# 8.0 ANALYSIS OF THE FINDINGS:

Due to the rapidity with which communications technology has been developing, *State-of-the-Art* can be considered a moving target. What would be considered as such today would be old technology within a few years. Therefore, for the purpose of this analysis, *State-of-the-Art* will be taken to mean the most advanced technology available today.

The current trend is towards wireless, digital and computer-based systems. Satellite applications are also featured more prominently as well.

Some of the obvious examples include cellular phones, VSAT and mobile satellite applications. In the region, computer communications and Fibre Optics are recent comers.

Also for purpose of analysis it is necessary to define a communications model. The CDERA's *Guidelines for a National Disaster Telecommunications Plan* identify a four level communication model. The levels are;

- Divisional
- National
- Regional
- International

These four levels will be used but as a result of the similarities in their requirements and characteristics, the National and Divisional levels will be combined.

## (a) National / Divisional

This combination involves communication within a country whether it is throughout the state or within sections of the state only.

The local telephone systems are adequate for these levels, particularly with the installation of fibre optic cables underground. This telephone infrastructure is more reliable and resilient to hurricanes. In addition, from all indications the telephone companies are much more conscious of the effects of natural disasters and consequently incorporate considerations for disaster mitigation in their system designs.

As indicated in the findings, cellular telephones are not used on a day to day basis for disaster preparedness. The various Cellular telephone operators have expressed their interest in discussing some form of agreement on the use of these systems for disaster preparedness and response in the cases where one does not already exist.

Providing the cells are operational, the benefits of using these are obvious. They can provide direct telephone contact between the several disaster response personnel and groups. Further, recent trends have involved the use of computers and faxes in

conjunction with the cellular phones for the transmission of data. A perfect application for the transmission of situation reports to the NDOs. Its application in the SUMA project is also clear.

The various radio networks are adequate. However, this is an area where the UNESCO's solar powered radio transmitters can be used. These systems can be used as repeaters. In addition to the commercial FM frequency band, they can be used in the 68-150 Mhz. range.[12]

The broadcast media seem to be very advanced in its application of modern technology. Most have facilities for the receipt of satellite broadcast. This will be further enhanced with the implementation of CANA's NewsSystem 4. Mobile transmitter facilities are also being used for both radio and television.

An area that can enhance the broadcast media is in the application of UNESCO's solar powered FM transmitters as a radio link between the NDOs and the broadcast stations. This can be very beneficial to a country like Antigua which has an agreement in place for using the several broadcast radio stations but does not have any physical link. This can also provide a means of providing the override facility for Jamaica.

**(b) Regional**

This level involves communication with participating CDERA states.

The telephone and fax is most widely used at this level. The installation of ECFS has significantly increase the reliability of the regional telephone network.

However, there is a need for greater communications capability at this level. This was evident during the Regional Rap'94 when difficulties were encountered in communicating on the HF radio network. The INMARSAT standard -C terminal had to be used to communicate with Jamaica's terminal at ODP. Its potential as a reliable means of communicating cannot go unnoticed.

With regards to the broadcast media, CANA's proposed system and the CBU system can provide the required regional coverage. Since these systems are one-way, their capabilities are reduced. In addition, the CBU system though operational requires upgrading to a fully digital system.

The availability and use of *state-of-the-art* communications technology at this level will be influenced by the outcome of a number of initiatives and projects being planned and implemented in the region. They include;

- ITU Plenipotentiary Conference Resolutions
- UN Projects - UN Network, SIDSNET, UN/ECLAC AMBIONET

[12]See Exhibit XVIII

- CANTO - Disaster Preparedness Seminar
- DERMS Project
- SUMA
- Telephone Companies' Projects - CARIBNET X.25, Americas-1

### *(i) ITU PLENIPOTENTIARY CONFERENCE RESOLUTIONS*

As recommended at the preparatory meeting to the ITU Plenipotentiary Conference, a resolution will be tabled by the Caribbean representatives mandating that Developed countries provide telecommunications equipment and technical assistance to Developing countries for use during disasters. The cost of usage should also be waived.

Should this resolution be carried the implications for the Caribbean region during a disaster is obvious.

Service providers like INMARSAT would most likely be approached for service.

### *(ii) UN PROJECTS*

The proposed UN Network would have a very significant impact on communications at the Regional level. This network may involve completely bypassing the local telephone companies by the use of direct satellite links.

It is expected that UNDP will be included on this network. This would mean that the various Regional Institutions may access this network through the UNDP field offices.

The SIDSNET project is expected to use various available means of communications including the UN network to establish a network of SIDS. If or when implemented this would provide additional means of regional communications.

A similar situation exists for the development of UN/ECLAC AMBIONET.

### *(iii) CANTO*

One of the agenda items of the proposed seminar on Disaster Preparedness and Relief by CANTO is the establishment of an emergency communication network and facilities. It is expected that this initiative will satisfy the requirements for communication at the regional level.

*(iv) DERMS PROJECT*

An output of the DERMS project is the establishment of a data network linking CDERA with sub-regional focal points and NDOs.

*(v) SUMA*

In addition to the portable computer and fax machine, an optional INMARSAT terminal may be made available for use during a disaster. This would make it possible to communicate in the region.

*(vi) TELEPHONE COMPANIES' PROJECTS*

The CARIBNET X.25 network and TSTT's Americas-1 system[13] are available. Providing that the price is right, the telecommunications services that can be derived from them can be enormous. Their pricing policy will also affect the outcome of the various UN projects.

The current scenario is that on one hand the telephone companies have installed ultra modern facilities to provide *state-of-the-art* services to the region. These services require substantial capital outlay for the necessary plant and equipment.

On the other hand, as evidenced by the large number of initiatives and projects in telematics, there is a significant demand for these services by the several regional and international agencies involved in disaster preparedness and response. However, these agencies all agree that the biggest impediment to the more extensive use of these services is the cost.

The various telecommunications entities continue to express their willingness to discuss these costs. Perhaps, the time is right for some dialogue between the two parties. Failure to do so may lead to a situation whereby third parties will find innovative means of satisfying this demand. As a result of the differences in the rate of technological advancement and the rate of the regulatory and policy formulation process, these third parties are able to make small fortunes within a very short period of time. The issue of *call back* services is a perfect example.

**(c) International**

This level involves communications with a non-CDERA state.

The telephone is used extensively at this level, however, the three INMARSAT -C terminals will provide direct satellite communications and will prove extremely helpful in disaster response.

[13]See Exhibit VIII and VIIII

As in the case of the regional communications level, availability and use of modern technology will be affected by the outcome of the same factors.

### (d) Human Resource Considerations

As indicated earlier, the development of the human resource is of paramount importance in deriving the maximum benefits from the use of modern communications technology in general and to disaster management in particular. In order to effectively use such equipment users must possess the necessary technical skills. As suggested by the numerous systems offering similar services and facilities, users must also be able to choose the most cost effective system for their needs.

Since telecommunication training is expensive and the financial resources of the region are limited, it is imperative that greater attention is paid to the importance of technical assistance programmes to the overall development of modern technology. Thus, the need arises for the strengthening of that cooperative bond between the various organisations and agencies involved in telecommunications in the region.

## 8.1 Benefits to be derived from the use of modern technology

The ultimate goal of any disaster response effort is to lessen, as far as possible, the effects of the disaster by reducing loss of life and property. Therefore, any benefits that are to be derived from the greater application of modern technology must lead to the achievement of this goal.

The benefits that may be derived are as follows;

- Provide a faster means of communication.
- Less likelihood of errors.
- Better informed decision making.
- Reduced costs.
- Provide a greater level of reliability.

### (1) Provide faster means of communications.

One of the major factors taken into consideration in the initial design of modern communications equipment is its operating speed. Microcomputers are an integral part of the design of these equipment and are becoming faster and more sophisticated.

This faster speed results in the more efficient use of limited bandwidth. This efficiency is further enhanced by the development and application of data compression techniques. With the advent of direct satellite communications and the application of fibre optics, the effect of this faster speed is readily noticeable.

### (2) Less likelihood of errors.

The error rates are also a consideration in the initial design of modern communications equipment. Since they tend to be digital, considerably lower error rates are intrinsic in these systems. In addition, the various digital signal processing and error correction techniques are applied resulting in further reductions in error rates. These rates are very critical in computer communications.

An example of this low error rate is the ECFS which has been designed to give an error of one per one thousand million bits or an error rate of less than 1E10-9. One can expect error rates close to this magnitude with the INMARSAT standard -C terminals.

This low error rate provides for the accurate transmission and decoding of the primitives of data communication, i.e. bits. Thus, there is less compromise of data integrity and much improvement in the quality of information intelligence.

In addition, by virtue of the fact that these systems are non-voice, the likelihood of errors with written information are considerably reduced.

**(3) Better informed decision making.**

Since these communications equipment facilitate access to more timely information of higher quality, the decision making process with regards to disaster preparedness, mitigation and response will be enhanced.

The CMO VSAT project is a very good example of such a benefit. As a result of the use of the VSAT communications systems, the various met offices are able to share more information with other regional met offices and World Meteorological Organisation (WMO). This will lead to an improved early warning weather system.

**(4) Reduced costs.**

Although it may be argued that equipment based on newer technology tend to be more costly because initially few manufacturers produce the equipment. However, in general the prices tend to drop in response to competition from other manufacturers and refinements to the original designs.

An example of this reduced cost is cellular telephone service. When this service was first available in the USA it was very costly, now the phone unit can be purchased as low as US$200 or less. Even here in the region Boatphone boast monthly service charges comparable to that obtained in some USA states.[14]

The Cable & Wireless CARIBNET X.25 network is yet another area where lower costs may be realized. However, it behooves C&W to focus on a wider market and higher utilization of its telecommunications infrastructure at very low unit costs to make this initiative economically viable to users like CDERA and UNDP. This would also complement the other existing telematics initiatives led by agencies such as UNESCO. Thus, there would be no need for agencies like UNDP to seek more feasible means of communications for projects such as SIDSNET and AMBIONET.

The cost of INMARSAT terminals and the usage charges are falling. A standard-C terminal now costs between US$6,000 - $10,000. Likewise the July 1994 issue of Ocean Voice - a monthly magazine on Maritime information Technology and electronics, reported that British Telecommunications (BT) and Comsat have announced drastic reductions in their tariffs. In addition to off peak rates non-UK registered users of BT now enjoy between 11.9% and 16.3% reduction for both standard-A and C. Meanwhile, Comsat users now enjoy more than 11% reduction in peak rates for standard-A.

INMARSAT standard-M is expected to cost much less than its predecessor standard-A and C.

[14]See Exhibit XV

### (5) Provide greater reliability of communications

Reliability is yet another major factor considered in the design of modern communications systems. In fact, elaborate reliability studies are conducted during the design process. In selecting components, their failure rates are taken into consideration.

Reliability is the corner stone of systems such as the INMARSAT and VSAT systems. CARIBNET has been designed to provide a level of redundancy for the routing of traffic. Likewise, the installation of underground fibre optic cables ensure the greater availability of the system.

## 8.2 Factors affecting the use of modern communications technology

The factors which impede the extensive use of modern communications technology are as follows;

- The cost associated with the acquisition and use of the equipment.
- Existing Telecommunications legislation.
- Government's inability to recognise the importance of telecommunications
- Lack of financial resources.

**(1) The cost associated with the acquisition and use of the equipment.**

As alluded to earlier, equipment considered *state-of-the-art* are not cheap. The cost of telecommunications infrastructure is also high. The newer INMARSAT standard-M system cost US$25,000 and the standard-B cost US$30,000. It may not seem much but these are equivalent to EC$67,500 and EC$81,000 respectively or TT$135,000 and TT$162,000 respectively.

Coupled with the high acquisition cost are the usage charges. As indicated earlier, the cost of the services provided by C&W's CARIBNET and TSTT's Americas-1 will determine the initial reaction to them.

Cellular phone services can be very expensive particularly if it is used daily.[15]

**(2) Existing Telecommunications legislation.**

Jamaica's Telecommunications Bill was proposed specifically in response to the rapid advancement in communications technology. It is not clear whether similar initiatives are being undertaken in the other CDERA states.

In addition, current license agreements with the telecommunication service providers have given them exclusive rights to all external communications. This resulted in opposition to CANA's and CBU's proposed systems in Barbados.

The implementation of the SIDSNET project may be in for much opposition from these telecommunications companies, particularly, if the UN satellite network is used. No doubt, the various governments' *will* power shall definitely be put to the test.

[15]See Exhibits XIIII to XVI

**(3) Government's inability to recognise the importance of telecommunications.**

The information super-highway exemplifies the importance of information to business, education and science. Telecommunications facilitates the flow of this information. Unfortunately, the governments in general have not realized the importance of telecommunications to the overall development of the region. Telecommunications should be considered as a resource and as such, it should be protected.

This lack of importance is further evidenced by the failure to provide telecommunications training as an area of priority.

In addition, the decision makers have not seen that linkage between development and telecommunications. As the economies move away from manufacturing industries to service oriented industries, the demand for information increases to support this shift. This greater demand for information generates a corresponding increase in the demand for telecommunications services. As computers play a greater role in business, there will be a greater need to share information as well. Consequently, the future development of the region will depend on its ability to access, share and use information.

**(4) Lack of financial resources.**

Coupled with number 3 above, is the lack of funds available for the purchase and use of modern equipment. The financial resources of the various governments are limited. Unfortunately, unless a disaster occurs the benefits of an efficient and effective disaster management system cannot be realized. It does not produce anything tangible as in the case with spending money on other economic activities.

For this reason, it is difficult to convince the various governments that they should increase funding for modern equipment. In fact, some of the NDOs have not even implemented the recommendations of the Wainworth Anderson and Anderson Coward report on the minimum equipment required for the NDO.

Funding may be obtained from the several donor agencies but their resources are limited and in some cases reduced.