.

- NDOs in participating states will be capable of accessing the regional data communication network and using its services for both emergency and routine communications.

(b) United Nations Economic Commission for Latin America and the Caribbean (UN/ECLAC)

In January 1991, UN/ECLAC was given the responsibility for executing the IDRC funded Caribbean Computer-Based Commonwealth Development Project. The project was designed to enable institutions and individuals in the Caribbean to build self-reliance in the use of computer-based communications techniques and thereby enhance the flow of information for social and economic development.

ECLAC was subsequently requested to host the Caribbean node of this network and provide the necessary equipment and infrastructure. This gave rise to the ECLAC/AMBIONET.

ECLAC/AMBIONET is aimed at effecting the communication linkages required to promote access to information, both within or outside the region, in support of sustainable economic and social development and to supporting the capacity-building required to achieve this.

At present, the system hosts 25 file libraries giving users immediate access to Caribbean Statistical data and limited full-text documents and E-mail communication facilities. In addition, it provides a gateway to other systems. It also supports Special Interest Groups (SIGS) through its Forums.

There are over 580 live users from the Caribbean, Mexico, Chile, the United States, Holland and Kenya.

AMBIONET can accommodate 32 simultaneous users at speeds of 9.6Kbits/s using X.25 Packet Switch connections to the public data network in Trinidad and regular direct-dial at speeds of 14.4 Kbits/s.

The Recently completed evaluation of the project also included a Strength, Weakness, Opportunity and Threat (SWOT) analysis. The strengths include;

- AMBIONET provides an acceptable E-mail service, SIGS and other forums to allow community interaction on a high level. As a result, AMBIONET is poised to be the electronic communications medium of choice for institutional and government information exchange.

- ECLAC is seen by the wider community as leaders and innovators in information technology.

Some of the opportunities open to ECLAC/AMBIONET include;

- To provide a communications platform for formal dialog between government and related Public Sector Organizations (Central Banks, Libraries, Finance Ministries etc.) in the Caribbean.

- To be the vehicle whereby informatic technology is disseminated throughout the region in the Public and Private Sectors.

Other points highlighted in the evaluation include;

- There have been varied levels of interest and participation by the various Cable & Wireless divisions in the different islands.

- The high cost of telecommunications impede the development of AMBIONET Project. It is hoped that the Caribnet X.25 System will alleviate this problem.

It should be noted here that AMBIONET can be used for storing and sharing statistical and historical data on disasters in the region.

(c) Pan American Health Organisation (PAHO)

PAHO is actively involved in the Caribbean region in disaster preparedness, response and mitigation. One of the projects currently being implemented is the SUpply MAnagement Project (SUMA).

SUMA was initiated in January 1992 and is aimed at developing a national or sub-regional capacity to sort and inventory all relief supplies arriving at the scene of a major disaster. In addition, it provides the affected country with a mechanism to inform donor countries and agencies immediately on receipt of their donations.

The project will supply among other things the following items;

- portable computes and appropriate supplies
- portable photocopiers
- VHF/UHF hand-held radios with repeaters for on-site communication
- optionally, a portable Earth Station for International satellite telecommunications (INMARSAT).

These items will be procured for each sub-region of PAHO.

At present, the PAHO field office in Barbados and Jamaica maintain VHF radio contact with CDERA and ODP respectively. Communication with the other sub-regional offices is through dial-in E-mail services via the Washington office. This system also gives limited access to the International Network (INTERNET). Regular telephone and fax are also used.

(d) ITU

The International Telecommunications Union (ITU) is responsible for setting Telecommunications standards and policy globally. It is tasked with studying technological issues and developing standards for solutions to communications problems. It is also responsible for developing telecommunications regulations.

In the Caribbean region, ITU has provided support to CDERA by providing a number of fellowships for persons nominated by CDERA for training in telecommunications relevant to disaster management.

ITU continues to provide fellowships for training in other areas of telecommunications to other organisations in the region. However, one problem that the representative identified was the lack of timely feedback from the governments on telecommunications training requirements. This information is necessary for budgetary purposes.

The ITU can also assist the region through the CTU in developing appropriate telecommunications policies as it relates to disaster management.

(e) Volunteers in Technical Assistance (VITA)

Volunteers in Technical Assistance (VITA) is a nonprofit private voluntary organisation which was established by scientists and engineers for the purpose of responding to technical inquires from people in developing countries. VITA conducts communications training and information management courses, manages a disaster resources program and operate a global communications system (VITACOMM).

VITACOMM utilizes advance communications technologies to disseminate information for development and humanitarian purposes. It comprise of three main systems. They are:

- VITASAT which offer non-voice communication and utilises LEO satellites.
- VITAPAC are digital packet radio networks for intra-country/regional communications.
- VITANET provides bulletin board and electronic mail services. It also allows access to data networks such as INTERNET.

VITA is currently developing a portable VITASAT ground station to be used for emergency operations. This system will form part of VITA's proposed disaster response communications system.[9] It can prove to be very useful to CDERA for use in remotely located disaster stricken areas.

[9]See Exhibit XXII

7.8 Regional Agencies

(a) CDERA

CDERA was established in September 1991 by the Conference of Heads of Governments of the Caribbean Community (CARICOM) to provide effective and coordinated relief assistance to disaster affected countries. Since then, CDERA has been actively involved in a number of initiatives and projects in the region aimed at improving the telecommunications capability of CDERA and the other NDOs. This present study on the *state-of-the-art* communications technology is one of the numerous activities undertaken by CDERA.

Some of CDERA's activities which would impact the application of *state-of-the-art* communications technology include;

- DERMS Project,
- ITU Fellowship for USTTI Training,
- INMARSAT Satellite Communications Terminal Trials,
- Collaboration with VITA
- Regional Emergency Telecommunications Project,
- SUMA Project.

CDERA has also identified the requirements for a Regional Data Communication Network. The minimum facilities required include Electronic mail (E-mail), File transfer and Conferencing facilities.

(i) DERMS Project

As alluded to earlier in this report, CDERA is designated as the Implementing Agency for the DERMS Project. They have been actively involved in the preparatory work of the project.

One of the Objectives of this project is to improve the networking capabilities among CDERA members states through the strengthening of data collection and data communications network. In this regards, CDERA has been actively involved in discussions on the establishment of this data communication network through its Information System and Technology Advisory Committee.

(ii) ITU Fellowship for USTTI training

In order to derive the maximum benefits from the use of *state-of-the-art* communications technology, personnel using and maintaining the systems must

possess and develop the necessary skills. It is in recognition of this fact that the ITU has provided fellowships for the training of regional Telecommunications professionals in courses of particular relevance to disaster and emergency management. These courses are run by the United States Telecommunications Training Institute (USTTI).

The objectives of the fellowship programme are:

- To facilitate the development of regional capability in those aspects of telecommunications most relevant to disaster and emergency communications.
- To develop skills necessary to take advantage of the benefits offered by new technologies.
- To ensure a rational development of the necessary skills throughout countries and institutions in the region.

So far three persons have received training under this programme.

This programme must be supported and wherever possible expanded for it is imperative that the human resource be developed along with the technology to ensure that the maximum benefits are derived from the use of *state-of-the-art* equipment.

(iii) INMARSAT Satellite Communications trials

In August 1993, CDERA received and subsequently began testing two INMARSAT-C portable satellite communication systems. These terminals were supplied by INMARSAT to CDERA on loan as part of a pilot project to evaluate their suitability for disaster and emergency communications.

The INMARSAT -C system is a non-voice, digital satellite communications system. It allows communications in a '*Store-and-forward*' mode to other INMARSAT system terminals or other data terminals connected to terrestrial data networks. Some of the services it is able to access include telex, X.25 packet data and facsimile. Installation is trivial since the antenna is extremely small and does not require directing as in the case with other satellite systems.

Following a successful one (1) year trial of the systems, INMARSAT has agreed to donate the two existing units and an additional terminal to CDERA. The third terminal is expected shortly. It is anticipated that these units will significantly improve the communications capability of CDERA at the regional and international levels.

However, CDERA will be responsible for the initial commissioning of the terminals and the usage charges.

As a result of this extensive testing of the systems, a number of problems were revealed. They were mainly related to the format of the files that can me transmitted

over the system. It is felt that these problems can be overcome through the use of appropriate software.

(iv) Collaboration with VITA

CDERA has collaborated with VITA in the determination of the suitability of VITA's Low-Earth-Orbiting (LEO) Digital Communications Satellite System to disaster and emergency management in the region.

This system is extremely low cost and utilizes existing amateur radio technology and equipment. It is non-voice and offers store-and-forward digital data capabilities. The ground station comprise of a computer equipped with appropriate software, a modem, an antenna system and an amateur radio transceiver.

VITA has also trained a number of the ITU Fellowship recipients under the auspices of USTTI. The areas of training included Disaster Communications Management, Packet Radio Communications and Ground station Operation and Maintenance for LEO Satellites.

(v) Regional Emergency Telecommunications Project

This project was executed by CDERA with funding provided by the Canadian International Development Agency (CIDA) and the ITU. It was conducted by a team of regional consultants.

The project was completed in December 1993, with the preparation of three documents by the consultants. These documents are intended to guide efforts to improve regional emergency telecommunications capability.

(vi) SUMA project

CDERA has collaborated with PAHO in the SUMA project. They have provided assistance in introducing SUMA to the English speaking Caribbean. They have also participated in SUMA's Technical Advisory Group and Steering Committee.

(b) SRU

The Seismic Research Unit (SRU) collects seismic information from Antigua, Dominica and St. Vincent via leased telephone lines from Cable & Wireless. The other stations such as Barbados, St. Lucia, Grenada and the other Leeward Islands are linked via VHF.

Although no costing information was available at the time of the interview, the high cost of the leased lines was identified as a major drawback to the development of this network. [10]

Communication with CDERA is via telephone and fax.

(c) CANTO

The Caribbean Association of National Telecommunications Organisations (CANTO) is a grouping of all telecommunications services providers in the Caribbean region. It is aimed at fostering a closer relationship among the telecommunications companies and in so doing take advantage of economies of scale through equipment bulk purchase. This will also bring about the standardization of telecommunications equipment in the region.

CANTO has realized the vulnerability of the Caribbean region to natural disasters and as a result, has established a *Disaster Preparedness and Relief Sub-Group* (DP&R. SG). This sub-group is tasked with the responsibility of preparing a Disaster Preparedness and Relief Handbook.

The purpose of the handbook is to identify the activities to be done before the commencement of the hurricane season, on the announcement of a hurricane warning and the restoration phase. The preparedness and restoration phases apply to other natural disasters.

CANTO through its DP&R. SG had planned a *Disaster Preparedness and Relief one day Seminar and Simulation Exercise* slated for May, 1994. Unfortunately, this seminar was not held, it has been scheduled for May, 1995.

This Seminar is expected to bring together representatives from the CANTO member companies, Regional and International Organisations. The areas to be examined include mitigation, preparedness and response[11].

(d) CMO

The Caribbean Meteorological Organization (CMO) is responsible for developing and promoting meteorology, operational hydrology and allied sciences in the English Speaking Caribbean countries.

CMO has established a Regional Meteorological Telecommunications Network linking the National Meteorological Centers in the region. It is a data network and uses two-way Very Small Aperture Satellite (VSAT) System. Data processing of the met information is done by computer at the headquarters in Trinidad.

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[10]See Exhibit VII

[11]See Exhibit XVIII for the draft agenda

Because two-way equipment is very costly, it was only possible to equip some stations with transmit only equipment. In which case the station receives met information from the very slow ANMET system of dedicated lines.

CMO has just completed a feasibility study on a project to upgrade the old weather radar stations in the region. If implemented, this project will provide six (6) radar units covering a greater area of the region. It would also enhance the region's early warning systems. CMO is in the progress of negotiating for the funding of the project.

(e) OECS AERADIO

OECS Aeradio is the telecommunications wing of the OECS Directorate of Civil Aviation. It is responsible for the installation and maintenance of all Communications and Navigational Aids at the airports of the OECS and the British Dependencies. It is headquartered in Antigua but has technical staff at all of the major airports.

Communication between the Base Workshop and the other stations is through the telephone and fax. However, Aeradio is investigating the feasibility of using Packet Radio for communication.

An INMARSAT standard -A terminal equipped with standby power facilities was supplied to Aeradio in 1993 by International Aeradio Caribbean Ltd. (IACL) for use in emergency.

This unit is available to any disaster stricken island for providing emergency communications facilities to the airport authorities in support of air traffic control . A member of the Aeradio's technical Staff would also accompany the unit.